INTERNATIONAL MONETARY FUND

IMF Country Report No. 21/12

PEOPLE'S REPUBLIC OF CHINA

SELECTED ISSUES

January 2021

This paper on the People's Republic of China was prepared by a staff team of the International Monetary Fund. It is based on the information available at the time it was completed on December 2, 2020.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
PO Box 92780 • Washington, D.C. 20090
Telephone: (202) 623-7430 • Fax: (202) 623-7201
E-mail: publications@imf.org Web: http://www.imf.org
Price: $18.00 per printed copy

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

PEOPLE'S REPUBLIC OF CHINA

SELECTED ISSUES

December 2, 2020

Approved By
Asia and Pacific Department

Prepared by a team led by Helge Berger, with individual chapters authored by Fei Han, Emilia Jurzyk, Sarwat Jahan, Cian Ruane, Caroline Zhou (All APD), Sonali Das (RES), Henry Hoyle (MCM), Grace Li (FAD), Phakawa Jeasakul (Resident Representative in Hong Kong SAR), Wenting Song (APD Summer Intern), and Wei Guo (SPR).

CONTENTS

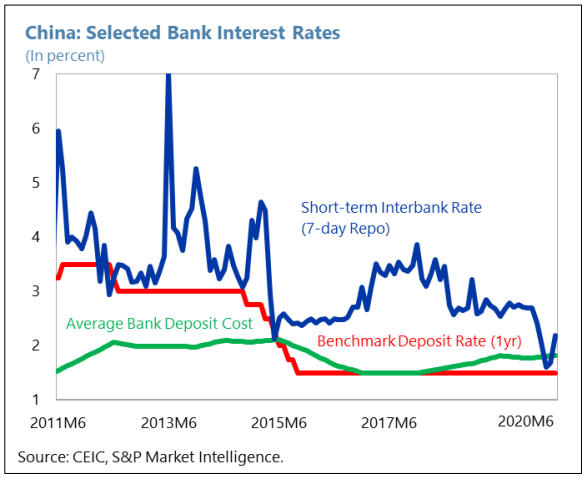
FURTHER STEPS TO IMPROVE MONETARY POLICY EFFECTIVENESS AND CREDIT ALLOCATION[1]

The reform of China's monetary policy framework has progressed, but there remains important scope for further improvement. Interest rate guidance policies continue to influence the pricing of bank deposits and loans, skewing the risk-adjusted returns of lending in favor of low-risk firms and contributing to distortions that limit the pass-through of policy interest rates to bank funding costs. Reforming interest rate guidance policies promises to strengthen the recovery by boosting market-based credit allocation to riskier firms, increasing the effectiveness of interest-rate based monetary policy, and raising household income.

A. The Role of Interest Rate Guidance Policies

1. China has gradually reformed its interest rate regime. The People's Bank of China (PBC) officially phased out its bank lending rate floor in 2013 and deposit rate ceiling in 2015, following several years of gradual liberalization of controls on wholesale bank funding interest rates. In 2015, authorities also informally adopted the 7-day repo rate as a short-term policy rate for an interest-rate targeting monetary policy framework intended to operate alongside their traditional credit growth-targeting policies. In 2019, the PBC introduced the Loan Prime Rate (LPR) system, requiring all loans to eventually be priced in reference to one of two LPRs, which are set as the PBC's 1-year Medium-term Lending Facility (MLF) rate plus a spread based on quotations from a panel of banks.

2. Policies however continue to guide deposit rate pricing. After the deposit rate ceiling was phased out in 2015, authorities introduced a self-regulatory mechanism for deposit pricing.[2] This system maintained an effective ceiling on deposit rates linked to benchmark deposit rates, even though it allowed that ceiling to rise for smaller banks and introduced further flexibility for certain wholesale and structured deposit types. Bank disclosures show deposit costs have drifted slightly higher during this period, largely owing to a shift into time deposits and other instruments that can offer higher yields but have remained relatively close to the benchmark deposit rates (figure). Transmission from short-term policy rates to bank deposit rates has been notably limited.



[1] Prepared by Henry Hoyle and Phakawa Jeasakul, with invaluable research assistance from Hong Xiao.

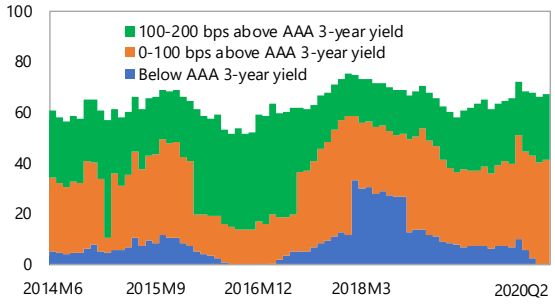
[2] This mechanism is administered by the National Interbank Funding Center under the guidance and supervisory management of the PBC.

3. Bank lending rate guidance continues to play an important role in the policy toolkit. Since the liberalization of bank lending rates, authorities have also maintained a similar self-regulatory mechanism for bank loan rate pricing. In 2015, the PBC incorporated "interest rate pricing behavior" into its Macroprudential Assessment (MPA) mechanism. Beginning in 2018, the State Council has also introduced a series of targeted credit policies that feature lending rate requirements to support funding to micro and small enterprises (MSEs), in part to offset increasing lender risk aversion amid rising defaults. Many of these policies require medium and large banks to explicitly target average lending rates to MSEs at spreads only 100 to 200 basis points above rates for prime customers.

B. Interest Rate Guidance Policies and Credit Allocation

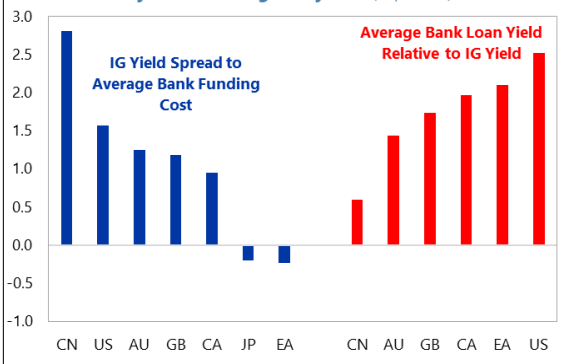
4. Chinese banks mostly lend at interest rates close to bond yields for the lowest-risk firms, which is unusual in international context. Data show that most Chinese bank loan rates are within 100-200 basis points of 3-year AAA-rated corporate bond yields (figure). This proximity to highly rated bond yields is unusual in international context, with the spread between bank loan rates and 3-year investment-grade bond yields significantly lower in China than in other major banking systems (figure). This suggests that Chinese banks are either disproportionately lending to low-risk borrowers or that their lending to higher-risk borrowers gets little compensation for greater credit risk.

Chinese banking system: Estimated share of bank loans by interest rate spread to 3-year AAA-rated bond yield
(In percent)



Source: CEIC, IMF staff calculations.
Note: Spreads are to one-year average AAA-rated 3-year yields. Bank loan distribution by interest rate data is estimated based on PBC loan pricing data

Banks: Average borrowing and lending spreads relative to local currency investment grade yields (In percent)



Source: Bloomberg, ChinaBond, bank annual reports, and IMF staff calculations.
Note: IG= Investment grade. IG yields based on three-year tenor. Data shown are 10-year averages.

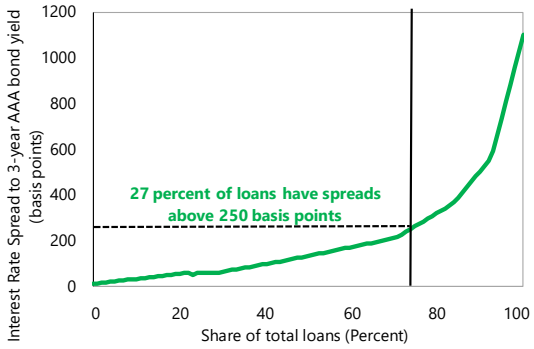
5. The low levels of bank loan rates in part reflect continuing deposit rate guidance. Deposit rate guidance policies keep the cost of bank funding unusually low relative to other funding costs in the economy, making it profitable for banks to lend to low-risk borrowers who could otherwise tap bond market funding. The average spread between investment-grade bond yields and bank funding costs in China is double that in major banking systems (figure). This excess profitability may be an important factor in boosting the supply of bank lending to less productive and often over-indebted state-owned enterprises (SOEs), as implicit guarantees ensure that these firms are among the lowest-risk borrowers from banks' perspective.

6. Lending rate guidance tools are likely another important factor in keeping bank loan rates low. Authorities' use of interest rate guidance policies to guide banks' loan pricing is difficult

to evaluate. However, the relatively muted shift in the distribution of bank loan rates after authorities liberalized lending rate regulation in 2013 suggests continued efforts to prevent banks from charging high interest rates to borrowers. More recently, authorities' increased use of credit policies with explicit lending rate guidance has coincided with further compression in the distribution of bank loan rates. Bank loan rates have declined overall since the introduction of the LPR reforms in 2019. Low bank loan rates may also reflect other factors that drive lending towards higher-quality borrowers, such as banks' preference for collateral, penalties for underwriting nonperforming loans, and a lack of underwriting or distribution capacity for small business loans.

7. Overall, China's low bank lending rates are indicative of weak market-based incentives for lending to high-risk borrowers. Loans to higher-risk firms are usually priced with significant premiums over loans to low-risk firms, including compensation for the risk-neutral probability of default, lender risk aversion, and information asymmetries. However, in China's banking system, bank loan rates are mostly too low to support similar premiums. Only about one quarter of Chinese bank loans have interest rates more than 250 points above the 3-year AAA-rated corporate bond yield, which is the average spread between 3-year bond yields for high-quality firms versus the best speculative-grade firms in other major financial systems (figure).[3] This suggests that weak returns on lending to risky firms may be an overlooked factor in driving China's well-known credit allocation skew in favor of SOEs.

Chinese banking system: Estimated loan distribution by interest rate spread to 3-year AAA bond yield



Source: CEIC, IMF staff calculations
Note: Loan distribution estimated based on June 2020 data.

8. Credit policies that require lending to high-risk borrowers may also create distortions, with limited benefits. Loan growth to MSEs has risen sharply since authorities introduced lending requirements to these firms in 2018. These requirements may however prompt banks to limit their risk exposure by tightening lending terms via collateral requirements, fees, or reduced maturities, or by chasing only the highest-quality borrowers eligible for credit policies. Banks may also offset future asset quality problems by reducing risk appetite in other areas of their business. Mandating rapid credit growth to certain borrower segments increases the likelihood that credit will be used for non-productive purposes, like real estate speculation. At the same time, the continued decline in the share of corporate bonds issued by privately owned enterprises and low-rated firms suggest that targeted lending may not provide a broad-based easing of financial conditions for riskier firms.

