

# International Monetary Review

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The Globalization of Chinese Banks

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Six Balancing Acts for the World to Achieve Sustainable, Green Development

**Andrew Sheng and Xiao Geng**

Building a One-Earth Balance Sheet

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# Special Column on Globalization of Chinese Banks and Enterprises

## The Globalization of Chinese Banks

*By* HERBERT POENISCH\*

Chinese owned banks have become not only the largest banks in the world but also major players on the global financial stage. In the first phase they followed Chinese enterprises as they expanded their global operations following the «going out» strategy starting in the early 2000s. In this role they followed in the footsteps of other international banks, such as US and European banks earlier on. At that stage funding of overseas operations was mainly from the head office. In the meantime they have moved on to become truly global banks, funded by international financial markets and local deposits in their branches.

Although we do not have the precise statistics on their global operations, approximations provided by the central banks in countries where they operate in allows the BIS to produce a comprehensive picture of their global operations. Through the nationality breakdown of their local banking statistics (LBS), the footprints of Chinese banks in close to 50 financial centres, such as Hong Kong, Singapore, London, Luxemburg are captured. Thus LBS capture about 93% of global banking activities. These data, in addition to the ones provided by China since the end 2015 allow us to draw conclusions about the importance of Chinese banks' global business.

As China does not publish data compatible with the Consolidated Banking Statistics (CBS) of the BIS we have to use counterparty data to obtain a picture of global activities of Chinese banks.

This article will cover the major Chinese participating banks, their cross border lending and borrowing, compared with the cross border business from China. It will also cover the ranking of Chinese banks among the global banks according to the Bank Internationalisation Index. Finally, the main differences between the globalisation strategy of Western and Japanese banks and Chinese banks will be spelt out.

### 1. Chinese banks global business

The Chinese banking system is the biggest in the world with estimated assets of RMB 336tr in mid 2021. This translates into USD 53tr or 350% of GDP. In comparison, the US banking system amounted to USD 19tr or 100% of GDP at the same time. The difference is mostly explained by the comparative importance of financial markets in financial intermediation in the USA. However, the Chinese banking system is basically a domestic system whereas the US system has a sizable share of cross border business.

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\*Herbert Poenisch, Member of IMI International Committee and former Senior Economist of BIS.

The US cross border claims were USD 4.35tr, or 22.8% of total assets. Chinese banks cross border claims amounted to USD 2.658 or 4.7% of total assets.

Out of all Chinese banks we need to define who qualifies as a Chinese global bank. According to the Bank Internationalisation Index (BII) of the Academy for Internet Finance (AIF) in Hangzhou the global Chinese banks are first and foremost the Bank of China (BOC), the Industrial and Commercial Bank of China (ICBC), the Construction Bank of China (CCB), and to a lesser extent the Agricultural Bank of China (ABC), China International Trust (CITIC) and second tier banks such as GuangDa, Jiaotong, Mingsheng, Pufa, Xingye, Chaoshang, The Financial Stability Board (FSB) rating of Global Systemically Important Banks (G-SIB) also features the major four Chinese banks. Regarding cross border business, two of the three policy banks, the China Development Bank (CDB) and the Export Import Bank of China (ExImbank) are major players which are included in the LBS. The major banks, BOC and ICBC each have more than 500 overseas affiliates. The CDB and ExImbank have only few branches, notably in Hong Kong and a small number of representative offices.

According to the Bank Internationalisation Index of 150 globally active international banks of the Hangzhou AIF, only foreign banks feature among the top 20 with the likes of Standard Chartered (61.7), Banco Santander (55.8), Credit Suisse (52.8), HSBC (50.8), Deutsche Bank (45.6), Citigroup (39.7), Mitsubishi UFJ (33.6). Chinese banks feature only after this, with BOC in position 21 (26.9), and ICBC (17.1). Other Chinese banks fall lower into single digit indices. This is explained by the relative importance of domestic business for Chinese banks. In addition to the global top 50 banks, AIF publishes rankings for G-SIB, Belt and Road countries and RCEP.

