Guide to China

2Q 2023
As of April 30, 2023
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8. Contribution to GDP growth
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Appendix: Key facts about China
Evolution of China’s economy

GDP size of China and U.S.
USD billions, current prices

<table>
<thead>
<tr>
<th>Decade</th>
<th>China ranking</th>
<th>China GDP contribution to global growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980s</td>
<td>8</td>
<td>1%</td>
</tr>
<tr>
<td>1990s</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>2000s</td>
<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>2010s</td>
<td>2</td>
<td>32%</td>
</tr>
<tr>
<td>2020s*</td>
<td>2</td>
<td>24%</td>
</tr>
<tr>
<td>2032*</td>
<td>1</td>
<td>30%</td>
</tr>
</tbody>
</table>

Real GDP per capita and urbanization ratios
USD, Constant prices, 1960 – 2032**

*2023 and 2024 forecasts are J.P. Morgan Global Economic Research forecasts and 2025-2032 forecasts are based on the J.P. Morgan 2023 Long-term Capital Market Assumptions (LTMA) estimates. Forecasts, projections or other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.**Includes forecasts for 2027 and 2032 based on the 2023 LTCA, the United Nations population projections and the United Nations World Urbanization Prospects: 2018 Revision.
Guideto China. Data are as of April 30, 2023.
The emergence of the middle class

Growth of the middle class
% of total population

<table>
<thead>
<tr>
<th>Country</th>
<th>1995</th>
<th>2023F</th>
<th>2030F</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>38%</td>
<td>41%</td>
<td>79%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4%</td>
<td>51%</td>
<td>72%</td>
</tr>
<tr>
<td>China</td>
<td>0%</td>
<td>30%</td>
<td>61%</td>
</tr>
<tr>
<td>Brazil</td>
<td>40%</td>
<td>57%</td>
<td>75%</td>
</tr>
<tr>
<td>Mexico</td>
<td>1%</td>
<td>1%</td>
<td>79%</td>
</tr>
</tbody>
</table>

Contribution to middle class growth: 2023 to 2030
Millions of people

<table>
<thead>
<tr>
<th>Region</th>
<th>2023F</th>
<th>2030F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest of Asia, 168</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China, 304</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India, 642</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>71</td>
<td>47</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>34</td>
<td>8</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td></td>
<td>-1</td>
</tr>
<tr>
<td>Central and South America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimates for regional contribution are from Kharas, Homi. The Unprecedented Expansion of the Global Middle Class, An Update. Brookings Institution, 2017. Middle class is defined as households with per capita incomes between $11 and $110 per person per day in 2011 PPP terms. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.

Long-term growth potential

Contribution to potential growth
Percentage points, real growth rate

TFP refers to total factor productivity and includes education. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.

Change in growth structure

Share of GDP by sector
% of nominal GDP

Agriculture  Manufacturing  Services

Contribution to GDP growth
Percentage points, real growth rate

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>1Q23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross capital formation (Investment)</td>
<td>1.8</td>
<td>1.7</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Consumption</td>
<td>-0.2</td>
<td>4.9</td>
<td>1.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Net exports</td>
<td>0.6</td>
<td>1.9</td>
<td>0.5</td>
<td>-0.1</td>
</tr>
<tr>
<td>Total GDP growth (% year-over-year)*</td>
<td>2.2</td>
<td>8.5</td>
<td>3.0</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*Aggregate GDP growth may be different from sum of sub-items due to rounding.
Importance of trade to China

Total exports and imports
% of GDP

Current account balance
% of GDP

Importance of Chinese trade to the world

China’s share in global trade
% of world total trade, goods only

- '80: 0%
- '83: 2%
- '86: 4%
- '89: 6%
- '92: 8%
- '95: 10%
- '98: 12%
- '01: 14%
- '04: 16%

Exports: 2022: 15%
Imports: 2022: 11%

China’s major trading partners
USD billions, rolling 12-month sum, goods only

- U.S.: -$500 -$300 -$100 $100 $300 $500 $700
- Hong Kong: $381
- EU: $310
- ASEAN: $268
- India: $105
- UK: $61
- Canada: $3
- Japan: -$8
- South Korea: -$21
- Brazil: -$51
- Taiwan: -$154

Exports: Blue
Imports: Gray
Trade balance: Diamond

Source: (Left) IMF; (Right) China Customs; J.P. Morgan Asset Management.
Chinese consumer

**Contribution to global consumption growth**

Household consumption

<table>
<thead>
<tr>
<th>Year</th>
<th>China</th>
<th>U.S.</th>
<th>Europe</th>
<th>Rest of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>38%</td>
<td>48%</td>
<td>54%</td>
<td>9%</td>
</tr>
<tr>
<td>2005</td>
<td>15%</td>
<td>12%</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>2010</td>
<td>37%</td>
<td>28%</td>
<td>18%</td>
<td>33%</td>
</tr>
<tr>
<td>2015</td>
<td>12%</td>
<td>12%</td>
<td>32%</td>
<td>27%</td>
</tr>
<tr>
<td>2021</td>
<td>9%</td>
<td>23%</td>
<td>28%</td>
<td>35%</td>
</tr>
</tbody>
</table>

**China’s share in global luxury goods consumption**

Domestic and overseas spending by Chinese consumers as % total

<table>
<thead>
<tr>
<th>Year</th>
<th>China</th>
<th>U.S.</th>
<th>Europe</th>
<th>Rest of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>19%</td>
<td>32%</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>2018</td>
<td>32%</td>
<td>35%</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>2020</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>2025F*</td>
<td>40%</td>
<td>35%</td>
<td>35%</td>
<td>40%</td>
</tr>
</tbody>
</table>

**China’s Singles’ Day vs. U.S. holiday sales**

USD billions, gross merchandise value

<table>
<thead>
<tr>
<th>Year</th>
<th>Prime Day</th>
<th>Cyber Monday</th>
<th>Black Friday</th>
<th>Thanksgiving, Sat. &amp; Sun.</th>
<th>China Singles’ Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>28.5</td>
<td>30.8</td>
<td>11.6</td>
<td>35.7</td>
<td>38.4</td>
</tr>
<tr>
<td>2019</td>
<td>10.2</td>
<td>11.6</td>
<td>7.4</td>
<td>10.4</td>
<td>14.8</td>
</tr>
<tr>
<td>2020</td>
<td>7.9</td>
<td>9.4</td>
<td>10.8</td>
<td>10.4</td>
<td>14.5</td>
</tr>
<tr>
<td>2021</td>
<td>14.3</td>
<td>11.2</td>
<td>10.7</td>
<td>11.2</td>
<td>14.3</td>
</tr>
<tr>
<td>2022</td>
<td>14.9</td>
<td>11.3</td>
<td>11.3</td>
<td>11.9</td>
<td>14.9</td>
</tr>
</tbody>
</table>

**Source:** (Left) World Bank; (Top right) McKinsey & Company “China Luxury Report 2019”; (Bottom right) Alibaba, Adobe Analytics, Amazon; J.P. Morgan Asset Management. Prime Day is an annual promotional event hosted by Amazon in late June (actual date varies by year). Singles’ Day occurs annually on November 11. Figure includes Alibaba’s Singles’ Day sales only. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated. *Forecast based on McKinsey & Company “China Luxury Report 2019”. **Final Singles’ Day sales for 2022 were not officially disclosed but were reported to be in line with 2021 sales. Guide to China. Data are as of April 30, 2023.
Household savings

Household savings rate
% household disposable income, latest*

Social benefits to households in cash**
% of GDP, latest*

Household wealth by asset type
% of total, as of Dec. 2019

Source: (Left) OECD; (Right) Goldman Sachs; J.P. Morgan Asset Management.
*OECD data for household savings rate and social benefits is lagged with the latest figures varying by country: Euro Area (2021), UK (2021), U.S. (2021), Japan (2021), China (2019), Mexico: household savings rate (2021), social benefits (2021). **Social benefits in cash include cash transfers by the government for pension and non-pension benefits.
Distribution of pre-tax national income

Top 10%'s ownership of national income and wealth*


Demographic trends

Total population
Billion people

Crude birth and death rate
Per 1,000 people

Source: United Nations-World Population Prospects 2022, United Nations-World Urbanization Prospects 2018, J.P. Morgan Asset Management. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated. Guide to China. Data are as of April 30, 2023.
Technological progress

### Patent applications

# of PCT patent filings*

- United States
- Japan
- Germany
- China

### Research and development

Expenditures as % of GDP


*PCT refers to Patent Cooperation Treaty. Patents filed under this treaty receive international patent protection.

China’s self-sufficiency rate for key technologies

Current self-sufficiency rate amongst different technology products
Percentage points

Source: J.P. Morgan Asset Management.
ERP = Enterprise resource planning; IaaS = Infrastructure as a Service; IC = Integrated circuit; PCB = Printed circuit board; RF IC = Radio frequency integrated circuit. Based on J.P. Morgan Asset Management’s estimates as of October 31, 2022. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.
Emission targets and energy mix

Greenhouse gas emission targets
Billion tonnes/year, CO2 equivalent

Structure of China’s energy consumption
% of primary energy

Source: J.P. Morgan Asset Management; (Left) Climate Action Tracker. Current policy forecast is the post-Covid forecast provided by Climate Action Tracker, (Right) BP Energy Outlook 2023. Forecast is based on BP’s scenario for global net-zero emissions by 2050. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated. Renewables include wind, solar, geothermal, biomass, biogas and biofuels.

