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Vanguard Research:
**Megatrends**

A Tale of Two Paths:
The Future of China

# About the Megatrends series

Megatrends have accompanied humankind throughout history. From the Neolithic Revolution to the Information Age, innovation has been the catalyst for profound socioeconomic, cultural, and political transformation. The term "Megatrends" was popularized by author John Naisbitt, who was interested in the transformative forces that have a major impact on both businesses and societies, and thus the potential to change all areas of our personal and professional lives.

Vanguard's "Megatrends" is a research effort that investigates fundamental shifts in the global economic landscape that are likely to affect the financial services industry and broader society. A megatrend may bring market growth or destroy it, increase competition or add barriers to entry, and create threats or uncover opportunities. Exploring the long-term nature of massive shifts in technology, demographics, and globalization can help us better understand how such forces may shape future markets, individuals, and the investing landscape in the years ahead.

## Vanguard Investment Strategy Group's Global Economics Team



**From left to right:** Joseph Davis, Ph.D., *Global Chief Economist;* Roger A. Aliaga-Díaz, Ph.D., *Americas Chief Economist*; Peter Westaway, Ph.D., *Europe Chief Economist*; Qian Wang, Ph.D., *Asia-Pacific Chief Economist*. **Americas:** Jonathan Lemco, Ph.D.; Andrew J. Patterson, CFA; Joshua M. Hirt, CFA; Maximilian Wieland; Asawari Sathe, M.Sc.; Adam J. Schickling, CFA. **Europe:** Shaan Raithatha, CFA; Roxane Spitznagel, M.Sc.; Griffin Tory. **Asia-Pacific:** Beatrice Yeo, CFA; Alexis Gray, M.Sc.

## Megatrend
# A Tale of Two Paths: The Future of China

- China's rise over the past century has seen its economy grow from being a tenth of the size of the U.S. economy in the 1990s to close to two-thirds of the size today, raising speculation that it might eventually overtake the U.S. as the world's economic powerhouse.[1]

- Whether China tips the global balance of economic power or remains stuck in the middle-income trap over the next two decades will hinge primarily on its ability to maneuver through rising international and domestic challenges. Based on a panel regression model across 100 countries over 20 years, we find that there remains considerable room for China to boost productivity through increases in education quality, domestic innovation, privatization reforms, and a more symmetric opening of capital markets.

- Under our assumption of a moderate pace of domestic reforms in a "slowbalized" world, China will eventually surpass the U.S. in its economic size—but only after 2050.[2] However, should China accelerate its domestic reforms immediately, the time taken to reach U.S. GDP could be further reduced by around 10 years. Alternatively, should China fail to implement domestic reforms in a timely manner, the economy may eventually find itself trudging down the path of long-term stagnation, with growth likely falling below 2%.

- China's long-term trajectory has implications for global growth, geopolitics, and financial markets. Spillovers from its new sources of growth, the need to balance global economic power, and the potential expansion of its equity and bond markets will have an impact on regional economies and investors.

## Authors

Qian Wang, Ph.D.        Adam J. Schickling, CFA        Beatrice Yeo, CFA

1 Size is measured using the level of nominal GDP in USD, sourced from the World Bank.

2 In a "slowbalized" world, the most likely trajectory for global trade lies somewhere between the rapid growth we saw before the global financial crisis in 2008 and outright deglobalization; see Lemco et al. (2021).

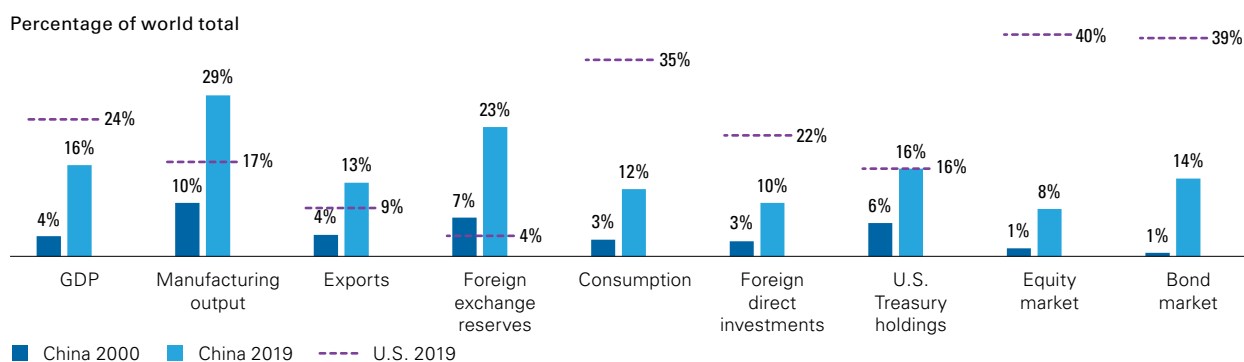## China's economic rise: Reforms hold the key to a brighter future

China's double-digit growth during the last three decades has elevated its economy to the second largest in the world after the U.S. and has made it the largest manufacturer and exporter, as well as the biggest holder of foreign exchange reserves. The country's importance is expected to grow in coming years as it boosts domestic demand and further opens its capital markets (**Figure 1**). However, the economy's rapid rise has added to concerns about potential shifts in the gravity of economic power from the West to the East.

Should China sustain its growth at the minimum 4.7% annualized rate needed to achieve its medium-term goal of doubling GDP per capita by 2035, it will surpass the U.S. to become the world's largest economy by 2040.[3] At first glance, this growth rate seems easily reachable, given that the economy has averaged 6.7% growth from 2014 to 2019. But international experience tells us that such high potential growth rates are unsustainable as the catch-up effect fades and competitive advantages soften. Many middle-income countries fall into stagnation after failing to implement much-needed structural reforms to offset these headwinds, a phenomenon often referred to as the "middle-income trap."[4] Furthermore, China faces unique constraints such as high leverage and overcapacity issues, as well as long-established, more well-known productivity headwinds from inefficient state-owned enterprises, combined with new challenges resulting from a more hostile global geopolitical environment.

Against this backdrop, we examine the current headwinds facing China and explore reforms needed to ensure its long-term competitiveness amid a more uncertain external environment. We conclude that China will most likely be able to successfully transition from high-growth economic miracle to a slower, more sustainable growth path that places a greater weight on an innovative, private-enterprise, and consumer-driven economy. This will enable it to eventually double its economic size—but not until 2040—and surpass the U.S. economy in nominal GDP terms after 2050. However, we acknowledge the risks involved in this transition, such as if China fails to engineer institutional reforms in a timely manner or if an outright deglobalization complicates matters further. Whether China successfully maneuvers these challenges and rises to become a global superpower will have important spillover effects on regional economies, geopolitics, and investors, which will be discussed in the second half of this paper.

**Figure 1. China's economic rise has further room to run**



Percentage of world total

GDP: China 2000 4%, China 2019 16%, U.S. 2019 24%
Manufacturing output: China 2000 10%, China 2019 29%, U.S. 2019 17%
Exports: China 2000 4%, China 2019 13%, U.S. 2019 9%
Foreign exchange reserves: China 2000 7%, China 2019 23%, U.S. 2019 4%
Consumption: China 2000 3%, China 2019 12%, U.S. 2019 35%
Foreign direct investments: China 2000 3%, China 2019 10%, U.S. 2019 22%
U.S. Treasury holdings: China 2000 6%, China 2019 16%, U.S. 2019 16%
Equity market: China 2000 1%, China 2019 8%, U.S. 2019 40%
Bond market: China 2000 1%, China 2019 14%, U.S. 2019 39%

■ China 2000   ■ China 2019   - - - - U.S. 2019

Sources: Vanguard calculations, based on data from the United Nations database.

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**3** See China's 14th Five-Year Plan announcement pertaining to its 2035 goal of doubling GDP per capita: https://www.globaltimes.cn/content/1205131.shtml.

**4** The phrase "middle-income trap" was first raised by Garrett (2004). He observed that many middle-income countries fell into stagnation because they failed to compete with both high-income countries (because of a lack of technology and supportive system) and low-income countries (because of lack of cheap labor). Latin American and Middle Eastern countries are examples of the middle-income trap. This occurs because of unfavorable demographic dynamics; low economic diversity; inefficient financial markets; lack of high-quality infrastructure; low innovation; weak economic, political, and judicial systems; and inefficient labor markets. These factors must be mitigated by structural reforms.

## A lower risk of hard landing, but secular risks remain

Vanguard's 2017 white paper *Navigating the Transition: China's Future at a Crossroads* highlighted how high debt ratios, overcapacity in the industrial sector, and rising asset bubbles posed downside risks for potential growth and elevated concerns around a near-term hard landing for China. On this front, it is commendable that the deleveraging, decapacity, and destocking campaigns in recent years, along with a more prudent focus on "quality" of growth and sound macroprudential measures, have helped reduce key economic and financial imbalances (see Figure A-1 in the Appendix on page 25).[5] This in turn reduces the chance of a near-term hard landing and places China in a better position to engineer further structural reforms needed to strengthen its long-term growth potential.[6]

Yet prevalent supply-side headwinds suggest that China is not immune to risks associated with long-term stagnation. Specifically, China has now approached a point where the catch-up effect associated with historically high growth rates when income levels are relatively low is rapidly diminishing as it becomes richer (**Figure 2**). Although countries such as Japan and South Korea experienced similar declines in growth rates in the 1970s and 1990s, respectively, globalization, industrial innovation, and structural reforms allowed them to successfully transition to high-income status. Whether China follows in their footsteps or remains stuck in middle-income status will hinge, critically, on whether it can innovate and institute reforms amid external and domestic headwinds.

Figure 2. As countries move to higher-income status, growth slows
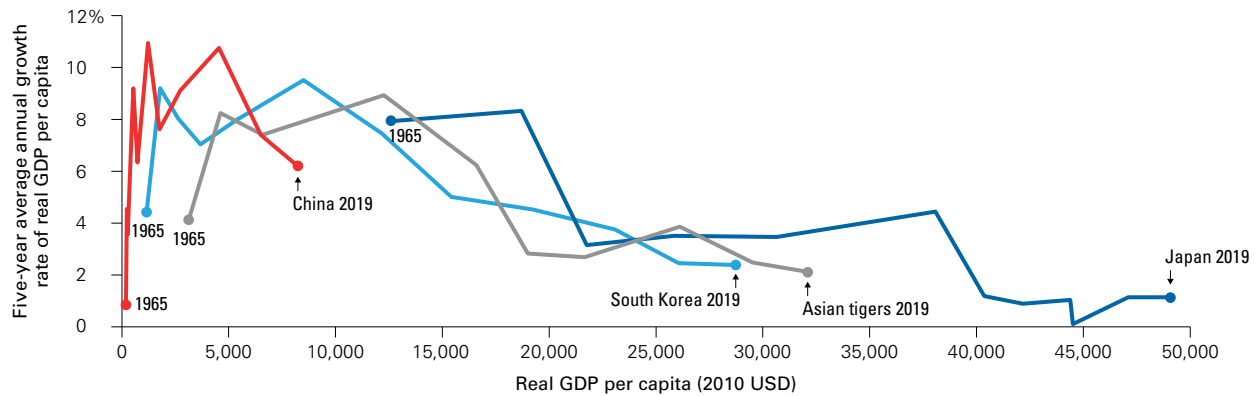


Note: "Asian tigers" are the high-growth economies of South Korea, Hong Kong, Taiwan, and Singapore.
Sources: Vanguard calculations, based on data from the World Bank.

