Innovation

The Story So Far

Innovation drives economic potential, especially as incomes rise and workforce and investment growth moderate. Promoting innovation is more difficult than cutting interest rates or approving projects. Innovativeness within an economy is an outcome reflecting education, intellectual property rights (IPR) protection, marketplace competition, and myriad other factors. Some countries have formal innovation policies and some do not, and opinions vary on whether government intervention helps or hurts in the long run. Many Chinese, Japanese, and other innovation policies have fallen short in the past, while centers of invention in the United States such as Silicon Valley, Boston, and Austin have succeeded with limited government policy support. In other cases, innovation interventions have helped, at least for a while.

- The 2013 Third Plenum released a series of decisions aiming at improving the innovation environment in China. Compared with previous innovation strategies, the Third Plenum placed a greater emphasis on market forces, calling for "market-based technology innovation mechanisms" while announcing that the "market is to play a key part in determinizing innovation programs and allocation of funds and assessing results, and administrative dominance is to be abolished."

- In May 2015, China officially launched Made in China 2025 (MC2025), a 10-year strategic plan for achieving new levels of innovation in emerging sectors. The MC2025 agenda diluted the Third Plenum's emphasis on market mechanisms with more elements of central planning. The blueprint set performance targets for 10 key industries in the proportions of domestic content and domestic control of intellectual property. An associated implementation road map document laid out specific benchmarks for global market share to be achieved by Chinese firms in emerging sectors, generating significant international backlash.

- Recognizing the prevalence of subsidy abuses and excess capacity related to its industrial policy programs, Beijing announced in December 2017 that it would gradually phase out some subsidy programs, such as for photovoltaic power generation and new energy vehicles (NEV).

- In March 2018, the U.S. Trade Representative's Section 301 Report concluded that key parts of China's technology push, including MC2025, were "unreasonable or discriminatory and burden or restrict U.S. commerce." The United States then imposed trade tariffs on $250 billion worth of Chinese imports over the course of 2018, including some products related to MC2025 and many that were not.

- In May 2019, the U.S. Trade Representative raised tariffs from 10% to 25% on nearly $200 billion of goods from China and started to review tariffs on the remainder of imports from China. Beijing retaliated by raising tariff rates on some imports from the United States. The U.S. Department of Commerce also added several Chinese high-tech manufacturers to its "Entity List"—a list of companies believed to present national security risks to the United States—effectively restricting those firms' access to U.S. exports.

Methodology

China's goal is to grow innovative industries and prune low-value sunset sectors. Indicators such as patent filings are increasing, but analysts question their quality. To measure progress, we estimate the industrial value-added (IVA)—a measure of meaningful output—of innovative industries as a share of all IVA in China, which tells us how much innovative structural adjustment is happening. Because China does not publish all IVA data details, we use an indirect approach to do this. Our supplemental gauges look at value-added growth rates in specific industries, China's performance compared with that of advanced economies in specific industries, China's trade competitiveness in innovative products, and two-way payments flows for the use of intellectual property.

Quarterly Assessment and Outlook

- We upgrade our assessment of China's innovation reform progress from neutral to slightly positive this quarter. Innovative industries contributed more to China's economy in 2Q2020 than in the previous quarter.

- Four out of the seven innovative industries we track grew above the industrial sector average in 2Q2020, while the other three underperformed.

- China imposed new restrictions on homegrown technology exports in August and December, which could hinder innovation by limiting the business scope of Chinese companies operating overseas and of foreign-invested firms in China.

This Quarter's Numbers

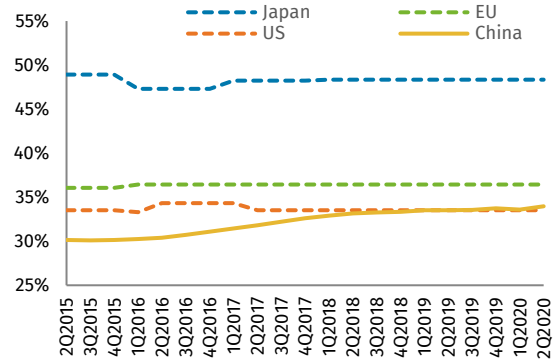
Our measure of innovative activity shows a rebound in 2Q2020: innovation played a bigger role in China's industrial sector after shrinking under COVID-19 in 1Q2020 (see **Innovative Industry Share in Industrial Value-Added [IVA]**). Innovative industries accounted for 33.97% of total industrial sector value-added, a small increase from 33.59% in 1Q2020 but still significant for a quarterly change. The industries now have more weight in China's economy than they do in the United States (33.52% as of 2017), but the European Union leads both (36.44% as of 2016).