Guide to China: Data are as of April 30, 2023.
Five-Year Plans

China's GDP per capita vs. Five Year Plans (FYP)
USD, nominal price

10th FYP:
- 7% GDP growth
- Boost international competitiveness
- Balance external position

11th FYP:
- Quantitative targets
- 7.5% annual GDP growth
- Increase services’ share in GDP and employment
- Create 45mn jobs

12th FYP:
- Rebalance to consumption from investment
- Shift coastal cities from manufacturing to R&D and services
- Expand highways and highspeed railways
- Prudent monetary policy and curb housing prices

13th FYP:
- Innovation
- Environment
- Supranational
- Reform one-child policy
- New urbanization

14th FYP:
- Expand domestic demand while keeping development of external sectors
- Improve self-sufficiency of key technologies and products
- Promote common prosperity
- Environmental protection

Forecast*

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*Nominal GDP per capita forecast from the IMF. Guide to China. Data are as of April 30, 2023.
China capital market opening

Foreign investment into onshore Chinese equities and bonds
Foreign investor outstanding holdings, USD billion

<table>
<thead>
<tr>
<th>Date</th>
<th>Key capital market developments in China</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/2002</td>
<td>China opens its domestic stock market via Qualified Foreign Institutional Investor program</td>
</tr>
<tr>
<td>11/2014</td>
<td>Launch of Shanghai North and Southbound Stock Connect*</td>
</tr>
<tr>
<td>07/2015</td>
<td>China allows foreign central banks, international financial organizations and sovereign wealth funds to enter domestic bond market</td>
</tr>
<tr>
<td>12/2016</td>
<td>Launch of Shenzhen North and Southbound Stock Connect*</td>
</tr>
<tr>
<td>06/2017</td>
<td>MSCI announces plan to include China A-shares in global indices</td>
</tr>
<tr>
<td>07/2017</td>
<td>Launch of Northbound Bond Connect**</td>
</tr>
<tr>
<td>09/2018</td>
<td>FTSE Russell announces plans to include China A-shares in global indices</td>
</tr>
<tr>
<td>01/2019</td>
<td>Bloomberg announces inclusion of Chinese CNY denominated bonds into global indices</td>
</tr>
<tr>
<td>09/2019</td>
<td>China lifts quota for QFI*** programs</td>
</tr>
<tr>
<td>10/2020</td>
<td>Launch of ETF cross listing in Shenzhen</td>
</tr>
<tr>
<td>06/2021</td>
<td>Launch of ETF cross listing in Shanghai</td>
</tr>
<tr>
<td>09/2021</td>
<td>Launch of Southbound Bond Connect**</td>
</tr>
<tr>
<td>07/2022</td>
<td>Launch of ETF Connect</td>
</tr>
<tr>
<td>2H2023</td>
<td>Proposed launch of Swap Connect</td>
</tr>
</tbody>
</table>

Source: Bloomberg L.P., CEIC, China Central Depository and Clearing (CCDC), China Securities Regulatory Commission, Hong Kong Exchanges and Clearing Limited, Hong Kong Monetary Authority, PBoC, Shanghai Clearing House (SCH), State Administration of Foreign Exchange and J.P. Morgan Asset Management. Bond holdings and inflows are based on data provided by CCDC and SCH. Equity holdings and inflows are based on data provided by the PBoC. *Stock Connect is a cross-border channel that connects the Shanghai Stock Exchange and Shenzhen Stock Exchange to the Hong Kong Stock Exchange. It allows qualified mainland Chinese investors to access eligible Hong Kong shares (Southbound) as well as Hong Kong and overseas investors to trade eligible A shares (Northbound) subject to a certain amount of daily quota. **Bond Connect is a mutual market access scheme that allows international and Chinese investors to trade in each others credit markets. ***QFI (Qualified Foreign Investors) refers to the program, which was first launched in 2002, that allows specified licensed international investors to participate in mainland China's stock exchanges. Guide to China. Data as of April 30, 2023.
China new energy vehicles

New energy vehicles (BEV* and PHEV**) in use
Millions

<table>
<thead>
<tr>
<th>Countries/Regions</th>
<th>2022</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Rest of the world</td>
<td>1.4</td>
<td></td>
</tr>
</tbody>
</table>

New energy vehicles (BEV* and PHEV**) sales
% , share of total car sales

<table>
<thead>
<tr>
<th>Countries/Regions</th>
<th>2022</th>
<th>2025F</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>29%</td>
<td>45%</td>
</tr>
<tr>
<td>Europe</td>
<td>21%</td>
<td>32%</td>
</tr>
<tr>
<td>U.S.</td>
<td>8%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Electric vehicle charging points
Thousands, publicly accessible

<table>
<thead>
<tr>
<th>Countries/Regions</th>
<th>Charging points per 100 BEV and PHEV vehicles in use in 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>12.5</td>
</tr>
<tr>
<td>Europe</td>
<td>6.6</td>
</tr>
<tr>
<td>U.S.</td>
<td>4.3</td>
</tr>
</tbody>
</table>

New energy vehicles (BEV* and PHEV**) in use

<table>
<thead>
<tr>
<th>Countries/Regions</th>
<th>2022</th>
<th></th>
</tr>
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<td>6.6</td>
</tr>
<tr>
<td>U.S.</td>
<td>4.3</td>
</tr>
</tbody>
</table>

*BEV stands for battery electric vehicles. **PHEV stands for plug-in hybrid electric vehicles. ***Projected sales are based on the Stated Policies Scenario forecasted by the IEA which accounts for all existing policies, policy ambitions and targets that have been legislated for or announced by governments around the world. It includes current EV-related policies and regulations, as well as the expected effects of announced deployments and plans from industry stakeholders. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated. Light duty vehicles are vehicles primarily used to transport passengers and cargo with a gross vehicle weight less than or equal to 10,000 pounds.
China’s role in global renewables’ supply chain

Contribution to global renewable electricity generation in 2021
Gigawatts

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>33%</td>
<td>11%</td>
</tr>
<tr>
<td>Hydro</td>
<td>29%</td>
<td>8%</td>
</tr>
<tr>
<td>Wind</td>
<td>40%</td>
<td>16%</td>
</tr>
<tr>
<td>Solar PV*</td>
<td>35%</td>
<td>13%</td>
</tr>
<tr>
<td>Others</td>
<td>22%</td>
<td>9%</td>
</tr>
</tbody>
</table>

% contribution to global renewable electricity generation capacity, 2021

Contribution to global lithium-ion battery production
Battery cell manufacturing capacity, gigawatt hours

<table>
<thead>
<tr>
<th>Year</th>
<th>2022</th>
<th>2027E*</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>77%</td>
<td>69%</td>
</tr>
<tr>
<td>U.S.</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>Germany</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Rest of the world</td>
<td>15%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: J.P. Morgan Asset Management; (Left) International Energy Agency 2022 Renewables Report; (Right) Bloomberg NEF.
*2027 figures are a Bloomberg NEF forecast.
China’s housing market in global context

China and U.S. residential real estate investment

Housing affordability in global major cities
Ratio, median apartment prices to median family disposable income

China–U.S. economic relations

Changes in U.S. sentiment toward China*

% in the U.S. who have a(n) __ view of China

- Favorable
- Unfavorable

Mar. 2023: 83%
Mar. 2023: 14%

Foreign direct investment
USD billions

U.S. FDI into China
China FDI into U.S.

Source: FactSet, J.P. Morgan Asset Management; (Top left) Pew Research Center; (Bottom left) U.S. Census Bureau; (Right) The American Chamber of Commerce in China 2023 China Business Climate Survey Report. *Pew Research Center survey of U.S. adults was conducted in March 2023. Results were formulated by tracking the change in responses from survey participants between 2005 and 2023 to the following question: "Please tell me if you have a very favorable, somewhat favorable, somewhat unfavorable, or very unfavorable opinion of China?". Prior to 2020, U.S. surveys were conducted via the phone and U.S. surveys conducted after 2020 were done online. **Survey conducted yearly between 2020-2022. Extended answers: 1) No, we are not considering relocating manufacturing or sourcing out of China, 2) Yes, we are considering relocating but have not taken active steps to relocate manufacturing or sourcing outside China yet, 3) Yes, we have started the process of relocating manufacturing or sourcing outside of China, 4) Other. Guide to China. Data are as of April 30, 2023.
China mobility: Subway and traffic congestion

Chinese major cities’ subway passenger flow
Index, 2019 average = 100, 7-day moving average

- Shenzhen
- Beijing
- Shanghai

Chinese major cities’ traffic congestion*
Index, 2019 average = 100, 7-day moving average

- Shenzhen
- Beijing
- Shanghai

Source: Wind, J.P. Morgan Asset Management; (Left) Local subway companies; (Right) Gaode.*Data has been discontinued on February 7, 2023.
China mobility: Flights and freight

Daily flights dispatched
Number of flights, 7-day moving average

<table>
<thead>
<tr>
<th></th>
<th>April 30, 2023</th>
<th>Number of flights</th>
<th>% as of 2019 average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>13,367</td>
<td>109%</td>
<td></td>
</tr>
<tr>
<td>HK, Macau &amp; Taiwan</td>
<td>259</td>
<td>125%</td>
<td></td>
</tr>
<tr>
<td>International</td>
<td>690</td>
<td>54%</td>
<td></td>
</tr>
</tbody>
</table>

Daily freight traffic**
7-day moving average

Source: Wind, J.P. Morgan Asset Management; (Left) Civil Aviation Administration of China; (Right) Ministry of Transport. *Elevated levels could be due to the Golden Week holiday effect. **Data has been discontinued on March 17, 2023. Guide to China. Data are as of April 30, 2023.
Impact of China’s reopening on the world

China’s top 10 imported goods categories
% of total gross goods import value*, 2021

- Mineral fuels and oils
- Electrical machinery and equipments
- Ores, slag and ash
- Machinery and mechanical appliances
- Photographic and medical instruments
- Vehicles
- Plastics
- Copper articles
- Organic chemicals
- Precious stones, metals and pearls

Asia markets’ dependence on Chinese tourists
Chinese tourist spending as % of GDP, 2019

Purchasing Managers’ Index

Manufacturing PMIs

<table>
<thead>
<tr>
<th>Year</th>
<th>Index</th>
<th></th>
<th>Year</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>50.1</td>
<td></td>
<td>2013</td>
<td>51.8</td>
</tr>
<tr>
<td>2014</td>
<td>52.3</td>
<td></td>
<td>2015</td>
<td>50.7</td>
</tr>
<tr>
<td>2016</td>
<td>48.5</td>
<td></td>
<td>2017</td>
<td>53.4</td>
</tr>
<tr>
<td>2018</td>
<td>52.3</td>
<td></td>
<td>2019</td>
<td>51.2</td>
</tr>
<tr>
<td>2020</td>
<td>47.8</td>
<td></td>
<td>2021</td>
<td>50.6</td>
</tr>
<tr>
<td>2022</td>
<td>49.5</td>
<td></td>
<td>2023</td>
<td>50.3</td>
</tr>
</tbody>
</table>

A reading above 50 represents expansion in activity versus the previous month and a reading below 50 represents deceleration in activity versus the previous month. A reading of 50 represents no change. Caixin/Markit PMI surveys 500 mainly small and medium-sized enterprises, while the NBS PMI surveys 3,000 companies, including state-owned enterprises, and is biased toward large-sized enterprises.