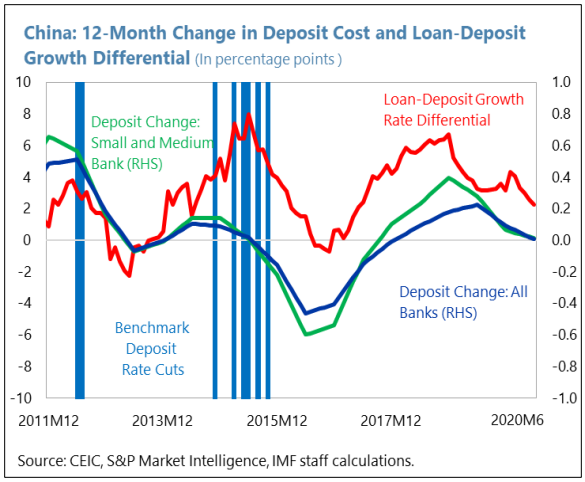
9. The COVID-19 crisis has likely exacerbated the effect of interest rate and credit policies on credit allocation. Chinese authorities have increased use of lending rate guidance policies during COVID, expanding targeted credit policies with explicit lending rate requirements and

[3] This share is likely overestimated, as much of the lending at higher interest rates may be consumer credit or mortgages.

imposing similar requirements on the use of central bank re-lending funding, further limiting scope for risk-based pricing. In China as well as around the world, COVID-19-related lockdowns have also disproportionately affected small businesses, increasing default risks for these firms. In China, this means the risk-adjusted return of loans to these firms has fallen by more than that of loans to larger firms, further worsening banks' expected profitability on such lending relative to low-risk lending.

C. Interest Rate Guidance Policies and Monetary Policy Transmission

10. Distortions from deposit guidance policies have probably limited the transmission of short-term policy rate cuts to bank funding costs during the COVID-19 crisis. Average bank deposit rates were largely unchanged from end-2019 to mid-2020, despite reductions in policy interest rates. Banks representing over 80 percent of deposits actually reported small increases in deposit funding costs during this period due to deposit composition shifts. While deposit guidance policies are designed to only limit *upward* adjustment of deposit rates, distortions created by these policies—specifically the wide gap between yields on regulated deposits and market-determined interest rates—have limited the *downward* adjustment of deposit yields as well. Specifically, deposit regulation constrains banks from raising rates to compete with the wide array of higher-yielding deposit alternatives, resulting in persistent deposit outflows and a reluctance of especially smaller banks to lower deposit rates. Historically, average bank deposit costs have risen most when the differential between loan growth and deposit growth was highest (figure). This has also coincided with periods when yields on alternative deposit products were highest.



11. At the same time, other credit growth policies have likely also interfered with monetary policy transmission to bank funding costs. During the COVID crisis, policy-driven supply constraints on bank deposits were exacerbated by sharply increased bank demand for funding due to higher aggregate credit growth targets and heavy net issuance of government bonds.[4] As banks competed for additional funding, their issuance of deposit alternative products surged and the yields on such funding rose. As a result, the pass-through of short-term policy interest rates to yields on deposit alternatives was also limited.

12. Inflexible bank funding costs can limit the effectiveness of the PBC's longer-term interest rate tools. In the context of sticky deposit rates, PBC adjustments to the LPR via cuts to the MLF rate would immediately shrink bank lending margins and profitability, reducing banks' ability to sustain credit growth and build buffers to absorb future losses. Some degree of compression of banks' net interest margins is common during policy interest rate easing cycles in international

[4] Authorities continue to guide banks to follow aggregate credit growth targets via the PBC's MPA tool.

experience, but the impact on credit allocation may be unique in China due to the unusual skew of risk-adjusted returns on lending. Uniform reductions in bank loan rates, as occurs via the LPR reference rate mechanism, would weaken the risk-adjusted returns of loans to risky firms, increasing lenders' preference for low-risk firms.

D. Advantages of Interest Rate Guidance Policy Reform

13. Phasing out interest rate guidance policies would bring a number of efficiency gains, including boosting market-based credit allocation to smaller, riskier firms. Evidence of supply pressures in the market for bank deposits suggest easing deposit rate guidance could lead to rising bank funding costs, potentially tightening financial conditions. Higher bank funding costs would however squeeze bank lending margins on loans to low-risk corporates, pushing such firms to shift to bond market finance. If lending rate guidance was also phased out, this could help improve the efficiency of financial intermediation overall, with banks increasing lending to smaller business that requires a specialized capacity to assess and monitor credit risk. This would ease credit constraints for smaller, riskier firms, as well as provide less expensive funding and better risk monitoring compared to smaller-scale nonbank lenders.

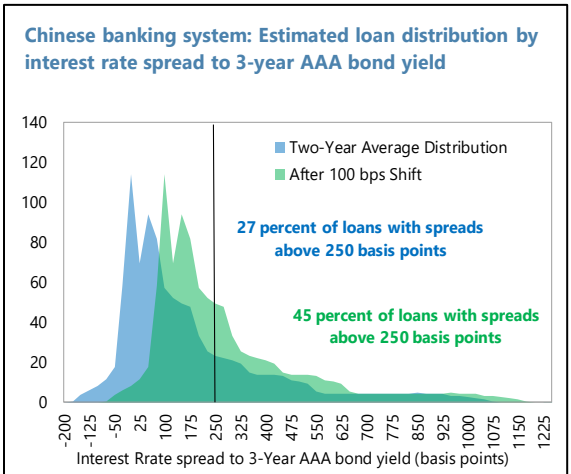
14. Freeing up deposit rate restrictions would also deliver immediate benefits to the household sector and improve authorities' ability to support the recovery. Higher deposit rates would increase household incomes and spending power, particularly among lower-income segments whose savings are primarily in bank deposits, and reduce precautionary savings behavior and investment-related housing demand. Without deposit rate guidance policies, short-term policy rates will have greater impact on bank deposit rates and other money market yields, improving monetary policy transmission. As banks would no longer need to compete aggressively to attract funding through deposit alternatives, incentives for financial and regulatory arbitrage (e.g., firms issue bonds at a lower cost and use proceeds to invest in structured deposits) would be more limited.

15. A simple exercise illustrates how removing interest rate guidance policies would likely improve access to bank credit for riskier borrowers. In a stylized scenario, ending deposit rate guidance is assumed to increase bank funding costs. In the scenario, investment grade corporate bond yields are assumed to remain unchanged, as rising bank funding costs have no effect on risk-free rates and only small effects on the risk-neutral probability of default. Another assumption is that credit markets are competitive, implying that low-risk firms can shift between bank and bond finance and all loans are priced to accurately reflect credit and other risks.

- *Low-risk firms migrate to the bond market, while medium-risk firms see no change in bank credit volumes*. Higher bank funding costs reduce the profitability of lending at low interest rates, tightening the supply of bank loans to low-risk firms and prompting these firms to shift borrowing to bond issuance. Banks respond to fewer low-risk customers by increasing the supply of loans to medium-risk firms, which offsets the supply impact from the reduced profitability of lending to them at lower margins. The price of credit for each firm type remains constant due to credit market competition.

- *High-risk firms see an increased supply of bank loans as banks are allowed to lend at higher rates*. Overall bank credit to these firms increases as the removal of lending rate guidance eases supply constraints, reduced lending to low-risk borrowers frees up lending capacity, and banks seek higher lending rates to maintain stable net interest income. Bank loan rates for this segment rise on average, largely due to new lending to borrowers previously without access to bank loans.

- *The net impact is illustrated by a shift in the distribution of bank loan rates.* Assuming for simplicity that banks maintain the shape of the loan distribution and target constant net interest income, a 100-basis point increase in bank funding cost shifts the existing distribution of loan rates higher by an equal amount relative to corporate bond yields. In this stylized example, the share of lending to high risk firms—proxied by lending with interest rates at least 250 basis points above AAA-rated bond yields—increases from 27 percent to 45 percent (figure).



16. Lifting interest rate guidance policies would require careful planning to navigate through uncertainty during the transition. Credit market frictions may initially limit firms' ability to shift to bond finance or obtain competitive loan pricing. Bond yields may temporarily rise, given banks' important role as investors in the government bond market. Over time, however, higher bond yields should attract institutional investor inflows into the government bond market, particularly given low interest rates in advanced economy financial systems. In the interim, the PBC may need to take additional monetary policy easing steps to offset temporary increases in borrowing costs. Clear communication is also critical as a number of policy actions in the past led to large market volatility.

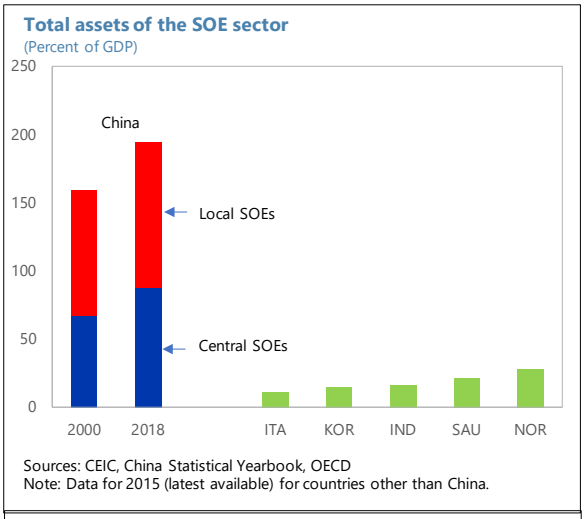
17. Other policy measures to ensure macro-financial stability will be necessary. The shift towards higher risk lending will decrease the share of loans supported by implicit guarantees, increasing the overall risk profile of the banking sector. This will necessitate stronger prudential regulation and supervision and raise the importance of sound governance and credit risk management. Further reforms to ensure competitive neutrality between private firms and SOEs will be necessary to fully address credit allocation problems. Authorities could also consider other measures to support credit access and reasonable borrowing costs for SMEs as credit policies are phased out, for instance by establishing a public credit guarantee scheme.

CHINESE STATE-OWNED ENTERPRISES, RESOURCE (MIS)ALLOCATION, AND PRODUCTIVITY[1]

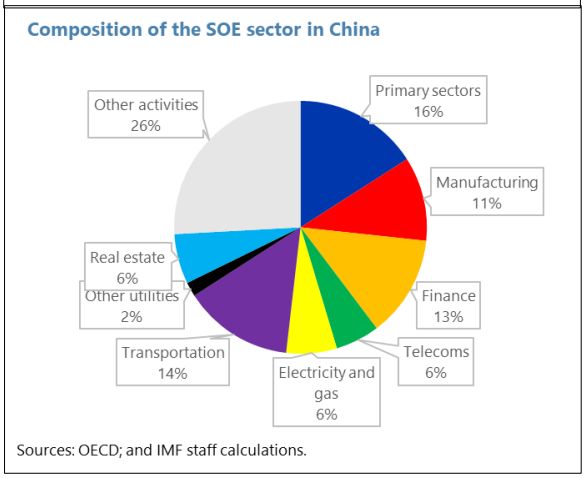
State-owned enterprises (SOEs) account for a large share of economic activity in many countries, but they play a particularly outsized role in China (IMF Fiscal Monitor). Continuing SOE reform could provide a substantial boost to Chinese aggregate productivity growth over the medium run and help counter the downward trend of aggregate productivity amplified by the COVID-19 crisis. In line with previous studies, the data shows large revenue productivity gaps between listed SOEs and private firms (POEs) that reflect significant resource misallocation. Credit misallocation plays a particularly important role in explaining these patterns, distorting the capital-intensity of SOEs relative to POEs. Reforms which even the competitive playing field between SOEs and POEs could help drive potential output growth during the recovery from the COVID-19 crisis. As Chinese SOEs are also used to provide many social and non-economic functions, complementary reforms will also be important to ensure that the gains are inclusively distributed, and workers do not lose out.