All of these banks report their cross border business in their annual reports, comprising loans and securities on the asset side as well as deposits and securities issued on the liabilities side. It is uncertain to what extent activities of their affiliates abroad are included in their annual reports.

Banks resident in China, mostly Chinese owned had cross border assets of USD 1.541 tr in mid 2021. Cross border liabilities amounted to USD 1.648 tr. This was the traditional picture with liabilities exceeding assets, as banks in China borrowed internationally to fund domestic as well as foreign operations. Looking at the nationality of Chinese owned banks, their global cross border assets amount to USD 2.658 tr and their liabilities to USD 2.509 tr. Assuming that most of the cross border asset from China are accounted for by Chinese owned banks, the difference of USD 1.1tr must be accounted for by lending from overseas affiliates of Chinese banks.

A big portion comes from lending by Chinese banks in Hong Kong, where the total cross border lending was USD 1.705tr in mid 2021 with Hong Kong owned banks providing only less than USD 100bn. The rest stems from foreign banks, first and foremost Chinese banks.

Regarding the currency breakdown, the major part of 60% of the cross border lending of Chinese owned banks was in USD, whereas USD liabilities made up less than half. RMB deposits made up about 30%, mostly in their branches in Hong Kong. This points to a currency mismatch similar to European and Japanese banks, as USD lending exceeds USD funding. This source of funding has come under increased stress during Covid19 and might resurface as result of recent tapering.

Whereas most other international banks conduct business with clients in advanced economies, Chinese banks mostly deal with emerging market developing countries (EMDC). In mid 2021 Chinese banks had claims on 133 EMDC out of a total of 143, with a market share of 22.6%. This difference is due to two reasons. Firstly, China is the major trading partner of some 63 countries among the EMDC group and secondly, Chinese banks provide the financial side of state led initiatives such as the Belt and Road Strategy. In addition, the two policy banks, the CDB and the ExImbank play a major role in financing Belt and Road projects, either to foreign partners or domestically to Chinese companies.

## 2. Different role of cross border lending

Whereas non Chinese global banks, such as US, European and Japanese are basically privately owned, main Chinese banks are state owned. They are pursuing different aims in their cross border business. Private banks are driven only by commercial motivations, whereas state banks are also pursuing non commercial aims such as state led initiatives and geopolitical considerations. Serving the BRI is such a case in point.

Auditors of non Chinese banks check the performance of their clients on whether the cross border business adds to the financial performance of the banks. This was the criteria for many European banks to rethink their business model after the Global Financial crisis, ie a retrenchment from overseas operations.

In the case of China this is not the case although we are assured that in the case of the policy banks they have to produce profits, subsidies can be provided through different channels. A study on the ODF finance provided by the two policy banks argues that Chinese cross border finance is different.

The nature of Chinas ODF is a mixture of official aid and export credits. In terms of lending destinations, these credits are aid-like and flow mostly to the EMDC, but in terms of their terms and conditions they appear commercial, ie in most cases the loans are non-concessional and surprisingly costly. There are two rationals behind Chinas ODF: pursuing the state's political and foreign policy objectives and facilitating firms international competition. In this model, the state participates in project financing, such as infrastructure not through direct allocation of fiscal revenue but through enhancing the creditworthiness of projects and making them financially viable to the market. This «state-supported, market based» means of development finance explains the relative costliness of the Chinese ODF. Chinese financiers have been cautious in discussing their operations in public, the real lending rationales behind the Chinese credits remain opaque.

Official Development Finance (ODF) includes different kinds of credits. In many cases it refers to official aid, ie grants and concessional loans that support the development of recipient countries. It also includes export credits that aim to facilitate exports of lending countries' firms. These two hold fundamentally different lending incentives: aid is charitable, whereas export and project credits are commercially driven. In contrast the OECD definition of Overseas Development Assistance (ODA) only includes grants and concessional loans. There is also an agreement on what constitutes a concessional loan under the export credit agreement (ECA). Non-concessional loans and export credits in the interest of the donor do not qualify as ODA but rather Other Official Flows (OOF).