Fixed asset investment

Year-over-year change, year-to-date

Jan.- Mar. 2023  y/y
Aggregate  5.1%
Public  10.0%
Private  0.6%

Jan.- Mar. 2023  y/y
Real estate  -5.8%
Manufacturing  7.0%
Infrastructure (excl. electricity)  8.8%

Consumption

Year-over-year change, 3-month moving average

3mma as of Mar. 2023

<table>
<thead>
<tr>
<th>Type</th>
<th>2023 Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail sales</td>
<td>5.9%</td>
</tr>
<tr>
<td>Online sales</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

Automobile sales
Million units, saar

<table>
<thead>
<tr>
<th>Country</th>
<th>Million units</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>24.6</td>
</tr>
<tr>
<td>U.S.</td>
<td>14.8</td>
</tr>
<tr>
<td>Euro Area</td>
<td>8.7</td>
</tr>
</tbody>
</table>

Consumer confidence and business expectations

**Consumer confidence Index**

- Income expectations
- Willingness to consume

**PMI business expectation sub-index Index**

- Non-manufacturing
- Manufacturing

Source: CEIC, National Bureau of Statistics of China, J.P. Morgan Asset Management. (Right) PMI is the Purchasing Managers’ Index. A reading above 50 represents expansion in activity versus the previous month and a reading below 50 represents deceleration in activity versus the previous month. A reading of 50 represents no change. *Guide to China*. Data are as of April 30, 2023.
Measures of unemployment

Surveyed urban unemployment rate

Surveyed urban unemployment rate by age

The urban survey unemployment rate includes a much wider definition of unemployed workers than the registered unemployment rate. The urban survey unemployment rate began in 2018 and it is now the major indicator used by policymakers for unemployment.

* Housing volume is composed with floor space of residential buildings sold, residential buildings newly started, residential buildings completed and land area purchased. Due to delay in data release, land area purchased for January 2023, February 2023 and March 2023 are estimated based on average monthly land sales in 2022. **Domestic loans refers to loans borrowed from banks. Self-raised funds include developers’ internal funds, funds raised from bond issuance, equity issuance and accounts payable to construction contractors and other relevant parties. Personal mortgage loans are mortgage loans that home buyers borrow from banks and public housing funds. Proportion of total funding percentages may not sum to 100% due to rounding. *Land area purchased for January 2023, February 2023 and March 2023 are estimated using average monthly land sales in 2022. 

Banks’ exposure to the property market

Outstanding property loans of 15 major banks*
CNY Trillions

<table>
<thead>
<tr>
<th>Year</th>
<th>Mortgage loans</th>
<th>Real estate development loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>'08</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>'09</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>'10</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>'11</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>'12</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>'13</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>'14</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>'15</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>'16</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>'17</td>
<td></td>
<td></td>
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<tr>
<td>'18</td>
<td></td>
<td></td>
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<tr>
<td>'19</td>
<td></td>
<td></td>
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<tr>
<td>'20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exposure to property market of 15 major banks
% of total outstanding loans

- Mortgage loans
- Real estate development loans


*15 major banks are Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, Postal Savings Bank, CITIC Bank, Industrial Bank, Minsheng Bank, Ping An Bank, China Merchants Bank, Hua Xia Bank, Everbright Bank, Shanghai Pudong Development Bank, Guangfa Bank. In aggregate, these banks’ accounted to 62% of total outstanding loans in Chinese banking system.

Quality of bank assets

Nonperforming loans (NPL) of banks

- CNY trillions

Capital adequacy ratios

- Capital adequacy ratio
- Tier-1 capital adequacy ratio

Source: China Banking and Insurance Regulatory Commission, J.P. Morgan Asset Management. Provision coverage ratio is the % of low-quality assets that a bank must cover with its own funds. Capital adequacy ratio is a measure of how much capital a bank has available as a % of a bank’s risk-weighted credit exposure. Tier-1 capital adequacy ratio is the ratio of a bank’s core tier 1 capital (equity capital and disclosed reserves) to its total risk-weighted assets. These are key measures of a bank’s financial strength. Guide to China. Data are as of April 30, 2023.
Foreign trade

Goods trade
Year-over-year change, 3-month moving average

<table>
<thead>
<tr>
<th>Year</th>
<th>Goods trade</th>
<th>3mma as of Mar. 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>'15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exports: 1.0%
Imports: -6.2%

Balance of trade
USD billions, 3-month moving average

<table>
<thead>
<tr>
<th>Year</th>
<th>Balance of trade</th>
<th>3mma as of Mar. 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>'15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Goods: 68.4 USD billions
Services: -15.7 USD billions

### Inflation

**Consumer price index**

Year-over-year change

<table>
<thead>
<tr>
<th>Year</th>
<th>y/y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 2023</td>
<td>0.7%</td>
</tr>
<tr>
<td>Headline CPI</td>
<td>0.7%</td>
</tr>
<tr>
<td>Core CPI</td>
<td>0.7%</td>
</tr>
<tr>
<td>Food inflation (RHS)</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

**Producer price index**

Year-over-year change

<table>
<thead>
<tr>
<th>Year</th>
<th>y/y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 2023</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Headline PPI</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Producer goods</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Liquidity injections by the PBoC
CNY billions, net injection

*Open market operation (OMO) includes reverse repo, repo and central bank bill issuance by the People’s Bank of China (PBoC). **Monetary policy tools include short-term liquidity operations (SLO), standing liquidity facility (SLF), medium-term liquidity facility (MLF) and pledged supplementary lending (PSL).
Central bank operations: Policy rates

Key policy rates
Per annum

<table>
<thead>
<tr>
<th>Policy rate</th>
<th>Description</th>
<th>Apr. 28, 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan prime rate (1-Yr/5-Yr)</td>
<td>New benchmark lending rate</td>
<td>3.65%/4.30%</td>
</tr>
<tr>
<td>Medium-term lending facility</td>
<td>Most representative policy tool</td>
<td>2.75%</td>
</tr>
<tr>
<td>Interbank repo</td>
<td>Interbank market rate</td>
<td>2.37%</td>
</tr>
<tr>
<td>Deposit rate</td>
<td>Benchmark rate for bank savings</td>
<td>1.50%</td>
</tr>
</tbody>
</table>

Source: CEIC, People’s Bank of China (PBoC), National Interbank Funding Center, J.P. Morgan Asset Management.
*Starting from August 20, 2019, the PBoC releases a monthly 1-year and 5-year loan prime rate (LPR) based on quotes from 18 banks. For this new monthly quote, banks are required to submit them in the form of open market operation rates (especially MLF) plus a margin to the national interbank lending center. The central bank requests all commercial banks to reference the finalized LPR to price their new lending and use LPR as the benchmark rate in floating rate loan contracts going forward. Guide to China. Data are as of April 30, 2023.
Central bank operations: Reserve requirements

Reserve requirement ratio

- **Large banks**
- **Small- and medium-sized banks**

Source: CEIC, People’s Bank of China (PBoC), J.P. Morgan Asset Management.

Large banks are six major banks in China, including Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, Postal Savings Bank of China. The other banks are categorized as small- and medium-sized banks. PBoC sets favorable required reserve ratio for banks which have met specific criteria, such as loans to small and medium-sized enterprises and agricultural sectors. These measures have significantly brought down the actual RRR for banks. According to the PBoC, after the latest RRR cut took effect on March 27, 2023, the realized weighted average RRR is 7.6% (November 25, 2022: 7.8%).

Credit conditions

Credit cycles
Percentage points, credit growth – nominal GDP growth, 3-month moving average

- Rapid rebound in CPI & PPI
- Loosening: 216bps rate cuts, 4tn stimulus
- Tightening: 125bps rate hikes, BASEL III adoption
- Interbank liquidity crunch
- Loosening: 56bps rate cuts, trust boom
- Wenzhou small and medium enterprise (SME) crisis*
- Tightening: shadow banking tightening
- Loosening: 165bps rate cuts, LGFV debt swap**
- A-share market crash
- Rate cut
- Tightening: implementation of de-leveraging policies
- COVID-19 outbreak
- U.S. – China trade tensions
- Looseining: RRR cuts
- Policy normalization Mar. 2023: 5.3ppt
- Loosening: RRR and LPR cuts

Credit growth measures the year-over-year growth of outstanding total social financing. *Wenzhou SME crisis refers to the wave of bankruptcies and funding problems faced by a large number of SMEs in Wenzhou in 2011. **LGFV refers to local government financing vehicle.
Credit impulse and commodity prices

Credit impulse and industrial metals’ prices
Percentage points, year-over-year change, % of nominal GDP

Year-over-year change, 3-month moving average

Bloomberg industrial metals index

Credit impulse measures the year-over-year change in credit flow (net flow of total social financing) as a percentage of nominal GDP. Guide to China. Data are as of April 30, 2023.
Fiscal policy

Fiscal revenues and expenditures*
Year-over-year change, 3-month moving average

Fiscal balance
% of nominal GDP

Source CEIC, Ministry of Finance of China, J.P. Morgan Asset Management; (Right) J.P. Morgan Economic Research. *Fiscal revenues include taxes, government funds, which are mostly derived from local government land sales, and other government revenues. Fiscal expenditures include government spending of funds raised from taxes, government funds and general bond issuance. **Actual deficit = fiscal revenues - fiscal expenditures (as shown in left-side chart). Budget deficit = actual deficit adjusted with the fiscal stability fund. Augmented deficit is an estimate of all the fiscal resources used by the government to support economic growth, i.e. fiscal balance plus investment via local government financing vehicles, policy banks and other channels. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.