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5 Excluding 2020, the pace of increase in China's debt ratios, for instance, has more than halved in the last five years, while the significant buildup of assets in the industrial sector has also seen improvements following the ramp-up in the capacity utilization rate. Although 2020 saw some retracements in this financial derisking progress in efforts to combat COVID-19, a large part of the increase in the debt-to-GDP ratio can be attributed to weaker nominal GDP rather than a significant buildup in credit. In fact, credit growth increased by a total of only 2.8 percentage points during 2020, compared with 20 percentage points during the 2008 global financial crisis.

6 A hard landing is defined as GDP growth falling sharply below 2% before rebounding over time as policymakers are forced to enact policy reforms (i.e., a V-shaped growth trajectory).

In addition to a fading catch-up effect, the Chinese economy is also facing a steep demographic transition as increasing life expectancy and fertility effects of urbanization and the former one-child policy have created an older, unequal age distribution.[7] As **Figure 3** shows, the working-age population in China, which captures those ages 15 to 64, is expected to decline nearly 50% over the next century, similar to Japan and Europe. However, the aging in those countries occurred after they reached high-income status, whereas China may find itself growing old before getting rich.

Figure 3. Demographic challenges are present worldwide, but China's are distinct
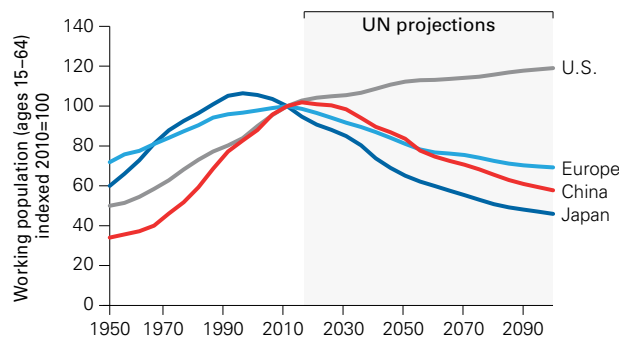


Sources: Vanguard calculations, based on data from the United Nations database.

## Productivity growth holds the key for the future: A cross-country analysis

Traditional growth theory such as the Solow Swan growth model (**Equation 1**) suggests that all else remaining constant, an aging population will result in lower economic growth because fewer people will be participating in the production of goods and services.[8]

Interestingly, though, in surveying other countries when they were at China's GDP per capita level, we don't find any strong statistical relationship between aging and subsequent economic growth (**Figure 4**), as that theory would suggest. A large part of this, in our view and others', can be explained by the offset provided by efforts to boost productivity growth—the other major factor in the Solow Swan equation that drives growth.[9] Previous research by Vanguard also found that the most important determinant of GDP growth—productivity— has a weak relationship with demographics.[10] As a caveat, we point out that China's projected aging is severe relative to historical standards.

## Equation 1. Solow Swan growth model

$$\frac{\Delta Y}{Y} = \frac{\Delta LF}{LF} + \frac{\Delta LP}{LP}$$

where

$\frac{\Delta Y}{Y}$ is the potential output growth rate,

$\frac{\Delta LF}{LF}$ is the long-run labor growth rate, and

$\frac{\Delta LP}{LP}$ is the long-run labor productivity growth rate.

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**7** According to the *Financial Times*, China reported its slowest population growth in close to five decades following a census completed in December 2020. Specifically, the average annual growth rate of 0.53% in the past decade was a decline of 0.04 percentage points from 2000 to 2010 and the lowest since the Great Famine (1959–1961).

**8** For additional information on the Solow Swan growth model, see Solow (1956) or Swan (1956) and Equation A-1 in the Appendix on page 25.

**9** See Acemoglu and Restrepo (2017).

**10** See Aliaga-Díaz et al. (2019).

Figure 4. No clear evidence that demographic deficits derail subsequent growth rates
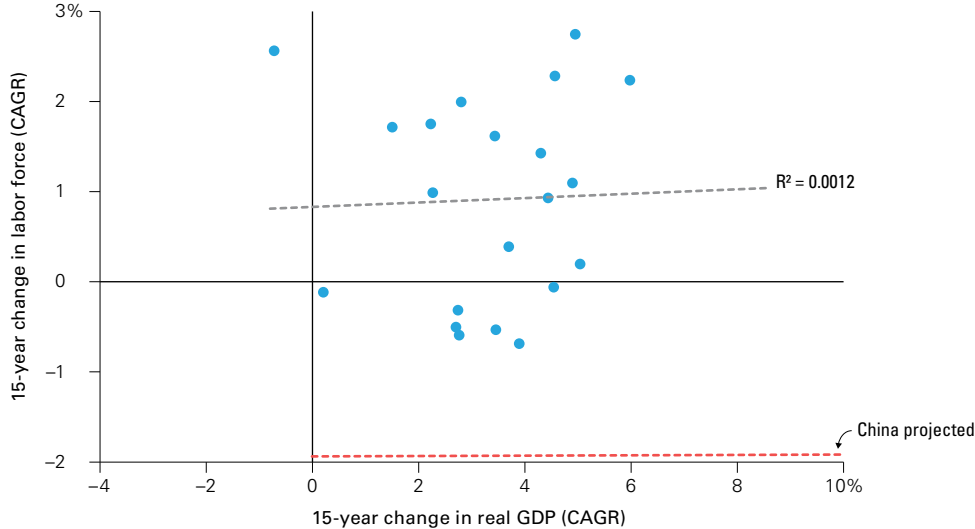


**Notes:** Growth rates are the compound annual growth rate (CAGR) over the 15-year period, or the longest available depending on the start date (when the country was China's current GDP per capita size). The dotted gray line reflects that in this data sample, any relationship between labor force growth and GDP growth appears inconclusive.

**Sources:** Vanguard calculations, based on data from the World Bank.

To determine the major factors that have explained productivity growth over the past half-century, we began with a cross-country panel regression model similar to the one used by Li et al. (2017). Their model sought to examine the correlation between per capita income and education in five specific years across more than 100 countries, with the only explanatory variable being the average years of schooling for those age 25 or above. To assess China's position relative to the rest of the world, the authors excluded China for all regressions, then examined the position of China relative to the regression line in each of the five years. We build upon this framework by adding additional variables that could help explain productivity growth over time, including core control variables such as investment and government share of GDP, as well as less conventional variables such as privatization reforms, research and development (R&D) spending, and economic globalization on both trade and capital terms (**Figure 5**).

Figure 5. Drivers of productivity growth

| Driver | Description |
|---|---|
| Human capital | Li et al. (2017) found a strong relationship between education and a country's income levels, with a 0.1-year rise in the years of schooling associated with a 2.6% rise in income. In our model, we measure human capital using the average years of schooling for those age 25 and above. |
| Investment and government share of GDP | In a growth decomposition exercise, Caselli, Esquivel, and Lefort (1996) included core variables traditionally considered vital to an economy's growth potential, such as total stock of initial physical capital, population growth rate, and government spending. We build upon their approach by including investment and government share of GDP as independent variables in our regression. |
| Idea Diffusion | Using a proprietary "Idea Diffusion" metric, Davis et al. (2020) found that the global sharing of ideas leads to a more productive world. Specifically, the authors estimate that a 0.1-unit rise in Idea Diffusion increases the average growth rate in real output per worker by 2% over a five-year period. In other words, as an economy absorbs more ideas from outside its domestic knowledge pool, it generally grows at a higher rate than if all ideas were domestically sourced. We include this measure in our cross-country regression to proxy for global innovation. |
| R&D share of GDP | In addition to global innovation, domestic innovation and R&D have proven to be an important contributor to productivity growth. In particular, Guellec and van Pottelsberghe de la Potterie (2001) found that an increase of 1% in domestic R&D generates 0.13% in productivity growth. We proxy domestic innovation via R&D spending as a percentage of GDP in our regression. |
| Privatization reforms | Barro (2003) found that institutional quality is among the most important determinants of long-run per capita output. We build upon this by including a regulatory quality index from the World Bank, which measures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. |
| Economic globalization | Lee (2016) found that a higher degree of trade openness has a strong, positive effect on GDP per capita. We build upon this by including an economic globalization variable that incorporates both trade globalization and capital liberalization measures from the KOF Swiss Economic Institute. Capital liberalization was included in addition to trade liberalization because academic literature suggests that the growth rate of output per worker rises by an average of 2.3% per year when emerging economies liberalize their capital markets (Henry, 2003). This finding can be attributed to a more efficient allocation of capital and a decrease in the cost of capital leading to a rise in investment.<br><br>Trade globalization measures the exports of goods and services as well as the degree of trade regulations/barriers and free-trade agreements a country has. Capital liberalization measures the capital flows and stocks of foreign assets and liabilities, as well as the prevalence of foreign ownership and regulations to international capital flows. The final economic globalization index included in the regression is an equally weighted average of the two indexes. |

Source: Vanguard.

Our regression model is expressed in **Equation 2**, where GDP per capita is a function of capital, human capital, and a group of measures of technology and reforms, including Idea Diffusion, R&D, privatization, and economic globalization. In our analysis, we use the nominal GDP levels of countries as weights, which means that we weight the productivity driver-income relationship for larger economies more than that of smaller ones, with the full sample period spanning from 1996 to 2017.[11]

We find that human capital, R&D, privatization reforms, and globalization are all important factors in predicting GDP per capita in our cross-country sample. All of our variables are statistically significant, and together, they explain over 90% of the variation in GDP per capita over time across countries (see Figure A-2 in the Appendix on page 26).

Figure 6 provides an international case study to illustrate how the future path of an economy, after reaching an income level similar to China's today, will primarily depend on the country's ability to push forward reforms in these areas. Specifically, we find that countries that were historical "leaders" in each of the respective growth fields such as R&D, human capital, privatization reforms, and economic globalization tended to fare better in their subsequent GDP growth rates than those classified as "laggards." The leaders experienced an average real GDP growth rate of around 4.5% in the 15 years after they achieved China's 2019 level of GDP per capita, while the laggards saw their growth rates fall to around 0.5% on average.