Chinese ODF generally falls into four categories: grant and interest free loans disbursed and funded by the government, concessional loans partly funded by the government and disbursed by policy banks, non subsidised loans disbursed and funded by policy banks, commercial bank loans insured by an official insurance company.

A similar “state driven-market based” logic can be applied to cross-border lending by the major state owned Chinese commercial banks to EMDC. They serve a multiple purpose, they serve state supported strategies such as the BRI as well as support Chinese enterprises in exports and overseas projects. They form part of the Chinese outward financial flows, including increase in direct investment assets and increase in other investment in the balance of payments, but excluding outward portfolio investments. These two components increased markedly in the past few years to reach USD 4tr in 2020. Increase in outward direct investment of USD 1tr and other investment of USD 3tr cover both, financing in AE as well as EMDC. Filtering out financial flows into EMDC, let alone ODF is very difficult. Official data, such as balance of payments data or annual reports of banks on the ODF is unavailable, as they normally publish only aggregate data and limited data by sector, region or project.

Whatever the commercial viability of Chinese banks' foreign activities, several risks remain and need to be managed. Overseas activities are subject to enhanced market risk as multiple currencies are involved and credit risk is ever present in EMDC, such as Venezuela in Latin America, Sudan in Africa and Pakistan in Asia. Among market risk, exchange rate risk features prominently as the RMB has recently been subject to appreciation. Banks could be caught in the undesirable situation when most of their assets are in a weak currency, such as the USD and most of their liabilities are in a strong currency such as the RMB. Regarding credit risk, EMDC have been exposed to increased risks due to the outfall of the Covid pandemic and downturn in the global economy. Will China Inc, rather than the Chinese banks absorb this enhanced risk or will the international community, such as the IMF have to step in?

## Conclusion

Chinese banks have expanded their foreign activity in recent years, mostly dealing with EMDC. They have implemented the Chinese approach called «state led-market based». This has been well received in recipient countries but is facing increased risks. These are market risks such as appreciating RMB and credit risk such as EMDC clients adversely affected by the outfall of the global pandemic. Further strain could be added if global interest rates rise and a resumption of capital repatriation to AE resumes tapering. Market driven international capital flows might not follow the underlying Chinese approach. Finally, will Chinese banks be able to meet the stricter FSB regulatory and supervisory requirements for global systemically important banks?

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## Stepping on Frost and Ice, Taming the Path

### The Internationalization of Global Banks

By BEN SHENGLIN, SHAO HUI, ZHU HE\*

#### Introduction

At the Digital Intelligence Change and Common Wealth Summit on December 5, 2021, the "2021 Global Bank Internationalization Index" was jointly released by Zhejiang University International Business School (ZUZIBS), Asia Pacific Institute of Economics and Management (APAEM), Zhejiang University Institute of Financial Technology (ZUZIF), Beijing Frontier Institute of Financial Supervision and Technology (FIRST), and Zhejiang Association of Digital Financial Technology (ZAFT). The report is based on the AIF at Zhejiang University's "Internationalization Report of Chinese Banks," which was first published in 2015 and provides an in-depth analysis of the development status and changes of Chinese banks through five lists of nearly 150 banks from 40 countries in three dimensions: organizational internationalization, business internationalization, and profit internationalization.

"Stepping on Frost and Ice, Taming the Path" is the title of this report. The new coronavirus pneumonia (COVID-19) began to spread around the world in 2020, and the epidemic gradually replaced global trade disputes as the primary global systemic risk, with serious consequences for the economy, trade, finance, and other fields, further complicating the international situation. Banks need "tame their ways" and be brave enough to face the subsequent "ice" and find new methods to handle the new chances and challenges in the internationalization process as anti-globalization events become more common.