## Chinese Yuan Exchange Rates

<table>
<thead>
<tr>
<th>Price Level</th>
<th>Index (inverted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciating</td>
<td>CFETS CNY Index*</td>
</tr>
</tbody>
</table>

### Exchange Rates and Descriptions

<table>
<thead>
<tr>
<th>Exchange Rate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD/CNY</td>
<td>Chinese Yuan in onshore market vs. U.S. dollar</td>
</tr>
<tr>
<td>USD/CNH</td>
<td>Chinese Yuan in offshore market vs. U.S. dollar</td>
</tr>
<tr>
<td>CFETS CNY</td>
<td>China Foreign Exchange Trade System basket of 24 currencies traded against the Chinese Yuan</td>
</tr>
</tbody>
</table>


*CFETS CNY Index data available as of December 2015.

Chinese currency in global perspective

Currency weights in IMF’s SDR basket

- U.S. Dollar: 43%
- Euro: 29%
- Chinese Yuan: 12%
- Japanese Yen: 8%
- Pound Sterling: 7%

Global central bank reserve manager holdings

% of total

SDR refers to the IMF’s Special Drawing Rights basket.
Size of Chinese and global equity markets

Stock exchange market capitalizations
USD trillions, 2022

NYSE & Nasdaq: $40.3 trillion
Shanghai & Shenzhen: $11.4 trillion
Japan: $5.4 trillion
Hong Kong: $4.6 trillion
London: $3.1 trillion

Stock exchange market capitalizations
USD trillions

## Types of and access to Chinese equities

### Share class

<table>
<thead>
<tr>
<th>Share class</th>
<th>Definition</th>
<th>Currency</th>
<th>Foreign investor access</th>
<th>Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onshore</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-shares</td>
<td>Securities incorporated in Mainland China, listed on the Shanghai or Shenzhen Stock Exchange</td>
<td>CNY</td>
<td>QFII (CNY), RQFII (CNH), Northbound Stock Connect</td>
<td>SZSE Composite Index, Shanghai Composite Index, CSI 300, MSCI China A, MSCI China</td>
</tr>
<tr>
<td>B-shares</td>
<td>Securities incorporated in Mainland China, listed on the Shanghai or Shenzhen Stock Exchange</td>
<td>USD (Shanghai), HKD (Shenzhen)</td>
<td>No restrictions</td>
<td></td>
</tr>
<tr>
<td><strong>Offshore</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-shares</td>
<td>Securities incorporated in Mainland China, listed on the Hong Kong Stock Exchange</td>
<td>HKD</td>
<td></td>
<td>Hang Seng Index, MSCI China</td>
</tr>
<tr>
<td>Red-chips</td>
<td>Securities of state-owned companies incorporated outside Mainland China, listed on the Hong Kong Stock Exchange</td>
<td>HKD</td>
<td>No restrictions</td>
<td></td>
</tr>
<tr>
<td>P-chips</td>
<td>Securities of non-government owned companies incorporated outside Mainland China, listed on Hong Kong Stock Exchange</td>
<td>HKD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overseas (N and S-shares)</td>
<td>Securities (including ADRs) listed on foreign exchanges such as the Nasdaq and NYSE (N-shares), and Singapore Exchange (S-shares)</td>
<td>USD, SGD</td>
<td></td>
<td>MSCI China</td>
</tr>
</tbody>
</table>

### Market capitalization and constituents by market

**MSCI indices, as of Apr. 2023**

- **Market capitalization (USD billions)**
  - A-shares: $1,718
  - B-shares: $6
  - H-shares: $480
  - Red-chips: $121
  - P-chips: $927
  - Overseas: $177

- **Number of constituents**
  - A-shares: 503
  - B-shares: 76
  - H-shares: 79
  - Red-chips: 23
  - P-chips: 20
  - Overseas: 20

Chinese initial public offerings

Initial public offerings
Includes Shanghai, Shenzhen, Hong Kong, and ADRs

IPO breakdown by sector
2016 – YTD 2023

<table>
<thead>
<tr>
<th>Sectors</th>
<th>% of market value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer</td>
<td>28.3%</td>
</tr>
<tr>
<td>Industrial</td>
<td>20.7%</td>
</tr>
<tr>
<td>Tech</td>
<td>10.8%</td>
</tr>
<tr>
<td>Materials</td>
<td>5.1%</td>
</tr>
<tr>
<td>Financials</td>
<td>17.4%</td>
</tr>
<tr>
<td>Comm. Servs.</td>
<td>12.5%</td>
</tr>
<tr>
<td>Energy</td>
<td>3.6%</td>
</tr>
<tr>
<td>Utilities</td>
<td>1.5%</td>
</tr>
<tr>
<td>Diversified</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

IPO breakdown by market
2016 – YTD 2023

Chinese stocks listed on U.S. exchanges

Chinese stocks listed on U.S. exchanges
Chinese ADRs*

Aggregate market cap (USD billions)
Total number

Chinese stock performance by listing
Price index, Jan. 2002 = 100

Shanghai Shenzhen CSI 300 Index
S&P China Select ADR Index

Sector composition of offshore and onshore equities

Sector weights
% of index market capitalization

State-owned enterprise representation in key stock indices

**Hang Seng Composite Index (HSCI)**
SOE as % of sector and % of overall index market capitalization

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Hang Seng</td>
<td>98%</td>
<td>70%</td>
<td>64%</td>
<td>59%</td>
<td>47%</td>
<td>44%</td>
<td>33%</td>
<td>25%</td>
<td>11%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>CSI 300</td>
<td>95%</td>
<td>64%</td>
<td>59%</td>
<td>47%</td>
<td>33%</td>
<td>25%</td>
<td>11%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

**CSI 300 Index**
SOE as % of sector and % of overall index market capitalization

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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hang Seng</td>
<td>100%</td>
<td>88%</td>
<td>80%</td>
<td>72%</td>
<td>65%</td>
<td>56%</td>
<td>53%</td>
<td>35%</td>
<td>26%</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>CSI 300</td>
<td>100%</td>
<td>80%</td>
<td>72%</td>
<td>65%</td>
<td>56%</td>
<td>53%</td>
<td>35%</td>
<td>26%</td>
<td>18%</td>
<td>26%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source: China Securities Index, Hang Seng Index, Wind, J.P. Morgan Asset Management.
SOE refers to state-owned enterprise, as defined by controlling stake owned by central and/or local governments and/or their subsidiaries.
Guide to China: Data are as of April 30, 2023.
Market structure of offshore vs. onshore equities

**Average daily turnover**
USD billions, 2022

- **Hong Kong**: $12.3
- **Shanghai & Shenzhen**: $134.5
- **U.S.**: $459.8

**Participation by type of investor**
% of total trading value, latest*

- **Individual investors**
  - **Shanghai**: 82%
  - **Hong Kong**: 15%
- **Institutional investors**
  - **Shanghai**: 18%
  - **Hong Kong**: 85%

Source: J.P. Morgan Asset Management; (Left) World Federation of Exchanges; (Right) CEIC, Hong Kong Exchanges and Clearing Limited, Shanghai Stock Exchange. Total value of share trading includes electronic order book, negotiated deals, and reported trades. *Latest is 2017 for Shanghai and 2020 for Hong Kong due to data availability.

*Guide to China. Data are as of April 30, 2023.*
MSCI China intra-year declines vs. calendar year returns
Local currency, average intra-year drops of -30.4% (median: -27.5%) and annual returns positive in 15 of 30 years of an average of 4.5%

Source: FactSet, MSCI, J.P. Morgan Asset Management.
Returns are based on price index only and do not include dividends. Intra-year drops refers to the largest market drops from a peak to a trough during the year. For illustrative purposes only. Returns are calendar year returns from 1993 to 2022 for the MSCI China. Guide to China. Data are as of April 30, 2023.
Chinese equity market corrections and subsequent performance

### Previous vs. current Chinese equity market corrections

#### MSCI China

- **Peak-to-trough correction**
- **4 weeks after trough**
- **12 weeks after trough**
- **26 weeks after trough**

<table>
<thead>
<tr>
<th>Correction Period</th>
<th>Peak-to-trough</th>
<th>4 weeks after</th>
<th>12 weeks after</th>
<th>26 weeks after</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr. '11 to Sep '11</td>
<td>-37%</td>
<td>19%</td>
<td>13%</td>
<td>32%</td>
</tr>
<tr>
<td>May '15 to Feb. '16</td>
<td>-43%</td>
<td>12%</td>
<td>13%</td>
<td>27%</td>
</tr>
<tr>
<td>Jan. '18 to Oct. '18</td>
<td>-33%</td>
<td>8%</td>
<td>8%</td>
<td>25%</td>
</tr>
<tr>
<td>Feb. '21 to Oct. '22</td>
<td>-63%</td>
<td>19%</td>
<td>19%</td>
<td>34%</td>
</tr>
</tbody>
</table>

**Source:** Bloomberg L.P., J.P. Morgan Asset Management.

Chinese market performance is based on the MSCI China price index only and do not include dividends. The periods above were chosen to illustrate particular market moving events in China and the recovery 4, 12, and 26 weeks after market trough. The April 2011 to September 2011 period represents a period in which global fears were heightened due to China’s perceived growth slowdown. Fears culminated in a dramatic market sell-off in August 2011. The May 2015 to February 2016 period represents the currency crisis in China. The January 2018 to October 2018 represents the beginning of the default cycle. The February 2021 to October 2022 period represents the recent regulatory tightening campaign in China. Past performance is not indicative of current or future results.