Equation 2. Cross-country panel regression

$$\ln(GDPPC_{i,t}) = \alpha + Education_{i,t} + Investment_{i,t} + Government_{i,t} + Idea\ Diffusion_{i,t} + R\&D_{i,t} + Privatization_{i,t} + Economic\ Globalization_{i,t} + \varepsilon_{i,t}$$

where

$\ln(GDPPC_{i,t})$ refers to the natural logarithm of GDP per capita of each country $i$ at time $t$,

$Education_{i,t}$ refers to the average years of schooling for age 25 and above,

$Investment_{i,t}$ refers to the investment share of GDP,

$Government_{i,t}$ refers to government spending as a share of GDP,

$Idea\ Diffusion_{i,t}$ refers to the rate of foreign Idea Diffusion into a country,

$R\&D_{i,t}$ refers to domestic research and development spending as a percentage of GDP,

$Privatization_{i,t}$ refers to the privatization reforms of each country, and

$Economic\ Globalization_{i,t}$ refers to the economic globalization index of each country.

Figure 6. Progress in domestic reforms is required to escape the middle-income trap

| Based on China's 2018 GDP per capita | Leader | | | | Laggard | | | |
|---|---|---|---|---|---|---|---|---|
| | Country/region | Years | Change | CAGR GDP | Country/region | Years | Change | CAGR GDP |
| Research and development change | South Korea | 1989–2004 | 0.7% | 5.9% | Russia | 1991–2006 | −0.3% | 0.5% |
| | Singapore | 1971–1986 | 1.0% | 5.6% | | | | |
| Average years of schooling | Baltic states | 1995–2010 | 3 | 5.0% | South America | 1985–2000 | 0.3 | 1.4% |
| | Malaysia | 2004–2019 | 2.4 | 3.3% | | | | |
| Privatization | Chile | 1994–2009 | 1.5 | 3.3% | South Africa | 2008–2018 | −0.3 | 0.0% |
| | Baltic states | 1995–2010 | 1.0 | 5.0% | Latin America | 1998–2013 | −0.2 | 1.7% |
| Globalization | Poland | 1998–2013 | 24.3 | 3.8% | South Africa | 2008–2018 | −0.9 | 0.0% |
| | Singapore | 1971–1986 | 15.5 | 5.6% | | | | |

Notes: The Baltic states are Estonia, Latvia, and Lithuania. *CAGR* is compound annual growth rate.
Sources: Vanguard, using data from the World Bank and the KOF Swiss Economic Institute.

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**11** We find that a weighted approach delivers more robust results than an unweighted approach.

## China in perspective

Against this backdrop, we set out to analyze each growth factor within China's context to assess its progress to date and identify areas of opportunities over the next decade. In particular, we build upon the framework of Li et al. (2017) by assessing where China stands relative to its past and to the rest of the world.

### Factor 1—Human capital

Similar to Li et al. (2017), we find that in terms of human capital, China was below the regression line (**Figure 7**) starting in the five years leading up to 2003, with per capita income about 90% of the level predicted by the global averages shown by the regression line. This suggests that China's human capital was not being fully utilized at that time.

Additionally, China also leaned toward the far left of the regression line, which speaks to its low initial levels of education of roughly six years, relative to the global average of 10 years. Over the years, China has steadily moved toward and along the regression line, and by 2017, it converged to the regression line, suggesting a much higher-quality education standard. Relative to G7 countries, however, China still has room for improvement when it comes to developing human capital.

*How to read the bubble charts*

One can think of each factor's contribution to productivity growth as having two components: the extent to which it moves toward the line and its growth along the line. Moving along the regression line means that higher per capita income is positively associated with higher levels of that particular factor. Moving higher toward the regression line signifies, whether through an increase in factor quality or a more efficient use of that factor, gradually increasing pass-through effects from higher levels of that factor leading to higher growth. The opposite is true for a movement lower and away from the regression line.

Figure 7. Human capital has become more in line with global standards
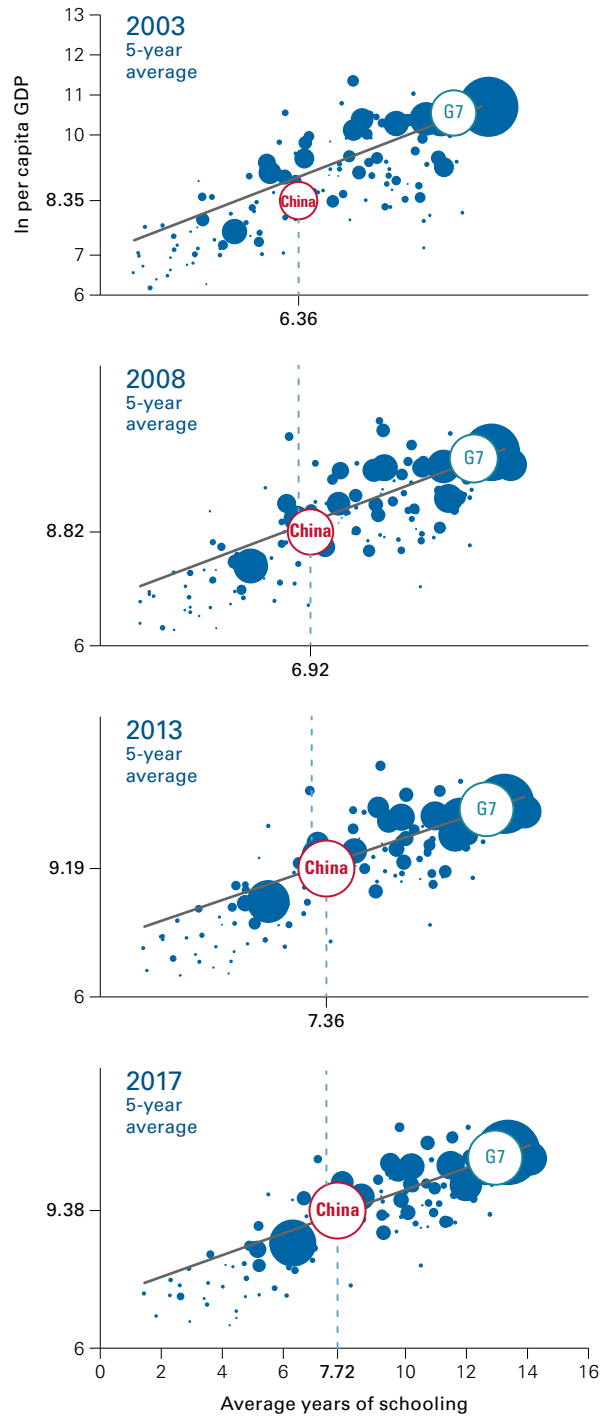


**Notes:** Bubble size reflects the country's GDP level. A list of the countries used in the regression can be found in Figure A-3 in the Appendix on page 26. *In* is natural logarithm, the difference of which is used to calculate the growth rate of GDP per capita.

**Source:** Vanguard.

Indeed, despite China's rapid progress in increasing the number of college graduates and enrollment in recent years, it still has abundant room to increase its average years of schooling for the broader population, with the percentage of college and high school graduates still less than a third of that of developed countries such as the U.S. A more educated workforce can have flow-through effects at boosting our second factor, R&D, given the strong positive correlation between the proportion of adults with a postsecondary education and the number of research personnel, which to date has been relatively small in China (**Figure 8**).

Figure 8. China's low research concentration can be improved by investing in higher education



Research personnel

○ Percentage of those ages 25 to 64 with postsecondary education
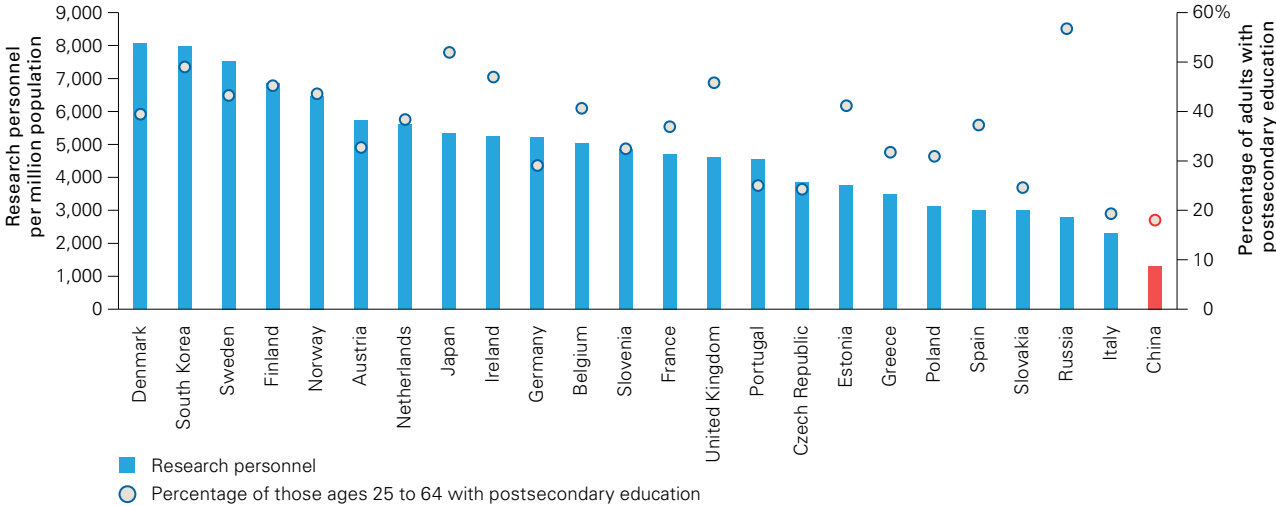
Sources: Vanguard calculations, based on data from the World Bank and the OECD.
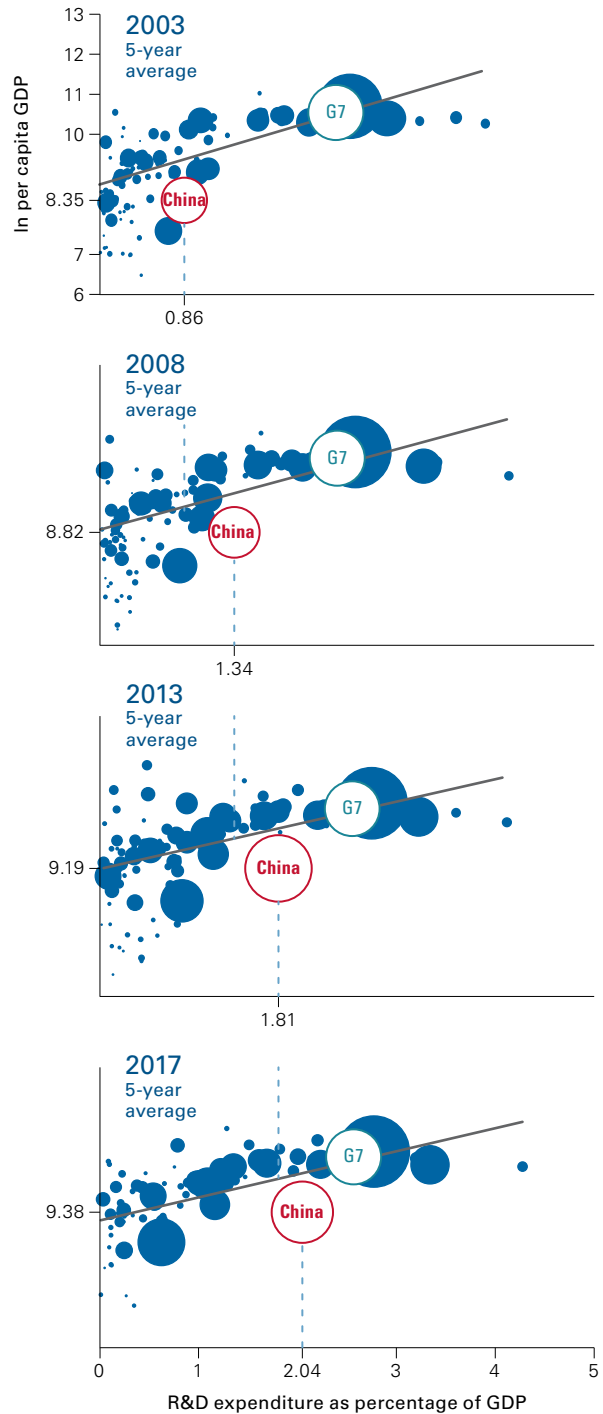
## Factor 2—R&D