#### The Bank Internationalization Index (BII)

The Bank Internationalization Index (BII) was first published in 2015, and it has been seven years since then. The Banks Internationalization Index (BII) system has been optimized and innovated based on prior findings. To construct the BII, the data is obtained using crawler technology and manual verification, key indicators are screened using text similarity calculation and one-way ANOVA, and the weights of each layer are determined using hierarchical analysis and coefficient of variation method, striving for scientific objectivity and assisting banks in clarifying their open positions in the international financial market.

In 2021, 42 global banks and 35 regional banks will be ranked and analyzed internationally. The 77 banks in the BII list have a combined asset value of US\$80 trillion, accounting for 60% of the global banking industry's total asset value. The global banks, which represent the most internationally prominent banking echelon, originate from 13 countries and include the Global Systemically Important Banks (G-SIBs) and major financial organizations in The Banker's Top 50 banks. Regional banks are represented by BRICS and countries along the "Belt and Road," with a focus on emerging market forces represented by the BRICS and countries along the "Belt and Road."

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\*Ben Shenglin, Co-director of IMI, Dean of Zhejiang University International Business School; Shao Hui, Assistant Professor, Zhejiang University International Business School; Zhu He, PhD Candidate, Zhejiang University International Business School.

### **Global Bank BII Comparison: Head Gathering**

Standard Chartered Bank (BII score 61.60) remains at the top of the internationalization list of global banks in 2020, having dominated the list for six consecutive years. SANTANDER CENTRAL HISPANO S.A., Barclays Bank, ABN AMRO, Credit Suisse and HSBC follow with BII scores above 50, exemplifying global operations.

The average BII score of the Top 20 worldwide banks is 40.87, which is approximately 4.09 times the average BII score of the 21st-42nd rank (9.99), indicating a significant disparity between the two echelons. All global banks entering the TOP20 BII list in 2020 are from developed countries in the top tier. Furthermore, Asia and the United States each have eight banks in the TOP20, while Europe has twelve, demonstrating the apparent international locational advantages of ancient capitalist countries like the United Kingdom, France, Germany, the Netherlands, and Italy. Chinese banks account for half of the 22 banks in the second tier (11), with Bank of China (21st, with a BII score of 26.87), Industrial and Commercial Bank of China (25th, with a BII score of 17.11), and Bank of Communications (30th, with a BII score of 8.55) occupying positions 21-30 in the BII ranking, and the remaining 8 occupying positions 31-42. The following 8 are in the 31-42 range, with a focus on the 36-42 range. These 11 Chinese banks are all Global Systemically Important Banks (G-SIBs) or in The Banker's Top 50 in terms of asset size, but their international performance is generally poor, and they still have great potential and broad room for development.

### **BII comparison of regional banks**

In 2020, Sweden-based Nordea United Bank (BII score of 52.14) continues to top the internationalization list of regional banks. Singapore's UOB, OCBC Bank and DBS Bank all entered the TOP 10, demonstrating Singapore's status as an Asian financial center; South Africa, Malaysia, India, Thailand and Indonesia all have banks in the TOP 20, demonstrating emerging market countries' international financial power and future growth potential. Regional banks come from a wider range of countries, with banks from 15 different countries making the TOP20 list (global banks TOP20 from 10 countries).

It's worth noting that 1/3 of the Top 20 regional banks are from RCEP member countries, including three from Singapore, one from Malaysia, one from Thailand, one from Australia, and one from South Korea, and the RCEP is the world's most populous free trade area with the largest economic and trade scale and the greatest development potential, with a significant impact on the development of the Asia-Pacific and global economies.