A. A Brief Overview of SOEs in China

1. State-owned enterprises command a large share of the Chinese economy. In 2018 (latest data available), total assets of Chinese SOEs stood at 194 percent of GDP—higher than in the early 2000s, and several orders of magnitude larger than in any other country *(IMF Fiscal Monitor)*. China's SOEs also operate in all sectors of the economy, while in other countries their operations are usually concentrated in a few sectors (mostly transport, utilities, and finance). After consecutive waves of reforms, the number of SOEs in China has declined significantly since the 1990s (a ⅔ decline among the industrial firms alone), along with the share of urban workers in SOEs. Some of the remaining SOEs have grown into industry leaders, with many now counting among the world's largest firms (*IMF Fiscal Monitor*). However, despite improvements in recent years, SOEs continue to underperform compared to private firms. As of end-2019, industrial SOEs (for which the data is readily available) remained less profitable than private firms, and a higher share of SOEs were loss making. At the same time, SOEs continued to receive a higher share of bank financing and enjoy



Sources: CEIC, China Statistical Yearbook, OECD
Note: Data for 2015 (latest available) for countries other than China.



Sources: OECD; and IMF staff calculations.

[1] Prepared by Wei Guo, Fei Han, Sarwat Jahan, Emilia Jurzyk (co-lead) and Cian Ruane (co-lead).

lower interest rates on their liabilities, likely due to the existence of implicit government guarantees (Lam et al., 2017; Gatley, 2018; Zhang and Wu, 2019).

2. SOEs provide many social and other non-economic functions, complicating the reform process. Traditionally, the presence of SOEs has been justified by the need to correct market failures that prevent efficient provision of services to the population or production of essential goods or industrial inputs (OECD, 2018). SOEs have also been used by governments to implement industrial policy, stabilize employment, or to protect national security (OECD, 2018). Some of these factors are at work in China, where SOEs have played a role in supporting the economy and employment during recessions (including during the latest COVID-19 crisis), and provide health and pension services to the population (*IMF Fiscal Monitor*). If SOEs are not able to properly recoup costs of the non-economic functions they are asked to fulfill, their performance and profitability may suffer. A comprehensive approach to reform efforts is therefore necessary, encompassing the broad arrays of roles SOEs are asked to fulfill. For example, while SOEs are often used to maintain employment stability, improving the social security system would protect workers over jobs while reducing the burden on SOEs.

B. Productivity Gaps Between Listed SOEs and POEs

3. We use the Wind database of listed firms to analyze the relative performance of listed SOEs and POEs from 2002 to 2019.[2] The database covers over 3700 listed firms in the Shenzhen and Shanghai stock exchanges between 2002 and 2019. The main benefits of using Wind are the recent time span covered by the database and the broad coverage of sectors.[3] We define SOEs based on the identity of the major shareholder of the firm, and separately define 'central' and 'local' SOEs as those owned by the central and local government, respectively. While listed firms are only a small subset of all registered firms, they account for a substantial share of Chinese economic activity: 6 percent of GDP and 10 percent of manufacturing value-added in 2019. Among listed firms, SOEs account for a large share of output in all industries, though this share has declined over time. In 2019, SOEs accounted for 29 percent of listed firms and 57 percent of listed firm value-added, with considerable heterogeneity across sectors. SOEs tend to be much larger than POEs, with the typical SOE employing more than twice as many workers as the typical POE (for more details see Jurzyk and Ruane, 2020).

4. We construct *revenue productivity* measures to compare the performance of listed SOEs and POEs and infer the extent of resource misallocation. We define revenue productivity as the average product of capital and labor (that is, value-added per unit of capital and labor). Revenue productivity varies dramatically across listed firms even within the same two-digit sector and year; the revenue productivity of firms at the 90th percentile is more than four times larger than that of firms at the 10th percentile. These average revenue productivity differences do not necessarily reflect

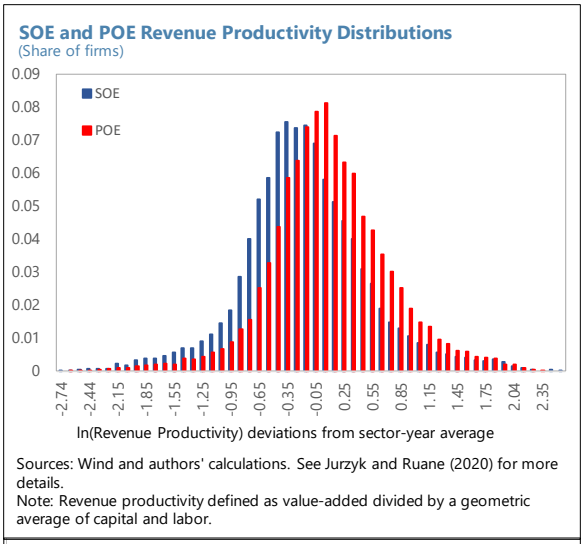
[2] For details see the forthcoming working paper "Resource Misallocation Among Listed Firms in China: The Evolving Role of State-Owned Enterprises" (Jurzyk and Ruane, 2020).

[3] The commonly used Chinese industrial survey is only available until 2013, and only covers firms in the industrial sector.

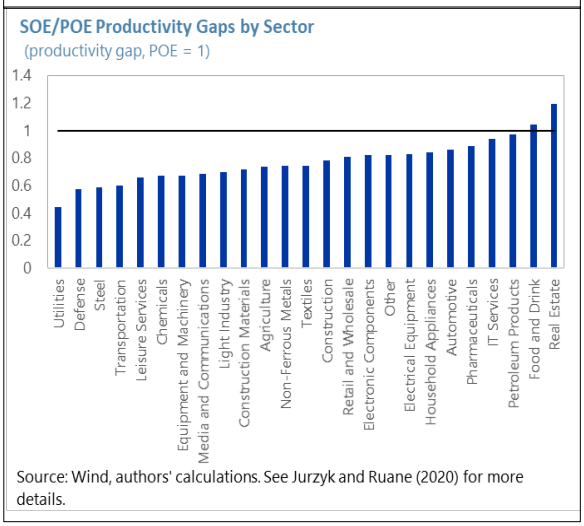
differences in the technology of firms or the quality of their products. Rather, they could reflect differences in factor prices faced by firms (e.g. interest rates), differences in markups, or other taxes and subsidies. Such permanent differences imply a misallocation of resources across firms which lowers aggregate productivity.[4] Reforms which reallocate resources more efficiently, closing the gaps in marginal products across firms, could therefore provide a substantial boost to Total Factor Productivity (TFP) growth.

5. We find that SOEs have significantly lower revenue productivity than POEs in the same sector, and that these productivity gaps remain substantial over time.

- There is a lot dispersion in the revenue productivity of both SOEs and POEs, with significant overlap between their distributions (figure). Many SOEs are clearly profitable and productive, even relative to POEs.
- However, there is a large statistically significant gap between the average productivity of SOEs and POEs, which widened to 30 percent during the GFC, though it has reduced somewhat to 20 percent as of 2019.
- These revenue productivity gaps are of similar magnitudes for central and local SOEs, suggesting that they are not driven by specific demands placed on central SOEs by the central government.
- They are also pervasive in almost every sector (figure). They are particularly large in sectors such as Utilities, Transportation and Steel Manufacturing, though smaller in more high-tech sectors such as IT Services, Manufacturing of Pharmaceuticals, and Medical Equipment. In addition, sectors with larger revenue productivity gaps are also those where SOEs account for a larger share of output and inputs, amplifying the distortionary impact of these gaps.



Sources: Wind and authors' calculations. See Jurzyk and Ruane (2020) for more details.
Note: Revenue productivity defined as value-added divided by a geometric average of capital and labor.

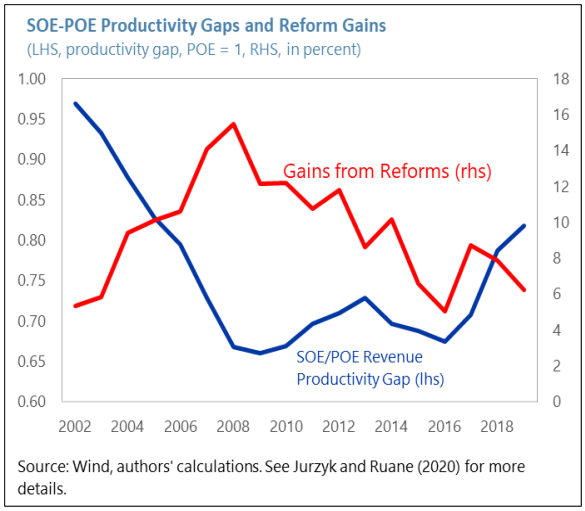


Source: Wind, authors' calculations. See Jurzyk and Ruane (2020) for more details.

[4] David and Venkateswaran (2019) estimate that transitory differences in capital productivity due to adjustment costs or informational frictions (which are therefore less likely to be related to policy distortions) account for only a small share of capital productivity dispersion for Chinese firms – 90 percent of capital productivity dispersion is due to permanent firm factors or factors correlated with firm productivity. Similarly, Wu (2018) finds that 70 percent of capital productivity dispersion is due to distortions as opposed to financial frictions.

- There is also evidence that the low productivity of SOEs reflects a particularly low average product of capital: value-added per unit of fixed assets is almost 40 percent lower for SOEs than POEs, while value-added per unit of labor of SOEs is similar to that of POEs (for more details see Jurzyk and Ruane, 2020). The low revenue productivity of SOEs is therefore explained to a large extent by an inefficiently high capital intensity of SOEs.

6. A quantitative model of misallocation suggests that closing SOE-POE revenue productivity gaps could increase the productivity of listed firms by around 6 percent. Large revenue productivity gaps between SOEs and POEs suggest that resource misallocation is an important drag on aggregate productivity. We evaluate these gains using a quantitative macroeconomic model of resource misallocation (Hsieh & Klenow, 2009). While we only have data for listed firms, these are the largest firms in the Chinese economy and therefore the most macro-important. We find that a policy which reduces the average SOE-POE revenue productivity gap in every sector could increase aggregate productivity among listed firms by between 5 and 6 percent.[5] A more ambitious policy aimed at reducing both the average productivity gap and the distorted capital-intensity of SOEs could yield gains of over 6 percent. This suggests that measures which equalize the playing field between SOEs and POEs, in particular equalizing the effective rental rate of capital, is an important potential source of growth.



Source: Wind, authors' calculations. See Jurzyk and Ruane (2020) for more details.

7. Extrapolating our results to the broader Chinese economy, our findings suggest that SOE reforms could double the rate of TFP growth for five years. The existing literature also finds large capital productivity gaps between SOEs and POEs for a much larger sample of industrial firms before 2012 (see Hsieh and Klenow (2009), Hsieh and Song (2015) or Wu (2018)). In addition, David and Venkateswaran (2019) document similar patterns of capital productivity dispersion between listed Chinese firms and a larger sample of industrial firms.[6] We therefore assume that our estimates of SOE-POE misallocation for listed firms apply also to non-listed firms, though we scale them down to around 4 percent based on the fact that the SOE share of assets for the whole economy is smaller than for listed firms.[7] Our findings of gains from reallocation in the order of 4 percent are similar to Hsieh and Klenow (2009), who find 5.3 percent gains on average between 1998 and 2005 from

[5] These gains are for 2019, though we find larger gains historically. We focus on closing the productivity gap for SOEs in the left tail of the productivity distribution, as these are the ones which appear to be benefiting from implicit subsidies. For more details see Jurzyk and Ruane (2020).