*Guide to China.* Data are as of April 30, 2023.
## Reform cycle policy principles

### MSCI China price index

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Principle</th>
<th>Policy Tool</th>
<th>Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Macro economic control</td>
<td>Interest rate and RRR hike, administrative power</td>
<td>Real estate, steel, auto, power plants, cement, glass and other industries with excessive capacity and/or high energy consumption. Cut export tariff return for high energy-consuming and heavy-pollution products.</td>
</tr>
<tr>
<td>2008</td>
<td>Economic stabilization</td>
<td>Infrastructure investment, interest rate and RRR cuts, fiscal expansion</td>
<td>Highway, railway, airports, real estate</td>
</tr>
<tr>
<td>2010-2011</td>
<td>Property market control</td>
<td>Credit control and purchase control in property market</td>
<td>Real estate</td>
</tr>
<tr>
<td>2015-2018</td>
<td>Supply-side reform</td>
<td>Monetary policy, administrative power</td>
<td>Traditional sectors (property market, steel, coal, cement, glass), local government financing</td>
</tr>
<tr>
<td>2021-Oct 2022</td>
<td>Limit monopoly power</td>
<td>Regulations, monetary policy</td>
<td>Internet, education, health care, real estate, energy</td>
</tr>
<tr>
<td>Nov 2022-</td>
<td>Policy pivot to support the economy</td>
<td>Stimulus measures</td>
<td>Mainly concentrated in real estate sector, along with easing of COVID restrictions</td>
</tr>
</tbody>
</table>

Source: Bloomberg L.P., MSCI, PBoC, J.P. Morgan Asset Management, PBoC: People's Bank of China. SAMR: State Administration for Market Regulation oversees all manner of market controls, including regulating anti-competition behavior, intellectual property rights, drug safety supervision and issuance of business licenses, etc.

MSCI China Real Estate Index
June 2020 = 100

- **Aug '20:** Introduction of three red-line rules
- **Dec '21:** PBoC pledges to support home buyers and promote healthy development of the real estate market
- **Jan '22 to Mar '22:** Local level easing measures introduced
- **Jul '21:** Government issues guidance on real estate monitoring and local governments tighten purchase restrictions measures
- **Oct '21:** National People’s Congress authorized the State Council to pilot property tax
- **May '22:** PBoC lowers mortgage rate floor and cuts LPR
- **Jun '22:** PBoC allows flexibility to reduce minimum mortgage rates / income tax rate in secondary home sales
- **Nov '22:** Growing reopening expectations: 16-points notice, easing on escrow accounts, CSRC 5-point measure
- **Dec '22:** State-owned enterprise banks to issue developers’ offshore debt secured by onshore guarantee
- **Jun '21:** National People’s Congress authorized the State Council to pilot property tax
- **Sep '22:** PBoC and CBIRC suggest 4 action plans to improve the balance sheet of high-quality developers

Source: FactSet, various news sources, J.P. Morgan Asset Management.
PBoC stands for People’s Bank of China. LPR stands for Loan Prime Rate. CSRC stands for China Securities Regulatory Commission. CBIRC stands for China Banking and Insurance Regulatory Commission.

Regulation and offshore China stock performance

MSCI Golden Dragon index

Dec '20: Holding Foreign Companies Accountable Act passed, panic on delisting of offshore China stocks

Nov '20: Regulatory intervention in IPO market

Apr '21: Regulatory campaign launched targeting internet giants’ monopolistic activities

Jul '21: Instructions published to strengthen social responsibility and labor rights on food delivery platforms

Jan '23: Reinstatement of popular ride-share app on app store and new user registration

Mar '23: Business conglomerate splits up into 6 different groups and two key listings on HK exchange

Oct '22: New guidelines to potentially further enhance the development of digital economy and infrastructure

Aug '22: US and China reached audit deal

Jun '22: Popular ride-share app banned from app stores for breaching data security laws

Apr '22: Resumed online game license approval

May '23: Former Premier Li Keqiang highlighted the key gov. focus for the year is to support the digital economy, improve the level of normalizing regulation and supply the platform economy

Source: Bloomberg L.P., MSCI, various news sources, J.P. Morgan Asset Management. The MSCI Golden Dragon Index captures the equity market performance of large and mid-cap China securities (H shares, B shares, Red-Chips and P-Chips) as well as securities classified in Hong Kong and Taiwan. Currently, the index also includes A stock connect large and mid-cap shares.

Chinese equity market dispersion

Share type dispersion
Price index, USD terms

<table>
<thead>
<tr>
<th>Market Performance</th>
<th>Hang Seng Index</th>
<th>S&amp;P China Select ADR Index</th>
<th>MSCI China A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since Jan '20</td>
<td>-30%</td>
<td>-38%</td>
<td>9%</td>
</tr>
<tr>
<td>Since Feb '21 peak</td>
<td>-36%</td>
<td>-64%</td>
<td>-30%</td>
</tr>
<tr>
<td>Since Oct '22 bottom</td>
<td>35%</td>
<td>49%</td>
<td>27%</td>
</tr>
</tbody>
</table>

## Chinese equities: Valuations

### MSCI China: Forward P/E ratio

<table>
<thead>
<tr>
<th>Index</th>
<th>Valuation measure</th>
<th>Latest</th>
<th>1/29/2021</th>
<th>Average</th>
<th>Std. dev. over-/under-valued</th>
<th>Time period</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI China</td>
<td>Forward P/E</td>
<td>10.5x</td>
<td>17.1x</td>
<td>11.8x</td>
<td>-0.5</td>
<td>20-year</td>
</tr>
<tr>
<td>MSCI China</td>
<td>Price to book</td>
<td>1.5x</td>
<td>2.8x</td>
<td>1.7x</td>
<td>-0.3</td>
<td>20-year</td>
</tr>
<tr>
<td>MSCI China</td>
<td>Dividend yield</td>
<td>2.5%</td>
<td>1.4%</td>
<td>2.7%</td>
<td>0.3</td>
<td>20-year</td>
</tr>
<tr>
<td>Hang Seng China Enterprises (H-shares)</td>
<td>Forward P/E</td>
<td>8.8x</td>
<td>11.8x</td>
<td>8.5x</td>
<td>0.3</td>
<td>15-year</td>
</tr>
<tr>
<td>CSI 300 (A-shares)</td>
<td>Forward P/E</td>
<td>14.2x</td>
<td>13.7x</td>
<td>14.2x</td>
<td>0.0</td>
<td>15-year</td>
</tr>
<tr>
<td>ChiNext</td>
<td>Forward P/E</td>
<td>34.1x</td>
<td>57.5x</td>
<td>38.3x</td>
<td>-0.4</td>
<td>10-year</td>
</tr>
<tr>
<td>SME Board</td>
<td>Forward P/E</td>
<td>24.2x</td>
<td>28.3x</td>
<td>23.4x</td>
<td>0.2</td>
<td>5-year</td>
</tr>
</tbody>
</table>

Chinese vs. U.S. equities: Relative valuations and performance

**MSCI China: Price-to-earnings relative to U.S.**
MSCI China vs. S&P 500, price to next 12-month earnings

- Average: -21%
- +1 Std. dev.: -1%
- -1 Std. dev: -41%
- Apr. 2023: -42%

**CSI 300: Performance relative to U.S.**
CSI 300 vs. S&P 500, difference in 12-month price returns

- CSI 300 outperformance
- CSI 300 underperformance

China: Sector earnings and valuations

Earnings growth of MSCI China*
Year-over-year change, earnings per share, consensus estimates

Earnings revision ratio of MSCI China
Net earnings revisions to consensus estimates, 3-month moving avg.

Sector Weight (%)
- Energy 3.2
- Financials 16.9
- Tech. 6.0
- Real Estate 3.3
- Industrials 5.8
- Utilities 2.6
- MSCI China 100.0
- Materials 3.7
- Cons. Staples 5.5
- Comm. Serv. 19.3
- Health Care 6.2
- Cons. Discr. 27.4

Source: FactSet, MSCI, J.P. Morgan Asset Management. *Sector indices used are from the MSCI China Index. Consensus estimates used are calendar year estimates from FactSet. Past performance is not a reliable indicator of current and future results. **Three largest sectors include Consumer Discretionary, Communication Services and Financials.