Applying the same framework to the R&D factor shows that China still has plenty of room for improvement in terms of enhancing both the quantity and quality of domestic research, as reflected by its bubble being both below and toward the left of the regression line in 2017 (**Figure 9**).

Although the rapid increase in R&D spending over the last decade is substantial, we observe that it still remains small relative to the size of China's economy, with R&D spending as a share of GDP 1 to 2 percentage points lower than that of other developed markets (**Figure 10**).

Part of this shortfall in domestic R&D can be explained by the capability to leverage foreign research, or the diffusion of ideas, as highlighted in our *Idea Multiplier* paper (Davis et al., 2020), where a higher diffusion rate implies a higher utilization of foreign research.[12] Even within China's own domestic research spending, we find that a large proportion (more than 80%) has historically been used for experimental development—essentially, research using existing knowledge. Meanwhile basic and applied research—or essentially the creation of new knowledge—have remained considerably smaller than in some developed markets (**Figure 11**). This suggests that there is scope not only for further support in terms of the quantity of R&D expenditure but also for the composition or quality of R&D to shift toward basic and applied research, consistent with research powerhouses such as the U.S. or South Korea.

Globalization may also affect China's rate of innovation. On one hand, a less friendly external environment today means that China could have less access to foreign technology and knowledge, which may stall experimental development in science and technology. On the other hand, it may very well accelerate China's path of domestic innovation, encouraging the government and the private sector to place an even greater emphasis on technology self-sufficiency and basic and applied research.

**Figure 9. R&D spending is rising, but it still lags global peers**



Notes: Bubble size reflects the country's GDP level. A list of the countries used in the regression can be found in Figure A-3 in the Appendix on page 26. *ln* is natural logarithm, the difference of which is used to calculate the growth rate of GDP per capita.

Source: Vanguard.

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12 Davis et al. (2020) found that a 0.1-unit increase in a country's Idea Diffusion score increases the average growth rate in real output per worker by 2% over the subsequent five-year period.

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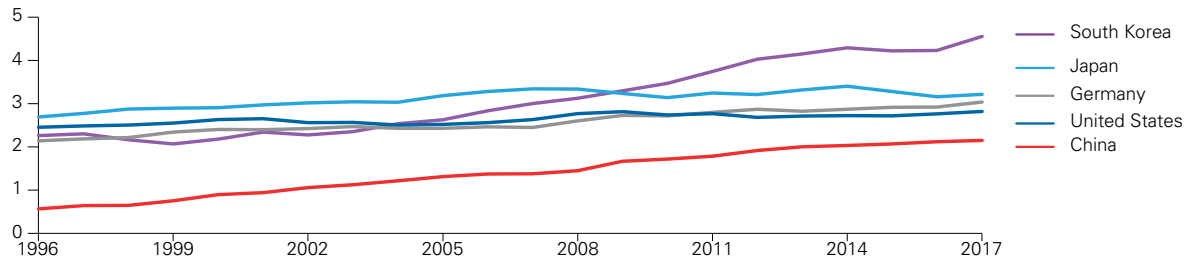
Source: Vanguard.

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Figure 10. Domestic innovation is rising, but still has room to catch up
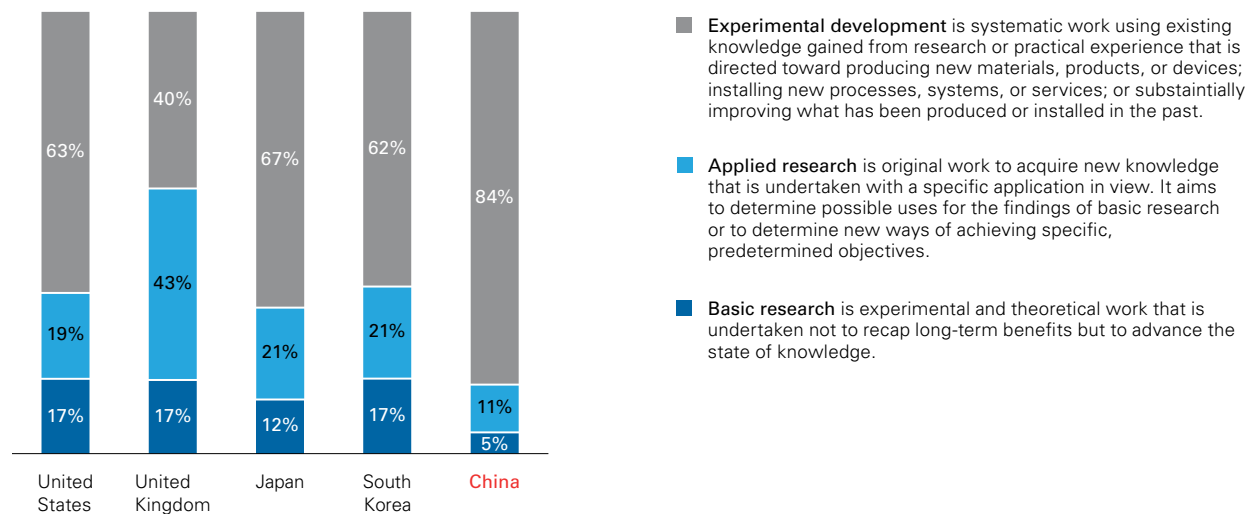
a. R&D spending (USD, billions)
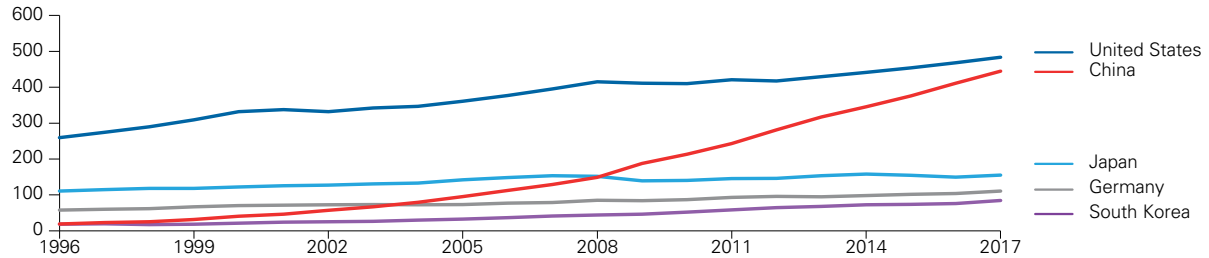


b. R&D spending (percentage of GDP)



Notes: R&D spending as a percentage of GDP is measured in purchasing power parity (PPP) terms. In PPP terms, China's GDP is already larger than that of the U.S., having surpassed it in 2017. Throughout this paper, when referencing China's surpassing U.S. GDP after 2050, we're using nominal GDP in U.S. dollars.

Sources: Vanguard, using data from the World Bank.

Figure 11. China's R&D has scope to shift more toward research



**Experimental development** is systematic work using existing knowledge gained from research or practical experience that is directed toward producing new materials, products, or devices; installing new processes, systems, or services; or substaintially improving what has been produced or installed in the past.

**Applied research** is original work to acquire new knowledge that is undertaken with a specific application in view. It aims to determine possible uses for the findings of basic research or to determine new ways of achieving specific, predetermined objectives.

**Basic research** is experimental and theoretical work that is undertaken not to recap long-term benefits but to advance the state of knowledge.

Note: Percentages may not total 100 because of rounding.

Sources: Vanguard, using data from the OECD.

### Factor 3—Privatization reforms

Globally, privatization reforms prove to be the most important factor after education in our regression, with a one-standard-deviation move raising the productivity growth rate by around 0.3 percentage points. As **Figure 12** illustrates, China made steady progress with its privatization reforms in the years leading up to 2008. On an absolute basis, we observe that between 1998 and 2008, higher per-capita income in China was positively associated with better institutional quality (or move toward privatization), consistent with the gradual increase in private share of capital investment (**Figure 13a**). At the same time, China's move above the regression line during this period also means that on a relative basis, it gradually increased the pass-through effects from better institutional quality to higher growth, consistent with a more efficient private sector (**Figure 13b**).

More recently, however, this trend has stalled.[13] Looking ahead, China is approaching a crossroads where it will need to decide whether to accelerate or delay its market-oriented reforms. Both options come with trade-offs, with the former likely to unleash long-term efficiency gains. Nonetheless, we recognize that there is always a relationship between the pace of reform and domestic and social stability, especially as the external environment has turned more challenging.