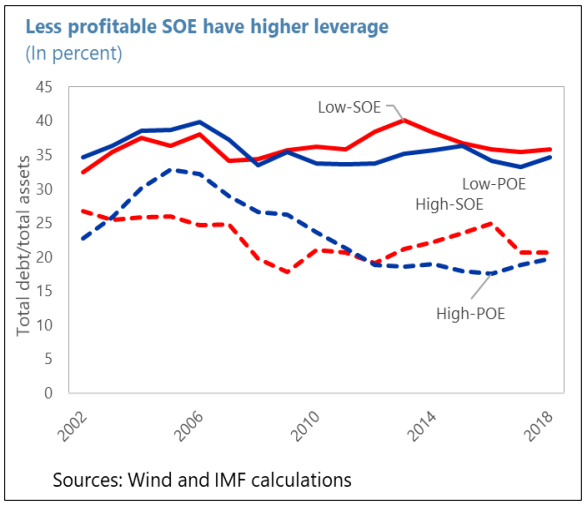
[6] While they don't estimate the productivity of SOEs vs. POEs, they find a similar decomposition of capital productivity dispersion for listed Chinese firms and for manufacturing firms in the Annual Surveys of Industrial Production.

[7] The most up to date data is for industrial firms, where the SOE share of assets is roughly a third smaller than for listed industrial firms.

reducing the average revenue productivity gap between state and private firms.[8] These gains are somewhat smaller than the 10 percent gains Brandt et al. (2013) estimate for state vs. non-state capital reallocation, however they account for between-sector capital misallocation while we restrict our attention to within-sector misallocation. Factoring in such across sector differences in SOE intensity would imply larger gains. Given that aggregate TFP growth has averaged 0.6 percent between 2012 and 2017 (Penn World Tables), our results suggest that SOE reform could more than double the rate of TFP growth for five years—or likely more, if sectoral reallocation would be considered as well.

C. The Role of Credit Misallocation[9]

8. Firms with low revenue productivity have higher leverage, suggesting an important role for credit misallocation. We find that there is a negative correlation between firm productivity and the leverage ratio (measured by the debt-to-asset ratio), suggesting that credit is allocated to the least efficient firms in the economy. This likely reflects the distortions from the implicit guarantees that make SOEs more credit-worthy (IMF Country Report No.19/274). Indeed, the data show that on average SOEs have higher leverage ratios than POEs (figure). Moreover, although both low-productivity SOEs and low-productivity POEs have deleveraged since 2016, the former remain the most leveraged. In fact, the leverage ratio of low-productivity SOEs is still more than 5 percentage points higher than that of high-productivity POEs, indicating that credit could be better channeled to more productive firms. In addition, credit misallocation seems to also exist within the SOE universe. The leverage ratio of high-productivity SOEs was 10 percentage points lower than the low-productivity SOEs at the end of 2016, although the gap has somewhat narrowed since then.

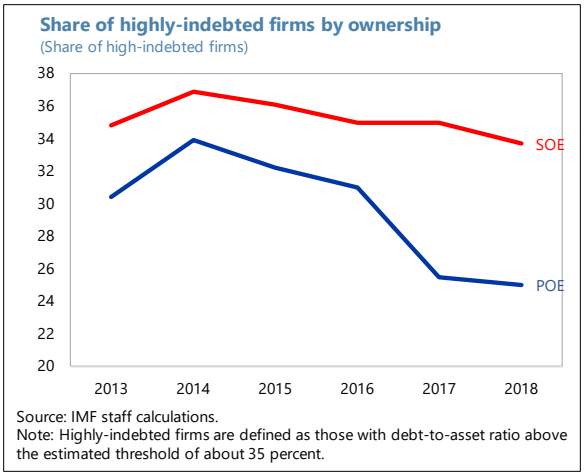


9. A reallocation of credit from highly-leveraged SOEs to POEs could increase aggregate investment and productivity. Using the threshold effect model (Hansen, 2002), we find that there is a non-linear correlation between leverage and investment. In particular, the impact of a 1-ppt increase in a firm's leverage ratio on investment is 0.1 ppt but falls dramatically to 0.01 ppt if the leverage ratio exceeds a threshold of about 35 percent. Both SOEs and POEs have similar leverage thresholds and the impact of leverage change on investment is of similar magnitudes. As a higher share of SOEs are highly indebted than POEs (figure), there is a clear benefit from deleveraging SOEs without having a large impact on investment. The resources or credit from such SOEs can then be

[8] They find that these gains shrank over time, from 8.2 percent in 1998 to 2.4 percent in 2005.

[9] This section draws from the forthcoming working paper "After COVID-19: A Better Deleveraging Strategy for a Stronger Recovery in China" (Zhou, Jahan, and Han 2020).

allocated to the less-indebted POEs to boost productive investment. Simulations find that reallocating credit from highly-leveraged SOEs to POEs can increase aggregate investment as more credit is allocated to the generally more productive POEs, thereby boosting overall productivity and enhancing growth. Growth would increase by 0.3-0.4 ppts annually when highly-indebted SOEs deleverage by 2 ppts and the freed-up credit is channeled to POEs.



Source: IMF staff calculations.
Note: Highly-indebted firms are defined as those with debt-to-asset ratio above the estimated threshold of about 35 percent.

D. Policies to Reform Chinese SOEs

10. Continue the process of identifying non-viable SOEs and opening non-strategic sectors to private/foreign competition to improve market competition among firms, supported by reform of the social safety net to relieve SOEs of social functions. Non-viable firms should be allowed to default and exit the market rather than being merged with more profitable/efficient SOEs. That would protect good performers and enhance market competition. Low productivity of SOEs in key sectors can create bottlenecks in the supply-chain, especially if they are in upstream sectors supplying intermediate inputs. Such distortionary bottlenecks can have large impacts on aggregate productivity (Jones, 2011). Reform of the social safety net should proceed in parallel to relieve SOEs of their role to stabilize employment and provide social security benefits for workers, transferring these obligations to the state. That would also allow more productive private firms to hire workers. This will be particularly important in light of recent hukou reforms, which could lead to a significant increase in demand for jobs in urban areas.

11. Ensure equal access to credit and capital by private firms and allow SOEs to deleverage. This would require recognizing and removing the implicit government guarantees that allow SOEs to access financing from banks and financial markets at lower rates. To ensure that the financial sector is prepared for the removal of implicit guarantees, banks could be required to carry higher risk weights on SOE loans, build liquidity buffers, reduce reliance on short-term funding, and increase capital. As highly leveraged firms invest less, deleveraging highly indebted SOEs could mitigate the impact on investment while improving credit allocation. Moreover, concerted efforts are needed to ensure that market-based policies are in place to allow credit to flow to its most productive use. Previous papers have discussed policy options including establishing competitive neutrality among firms (Jahan and Kang, 2019). Strengthening the credit culture would also help improve lending decisions, with reforms targeted to improve credit ratings, strengthening credit registries, ensuring adequate capitalization of banks and promoting more risk-based vs. collateral-based lending (Jahan *et al.*, 2019).

12. Improve SOE governance. Most non-financial SOEs operate as large business groups organized under one parent holding company owned directly by the State-Owned Assets Supervision and Administration Commission (SASAC). While current policies prevent officials from holding part-time roles on corporate boards, there is a tradition of annual exchange of management

staff between SASAC and the central SOEs, and some of the top managers of national SOEs are given seats in important party bodies (Milhaupt, 2019), thus blurring the distinction between the company and its supervisors. Corporate boards—a standard feature elsewhere and recommended by the 2013 Third Party Plenum—continue to be missing in many mid-sized and smaller SOEs. It is therefore important to allow for the appointment of company managers with international/private sector experience, to increase the transparency of SOE group structures and activities, and to clarify the role of the Party in decision making.

References

Brandt, L., Tombe, T. and X. Zhu, 2013. "Factor market distortions across time, space and sectors in China. " Review of Economic Dynamics, 16, 39-58.

David, J. and Venkateswaran V., 2019. "The Sources of Capital Misallocation". American Economic Review, 109, 2531-67.

Gatley, T., August 2018. "The True Value of SOE Interest Rate Subsidies." Gavekal Dragonomics.

Hsieh, C.T. and P. Klenow, 2009. "Misallocation and Manufacturing TFP in China and India." Quarterly Journal of Economics, 124 (4), 1403-1448.

Hsieh, C.T. and Z. Song, 2015. "Grasp the Large, Let Go of the Small: The Transformation of the State Sector in China." Brookings Papers on Economic Activity, Spring, pp. 295-346.

Jahan, S., M. Catalan, E. Jurzyk, S. Paroutzoglou, and L. Zhang, 2019. "Improving the Allocation of Corporate Credit in China", IMF Country Report No. 19/274, Washington, DC: International Monetary Fund.

Jahan, S. and K. Kang, 2019. "Applying Competitive Neutrality in Corporate Financing in China, in Opening Up and Competitive Neutrality: The International Experience and Insights for China."

Jurzyk, E. and C. Ruane, 2020. "Resource Misallocation Among Listed Firms in China: The Evolving Role of State-Owned Enterprises", forthcoming IMF Working Paper.

Jones, C. 2011. "Intermediate Goods and Weak Links in the Theory of Economic Development". American Economic Journal: Macroeconomics. Vol. 3 (2), pp. 1-28.

Lam, W. R, and A. Schipke, 2017. "State-owned Enterprise Reform, Chapter 11 in Modernizing China: Investing in Soft Infrastructure." Washington, DC: International Monetary Fund.

Lardy, N.R., 2019. "The State Strikes Back: The End of Economic Reform in China?", Washington D.C., Peterson Institute for International Economics.

Milhaupt, C. J., 2018, "The Governance Ecology of China's State-Owned Enterprises", The Oxford Handbook of Corporate Law and Governance, Oxford, 2018.

Organization for Economic Co-operation and Development, 2018. "Ownership and Governance of State-Owned Enterprises: A Compendium of National Practices." Paris: OECD.

Wu, G.L., 2018. "Capital misallocation in China: Financial frictions or policy distortions?". Journal of Development Economics, 130, 203-223.

Zhang, L and Y. Wu, 2019. "Credit Bonds, Chapter 4 in The Future of China's Bond Market". Washington, DC: International Monetary Fund.

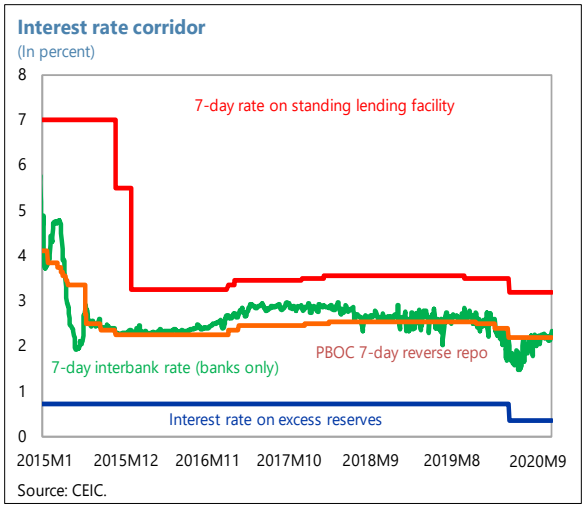
Zhou, Y., Jahan S., and F. Han, 2020, "After COVID-19: A Better Deleveraging Strategy for a Stronger Recovery in China", forthcoming IMF Working Paper.

CONVENTIONAL MONETARY POLICY TRANSMISSION AND POLICY COORDINATION IN CHINA[1]

Following recent reforms to China's monetary policy framework, there is evidence that the interest rate channel of monetary policy transmission works. However, the impact varies across financial markets and is weaker when monetary policy actions are not coordinated with fiscal policy. This suggests the need for further improvements, by formulating a clear inflation objective and granting the PBC operational (instrument) independence, and clarifying the monetary policy framework, with a focus on one key policy interest rate.