## Onshore equities: Sector performance

<table>
<thead>
<tr>
<th>Returns (%)</th>
<th>1Q '23</th>
<th>YTD '2023</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utilities</strong></td>
<td>-15.6</td>
<td>Energy 12.7</td>
</tr>
<tr>
<td><strong>Con. staples</strong></td>
<td>61.8</td>
<td>Telecom 34.9</td>
</tr>
<tr>
<td><strong>Financials</strong></td>
<td>-19.3</td>
<td>Telecom 45.5</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>-20.6</td>
<td>Health Care 26.5</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>35.7</td>
<td>Materials 30.3</td>
</tr>
<tr>
<td><strong>Con. staples</strong></td>
<td>38.8</td>
<td>Energy 7.5</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>32.9</td>
<td>Health Care 9.2</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>34.2</td>
<td>Telecom 8.3</td>
</tr>
<tr>
<td><strong>All A-Share</strong></td>
<td>34.6</td>
<td>Telecom 30.8</td>
</tr>
<tr>
<td><strong>Industrials</strong></td>
<td>30.2</td>
<td>Materials 6.7</td>
</tr>
<tr>
<td><strong>Telecom</strong></td>
<td>8.4</td>
<td>All A-Share 6.7</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>-15.4</td>
<td>All A-Share 6.7</td>
</tr>
<tr>
<td><strong>Financials</strong></td>
<td>-18.9</td>
<td>Materials 6.7</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>25.4</td>
<td>All A-Share 5.2</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>17.0</td>
<td>All A-Share 7.2</td>
</tr>
<tr>
<td><strong>All A-Share</strong></td>
<td>30.1</td>
<td>Materials 7.2</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>8.0</td>
<td>Materials 5.2</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>3.9</td>
<td>All A-Share 25.1</td>
</tr>
<tr>
<td><strong>Telecom</strong></td>
<td>18.6</td>
<td>Con. disc. 28.3</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>7.7</td>
<td>Industrials 26.0</td>
</tr>
<tr>
<td><strong>Con. staples</strong></td>
<td>-19.6</td>
<td>Materials 6.8</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>3.6</td>
<td>Industrials 24.3</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>2.6</td>
<td>Industrials 26.0</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>0.7</td>
<td>Con. staples 23.6</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>6.0</td>
<td>Utilities 23.9</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>3.5</td>
<td>Telecom 17.7</td>
</tr>
<tr>
<td><strong>All A-Share</strong></td>
<td>18.9</td>
<td>Industrials 16.7</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>6.7</td>
<td>Con. disc. 17.3</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>7.7</td>
<td>Con. disc. 15.1</td>
</tr>
<tr>
<td><strong>Con. staples</strong></td>
<td>-19.6</td>
<td>Materials 15.1</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>3.6</td>
<td>Materials 13.6</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>2.6</td>
<td>Materials 14.6</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>0.7</td>
<td>Con. disc. 5.5</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td>6.0</td>
<td>Con. disc. 23.0</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>3.5</td>
<td>Materials 5.4</td>
</tr>
<tr>
<td><strong>All A-Share</strong></td>
<td>25.1</td>
<td>Materials 22.9</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>23.6</td>
<td>Materials 8.7</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>23.9</td>
<td>Materials 6.4</td>
</tr>
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<td><strong>Con. disc.</strong></td>
<td>17.7</td>
<td>Materials 7.3</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>16.7</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>15.1</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>14.6</td>
<td>Con. disc. 6.9</td>
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<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Con. disc.</strong></td>
<td>23.0</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>21.5</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>All A-Share</strong></td>
<td>7.0</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>6.2</td>
<td>Con. disc. 6.9</td>
</tr>
<tr>
<td><strong>Financials</strong></td>
<td>6.9</td>
<td>Con. disc. 6.9</td>
</tr>
</tbody>
</table>

*Price-to-earnings refer to forward P/E ratios. Annual returns are total returns based on CSI all share index and CSI all share sector indices. Past performance is not a reliable indicator of current and future results.

China equities: Growth vs. Value

Growth vs. Value valuations*
MSCI China Growth fwd. P/E ratio/Value fwd. P/E ratio

Growth vs. Value relative performance
MSCI China Growth/Value performance, Jan. 2006 = 100

Source: FactSet, MSCI, J.P. Morgan Asset Management.
*Growth is the MSCI China Growth index and value is the MSCI China Value index. Past performance is not a reliable indicator of current and future results.
Chinese private equity markets

Number of unicorns by city*

<table>
<thead>
<tr>
<th>City</th>
<th>Unicorns</th>
<th>% of total valuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisco</td>
<td>181</td>
<td>6%</td>
</tr>
<tr>
<td>New York</td>
<td>126</td>
<td>5%</td>
</tr>
<tr>
<td>Beijing</td>
<td>79</td>
<td>10%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>66</td>
<td>3%</td>
</tr>
<tr>
<td>London</td>
<td>42</td>
<td>0%</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>33</td>
<td>0%</td>
</tr>
<tr>
<td>Bengaluru</td>
<td>33</td>
<td>0%</td>
</tr>
<tr>
<td>Berlin</td>
<td>22</td>
<td>0%</td>
</tr>
<tr>
<td>Paris</td>
<td>22</td>
<td>0%</td>
</tr>
<tr>
<td>Guangzhou</td>
<td>22</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: (Left) Hurun Research Institute, Hurun Global Unicorn Index 2023 Report; (Right) KPMG, PitchBook, J.P. Morgan Asset Management.

*Unicorns defined as companies worth at least a billion dollars and not yet listed on a public exchange. Unicorn valuations are a snapshot of December 31, 2022. All venture capital fundraising and exits data are sourced from Pitchbook with China data as of December 31, 2022, global data as of December 31, 2022, and U.S. data as of March 31, 2022.

Guide to China: Data are as of April 30, 2023.
MSCI Emerging Markets Index: Inclusion of China A-Shares

August 2011
China: 17%

Pre A-Share Inclusion

May 2019
China: 32%

A-Share inclusion begins

April 2023
China: 31%

20% A-Share inclusion (Current)

Onshore equities: Market opening

Foreign investors’ holdings of onshore Chinese equities

<table>
<thead>
<tr>
<th>CNY trillions</th>
<th>% of domestic market cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>'14</td>
<td>'15</td>
</tr>
<tr>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>2.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>3.0%</td>
<td>3.5%</td>
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<tr>
<td>4.0%</td>
<td>4.5%</td>
</tr>
<tr>
<td>5.0%</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

China’s weight in selected indicators

<table>
<thead>
<tr>
<th>% of total</th>
<th>55%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-shares*</td>
<td>51%</td>
</tr>
<tr>
<td>Offshore</td>
<td>49%</td>
</tr>
</tbody>
</table>

Source: J.P. Morgan Asset Management; (Left) CEIC, People’s Bank of China, Shanghai Stock Exchange, Shenzhen Stock Exchange; (Right) Bloomberg L.P., MSCI, World Bank. Share of EM GDP is for 2021 and is calculated as Chinese nominal GDP in U.S. dollars as a percentage of all emerging markets within the MSCI EM index and as a percentage of the global GDP. Share of EM market cap is for 2020 and is calculated as China’s market capitalization of listed domestic companies as a percentage of all emerging markets’ capitalization of listed domestic companies within the MSCI EM index and as a percentage of global market capitalization. *Currently, an index inclusion factor (IIF) of 20% is applied to China A Large Cap, ChiNext Large Cap and China A Mid Cap (including eligible ChiNext shares) within MSCI ACWI and MSCI EM Index. 100% A-share inclusion is shown for illustrative purposes only. Guide to China. Data are as of April 30, 2023.
### Onshore equities and global portfolios

#### Correlation between A-shares and global equities

<table>
<thead>
<tr>
<th></th>
<th>S&amp;P 500</th>
<th>MSCI ACWI</th>
<th>MSCI EM</th>
<th>MSCI EAFE</th>
<th>MSCI China</th>
<th>CSI 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>1.00</td>
<td>0.98</td>
<td>0.77</td>
<td>0.89</td>
<td>0.54</td>
<td>0.39</td>
</tr>
<tr>
<td>MSCI ACWI</td>
<td></td>
<td>1.00</td>
<td>0.83</td>
<td>0.94</td>
<td>0.61</td>
<td>0.44</td>
</tr>
<tr>
<td>MSCI EM</td>
<td></td>
<td></td>
<td>1.00</td>
<td>0.87</td>
<td>0.85</td>
<td>0.58</td>
</tr>
<tr>
<td>MSCI EAFE</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>0.66</td>
<td>0.44</td>
</tr>
<tr>
<td>MSCI China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>0.72</td>
</tr>
<tr>
<td>CSI 300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

#### Efficient frontier

MSCI All Country World and China A-shares

- **85.0% AC World + 15.0% China A**
- **87.5% AC World + 12.5% China A**
- **90.0% AC World + 10.0% China A**
- **92.5% AC World + 7.5% China A**
- **95.0% AC World + 5.0% China A**
- **97.5% AC World + 2.5% China A**
- **99% AC World + 1% China A**
- **100% AC World (0.0% China A)**

### Source

Global investor positioning in Chinese assets

**Total net flows into China equities**
USD billions, active and passive, 4-week moving average

- A-shares: 3.13
- Offshore: 6.86

**Cumulative flows since Oct. '22 low (USD billions)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-shares</td>
<td>3.13</td>
</tr>
<tr>
<td>Offshore</td>
<td>6.86</td>
</tr>
</tbody>
</table>

**% of investors with no China A-share exposure**

- 73%
- 30%


Onshore sentiment tracker

Number of new investor accounts
In millions

Funds raised in newly issued mutual funds and equity market movements
CNY billion

Global revenue exposure to China

MSCI China
- China: 88%
- Europe: 3%
- Asia ex-China: 3%
- Other: 3%
- U.S.: 3%

MSCI All Country World excluding U.S.
- Other: 23%
- U.S.: 18%
- Japan: 9%
- Europe: 23%
- Asia ex-China & Japan: 13%

MSCI Emerging Markets
- China: 27%
- Asia ex-China & Japan: 23%
- Europe: 8%
- Other: 10%
- U.S.: 60%

S&P 500
- U.S.: 60%
- Japan: 3%
- Europe: 13%
- Other: 11%
- Asia ex-China & Japan: 5%

Debt and bond markets

Bond market size in value and as % of GDP

Debt and bonds as % of GDP

Total market value of total debt and bonds* as % of nominal GDP, 2022

Source: BIS, Bloomberg L.P., IMF, World Federation of Exchanges, J.P. Morgan Asset Management. Debt valuation is as of 3Q22, bond valuation is as of April 30, 2023. Bond market outstanding refers to the total U.S. dollar value of bonds (corporate and government) in the market and does not reflect mandatory prepayment. *The difference in Japan’s government borrowing in debt and in bonds is due to the differing valuation dates. **Government bonds include onshore listed central and local government bonds for all countries. Corporate debt is borrowing by non-financial corporations; Corporate bonds are all onshore listed corporate bonds. Household borrowing is only accounted for in total debt as individuals do not issue bonds.