Specifically, the internationalization performance of banks in RCEP member countries has the following characteristics. First, member banks' internationalization levels are distributed in a ladder: the first echelon has a high international influence, such as Japan's Bank of Tokyo-Mitsubishi UFJ, Singapore's UOB, and OCBC Bank successfully entered the TOP 20 in the list of global banks; the second echelon, such as banks in China, Australia, Korea, and Indonesia, has a few representative banks with a high internationalization level, but the overall national internationalization level is low; the third Third-tier banks, such as the Philippine National Bank and the Industrial and Commercial Bank of Vietnam, continue to dominate their domestic markets and have not yet completed their banks' internationalization. Second, although the internationalization level of banks in RCEP member countries is on an upward trend, the BII scores of different banks are mixed. In 2020, the BII scores and rankings of banks in South Korea, Singapore, and Australia have improved as a whole, while some of the BII scores of banks in China and Indonesia have improved significantly compared to 19 years, but some banks' BII scores have regressed due to the impact of the epidemic.

### Internationalization ranking of Chinese banks

Looking back, the accomplishments are remarkable, with large state-owned banks serving as forerunners in their respective overseas journeys, forming the global layout at the outset, and the synergy effect between domestic and overseas being remarkable; however, the future is hazy, with the spread of Newcastle pneumonia, the intensification of geopolitical friction, and the rise of the counter-globalization wave. It is meaningful to consider the internationalization of Chinese banks at this "tipping point" in history.

Based on the above index compilation scheme, this report calculates the BII values of five large state-owned commercial banks and some joint-stock banks, and ranks them as follows:

Rankings	Name of Bank	BII
1	Bank of China	26.87
2	Industrial and Commercial Bank of China	17.11
3	Bank of Communications	8.55
4	China Construction Bank	7.87
5	Agricultural Bank of China	6.61
6	Shanghai Pudong Development Bank	4.36
7	China Minsheng Bank	4.25
8	China CITIC Bank	3.98
9	China Everbright Bank	2.85
10	China Merchants Bank	2.72
11	Industrial Bank	1.10
12	Bank of Beijing	0.34

The internationalization of Chinese banks has greatly improved as the country's financial opening-up process proceeds. The number of countries with global presence has more than doubled to more than 60 in the ten years since Chinese banks went global; total overseas assets have exceeded USD 2 trillion, 3.5 times that of ten years ago; and total overseas revenue has exceeded USD 50 billion, 4.3 times that of ten years ago.

In recent years, with the deepening of global economic integration and the rapid expansion of RMB internationalization, Chinese banks accelerated their pace of internationalization and achieved great progress. Other national joint-stock banks, as well as some urban commercial banks and agricultural commercial banks, are increasing their overseas operations and investigating internationalization in their own unique ways.

The internationalization path of Chinese banks can be broadly divided into four categories regarding the development characteristics of each bank.

#### 1. Policy Banks

Policy banks, such as the China Development Bank and the Export-Import Bank, are characterized by their primary focus on advancing the overall national strategy, and their international business expansion often precedes institutional development.

#### 2. State-owned commercial banks

The six large state-owned commercial banks (including China Postal Savings Bank) are characterized by a mix of commercial and policy undertones, a head start in international expansion, and a focus on broad institutional network and product coverage. Judging from the BII index in the past two years, the six state-owned banks (including China Postal Savings Bank) have a clear leading position. In recent years, state-owned banks have taken use of their scale and brand advantages by taking on underwriting responsibilities for overseas issuances of

RMB bonds on a number of occasions, allowing them to expand their international business space while diversifying their operations.

### 3. National joint-stock banks

National joint-stock banks, such as China Merchants Bank, are distinguished by their commercial principles, and instead of pursuing large-scale development, they focus on establishing the essential foreign backbone network to achieve distinctive characteristic development. The worldwide expansion of China's joint-stock banks has intensified in recent years, particularly the trend of establishing branches along the "Belt and Road." Eleven of the twelve joint-stock banks now have international branches.