A. An Evolving Policy Framework

1. China's monetary policy framework continues its transition to a more market-based approach. With interest rate liberalization largely complete (with the removal of the ceiling on deposit rates in 2015) and the development of an interest rate corridor, China has been moving towards a standard interest-rate based policy framework. While the financial system remains largely bank-based, the government has regularly implemented measures to develop financial markets, including to open up China's bond market.



2. A growing literature finds that monetary policy transmission in China is becoming more similar to that of advanced countries. For example, several studies find that policy rates now have a larger effect than monetary aggregates on economic activity (e.g. Fernald et al 2014; Harjes 2016; Kamber and Mohanty 2018; Kim and Chen 2019).

3. However, the monetary framework remains complex. Although communications have improved (McMahon et al 2018), a lack of clarity remains on several parts of the framework, particularly on the nominal anchor (intermediate target). The previous official intermediate target, M2, was de-emphasized but has not been replaced with a new intermediate target. Instead, there are many policy instruments that appear to be aimed at several intermediate targets (see Jones and Bowman 2019). Moreover, the improvements to the loan prime rate (LPR) regime that were introduced in mid-2019 have elevated the importance of the MLF rate as a policy rate, making it the medium-term policy rate. Previously, the PBC's 7-day reverse repo rate has been seen as the rate that would become the key policy rate when benchmark lending rates were phased out.

[1] Based on a forthcoming working paper by S. Das and W. Song "Monetary Policy Transmission and Policy Coordination in China."

4. The institutional set-up for macroeconomic policy making in China is distinct from advanced countries, with a high degree of coordination between monetary and fiscal policies. The State Council (SC)[2] is the decision-making body and the People's Bank of China (PBC) does not have full operational independence. While the PBC's recommendations carry disproportionate weight in the SC's deliberations, decisions on key monetary policy matters are collective, and are often taken in the context of a larger policy decisions.

5. Does the use of multiple monetary policy instruments and the coordination with fiscal policy matter for the effectiveness of monetary policy in China? To answer the question, the following analysis: (i) constructs a series of monetary shocks using a market measure of monetary policy expectations, following the most recent empirical literature studying monetary transmission (see e.g. Nakamura and Steinsson 2018), (ii) combines it with measures of monetary-fiscal coordination using text search of the SC's website, and (iii) provides empirical evidence on the effects of monetary policy in a series of regression models.[3].

B. Monetary Policy Shocks

6. Monetary policy instruments. To identify changes in monetary policy, the timing of announcements on changes to the PBC's main policy instruments from 2008 onwards is recorded. These are:

(i) The reserve requirement ratio (RRR). This is the share of banks' deposit kept in reserve with the PBC. Both broad-based changes and those targeted to a subset of banks are recorded.

(ii) PBC's 7-day reverse repo rate. This is the policy rate at the center of the interest rate corridor, between the interest on excess reserves (lower bound) and the rate on the PBC's 7-day standing lending facility (upper bound).

(iii) Benchmark deposit and lending rates. These have not been changed since 2015 but were in use in the earlier part of the sample being analyzed. When used, the rates were adjusted in the same direction and by similar magnitudes.

(iv) The rate on the PBC's medium-term lending facility (MLF). Since mid-2019, when the LPR was linked to this policy rate, the MLF rate became the main policy instrument by which to influence bank lending rates.

7. A daily measure of monetary policy shocks. A market measure is used to capture the unexpected component of changes to the monetary policy instruments, following Kamber and Mohanty (2018). Specifically, the unexpected component of monetary policy events is measured as the daily close-to-close change in the rate on one-year interest rate swaps (IRS) based on the

[2] China's 13th SC consists of 35 members: the Premier, Vice Premiers, heads of 25 ministries, and the Governor of the PBC. The Standing Committee of the SC consists of 10 members, not including the heads of most ministries and the PBC Governor. The whole SC meets biannually or an ad hoc basis, while the Standing Committee meets weekly.

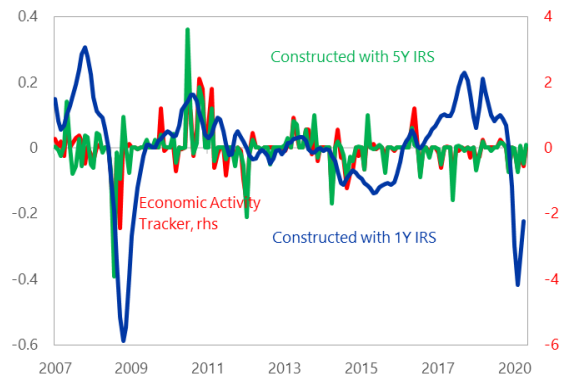
[3] For detailed empirical strategy and results, see the forthcoming working paper by S. Das and W. Song.

interbank 7-day repo rate, around policy announcements. The main advantages of this measure are that it: (i) directly gets at the 'surprise' component of the policy announcement, and (ii) provides a measure that is comparable across monetary policy instruments. The text table shows summary statistics for the daily measure of monetary shocks. The standard deviation of the IRS rates on days without policy events is 5 basis points, and higher on policy announcement days, at 10 basis points. The daily shock measure is also is validated by a shorter sample of higher-frequency data.

Policy events and IRS

	Mean |ΔIRS| (bps)	Std Dev ΔIRS (%)
RRR	7.3	11.9
PBC 7-day reverse repo rate	10.9	15.6
Benchmark lending and deposit rate	5.5	6.8
MLF rate	4.3	3.2
All policy events	6.9	10.4
Non-event days	3.1	5.0

Source: Author's calculations



Source: Eikon and IMF Staff Calculation

8. The shock series demonstrates that the PBC's monetary policy has generally been countercyclical. The grey line in the text figure is a measure of cyclical economic activity constructed by IMF staff (see Box 3 of staff report and Zhang et al. forthcoming). The dark blue line is the series of monetary policy shocks constructed using the one-year IRS swap on the 7-day repo rate.

C. Monetary-Fiscal Coordination

9. **Text searches of China's State Council website are conducted to determine whether monetary policy measures are coordinated with fiscal policy.**[4] News releases are scraped from the English version of SC website. These are then searched for fiscal and monetary keywords and used to sort the monetary policy shocks into coordinated and uncoordinated, by quarter.[5] The website releases begin in May 2013, thus the sample goes from May 2013 to April 2020. Two main types of monetary-fiscal coordination appear from the SC releases: (i) joint measures focused on micro and small enterprises (MSEs), and (ii) accommodative monetary policy to provide supportive conditions for fiscal stimulus.

[4] Another measure of monetary policy coordination, that captures the intensity of monetary policy, is also used. Specifically, when multiple monetary instruments are used within a two-week span. This type of monetary action is more likely to be coordinated with fiscal policy and provides a cross-check on our text-based coordination measure. The results are similar to those presented below on the text-based measure.

[5] The monetary keywords are: monetary, money supply, credit supply, reserve requirement ratio, RRR, interest rate(s), re-lending, re-discount, government-backed financing guarantee fees; and the fiscal keywords are: fiscal, deficit-to-GDP, local government (special) bond(s), subsidies, tax exemptions, tax relief, social benefits, social protection, social assistance, bond quotas, value-added tax, fee cuts.

D. Empirical Specification and Results

10. Local projections (Jordà 2005) are estimated to study the impact of monetary policy shocks over time:

$$\Delta_h y_{t+h,t-1} = \alpha_h + \beta_h v_t + \mathbf{\Gamma_h' Z_t} + \varepsilon_t \quad (1)$$

for horizon $h = 0, 1, 2, ...$, where:

- the dependent variable $\Delta_h y_{t-1,t+h}$ is measured as its change from the day before the shock to h periods after the shock. The dependent variables studied are interbank market rates, sovereign bond yields, and credit bond (bonds issued by non-financial firms)[6] spreads, at various maturities.

- α_h is a constant, v_t is the daily monetary shock measure, and the control variables, $\boldsymbol{Z_t}$, are monthly measures of cyclical economic activity (constructed by IMF staff, see Box 3) and inflation.

- The coefficients of interest are the β_h, the path of which trace the cumulative responses of the dependent variable to the monetary policy shock.

11. Next, to gauge the effect of coordination on transmission, the local projections are estimated separately for the uncoordinated and coordinated monetary policy shocks. The variables are as in equation (1) except that the vector of control variables now also includes two interaction terms: (i) of the monetary policy shock with the output gap, and (ii) of the monetary policy shock with inflation, to account for the possibility that monetary policy may have a different impact in a downturn. This is important to ensure that any potential differential effects found between coordinated and uncoordinated monetary shocks are not being driven by the state of the business cycle.

12. Monetary policy shocks have an immediate impact on sovereign bond yields and state-owned enterprise bond spreads, but less of an impact on corporate bond spreads and other credit bond spreads. The text table presents the same-day effects of monetary shocks, by estimating the special case of equation (1) with *h*=0. Each estimate comes from a different regression and the dependent variable is a particular maturity yield or spread.

- *An expansionary monetary policy shock moves the whole term structure of sovereign yields downwards*. Focusing first on the *sovereign yields*, the coefficient estimates are positive and significant for the 1- to 10-year maturities. A shock that is accompanied by a 100 bps decrease in the IRS rate is associated with about a 20-30 bps decrease in the sovereign yields.

[6] China's credit bond market is unique, reflecting its development and successive waves of financial sector development and liberalization (see Schipke et al 2019). *Enterprise bonds* were launched in 1982 and are almost exclusively for SOEs. They make up about 8 percent of the bond market, and 80 percent of enterprise bonds have been issued by LGFVs. *Corporate bonds* have been issued since 2007, accounting for 5 percent of the market. Companies also raise funds through *medium-term notes* (7 percent of the market) and *commercial paper* (2 percent).

- *An expansionary monetary policy shock also affects all enterprise bond spreads.* The coefficient estimates are positive and significant at the 1- to 10-year maturities for the *enterprise bond spreads*. The same monetary policy shock is associated with about a 15-20 bps decrease in the spreads.

- *But the shock does not appear to affect corporate and other credit bond spreads*. The coefficient estimates are positive but smaller and not generally statistically significant for the corporate and other credit bonds spreads.

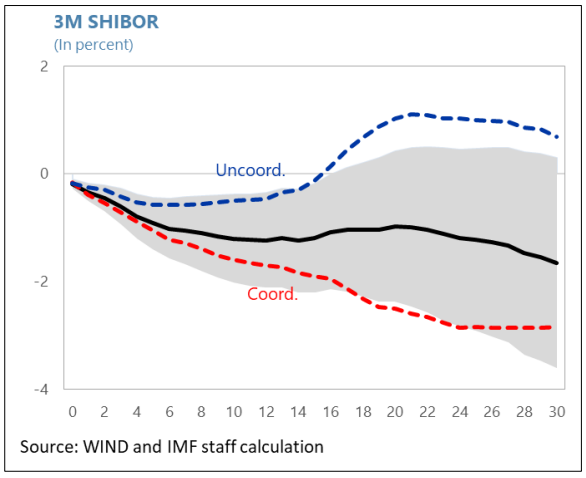
Effects of Monetary Policy on Interest Rates

Maturity	Sovereign Yields	Enterprise Bonds Spreads	Corporate Bond Spreads	Other Credit Bond Spreads 1/
3 month	0.02	--	--	--
	(0.12)			
6 month	0.13	--	--	--
	(0.08)			
1 year	0.20***	0.16*	0.20*	0.02
	(0.07)	(0.08)	(0.12)	(0.09)
3 year	0.19***	0.17**	0.14	0.06
	(0.07)	(0.08)	(0.10)	(0.09)
5 year	0.28***	0.22**	0.00	--
	(0.07)	(0.10)	(0.11)	
10 year	0.27***	0.21**	0.01	--
	(0.07)	(0.07)	(0.09)	
N	46	46	38	46
Macro controls	Y	Y	Y	Y

Note: The table present the effect of monetary policy surprises on sovereign yields and credit bond spreads as specified in equation (1). Standard errors are in brackets.
1/ Other credit bonds are commercial paper at the 1 year maturity and medium-term notes at the 3 year maturity of AAA ratings.