Bonds and yields by market

Debt by market
% GDP, includes government and corporate debt

Yields by market
Government and corporate bond indices

Country yields are provided by Bloomberg L.P. and are represented by the global aggregate for each country, except for U.S. which is based on Bloomberg U.S. Aggregate. Yield is not guaranteed. Positive yield does not imply positive return.
China's three different bond markets
As of March 31, 2023

Onshore CNY (CNY) market*
Value: USD$7.8 trillion (the largest)
Average credit rating: A+
Average yield-to-maturity: 2.81%

Offshore foreign currency market**
Value: USD$404 billion (the middle)
Average credit rating: A-
Average yield-to-maturity: 7.18%

Offshore CNY (CNH) market***
Value: USD$31 billion (the smallest)
Average credit rating: AA-
Average yield-to-maturity: 3.14%

China's onshore bond market by type of issuer
USD trillions, as of March 31, 2023

- Govt/Govt Sponsored: $2.72
- Bank: $2.37
- Regional Gov.: $1.98
- Other Gov. Related: $0.22
- Finance: $0.41
- Industrials: $0.07
- Utility: $0.04

Counted as government debt, officially

*FTSE Chinese (Onshore CNY) Broad Bond Index is used as a proxy for China onshore universe statistics. **J.P. Morgan Asia Credit Index (JACI) China is used as a proxy for Chinese foreign currency-issued bond universe statistics. ***FTSE Dim Sum (Offshore CNY) Bond Index is used as a proxy for China offshore universe statistics.


Onshore government and corporate bonds

Onshore government bond yields
% per annum

Yield of onshore corporate bonds*
Basis points

Value of defaults in onshore market
CNY billion

Source: Bloomberg L.P., Wind, J.P. Morgan Asset Management; (Top-right) China Securities Index Co., Ltd.
*Credit rating in Chinese onshore bond market may be inflated, given the absence of international rating agencies.
Chinese offshore credit spreads and bond market returns

Chinese offshore corporate credit spreads
Basis points, daily

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HY</td>
<td>3.5%</td>
<td>14.9%</td>
<td>9.8%</td>
<td>8.7%</td>
<td>-5.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td>IG</td>
<td>161</td>
<td>142</td>
<td>8.4%</td>
<td>-5.2%</td>
<td>3.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Govt.</td>
<td>3.0%</td>
<td>12.7%</td>
<td>9.3%</td>
<td>-0.1%</td>
<td>-10.1%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Asian Bonds</td>
<td>0.5%</td>
<td>11.3%</td>
<td>9.2%</td>
<td>-0.1%</td>
<td>-10.1%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Global Bonds</td>
<td>-0.8%</td>
<td>10.2%</td>
<td>8.7%</td>
<td>-2.4%</td>
<td>-11.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>China Real Estate HY</td>
<td>3.4%</td>
<td>6.6%</td>
<td>3.4%</td>
<td>6.6%</td>
<td>10.2%</td>
<td>8.7%</td>
</tr>
<tr>
<td>China HY</td>
<td>-1.2%</td>
<td>6.8%</td>
<td>7.5%</td>
<td>-4.7%</td>
<td>-16.2%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Global Bonds</td>
<td>-3.1%</td>
<td>3.4%</td>
<td>6.6%</td>
<td>-2.4%</td>
<td>-11.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>China Real Estate HY</td>
<td>-4.2%</td>
<td>2.8%</td>
<td>6.3%</td>
<td>37.2%</td>
<td>-36.0%</td>
<td>-7.0%</td>
</tr>
<tr>
<td>China HY</td>
<td>-4.2%</td>
<td>2.8%</td>
<td>6.3%</td>
<td>37.2%</td>
<td>-36.0%</td>
<td>-7.0%</td>
</tr>
</tbody>
</table>

Left graph indices used are: Bloomberg Asia ex-Japan USD Credit China High Yield (China HY) and Bloomberg Asia ex-Japan USD Credit China IG (China IG). Right graph based on Bloomberg China Aggregate Index (China Agg), Chinese Central Government Bonds Index (China Govt.), Bloomberg Asia ex-Japan China High Yield Credit (China HY), Bloomberg Asia ex-Japan China Investment Grade Credit Index (China IG), Markit Asia ex-Japan China High Yield Real Estate Credit (China Real Estate HY), J.P. Morgan Asia Credit Index (JACI) (USD Asian Bonds), Bloomberg Global Aggregate (USD Global Bonds). Returns are in U.S. dollars. 5 year annualized returns are from December 31, 2017 to December 31, 2022. Past performance is not a reliable indicator of current and future results.

Bond index weightings to China

Weight of China in bond universe and bond indices

Based on J.P. Morgan CEMBI Broad Index (USD EMD corporates), J.P. Morgan EMBIG Broad Diversified Index (USD EMD sovereigns), J.P. Morgan GBI-EM Global Diversified Index (Local EMD sovereigns), Bloomberg Global Aggregate (Global Aggregate). Global bond universe data from the BIS are as of 3Q22. If the total debt figure was not available, international debt + domestic debt was used as a proxy.

Returns and volatility of Chinese bonds

Return and volatility of government bonds
Annualized total return and volatility, May 2013 – Apr. 2023

- Chinese Central Gov. Bonds (CNY): 4.0%
- Chinese Central Gov. Bonds (USD): 5.0%
- U.S. Treasuries: 4.4%

Return of Chinese bonds versus Asia benchmarks
Annualized total return, May 2018 – Apr. 2023

- Corporate Credit (USD): 0.5%
- Corporate Credit (Local ccy): 1.5%
- Government Debt (Local ccy): 4.5%

Source: Bloomberg L.P., J.P. Morgan Asset Management; (Right) CSI, J.P. Morgan Economics Research, WIND.
Central government bonds and U.S. Treasury bonds returns are unhedged and calculated for the period between 05/31/2013 and 04/30/2023.
Volatility calculated based on monthly price changes. Chinese and benchmark bond returns shown are calculated for the time period between 05/31/2018 and 04/30/2023. Indices used are: JACI (Asia USD corporate credit), CSI 3-5 year Corporate Bond Index & Bloomberg Aggregate Corporate 3-5 Year (Asia local ccy corporate credit) and JADE (Asia local ccy gov. debt).
Diversification benefits of Chinese bonds

Correlation between Chinese and global government bonds
Total return index in USD*, 12-month rolling correlations of monthly returns

Average: 0.33

<table>
<thead>
<tr>
<th>15-year correlation to Global Aggregate Treasuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>South Africa</td>
</tr>
<tr>
<td>Mexico</td>
</tr>
<tr>
<td>U.S.</td>
</tr>
<tr>
<td>UK</td>
</tr>
<tr>
<td>Italy</td>
</tr>
<tr>
<td>Japan</td>
</tr>
<tr>
<td>Germany</td>
</tr>
</tbody>
</table>


Appendix: Key facts about China

Basics
Official name: People’s Republic of China (PRC)
Formation: c. 2070 B.C. (first pre-imperial dynasty)
Founding of the State: 1949

Demographics
Population: 1.4 billion (2022)
56 ethnic groups, with the majority of the population (92%) being Han
Official language: Mandarin
Median age: 38.4 (2021)

Geography
Capital: Beijing
Largest cities by population: Shanghai, Beijing, Tianjin, Guangzhou, Shenzhen, Wuhan
Land area: 9.7 million sq. km or 3.7 million sq. mi

Economy
Type: Socialist market economy
Nominal GDP: US$18.32 trillion (2022)
Nominal GDP per capita: $12,733 (2021)
Gini coefficient: 0.47 (2021)

Government
Ruling party: Chinese Communist Party (CCP)
General Secretary of CCP, President of PRC: Xi Jinping
Premier of PRC: Li Qiang
Legislative body: National People’s Congress (NPC)
The General Secretary of the CCP is elected by the Party Congress every 5 years. The President of PRC and the Premier of PRC are elected by the NPC every 5 years. The Premier has a two term limit while the President of the PRC and the General Secretary of the CCP have no term limit.

Central Bank
The central bank is the People’s Bank of China (PBOC)
Target/goal: Maintain stability of the value of the currency and promote economic growth through tools such as open market operations, reserve requirement ratios, interest rates and lending facilities to banks
Policy: Mix of quantity and price control

Currency
Renminbi (CNY) or Chinese Yuan (¥) is the official currency
In foreign exchange markets:
CNY is the onshore CNY traded within China, managed by the PBOC
CNH is the offshore currency traded outside of China at a free-floating rate

Equity markets
Size: $11.4 trillion (2022)
The onshore market is comprised of Chinese companies listed in Shanghai and Shenzhen stock exchanges
The offshore market is comprised of Chinese companies listed in the Hong Kong Stock Exchange and overseas

Fixed income markets
Size: $18.3 trillion (2022)
Onshore bonds are listed in Mainland Chinese exchanges and denominated in CNY
Offshore bonds or “dim sum bonds” are primarily traded in Hong Kong and denominated in CNH
Offshore foreign currency bonds are traded in Hong Kong dollars, U.S. dollars or euros.
J.P. Morgan Asset Management: Index Definitions

All indexes are unmanaged and an individual cannot invest directly in an index. Index returns do not include fees or expenses.