Some innovative industries witnessed robust growth while others lagged. Special purpose equipment, electric machinery, communication equipment and electronics, as well as instruments and meters expanded faster than the industrial sector average in 2Q2020, while universal equipment, autos, and ex-auto transportation equipment underperformed (see **Industrial Value-Added Growth Rates for Specific Innovative Industries**). This divergence is likely temporary: preliminary data show that auto and universal equipment have rebounded in 3Q2020.

After several quarters of contraction, two-way IP flows increased in 2Q2020, with imports rising 5% year-on-year (yoy) (see **Intellectual Property Flows**). This suggests China is purchasing (and paying for) more foreign copyrights, proprietary manufacturing processes, and/or computer and software-related licensing than at this time last year. Increased IP trade can suggest stronger IPR enforcement in China, but this quarter's increase may reflect surging semiconductor imports as Chinese firms continue to stockpile ahead of tighter U.S. export controls.

Primary Indicator: Innovation Industry Share in Industrial Value-added

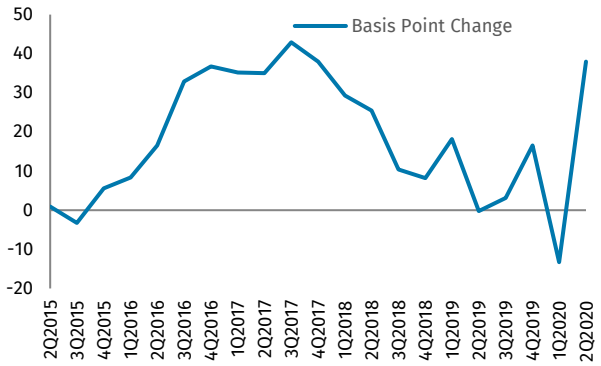
4qma, percentage



Source: OECD, National Bureau of Statistics, Rhodium Group.

Supplemental 1: Volatility in Innovative Industry

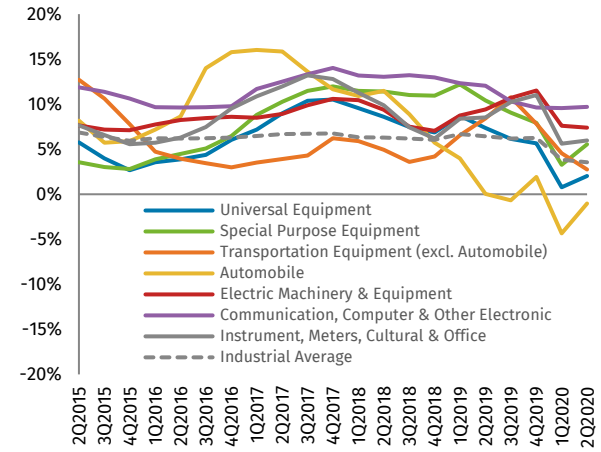
4qma, bp



Source: National Bureau of Statistics, Rhodium Group.

Supplemental 2: Industrial Value-Added Growth Rates for Specific Innovative Industries

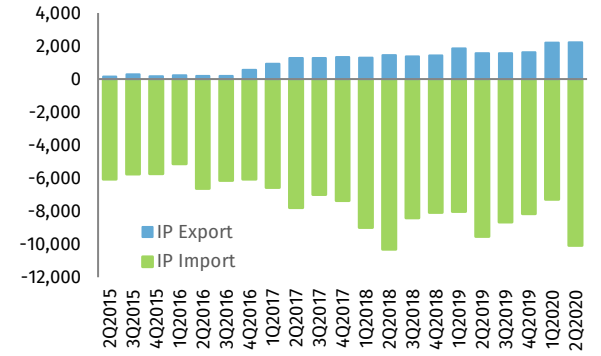
4qma, percent



Source: National Bureau of Statistics, Rhodium Group.