13. The cumulative impulse response functions show that monetary policy passes-through to interest rates. In the figures that follow, the black solid line shows the cumulative impulse response to an expansionary monetary policy shock that decreases the IRS rate by 1 percentage point on impact (the results of estimating equation (1) for all *h*). The shaded area represents the 90 percent confidence intervals. The dashed red line shows the impulse response to a shock that is coordinated with fiscal policy, and the dotted blue line shows the impulse response to an uncoordinated shock.

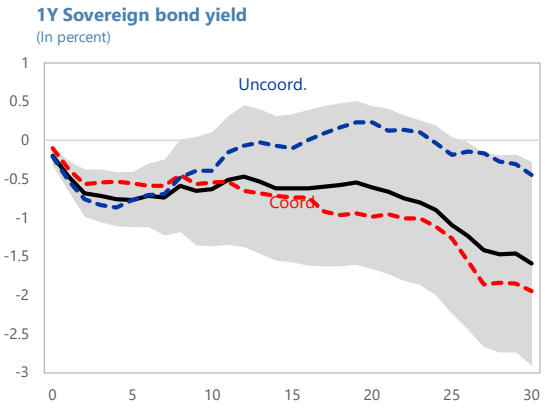
- *Monetary policy transmits to the interbank market.* While the primary source of banks' funds are deposits, they also issue structured deposits which are priced off the 3-month SHIBOR. The 1 percentage point expansionary monetary policy shock leads to a 35 bps decrease in the 3-month SHIBOR on impact.



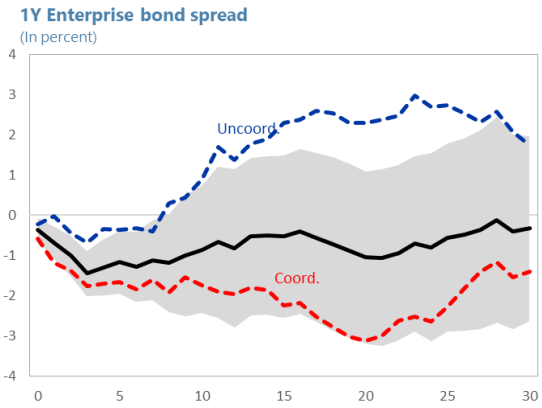
Source: WIND and IMF staff calculation

- *Monetary policy also affects sovereign yields and credit bond spreads.* The panel below shows the impulse responses for 1-year sovereign yields and credit bond spreads. An expansionary monetary policy shock that decreases the IRS rate by 1 percentage point leads to a 0.7 percentage point decrease in the sovereign yield after 3 days, and the effect appears to fade out (not remain statistically significant) after one week. The same shock leads to a 1.3 percentage point decrease in enterprise bond spreads 3 days after the shock, the peak response, and a 1.7 percentage point decrease in corporate bond spreads. The effect on the commercial paper is not statistically significant for any time frame.

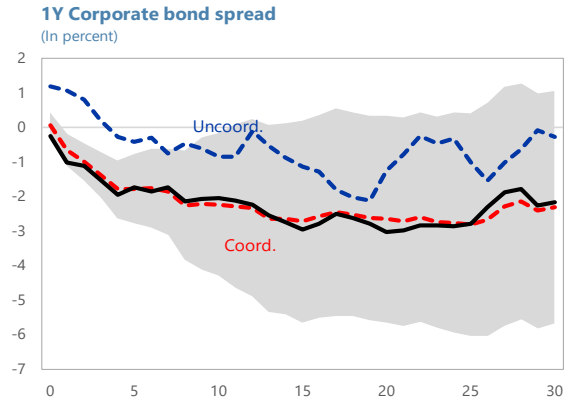
Effects of Monetary Policy on Interest Rates: Cumulative Impulse Responses



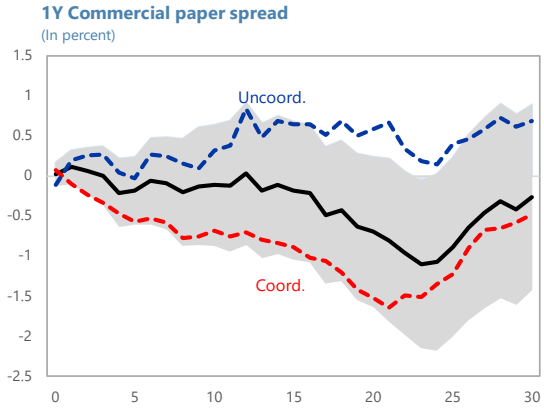
Source: WIND and IMF staff calculation



Source: WIND and IMF staff calculation



Source: WIND and IMF staff calculation



Source: WIND and IMF staff calculation

14. However, the impact is monetary policy is significantly stronger when coordinated with fiscal policy. The effect of coordinated monetary policy is larger in most cases. Indeed, only the 1-year sovereign yield is significantly affected by both uncoordinated and coordinated monetary policy shocks. However, for the credit bond spreads, the significant impact of the monetary policy shock is conditional on fiscal policy moving in the same direction. For example, coordinated shocks reduce enterprise spreads by 3.3 percentage points 20 days after the shock. Similar results are found for the 3- and 5-year maturities of sovereign and credit bonds (not pictured).

15. The ability of fiscal policy to amplify the effects of monetary is beneficial, but the results suggest continued difficulties in the transmission of monetary policy. Given the collective decision making around macroeconomic policy, it is not surprising that monetary and fiscal policy work in tandem to counter economic shocks. While policy coordination can clearly be beneficial in certain circumstances, monetary policy needs the ability to respond quickly and independently to economic events. A muted market response to uncoordinated monetary policy weakens the ability of the monetary authority to use its tools to affect the economy, particularly through standard interest-rate channels.

E. Policy Implications

16. Continued reforms to strengthen the interest-rate based framework are needed. These include:

- *Formulating a clear inflation objective and granting the PBC operational (instrument) independence*. Having the SC set the overall goals for monetary policy (but not specific interest rate targets) and delegating the responsibility to meet them to the PBC is particularly important within a collective decision-making structure. This is to ensure that multiple stakeholders are not steering policies towards different objectives at different times,[7] and to limit fiscal dominance (large augmented deficits and resulting pressures for credit expansion) in non-crisis periods.

- *Streamlining and clarifying the monetary policy framework, with a focus on one key policy interest rate*. The PBC should guide the short-term interbank rate in the clearest manner possible, and let longer-term rates be market-determined, reflecting expectations of the central bank's future policy rates and future inflation, among other factors. The clearer the policy framework, the easier it will be for the market to establish a yield curve.

- *Reforms to further improve interest rate pass-through*, including continued progress on LPR reform and phasing out the benchmark deposit rate (see SIP 1).

- *Steps to increase the financial robustness of the banking system to fluctuations in short-term interest rates*. These include (i) raising bank capital, and (ii) further developing interest-rate hedging instruments.

[7] For example, Ma (forthcoming) suggests that historically "many government agencies and stakeholders will attempt to steer monetary policies in their favor through the SC, often leading to pressures for excessive monetary expansion and a rising leverage ratio in the economy."

References

Fernald, J. G., M. M. Spiegel, and E. T. Swanson (2014). Monetary policy effectiveness in China: Evidence from a FAVAR model. *Journal of International Money and Finance* 49, 83-103.

Harjes T (2017), 'A Market-Based Monetary Policy Approach for China', in 'People's Republic of China: Selected Issues', IMF Country Report No 17/248, pp 34–40.

Jordà, Ò. (2005). Estimation and inference of impulse responses by local projections. *American Economic Review*, 95(1), 161-182.

Kamber, G., & Mohanty, M. S. (2018). Do interest rates play a major role in monetary policy transmission in China? *BIS Working Paper*.

Kim S and H Chen (2019), 'From a Quantity to an Interest Rate-Based Framework: Multiple Monetary Policy Instruments and their Effects in China', Hong Kong Institute of Monetary Research Working Paper No 01/2019.

Ma J (forthcoming), 'China's Interest Rate Liberalization', in M Amstad, G Sun and W Xiong (eds), *The Handbook of China's Financial System*, Princeton University Press, Princeton

Nakamura, Emi and Jón Steinsson (2018), 'High-Frequency Identification of Monetary Non-Neutrality: The Information Effect', *The Quarterly Journal of Economics*, Volume 133, Issue 3, August 2018, Pages 1283–1330, https://doi.org/10.1093/qje/qjy004

Schipke, Alfred., Markus Rodlauer, and ZHANG Longmei, 'China's Bond Market: Characteristics, Prospects, and Reforms,' in Alfred Schipke, Markus Rodlauer, and ZHANG Longmei, eds., *The Future of China's Bond Market*, Washington, D.C. (IMF) 2019.

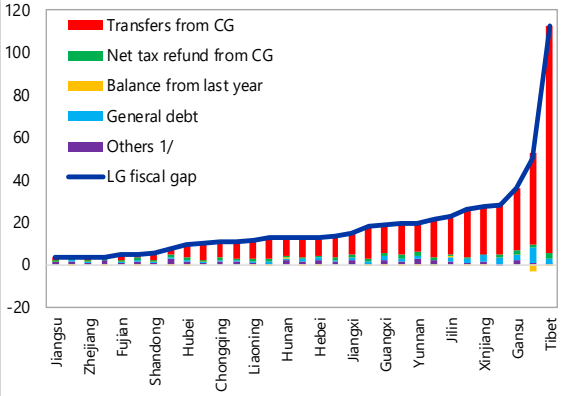
INTERGOVERNMENTAL COORDINATION IN CHINA: HOW MUCH FISCAL RISK SHARING IS THERE AND CAN IT BE IMPROVED?[1]

The COVID-19 crisis has weakened local governments (LGs)' fiscal health, particularly in the worst-hit regions, calling for stronger fiscal risk-sharing across provinces. The existing transfer system, which channels resources from the central government (CG) to LGs, has significant interregional risk-sharing qualities but could be enhanced by establishing an overarching automatic and non-regressive mechanism for the overall fiscal transfers from the CG to each province that would support LGs when facing large idiosyncratic shocks. There is also evidence suggesting the local SOE transfer system could be improved to increase the effectiveness of local fiscal policy.

A. Introduction: Local Government Financing Amid COVID-19

1. Already before the COVID-19 outbreak, China's LGs were heavily relying on transfers from the CG to fill the large gaps between their own fiscal revenues and expenditures. Most provinces have to rely on funding sources other than local tax and non-tax revenues to fill in the local revenue-expenditure gap (hereafter, fiscal gap) resulting from the long-standing misalignment between LGs' limited revenue sources and high expenditure responsibilities.[2] Transfers from the CG budget have been the major source of such funding, particularly for provinces with relatively large fiscal gaps (figure). Other key sources of financing include tax refund from the shared taxes between CG and LGs, LG bond issuance within CG-allocated quotas, dividend transfers from local state-owned enterprises (LSOEs), withdrawals of LG deposits, and land sales.