**Figure 12. Privatization reforms have stalled in recent years**
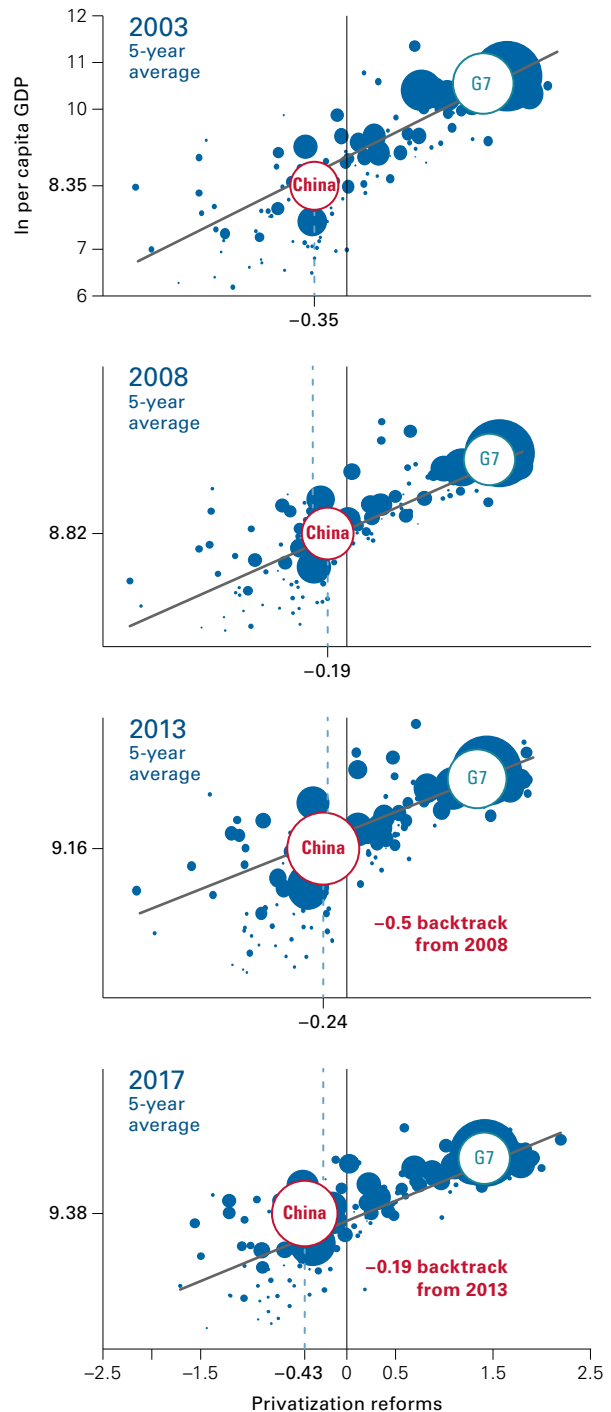


Notes: Bubble size reflects the country's GDP level. A list of the countries used in the regression can be found in Figure A-3 in the Appendix on page 26. *In* is natural logarithm, the difference of which is used to calculate the growth rate of GDP per capita.
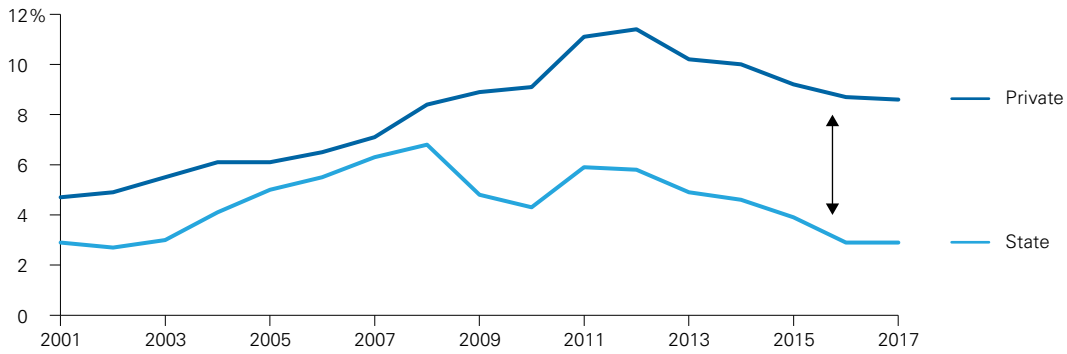
Source: Vanguard.

**13** The reversal of this trend is shown in Figure 12 from the comparison of the bottom chart (2017) with the chart just above it (2013).

Figure 13. Boosting the share of private investment will be key to lifting productivity

a. Share of capital investment by type of firm
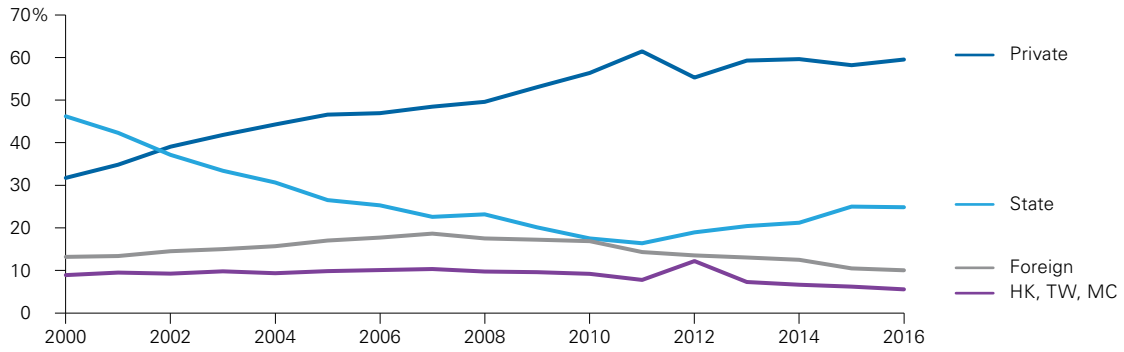


b. Return on asset for state versus private firms



Note: The dark-blue line in Figure 13a refers to investments funded by Greater China firms (Hong Kong, Taiwan, and Macao).
Sources: Vanguard, using data from CEIC.

## Factor 4—Economic globalization

China made considerable progress opening its market to the external sector leading up to the global financial crisis, in terms of both trade and capital flows (**Figure 14**), as it emerged as the "world's factory" and welcomed foreign investors into its capital markets. More recently, however, our economic globalization measure has shown signs of decline (**Figure 15**) as China gradually rebalances away from trade to domestic consumption and investment. The tightening of capital controls after 2014 has also weighed on capital globalization. Although the decline in trade globalization comes as no surprise as the economic structure changes, we see room for improvement on the capital-globalization front to allow for more two-way symmetric exchange of capital rather than the current asymmetric capital flow promoting northbound flows but limiting southbound flows.[14]

**Figure 15. Tightening of capital controls post-2014 has contributed to a decline in China's globalization measure**
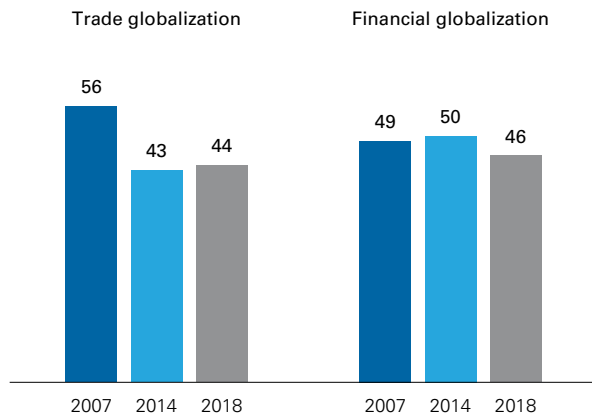


Notes: Trade globalization measures the export of goods and services as well as the degree of trade regulations/barriers and number of free trade agreements a country has. Financial globalization measures foreign direct investment, portfolio investment, and the regulations to international capital flows.
Sources: Vanguard, using data from the KOF Swiss Institute.

**Figure 14. Economic globalization has backtracked in recent years**
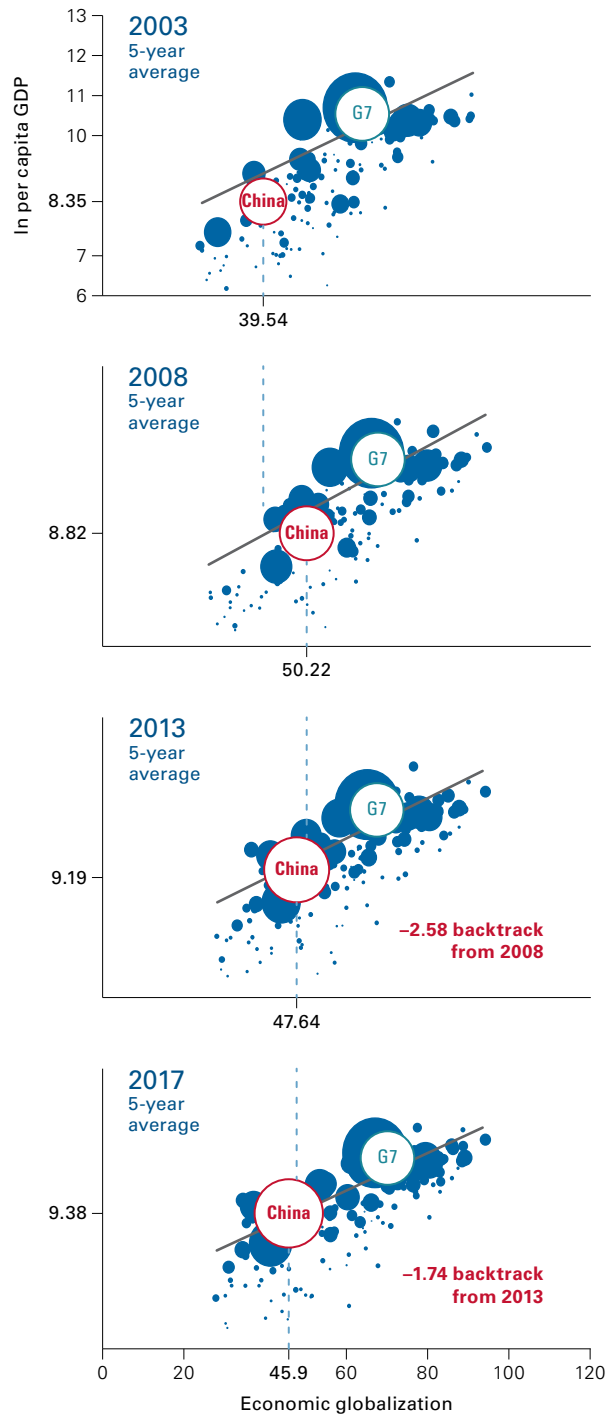


Notes: Bubble size reflects the country's GDP level. A list of the countries used in the regression can be found in Figure A-3 in the Appendix on page 26. *ln* is natural logarithm, the difference of which is used to calculate the growth rate of GDP per capita.
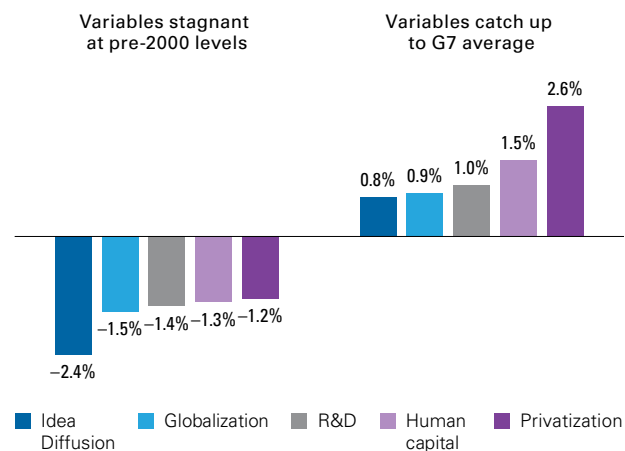Source: Vanguard.