Equities:
The S&P 500 Index is widely regarded as the best single gauge of the U.S. equities market. The index includes a representative sample of 500 leading companies in leading industries of the U.S. economy. The S&P 500 Index focuses on the large-cap segment of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.
The MSCI® EAFE (Europe, Australia, Far East) Net Index is recognized as the pre-eminent benchmark in the United States to measure international equity performance. It comprises 21 MSCI country indexes, representing the developed markets outside of North America.
The MSCI Europe Index is a free-float-adjusted market capitalization index that is designed to measure developed market equity performance in Europe. As of June 2007, the MSCI Europe Index consisted of the following 16 developed market country indices: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.
The MSCI ACWI (All Country World Index) Index is a free-float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. As of June 2009 the MSCI ACWI consisted of 45 country indices comprising 23 developed and 22 emerging market country indices.
The MSCI ACWI ex USA Index captures large and mid cap representation across 22 of 23 Developed Markets (DM) countries (excluding the US) and 27 Emerging Markets (EM) countries*. With 2,357 constituents, the index covers approximately 85% of the global equity opportunity set outside the US.
The MSCI Emerging Markets Index is a free-float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets. As of June 2007, the MSCI Emerging Markets Index consisted of the following 25 emerging market indices: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey.
The MSCI China Index captures large and mid cap representation across China H shares, B shares, Red chips and P chips. With 148 constituents, the index covers about 84% of this China equity universe. The MSCI China Index was launched on December 31, 1992.
The MSCI China A Index captures large and mid-cap representation across China securities listed on the Shanghai and Shenzhen exchanges. The index covers only those securities that are accessible through “Stock Connect”. The index is designed for international investors and is calculated using China A Stock Connect listings based on the offshore CNY exchange rate (CNH).
The MSCI China Growth Index captures large and mid cap securities exhibiting overall growth style characteristics across the Chinese equity markets. The growth investment style characteristics for index construction are defined using five variables: long-term forward EPS growth rate, short-term forward EPS growth rate, current internal growth rate and long-term historical EPS growth trend and long-term historical sales per share growth trend.
The MSCI China Value Index captures large and mid-cap Chinese securities exhibiting overall value style characteristics. The value investment style characteristics for index construction are defined using three variables: book value to price, 12-month forward earnings to price and dividend yield.
The Shanghai Stock Exchange Composite Index is a capitalization-weighted index. The index tracks the daily price performance of all A-shares and B-shares listed on the Shanghai Stock Exchange. The index was developed on December 19, 1990 with a base value of 100.
The China Shenzhen Composite Index is an actual market-cap weighted index that tracks the stock performance of all the A-share and B-share lists on Shenzhen Stock Exchange. The index was developed on April 3, 1991 with a base price of 100.
The Hang Seng Index (“HSI”) is the most widely quoted gauge of the Hong Kong stock market. It includes the largest and most liquid stocks listed on the Main Board of the Stock Exchange of Hong Kong. Stocks are free-float-adjusted for investability representation, and a 10% capping is applied to avoid single stock domination. The index was developed on November 24, 1969 with a base price of 100.
The Shanghai Shenzhen CSI 300 Index (“CSI Index”) is a free-float weighted index that consists of 300 A-share stocks listed on the Shanghai or Shenzhen Stock Exchanges. The Index has been calculated since April 8, 2005, with a base value of 1000 on 12/31/2004.
The SZSE Composite Index is a stock market index of Shenzhen Stock Exchange. It includes all companies listed on the exchange.
The Hang Seng China Enterprises Index (“HSCEI”) serves as a benchmark that reflects the overall performance of Mainland securities listed in Hong Kong. The index comprises the largest and most liquid Mainland securities listed in Hong Kong. Stocks are free-float-adjusted for investability representation, with a 10% capping to avoid single stock domination. The index was launched on August 8, 1994.
The SME Index comprises the 100 largest and most liquid A-share stocks listed and trading on the SME Board Market. The index aims to reflect the performance of the Small and Medium Enterprise (SME) Board level. The index is free-float, with a base date of May 31, 2010.
The ChiNext Index comprises the 100 largest and most liquid A-share stocks listed and trading on the ChiNext Market of Shenzhen Stock Exchange. The index aims to reflect the performance of ChiNext Market level. The index free-float capitalization-weighted. The Index has a base value of 1000 on May 31, 2010.

Fixed income:
The Bloomberg Global Aggregate Index is a flagship measure of global investment grade debt from twenty-four local currency markets. This multi-currency benchmark includes treasury, government-related, corporate and securitized fixed-rate bonds from both developed and emerging markets issuers.
The J.P. Morgan GBI EM Global Diversified tracks the performance of local currency debt issued by emerging market governments, whose debt is accessible by most of the international investor base.
The J.P. Morgan Emerging Markets Bond Index Global Diversified (EMBI Global Diversified) tracks total returns for U.S. dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities: Brady bonds, loans, Eurobonds. The index limits the exposure of some of the larger countries.
The FTSE China (Onshore CNY) Broad Bond Index measures the performance of a subset of bonds from the FTSE Chinese (Onshore CNY) Broad Bond Index (CNYBBI) which tracks onshore Chinese yuan-denominated fixed-rate governments, agencies, and corporations debt issued in mainland China. The index includes bonds that are traded on the China Interbank Bond Market (CIBM).
The J.P. Morgan Asia Credit Index Core (JACI Core) consists of liquid US-dollar denominated debt instruments issued out of Asia ex-Japan. The JACI Core is based on the composition and established methodology of the J.P. Morgan Asia Credit Index (JACI), which is market capitalization weighted. JACI Core includes the most liquid bonds from the JACI by requiring a minimum $350 million in notional outstanding and a minimum remaining maturity of 2 years. JACI Core also implements a country diversification methodology. Historical returns and statistics for the JACI Core are available from December 30, 2005.
J.P. Morgan Asset Management: Index Definitions

Fixed income cont.:
The J.P. Morgan Asia Diversified (JADE) Indices track local currency government bonds issued by countries within the Asia region (excluding Japan). The two main composite series are the JADE Broad and the JADE Global which provide diversified exposure to the countries within the region. The JADE Global excludes countries with capital controls and those not accessible by foreign investors. Launched in March 2016, the JADE Broad/Global indices have daily historical index levels and statistics starting from Dec 31, 2004.

The Bloomberg Global Aggregate - Corporate Index is a flagship measure of global investment grade, fixed-rate corporate debt. This multi-currency benchmark includes bonds from developed and emerging markets issuers within the industrial, utility and financial sectors.

The Bloomberg Global Treasury Index tracks fixed-rate, local currency government debt of investment grade countries, including both developed and emerging markets. The index represents the treasury sector of the Global Aggregate Index and contains issuers from 37 countries denominated in 24 currencies.

The CSI Corporate Bond Index selects eligible corporate bonds listed at Shanghai Stock Exchange and Shenzhen Stock Exchange, with remaining term to final maturity over 1 year. The index was launched on June 9, 2003 and is based at 100 to Dec 31, 2002.

Other asset classes:
The Bloomberg Industrial Metals Subindex is composed of futures contracts on aluminum, copper, nickel and zinc. It reflects the return of underlying commodity futures price movements only. It is quoted in USD.

Definitions:
Price to forward earnings is a measure of the price-to-earnings ratio (P/E) using forecasted earnings. Price to book value compares a stock’s market value to its book value. Price to cash flow is a measure of the market’s expectations of a firm’s future financial health. Price to dividends is the ratio of the price of a share on a stock exchange to the dividends per share paid in the previous year, used as a measure of a company’s potential as an investment.

Bonds are subject to interest rate risks. Bond prices generally fall when interest rates rise.

The price of equity securities may rise, or fall because of changes in the broad market or changes in a company’s financial condition, sometimes rapidly or unpredictably. These price movements may result from factors affecting individual companies, sectors or industries, or the securities market as a whole, such as changes in economic or political conditions. Equity securities are subject to “stock market risk” meaning that stock prices in general may decline over short or extended periods of time.

Real estate investments may be subject to a higher degree of market risk because of concentration in a specific industry, sector or geographical sector. Real estate investments may be subject to risks including, but not limited to, declines in the value of real estate, risks related to general and economic conditions, changes in the value of the underlying property owned by the trust and defaults by borrower.

International investing involves a greater degree of risk and increased volatility. Changes in currency exchange rates and differences in accounting and taxation policies can raise or lower returns. Also, some markets may not be as politically and economically stable as other nations. Investments in emerging markets can be more volatile. The normal risks of international investing are heightened when investing in emerging markets. In addition, the small size of securities markets and the low trading volume may lead to a lack of liquidity, which leads to increased volatility. Also, emerging markets may not provide adequate legal protection for private or foreign investment or private property.

Investments in commodities may have greater volatility than investments in traditional securities, particularly if the instruments involve leverage. The value of commodity-linked derivative instruments may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. Use of leveraged commodity-linked derivatives creates an opportunity for increased return but, at the same time, creates the possibility for greater loss.

Derivatives may be riskier than other types of investments because they may be more sensitive to changes in economic or market conditions than other types of investments and could result in losses that significantly exceed the original investment. The use of derivatives may not be successful, resulting in investment losses, and the cost of such strategies may reduce investment returns.

There is no guarantee that the use of long and short positions will succeed in limiting an investor’s exposure to domestic stock market movements, capitalization, sector swings or other risk factors. Investing using long and short selling strategies may have higher portfolio turnover rates. Short selling involves certain risks, including additional costs associated with covering short positions and a possibility of unlimited loss on certain short sale positions.

Forecasts, projections and other forward looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecast, projections or other forward statements, actual events, results or performance may differ materially from those reflected or contemplated. Positive yield does not imply positive return.

J.P. Morgan Asset Management (JPMAM) Global Market Insights Strategy Team as of 04/30/21. There can be no assurance that the professionals currently employed by JPMAM will continue to be employed by JPMAM or that the past performance or success of any such professional serves as an indicator of such professional’s future performance or success.
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Guide to China

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