Most LGs rely heavily on CG transfers to fill in their own fiscal gaps (Percent of GDP; 2018)



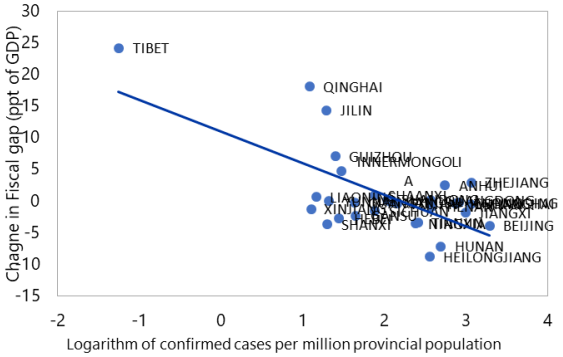
Sources: Ministry of Finance, CEIC, IMF staff calculation.
1/ Others include transfers from other fiscal accounts (e.g., special purpose bonds, LSOE dividend transfers, deposit withdrawals, and land sales).

2. While fiscal transfers and LG bond issuance have increased, the pandemic still curtailed LGs' ability to support growth at the provincial level. The CG has increased the ceiling on special LG bond issuance in 2020 by 74 percent (or RMB1.6 trillion) and issued RMB1 trillion anti-epidemic special Treasury bonds with the proceeds allocated to LGs. However, LGs' fiscal expenditure still declined in 24 out of 31 provinces during January-April 2020 by an average of 4 percent (y/y), as

[1] Prepared by Fei Han, Chenqi Zhou, and Grace Li.
[2] The fiscal gap is defined as the difference between the local revenues and expenditures of LGs, which would be largely closed if the transfers and tax refund from the CG are also included in the revenues.

their own fiscal revenue declined in 30 provinces by an average of 12 percent.[3] Provinces that were worse hit by the pandemic experienced larger widening in their fiscal gaps (figure). Widened fiscal gaps in most provinces constrained LGs' ability to support growth.

Fiscal gap widened more in provinces with more COVID-19 cases (Change in seasonally-adjusted fiscal gap in 2020Q1; log of confirmed cases in share of population in 2020Q1)



Sources: CEIC; Haver Analytics; and IMF staff calculations.
Note: Hubei is excluded from the figure.

3. The fiscal transfer system within China's fiscal framework can be improved to increase fiscal risk-sharing and help smooth regional shocks from the crisis. While self-insurance via unrestricted LG borrowing would enhance LGs' ability to fill structural financing gaps, debt financing will be less effective than a transfer-based mutual insurance system in the presence of Ricardian households and potentially rising risk premia for weaker LGs (Farhi and Werning, 2017; Berger, *et al*. 2019). The existing fiscal transfer system in China consists of general and special purpose transfers and mainly serves the purpose of reducing fiscal disparities across provinces (Wingender, 2018).[4] Although the general transfers are governed by an automatic and transparent rule that takes into account both standardized expenditures and revenues of provincial governments, the rule does not explicitly and adequately account for regional business cycles for risk-sharing purposes. Also, the special purpose transfers are not based on a clearly defined rule but relied—to some extent—on hard-to-predict *ex post* transfers.[5] This suggests looking for ways to improve the existing fiscal transfer system.

B. Empirical Strategy and Results[6]

4. The strategy to describe the current CG transfer-based fiscal risk-sharing system in China follows the standard empirical literature. Fiscal transfers from the CG serve two important purposes: (i) insurance against regional macroeconomic shocks, or short-term transfer of funds to smooth the impact of idiosyncratic regional shocks (*risk-sharing*), and (ii) *redistribution*, or permanent transfer of funds from richer to poorer regions via the CG budget to help convergence of regional living standards to the national average. To disentangle the risk-sharing effects from the redistribution effects, the two-step estimation approach developed by Von Hagen (1992) and Bayoumi and Masson (1995) is used. The approach features two separate regressions—a cross-section regression on average levels of regional variables (for the redistribution effect) and a panel

[3] LGs' total revenue including transfers from the CG has largely increased over the same period due to the higher transfers.

[4] The general transfers have been increasing over time and accounted for about 90 percent of total transfers at the national level in 2019 as some of the special purpose transfers were moved to general transfers.

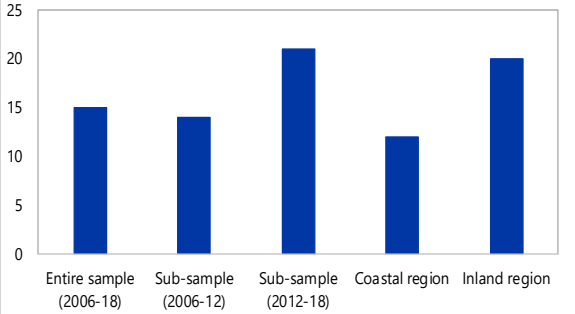
[5] Having said this, the revised Budget Law taking effect since October 2020 has tried to increase the predictability of transfers, including by requiring higher-level governments to inform lower-level governments of at least 90 percent of the expected general transfers and 70 percent of special purpose transfers for next year in advance.

[6] For detailed empirical strategy and results, please see the forthcoming working paper Han *et al*. (2020).

data regression on changes of regional variables (for the risk-sharing effect). To ensure robustness, the one-step approach proposed by Poghosyan *et al.* (2016) is used as well, which assesses the redistribution and risk-sharing effects in one step using the pooled mean group (PMG) estimator by Pesaran *et al.* (2016).

5. The results suggest significant risk-sharing and redistribution effects of CG transfers in China. The dataset for the regressions consists of province-level fiscal and macroeconomic data spanning from 2006 to 2018.[7]

- *Systematic fiscal risk sharing effect is estimated to be about 15 percent.* The coefficient for the risk-sharing effect is estimated to be 0.87 and 0.82 with the two-step and one-step approaches (both statistically significant), respectively, with an average of 0.85, suggesting a risk-sharing effect of 15 percent on average (figure). This indicates that the disposable income of a given province would fall by about 85 cents in response to a temporary 1-RMB decline in its aggregate income relative to the national average. The remaining 15 cents are smoothed out by the CG transfers. These estimates are slightly higher than indicated by the earlier literature on fiscal risk sharing in China, for example, Du *et al.* (2011), which found fiscal risk sharing effects of about 9 percent. This is likely due to the more recent data sample (2006-18), which uses an updated measure of disposable income. The risk-sharing effect of LSOE dividend transfers is not statistically significant, suggesting that such transfers do not help LGs smooth idiosyncratic shocks.



Source: IMF staff estimates.
Note: The estimates for the entire sample is the average of the two-step and one-step approaches, while those for sub-samples are only from the two-step approach as the PMG estimator in the one-step approach requires both large N and large T.

- *Redistribution effects are larger.* The coefficient for the redistribution effect is estimated to be around 0.67 (statistically significant) using both the two-step and one-step approaches, suggesting that the magnitude of the redistribution effect is about 33 percent. This implies that a province with a 1-RMB permanently lower aggregate income relative to the national average (as a result of a permanent shock) would have a disposable income that is only 67 cents below the national average, with the remaining 33 cents being covered by the CG transfers.

6. **Fiscal risk-sharing has increased over time and is higher in less developed inland provinces.** To examine the time and regional variations in the risk-sharing effect, the data sample is

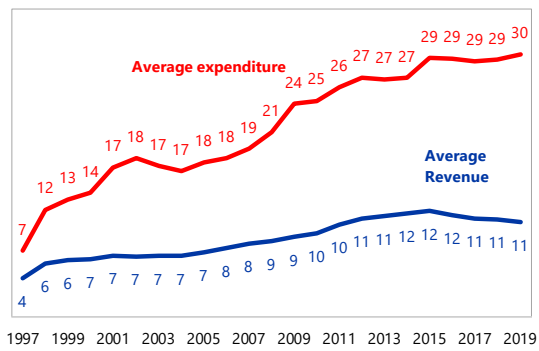
[7] The key variables in the regressions are net CG transfers, pre-transfer aggregate provincial income, and post-transfer disposable provincial income. Following Du *et al.* (2011), the pre-transfer aggregate provincial income is calculated as the sum of the household disposable income (excluding transfer income from both private and public sources), LG revenue, LG extrabudgetary revenue, and CG tax refund. The post-transfer disposable provincial income is calculated as the sum of the pre-transfer aggregate provincial income and the net CG transfers. All variables are in real *per capita* terms in the regressions. Data of CG transfers at the province-level are only available until 2018.

broken down into (i) two sub-sample periods with the same number of observations (2006-12 and 2012-18) and (ii) coastal region and (less developed) inland region.[8]

- *The risk-sharing effect has increased over time.* The estimation results suggest that the risk-sharing effect increased from 14 percent during 2006-12 to 21 percent during 2012-18. This finding reflects the higher dependence of LGs on CG transfers (figure).

- *Regional variations suggest a higher risk-sharing effect in the inland region.* The estimation results suggest that the fiscal risk-sharing effect in the inland provinces (about 20 percent) is significantly higher than the coastal provinces (about 12 percent). This indicates that China's CG transfer system provides higher shock-smoothing for less developed provinces.

LG average revenue and expenditure
(In percent of GDP)



Sources: Ministry of Finance, and IMF staff calculations.

7. The fiscal risk-sharing effect seems broadly comparable with the estimates for advanced economies in literature which have a large variation. The text table compares the estimated risk-sharing and redistribution effects for China with those for major advanced economies in literature. The risk-sharing effect of 15 percent in China seems to be within the estimate range for the U.S. or U.K., although the average redistribution effect of 33 percent for China are on the high end (Table 1). However, in contrast to the observation that the effect has broadly declined in these advanced economies over time, likely due to an increased harmonization of regional business cycles and better functioning interregional financial markets (Poghosyan *et al.*, 2016), the effect has increased in China, reflecting the higher importance of CG transfers in smoothing regional shocks.

Text table. Comparison with Advanced Economies

Country	Sample period	Risk-sharing effect	Redistribution effect
China (average of the two-step and one-step approaches)	2006–17	16%	34%
China: Du *et al.* (2011)	1980–2007	9%	–
U.S.: Bayoumi and Masson (1995)	1969–86	30%	22%
U.S.: Athanasoulis and Wincoop (2001)	1963–90	10-20%	–
U.S.: Melitz and Zumer (2002)	1977–92	20%	16%
U.S.: Poghosyan *et al.* (2016) (average of two-step and one-step approaches)	1998–2010	8%	21%
U.S.: Furceri *et al.* (2020)	1998–2017	4%	–
Canada: Bayoumi and Masson (1995)	1965–88	17%	39%
Canada: Obstfeld and Peri (1998)	1971–95	13%	53%
Canada: Melitz and Zumer (2002)	1965–88	10-15%	16%
Canada: Poghosyan *et al.* (2016) (average of two-step and one-step approaches)	1992–2009	6%	25%
U.K.: Goodhart and Smith (1993)	1966–88	21%	21%
U.K.: Melitz and Zumer (2002)	1971–93	20%	26%

Source: Author, based on the literature search.

8. However, there is a stronger need for idiosyncratic shock-smoothing in China given the lower business cycle synchronization in China than in the U.S. The average synchronization

[8] The coastal region includes 11 provinces (Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin, and Zhejiang) and the inland region includes the remaining 20 provinces. National average is used in the regressions for both coastal and inland regions.

of local business cycles in China is measured as the cross-sectional average of pairwise synchronicities calculated as the negative of the absolute divergence in provincial GDP growth following Furceri *et al.* (2020) and Giannone *et al.* (2010). The results show that the average divergence of GDP growth has been, on average, higher in China than in the U.S. (figure).