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**14** Northbound trading allows foreign investors to invest directly in securities listed on the Shanghai Stock Exchange (i.e., capital inflow into China), while southbound trading allows domestic investors from Mainland China to invest directly in securities offshore (i.e., capital outflow).

## The future: Lower but more sustainable growth

To gauge how China's overall growth trajectory would look if it makes significant progress or backslides on the above-mentioned factors, we conducted a counterfactual exercise to identify the areas of opportunities and risk. Our calculations show that on the external front, if the globalization of ideas had stagnated back in the early 1990s, China's growth would have been about 2% lower today, all else equal (**Figure 16**). This implies that China's annual real GDP growth in the years leading up to COVID-19 would have been around 4% instead of 6%. In the tail-risk event that the Idea Diffusion rate does not just stagnate but effectively falls to 0—effectively eliminating all international knowledge sharing—this slowing in growth would be further magnified by nearly 4 percentage points, dropping the pre-COVID-19 growth rate from 6% to closer to 2%.

Figure 16. Counterfactual analysis—Domestic reforms hold the key to the upside

Difference in annual GDP growth



Note: Idea Diffusion, in an optimistic scenario, would be catching up to the G7 leader, not the G7 average.
Source: Vanguard.

Although these numbers suggest that the external environment matters for the future of China, an acceleration of domestic reforms can help mitigate these headwinds, our analysis shows. For example, Figure 16 also shows that if China had caught up to the G7 average standard on privatization reforms over the past two decades, growth could have been close to 3% higher today, suggesting that there remains much room to boost domestic reforms. Similarly, investing in domestic R&D and education proves to have a bigger incremental impact on the upside potential than that of external factors such as the globalization of ideas, trade, and capital flows.
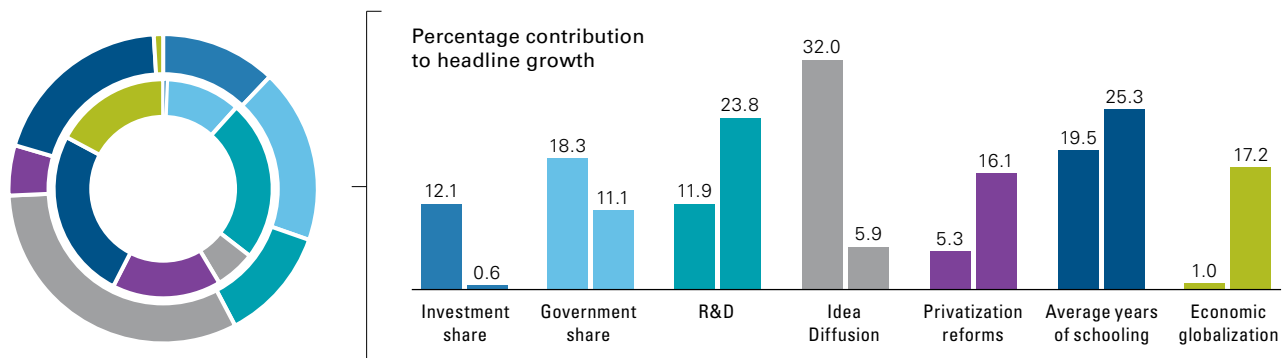
**Figure 17** shows our base-case assumption of how these various growth factors are likely to evolve over the next 15 years. Although the rate of growth will be lower than that of the last 15 years, as reflected by the size of the pie, the drivers of growth will likely become more diversified and balanced, with the economy depending more on privatization reforms, human capital, domestic R&D, and two-way opening of its capital markets than on investment spending and foreign research.

Per our counterfactual analysis, we present various risk scenarios to our baseline over the next 15 years (**Figure 18**). In a highly optimistic scenario, where reglobalization takes place on the external front and China accelerates domestic reforms and plays catch-up to the G7 average standard for all the above-mentioned factors, China will be able to achieve its goal of doubling its GDP by 2035, with its terminal real GDP growth rate being around 5.4%.

On the other hand, if the external environment sours to a deglobalization state or if knowledge sharing between China and the developed world halts, and if China fails to accelerate domestic innovation and privatization reforms, China will likely end up in a long-term stagnation phase, where growth will continue to decelerate and settle at a 1% terminal rate by 2035. Under this scenario, China may never reach its 2035 goal of doubling GDP per capita. That said, if China uses the more hostile global environment as an opportunity to accelerate domestic reforms, its growth rate at the end of the 15-year time frame will exceed that of our base-case scenario, highlighting the importance of domestic reforms over the fate of the external environment.
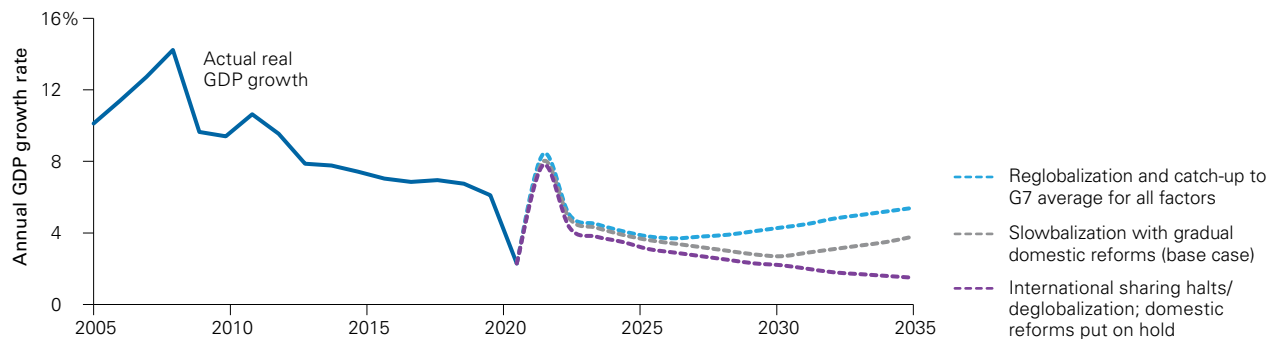
## Figure 17. Lower speed, but more balanced and sustainable growth

**Past 15 years** (outer ring/left bars); **next 15 years** (inner ring/right bars)



Percentage contribution to headline growth

| | Past 15 years | Next 15 years |
|---|---|---|
| Investment share | 12.1 | 0.6 |
| Government share | 18.3 | 11.1 |
| R&D | 11.9 | 23.8 |
| Idea Diffusion | 32.0 | 5.9 |
| Privatization reforms | 5.3 | 16.1 |
| Average years of schooling | 19.5 | 25.3 |
| Economic globalization | 1.0 | 17.2 |

Source: Vanguard.

## Figure 18. Scenarios for China's growth



Actual real GDP growth

- Reglobalization and catch-up to G7 average for all factors
- Slowbalization with gradual domestic reforms (base case)
- International sharing halts/ deglobalization; domestic reforms put on hold

| | Reglobalization and accelerated domestic reforms | Slowbalization with gradual domestic reforms (base case) | International knowledge sharing halts and domestic reforms put on hold |
|---|---|---|---|
| Probability | 15% | 60% | 25% |
| 2035 real GDP growth rate | 5.4% | 4.0% | 1.5% |
| Average 2021–2035 real GDP growth rate | 4.7% | 3.8% | 2.9% |
| Year China will double GDP per capita | 2034 | 2038 | 2050 |

Notes: Probabilities assume that these are the only three possible outcomes. In actuality, there are multiple combinations of outcomes that fall somewhere on a spectrum between the optimistic (reglobalization) and pessimistic (deglobalization, halted domestic reforms, and a decline in international knowledge sharing) scenarios.
Source: Vanguard.

## Lasting shifts toward consumption and services

A successful push-through of domestic reforms will likely expand the proportion of middle-class workers and enable consumption to increase further. As **Figure 19a** shows, despite a steady rise in total consumption share of GDP since 2010, China's ratio still remains lower than that of most developed economies, where consumption accounts for about 80% of the economy. In the coming decade, we expect China's total consumption to grow faster than GDP growth given the government's emphasis on boosting domestic demand as part of its dual circulation strategy outlined in the 14th Five-Year Plan proposal. Additionally, as consumers become wealthier, we see the type of consumption expenditure gradually shifting from goods to services (**Figure 19b**); more than a third of Chinese consumption now goes to services, up from a tenth two decades ago. This, alongside the shift toward newer types of investment, will see the tertiary sector grow in importance over the next 15 years.

Based on international experience, which suggests that a full rebalancing cycle takes about 30 years to complete, we estimate that China's rebalancing, which started in 2010, will approach its steady state around 2035, with consumption estimated to account for about 70% of the economy by then. With China's capital per capita ratio still low relative to international standards, the share of investment in the Chinese economy may not fully converge to that seen in other developed markets and may instead settle at a relatively higher level. However,

the type of investment is likely to shift increasingly away from traditional old-economy sectors such as textiles and mining and toward new economy sectors relating to health care, high-tech manufacturing, and innovative green technology (**Figure 20**).

The shift in the type of investment is likely to be more sustainable and is also consistent with the government's recent decarbonization goals and efforts, with China pledging to have carbon dioxide emissions peak before 2030 and to achieve carbon neutrality before 2060.