Supplemental 3: Intellectual Property Flows

USD Million



Source: National Bureau of Statistics, Rhodium Group.

Policy Analysis

China started to modify innovation policies amid growing political tension. Beijing has stopped using explicit market shares and growth targets to guide industrial policy and

pledged to let the market play a bigger role in supporting innovation, while intensifying its focus on state-engineered technology self-reliance.

Beijing tightened technology export controls in apparent retaliation to U.S. measures. On August 28, China's Ministry of Commerce (MOFCOM) and Ministry of Science and Technology (MOST) published a revised version of the Catalogue of Technologies Prohibited or Restricted from Export (Catalogue). MOFCOM added 23 restricted technologies (including drone technology, 3D printing, and a whole range of cyber technologies), removed 9, and modified 14. The addition of "data analysis-based personalized information recommendation technology" to the export control list effectively prohibited the video-sharing app TikTok from being sold to U.S. companies without Beijing's approval, in reaction to U.S. sanctions.

More importantly, on October 17, the National People's Congress Standing Committee passed the Export Control Law, which went into effect on December 1, 2020. The ambiguous "deemed export" provision could prevent multinational companies from transferring sensitive technology between parts of the same company, even if the transaction is not cross border. The law also applies to reexports of sensitive China-origin content *outside* of China's borders, expanding and tightening its technology export control regime.

Other policies offered positive signals on the state-market balance in promoting innovation. The Shenzhen Comprehensive Reform Program released by the State Council on October 11 promised big reforms for the country's innovation base. One section of the program focuses on the "marketization" of technology and data as fundamental factors of production or inputs needed to produce the economy's output. This means Shenzhen can experiment with policies that give the market, rather than the government, more say in what innovation opportunities to pursue and how research and development resources should be allocated. Specific policies and plans for nationwide expansion have not yet been released.

Final Dashboard Assessment

Innovation is the policy area that has shown the most consistent improvement since the inception of the China Dashboard project, demonstrating China's commitment to dedicating political and economic resources to improving the performance of the technology sector, and innovation activities in general. However, looking back at the 2013 reform agenda, the China Dashboard shows innovation policies have deviated from Beijing's commitment to make the market the driving force of innovation, as progress was dependent on government activism. Intellectual property protection and enforcement improvements helped level the playing field for private and foreign firms, but there is skepticism about whether these improvements will last once campaign-style enforcement loses political momentum. In industrial policy, Beijing reinforced the state's dominant role in guiding innovation. Made in China 2025 drove significant investment and rapid growth but at the cost of low investment efficiency, overcapacity, and market discrimination. An honest assessment of the program is lacking, and the government instead tried to downplay it without materially changing the substance in response to international pushback.

But state dominance over innovation policy has boosted innovative activity in China. Since our first Dashboard update in fall 2017, the innovative industry share has risen from 31.80% to 33.97%—a material increase in a short period of time. Growth has been consistent: innovation levels rose in 11 out of the 13 review periods in our records. By our measure, China has already caught up with the United States in terms of broadly defined innovation industries (though it is far from the cutting edge) and at this rate would reach parity with the EU within two to three years. While our indicators speak to the trend, they do not judge the means. China's high-tech ambitions might well be better served by allowing more competition and eliminating market distortions.

China's innovation policy is likely to include a mix of market and state drivers in the coming years. The communique of the Party's Fifth Plenum, released on October 29, again identified innovation as the most important growth engine for China's economy for the next 15 years. The blueprint establishes technological self-reliance as a major pillar in the new "dual circulation" policy, in response to declining growth potential at home and rising hostilities abroad. However, there is no guarantee that government-engineered innovation outcomes will be more successful than encouraging and enabling market competition. The Fifth Plenum communique eliminated mention of Made in China 2025 by setting market share and growth targets for domestic companies in 10 priority industries. The new plan shows various modifications but no substantial change of directions. The increasingly hostile technological competition between China and other advanced economies has become a justification for government intervention in the innovation ecosystem, even if it is clearly suboptimal on economic terms.