9. An alternative CG transfer mechanism that is automatic and non-regressive could achieve higher fiscal risk-sharing at lower costs. Following Furceri and Zdzienicka (2015) who constructed a supranational fiscal risk-sharing mechanism based on a non-regressive and automatic transfer rule for the euro area, we simulate the counterfactual fiscal risk-sharing effect by redistributing the total CG transfers (T_t^{Total}) over the sample period according to a similar rule:

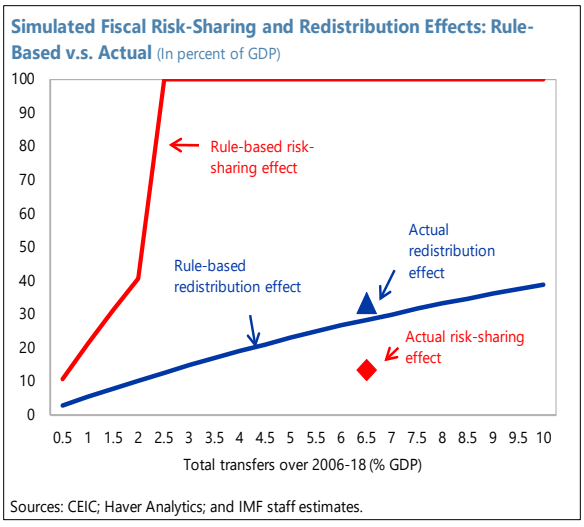
$$T_{it} = 0, \qquad if\ \varepsilon_{it} \geq 0$$

$$T_{it} = |\varepsilon_{it}| * \frac{GDP_{it}}{\sum_i GDP_{it}} * \tau * T_t^{Total}, \qquad if\ \varepsilon_{it} < 0$$

where ε_{it} are the shocks for province i at year t. The transfers to province i at year t (T_{it}) are a function of three factors: (i) the size of the provincial shock, (ii) the relative size of the provincial economy (post-transfer income instead of GDP is also used for robustness), (iii) the size of the total transfers, and (iv) a constant parameter (τ) to calibrate the total size of the alternative transfers.[9] Following Furceri and Zdzienicka (2015), the provincial shocks are derived from the following simple regression, estimated province-by-province:

$$\Delta log(GDP_{it}) = \alpha_i + \sum_{j=1}^{2} \beta_{ij} \Delta log\left(GDP_{i,t-j}\right) + \varepsilon_{it}$$

Simulations using the rule-based transfers suggest that when the parameter τ is above a certain threshold (around 4), all idiosyncratic shocks could be smoothed. More importantly, the rule-based transfers could have delivered significantly higher



[9] The total size of the alternative transfers is constrained to be less than or equal to the total size of actual transfers over the sample period of 2006-18. We implicitly assume that CG could borrow intertemporally over the years.

risk-sharing than the realized risk-sharing of about 15 percent, while keeping the redistribution effect similar to the realized level of 33 percent (figure).

C. Considerations for Reform

10. It is important to further reform China's intergovernmental framework based on international best practices to address the long-standing misalignment between LGs' own revenues and expenditures. The structural underfinancing has weakened LGs' ability to respond to idiosyncratic shocks and increased their reliance on CG transfers. Reducing the misalignment of central-local fiscal responsibilities could lower the need for fiscal risk-sharing. On the expenditure side, the assignment of expenditures to the appropriate level of governments (laid out in the State Council reform plan) should be decided on assessments of the economies of scale, equity considerations, and externalities. Centralized pension and unemployment insurance systems should also be considered. On the revenue side, tax reforms to provide LGs with more authority over some tax rates and bases (e.g., PIT and property tax) could strengthen LGs' fiscal accountability (Wingender, 2018; Ahmad 2011). It is also critically important to align LGs' borrowing limits with their expenditure responsibilities and contain investment financed off-budget, including by ensuring realistic LG financing arrangements, carefully assessing and dismantling implicit guarantees on remaining off-budget investments (e.g., by allowing them to default), and bringing non-commercial investment on budget.

11. Empirical findings suggest room for improving the efficiency of fiscal transfers to increase the effectiveness of fiscal policy as a stabilization tool and enhance risk-sharing in China amid the current COVID-19 crisis. The existing CG transfer system already has significant risk-sharing and redistribution effects, including some regional features where the effects are larger in the less developed inland regions. However, the COVID-19 crisis has further widened LGs' fiscal gaps, constraining LGs' ability to respond to the shock and increasing their reliance on CG transfers. It is hence useful to consider measures to further enhance the fiscal risk-sharing effects of CG transfers:

- *An alternative automatic and non-regressive CG transfer mechanism* could help increase the fiscal risk-sharing effect while keeping the redistribution effect at roughly similar levels. A transparent, well-understood transfer mechanism would assure households and investors that LGs will have access to the fiscal resources needed to compensate for the effects of local shocks and avoid a sharp tightening of financial conditions even if temporary borrowing is required.

- *Common borrowing*—for example, in the form of CG-issued bonds—is the second-best option when the funding for CG transfers is constrained, which will reduce the degree of fiscal risk-sharing as the debt is eventually carried by all. However, the mechanism will still deliver more targeted transfers than the current transfer system and break the vicious cycle between weaker LG fiscal health and higher borrowing costs in the case of LG self-insurance (IMF, 2020b).

12. Reducing the LG-LSOE-bank interlinkages could help contain the higher moral hazard from enhanced fiscal risk-sharing. Enhanced fiscal risk-sharing could also increase the moral

hazard of LSOEs and local banks as the anticipated improvement in LG fiscal health reduces LSOEs' borrowing costs and encourages higher risk-taking behaviors (IMF, 2020b). Removing explicit and implicit government guarantees for LSOEs could help break the interlinkages and contain the increase in moral hazard. This would also call for stronger governance rules guiding LG fiscal decisions, including preventing LGs from using the transfers to protect weak LSOEs.

13. Raising LSOE dividend transfers to LGs during downturns might improve LG's ability to smooth shocks. When considering macroeconomic stabilization, it is generally more effective and helpful to rely on direct and transparent fiscal policies than using SOEs to support employment which is typically less efficient than the former during economic downturns (IMF, 2020a). This suggests that a countercyclical rule for LSOE dividend transfers, for example, one that features discretionary adjustments to increase the transfer ratios during economic downturns, might help reduce fiscal gaps and the need for fiscal risk-sharing.[10]

14. Increasing interregional mobility of production factors by phasing out local protectionism and LG interventions in the product and factor markets could help with local adjustments to idiosyncratic shocks, thereby limiting the need for fiscal risking-sharing. After the tax decentralization reform in 1994, LGs—in pursuit of their objectives of social and economic stability and fiscal revenue maximization—have introduced widespread local protectionism, including barriers in capital, labor, goods, and services (Zhao and Ni, 2018; Poncet, 2005; Zhu, 2004). Economic reforms promoting domestic market integration could allow higher mobility in production factors (capital and labor), which could increase households' and private firms' capacity to smooth idiosyncratic shocks via market and financial channels and minimize the need for fiscal risk sharing.[11]

[10] The role of LSOE dividend transfers would be less significant than the CG transfers during economic downturns, as LSOEs' profits are likely to be procyclical.

[11] See the forthcoming working paper Han *et al.*, (2020) for further discussions.

References

Ahmad, E., 2011, "Should China Revisit the 1994 Fiscal Reforms?" Asia Research Centre Working Paper 52, London School of Economics & Political Science, London, U.K.

Athanasoulis, S., and Wincoop, E. v., 2001, "Risk Sharing Within the United States: What Have Financial Markets and Fisal Federalism Accomplished?" *The Review of Economics and Statistics*, Vol. 83, No. 4, pp. 688–98.

Bayoumi, T., and Masson, P., 1995, "Fiscal Flows in the United States and Canada: Lessons from Monetary Union in Europe," *European Economic Review,* 39: pp. 253–74.

Berger, H., Dell'Ariccia, G., and Obstfeld, M., 2019, "Revisiting the Economic Case for Fiscal Union in the Euro Area," IMF Economic Review, Vol. 67, pp. 657–683.

Du, J., He, Q., and O. M. Rui, 2011, "Channels of Interprovincial Risk Sharing in China," *Journal of Comparative Economics*, 39, pp. 383–405.

Farhi, E., and Werning, I., 2017, "Fiscal Unions," American Economic Review, Vol. 107, No. 12, pp. 3788–3834.

Furceri, D., and Zdzienicka, A., 2015, "The Euro Area Crisis: Need for a Supranational Fiscal Risk Sharing Mechanism," *Open Economies Review*, Vol. 26, No. 4, pp. 683–710.

Furceri, D., Loungani, P., and Pizzuto P., 2020, "Moving Closer? Comparing Regional Adjustments to Shocks in EMU and the United States," *Journal of International Money and Finance*, 102282.

Han, F., Li, G., and Zhou, C., "Intergovernmental Coordination in China: How to Enhance Fiscal Risk-Sharing?" IMF Working Paper (*forthcoming*).

International Monetary Fund (IMF), 2020a, "*Fiscal Monitor*," April Issue.

IMF, 2020b, "*Global Financial Stability Report,*" October Issue.

Lardy, N.R., 2019, "*The state strikes back: The end of economic reform in China?*" Peterson Institute for International Economics.

Martinez, J., Qian, B., Wang, S., Zhang, L., and Zhou, H., 2014, "An Essay on Public Finance in China," *Annals of Economics and Finance*, Vol. 15, No. 1, pp. 289–405.

Melitz, J., and Zumer, F., 2002, "Regional Redistribution and Stabilization by the Centre in Canada, France, the U.K. and the U.S.: A Reassessment and New Tests," *Journal of Public Economics,* 86 (2): pp. 263–84.

Obstfeld, M., and Peri, G., 1998, "Regional Non-Adjustment and Fiscal Policy," *Economic Policy,* 26: pp. 205–69.

Orlik, T., 2020, "*China: The Bubble that Never Pops*," Oxford University Press, USA.

Pesaran, H., Shin, Y., and Smith, R., 1999, "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association,* 94: pp. 621-34.

Poghosyan, T., Senhadji, A., and Cottarelli, C., 2016, "The Role of Fiscal Transfers in Smoothing Regional Shocks: Evidence from Existing Federations," IMF Working Paper 16/141.

Poncet, S., 2005, "A fragmented China: Measure and determinants of Chinese domestic market disintegration," *Review of international Economics*, Vol. 13, No. 3, pp. 409–430.

Von Hagen, J., 1992, "Fiscal Arrangements in a Monetary Union: Evidence from the US", In *Fiscal Policy, Taxes, and the Financial System in an Increasingly Integrated Europe*, ed. Don Fair and Christian de Boissieux, (Kluwer, London).

Wingender, P., 2018, "Intergovernmental Fiscal Reform in China," IMF Working Paper 18/88.

Zhao, Y., and Ni, J., 2018, "The border effects of domestic trade in transitional China: local Governments' preference and protectionism," *The Chinese Economy*, Vol. 51, No. 5, pp. 413–431.

Zhu, H., 2004, "The Effects of Interregional Competition and Fiscal Incentives on Privatization in China," *Economic Research Journal*, Vol. 2, pp. 24–34 (in Chinese).