### Figure 20. Investment growth is shifting toward consumer-related and high-tech, greener sectors

Percentage year-over-year

| Sector | Value |
|---|---|
| Health care | 15.2% |
| Entertainment | 12.0% |
| Scientific research | 10.9% |
| Information technology | 10.9% |
| Environment | 6.6% |
| Real estate | 6.5% |
| Transportation | 5.7% |
| Mining | 0% |
| Autos | −0.4% |
| Textiles | −1.4% |

**Sources:** Vanguard, using data from CEIC. Data are through June 2021.

### Figure 19. Consumption and services have room to further expand in China

a. Consumption is forecasted to account for more than two-thirds of the economy by 2035
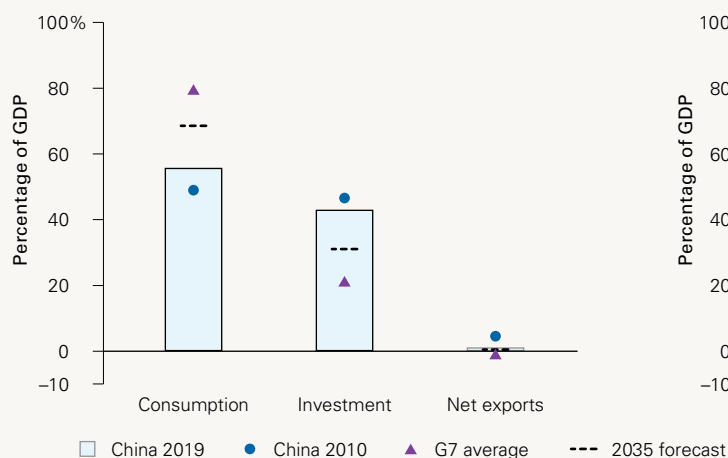
b. Service sector will likely grow in importance as consumers become wealthier

□ China 2019    ● China 2010    ▲ G7 average    --- 2035 forecast
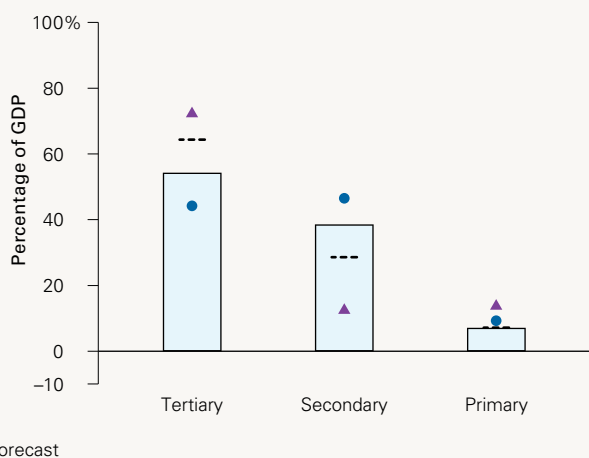
**Notes:** The tertiary sector refers to the provision of commercial services such as insurance, sales, and teaching. The secondary sector relates to the manufacturing and assembly process, where raw materials are transformed into components and assembled. The primary sector involves agricultural cultivation and the acquisition of raw materials; common examples are farming and fishing.

**Sources:** Vanguard, using data from the World Bank.
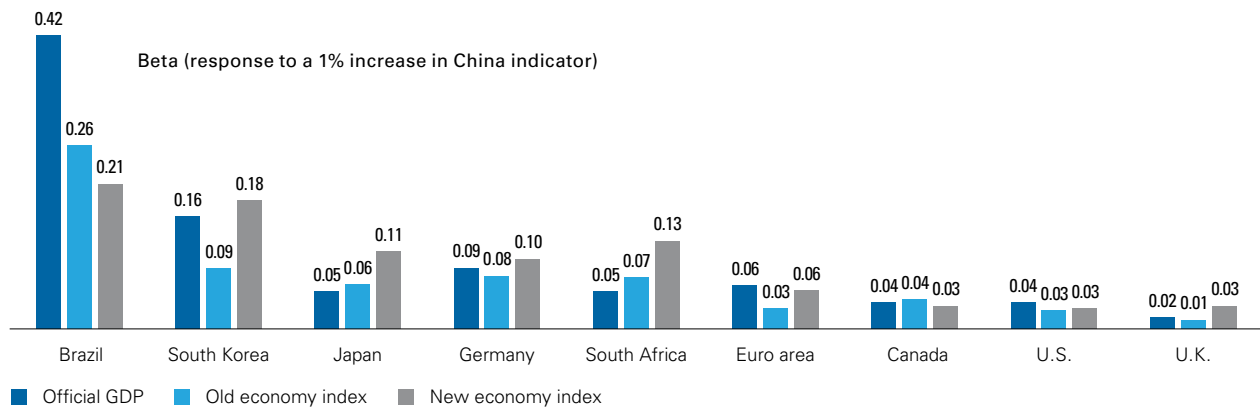
## Implications for the rest of the world

### Uneven spillover to global growth

China's lower growth rate and domestic consumption rebalancing will have uneven impacts throughout the world. The China dividend—the economic tailwind other economies reaped from China's twenty-first-century surge—will decline as the world's second-largest economy settles into a more sustainable, lower growth trajectory.[15] China's shift to a consumer-based economy will also present variation of trading partners' economic responses (**Figure 21**), with some countries, such as

Japan and South Korea, benefiting from the rise of the Chinese consumer. Tourism, luxury goods, and education are just a few examples of how a richer Chinese consumer will have positive economic spillover effects for developed economies.

Brazil is expected to be the hardest-hit economy as the slowdown in China's old-economy industries disproportionally impairs Brazilian exports. Otherwise, the total economic impact for much of the developed world will be a modest 0.1 to 0.2 percentage points.

**Figure 21. Uneven regional impacts from a rebalancing Chinese economy**



Beta (response to a 1% increase in China indicator)

| | Official GDP | Old economy index | New economy index |
|---|---|---|---|
| Brazil | 0.42 | 0.26 | 0.21 |
| South Korea | 0.16 | 0.09 | 0.18 |
| Japan | 0.05 | 0.06 | 0.11 |
| Germany | 0.09 | 0.08 | 0.10 |
| South Africa | 0.05 | 0.07 | 0.13 |
| Euro area | 0.06 | 0.03 | 0.06 |
| Canada | 0.04 | 0.04 | 0.03 |
| U.S. | 0.04 | 0.03 | 0.03 |
| U.K. | 0.02 | 0.01 | 0.03 |

**Notes:** A vector autoregression model was used to measure the effects of China's old and new economy growth momentum on the respective country or region's growth. The sample period covers from 2006 to 2018.
**Sources:** Vanguard calculations, based on data from Thomson Reuters Datastream, CEIC, and Bloomberg.

**15** See Arora and Vamvakidis (2011), which estimates that a 1-percentage-point increase in China's growth is correlated with an average 0.5-percentage-point increase in the growth of other countries.

**U.S.-China relationship is likely to remain contentious**

China's economic rise may further complicate its relationship with the U.S., which to date has been challenged by fundamental disagreement on many critical issues and the long-term competitive dynamics of two global economic powers. As **Figure 22** shows, a pursuit of China's reform agenda in our base case is likely to elevate it to replace the U.S. as the world's largest economy within three decades.[16] Should China accelerate reforms immediately, the time taken to reach U.S. GDP will be further reduced by around 10 years. On the other hand, if China chooses not to reform, it may continue to lag the U.S. in economic size, but ongoing technology competition may mean that the contentious relationship between the two countries is likely to persist.

Figure 22. China is set to become the world's largest economy if reforms are undertaken
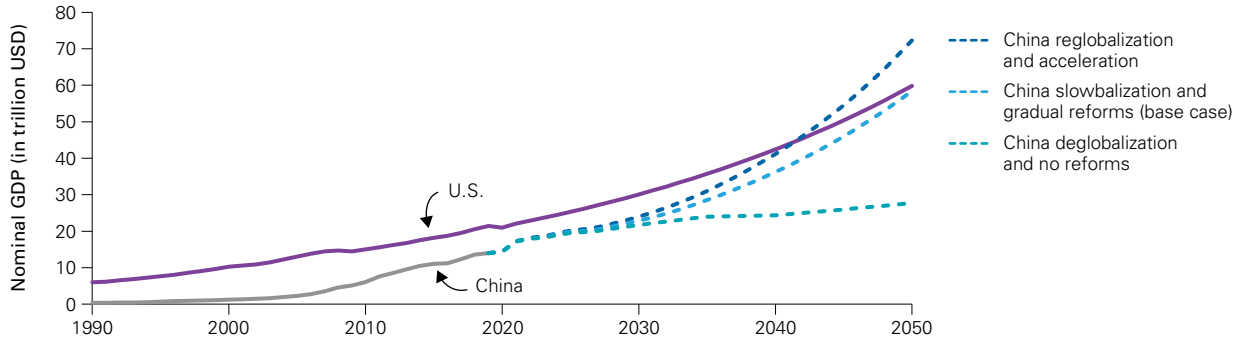


Sources: Vanguard, using data from the World Bank.

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**16** "World's largest economy" is in terms of nominal GDP in U.S. dollars. We note that China's nominal GDP per capita will still be smaller than that of the U.S. even if nominal GDP levels converge, given China's larger population size.

## China's share of global financial markets is expected to double

By promoting more symmetric two-way capital flows as part of its reform agenda, China could see its capital markets grow as foreign investor flows intensify. Although China is presently the second-largest equity and bond market globally, its capital markets as a percentage of GDP remain considerably behind the developed-market average (**Figure 23a**), suggesting there is room for growth. Based on our forecasts of GDP

growth, international capital openness, and domestic economic reforms to strengthen the role of direct financing, we expect China's equity market capitalization as a percentage of GDP to increase from 61% in 2019 to 76% in 2035. We expect bond market capitalization to increase from 105% to 136% of GDP. For a globally diversified investor, this translates to China's portfolio allocation roughly doubling from 7% to 14% in an equity portfolio and 7% to 12% in bond portfolios by 2035 (**Figure 23b**).[17]

### Figure 23. China's growing capital markets affect investors globally

a. Market size as a percentage of GDP

b. China allocation in global portfolio
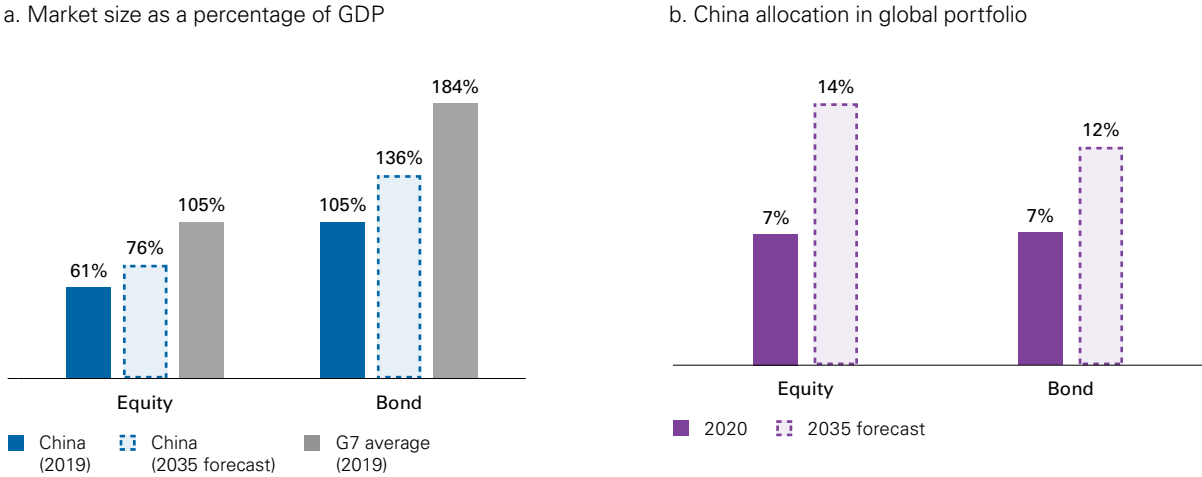


Notes: China's 2035 market capitalization forecast is estimated via cross-sectional ordinary least squares regression, with GDP growth, international capital openness, and privatization as independent variables. Future portfolio allocation is calculated by taking the forecasted market size as a percentage of GDP and China's expected GDP as a percentage of global GDP in 2035, assuming other economies' financial markets grow at recent trends. Portfolio allocation indicates total share of Chinese companies, regardless if traded as A shares or H shares.
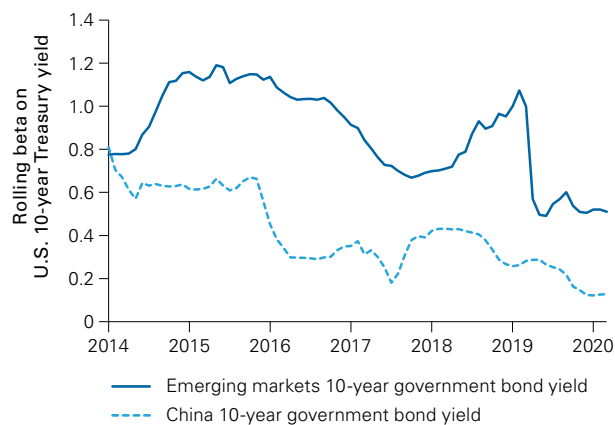Sources: Vanguard calculations, based on data from the World Bank and Bloomberg.

**17** The equity benchmark is the FTSE Global All Cap Index; the bond benchmark is the Bloomberg Barclays Global Aggregate Bond Index.

An increased portfolio allocation in China has considerable diversification benefits given the region's relatively low correlation with other markets.[18] **Figure 24** demonstrates that China's 10-year interest rates have become increasingly insensitive to U.S. yields since 2015 and are considerably less correlated than emerging-market yields. This has implications for both bond and equity investors because interest rates also affect equity valuations. This dynamic will evolve with time, as equity correlations are expected to increase with the rest of the world given a loosening of capital controls. But in a world where many major central banks act in tandem, China is likely to be the most uncorrelated of all major economies.

As China's global footprint and financial market grow, greater accountability and regulatory oversight is expected to follow, helping to boost investor confidence. Although this development would reduce future equity returns because uncertainty is a component of the equity risk premium, this could be partially offset by a loosening of capital controls, giving China-domiciled investors easier access to investment options outside of Mainland China and therefore raising the required return of Chinese equities.

## Conclusion

China's future as the world's largest economy is not a foregone conclusion, with the country on the precipice of significant domestic and international challenges. To avoid the middle-income trap, China must change in two interrelated areas: alleviating structural risks, such as imbalances, inefficiencies, and inequality; and encouraging technological innovation and industrial upgrading. Progress in these fields, coupled with an evolving external environment, creates a myriad of potential long-term economic trajectories for China.

In our view, the most likely scenario entails international headwinds from slowing global trade growth and gradual domestic reforms as policymakers balance medium-term political and financial concerns with their desire for sustainable long-term growth, propelling China to become a global economic superpower. High growth begets greater international competition, however, as political pressures in the developed world will intensify, further supporting the case for China's expansion of domestic consumption and innovation. Failure to do so could result in China's entering a long-term stagnation phase and failing to ever match U.S. economic size. China's future has varying implications for regional economies; geographic neighbors and raw commodity exporters will be most affected, while global portfolios will likely see their investment allocation to the region double.

Figure 24. China's interest rates have become less sensitive to U.S. yields



Emerging markets 10-year government bond yield

China 10-year government bond yield

Notes: Beta is a measure of interdependence among variables; the greater the value, the more codependent. In this figure, the dotted line is declining more than the solid line, indicating that China and U.S. 10-year government bond yields have become less related over time and to a more significant degree than U.S. and emerging markets 10-year government bond yields. We used the GDP-weighted 10-year yield of the BRICS countries (Brazil, Russia, India, China, and South Africa) to reflect emerging markets 10-year government bond yields.

Sources: Vanguard calculations, based on data from Bloomberg.

18 See Shan et al. (2019).

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## Appendix

### Figure A-1. China's emphasis on growth quality has seen some reduction in demand-side headwinds

(>) indicates higher values lead to healthier and more sustainable growth prospects
(<) indicates lower values lead to healthier and more sustainable growth prospects

| | | 2015 | 2019 | 2020 |
|---|---|---|---|---|
| Financial imbalances | Debt-to-GDP ratio (<) | 251% | 278% | 306% |
| | Five-year change in debt-to-GDP ratio (<) | 55% | 27% | 40% |
| Overcapacity reduction | Inventory-to-sales ratio (months) (< ) | 18.3 | 14.5 | 17.7 |
| | Industry capacity utilization ratio (>) | 74.6 | 77.5 | 78 |
| Economic rebalancing | Consumption versus investment share of GDP (>) | 8% | 13% | 11% |
| | Service versus manufacturing share of GDP (>) | 10% | 16% | 17% |
| Macro policy cushion | Foreign exchange (FX) reserves (USD trillion)* (>) | 3.0 | 3.1 | 3.2 |
| | Total social financing growth trough to peak** (<) | 5.1% | 0.6% | 3% |
| | Policy rate cuts** (<) | 1.3% | 0.1% | 0.3% |
| Asset price appreciation | Five-year increase in margin trading (RMB billion) (<) | 53.1 | -0.9 | 31.3 |
| | Five-year increase in retail speculation (new trading accounts opened, million) (<) | 2.6 | −1.4 | 0.5 |
| | Property price growth year-over-year (Tier 1 city) (<) | 19.9% | 3.9% | 4.0% |

Notes: *We used 2016's FX reserves to compare to 2019, given that most of the 2015-16 FX drain happened in the latter year. ** We compared the 2015-16 easing cycle to the 2018-19 easing cycle.
Sources: Vanguard, using data from WIND, CEIC, and the Bank of International Settlements.

### Equation A-1: Solow Swan growth model

The equation is derived per the following:

Start with Cobb-Douglas production function:
$Y = AK^\alpha L^\beta$

Solow-Swan growth model, which rewrote Cobb-Douglas function into per-capita form:
$Y/L = AK^\alpha L^{\beta-1} = AK^\alpha/L^{1-\beta}$
$Y/L = AK^\alpha/L^\alpha = A(K/L)^\alpha$

where $Y/L$ reflects labor productivity.
$Y = A(K/L)^\alpha L = (Y/L)L$
$\%\Delta Y = \%\Delta(Y/L) + \%\Delta L$

Note: For more information, see: https://www.pitt.edu/~mgahagan/Solow.htm

Figure A-2: Regression results for Equation

| Variable | Variable description | Coefficients | P > |Z| |
|---|---|---|---|
| $\ln(GDPPC_{i,t})$ | Natural log of GDP per capita of each country $i$ at time $t$ | | |
| α | Constant | 6.737 | 0.00 |
| $Education_{i,t}$ | Average years of schooling for ages 25 and above | 0.181 | 0.00 |
| $Investment_{i,t}$ | Investment share of GDP | 0.567 | 0.02 |
| $Government_{i,t}$ | Government spending as a share of GDP | −1.702 | 0.00 |
| $Idea\ Diffusion_{i,t}$ | Idea Diffusion rate | 1.581 | 0.00 |
| $R\&D_{i,t}$ | R&D spending as a share of GDP | 0.158 | 0.00 |
| $Privatization\ Reforms_{i,t}$ | Word Bank's regulatory quality index | 0.299 | 0.00 |
| $Economic\ Globalization_{i,t}$ | KOF Swiss Institute Economic Globalization Index (includes trade and financial globalization) | 0.007 | 0.03 |

Figure A-3. Countries used in regression

| | | | | |
|---|---|---|---|---|
| Albania | China | Honduras | Mexico | Seychelles |
| Algeria | Colombia | Hungary | Mongolia | Sierra Leone |
| Angola | Comoros | Iceland | Montenegro | Singapore |
| Antigua and Barbuda | Costa Rica | India | Morocco | Slovenia |
| Argentina | Croatia | Indonesia | Mozambique | South Africa |
| Armenia | Cyprus | Iraq | Myanmar | Spain |
| Australia | Czech Republic | Ireland | Namibia | Sri Lanka |
| Austria | Denmark | Israel | Nepal | Sudan |
| Azerbaijan | Djibouti | Italy | Netherlands | Suriname |
| Bahrain | Dominica | Jamaica | New Zealand | Sweden |
| Bangladesh | Dominican Republic | Japan | Nicaragua | Switzerland |
| Barbados | Ecuador | Jordan | Niger | Tajikistan |
| Belarus | El Salvador | Kazakhstan | Nigeria | Thailand |
| Belgium | Equatorial Guinea | Kenya | Norway | Togo |
| Belize | Estonia | Kuwait | Oman | Trinidad and Tobago |
| Benin | Ethiopia | Latvia | Pakistan | Tunisia |
| Bhutan | Fiji | Lebanon | Panama | Turkey |
| Bosnia and Herzegovina | Finland | Lesotho | Paraguay | Uganda |
| Botswana | France | Liberia | Peru | Ukraine |
| Brazil | Gabon | Lithuania | Philippines | United Arab Emirates |
| Bulgaria | Georgia | Luxembourg | Poland | United Kingdom |
| Burkina Faso | Germany | Madagascar | Portugal | United States |
| Burundi | Ghana | Malawi | Qatar | Uruguay |
| Cambodia | Greece | Malaysia | Romania | Uzbekistan |
| Cameroon | Grenada | Maldives | Russian Federation | Zambia |
| Canada | Guatemala | Mali | Rwanda | Zimbabwe |
| Central African Republic | Guinea | Malta | Saudi Arabia | |
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