### 4. City and agricultural commercial banks

City merchant banks, such as Bank of Beijing and Bank of Shanghai, and agricultural merchant banks, such as Guangzhou Rural Commercial Bank, are characterized by their focus on serving local and indigenous enterprises, so the number of overseas institutions and the proportion of their overseas revenue is relatively limited. They are, nevertheless, looking into international development options that are tailored to their needs. Bank of Beijing is one of the "leaders" among them. Bank of Beijing has been experimenting with internationalization in recent years, opening offices in Hong Kong and Amsterdam, respectively, setting a "leading role" for other urban and rural commercial banks in China and laying the groundwork for the bank to open branches overseas and expand its international business.

## Conclusion

Initially, the overseas expansion of Chinese banks was carried out through the "point" model of opening branches and overseas M&A. Before 2006, the overseas expansion of Chinese banks was mainly based on the establishment of branches; while after 2006, the overseas expansion of Chinese banks was mainly based on the initiation of cross-border M&A. According to incomplete statistics, a total of 25 cross-border M&A activities of Chinese banks occurred from 2006 to 2020. This new expansion mode accelerates the "point" layout of Chinese banks, which not only increases their market share in the relevant regions and expands their customer resources, but also lays a solid foundation for the "line" international layout afterwards.

With the gradual promotion of "One Belt, One Road", the internationalization layout of Chinese banks gradually tilted to the regions along the "One Belt, One Road", and became the "One Belt, One Road" based on the cities along the "One Belt, One Road". The international layout of Chinese banks is gradually tilted towards the regions along the "Belt and Road" route, and has become a "face" layout based on the cities along the "Belt and Road" route. By the end of 2020, 11 Chinese banks had established more than 80 primary branches in 29 countries along the Belt and Road.

All in all, the pace of internationalization of Chinese banks is closely related to the deepening of China's financial opening. Over the past few decades, the medium-to-high-speed growth of China's economy, the reform and opening up of the financial market, the continuous promotion of RMB internationalization, the introduction of the "Belt and Road" initiative and the accelerated pace of Chinese enterprises' "going out" will also usher in a period of rapid development for the internationalization of Chinese banks. A period of rapid development.

The report was first released by the Zhejiang University International Business School (ZIBS) and the Cambridge Centre for Chinese Management (CCCM) in the Cambridge Judge Business School in March 2021. For more information about the DOI index, the report as well as the list of Top 100 most international Chinese enterprises, please refer to the report on the Internationalization of Chinese Enterprises 2021.

**Appendices: BII List**

• Most International Global Banks

<b>Rankings</b>	<b>Global Banks</b>	<b>Countries</b>
1	Standard Chartered	Britain
2	Banco Santander	Spain
3	Barclays Bank	Britain
4	ING Bank	Netherlands
5	Credit Suisse	Switzerland
6	HSBC Holdings	Britain
7	Deutsche Bank	Germany
8	Scotiabank	Canada
9	Unicredit Group	Italy
10	Société Générale	France
11	Citigroup	U.S.A
12	UBS Group	Switzerland
13	Royal Bank of Canada	Canada
14	Mitsubishi UFJ FG	Japan
15	State Street Corp	U.S.A
16	TD Canada Trust	Canada
17	Groupe Crédit Agricole	France
18	Goldman Sachs	U.S.A
19	BNP Paribas	France
20	Bank of New York Mellon	U.S.A
21	Bank of China	China
22	Morgan Stanley	U.S.A
23	JP Morgan Chase	U.S.A
24	Groupe BPCE	France
25	Industrial and Commercial Bank of China	China
26	Australia & New Zealand Banking Group Limited	Australia
27	Bank of America	U.S.A
28	Commonwealth Bank of Australia	Australia
29	Royal Bank of Scotland	Britain
30	Bank of Communications	China
31	China Construction Bank	China
32	Agricultural Bank of China	China

Rankings	Global Banks	Countries
33	Mizuho FG	Japan
34	Wells Fargo	U.S.A
35	Westpac Banking Corporation	Australia
36	Shanghai Pudong Development Bank	China
37	China Minsheng Bank	China
38	Sberbank	Russia
39	China Citic Bank	China
40	China Everbright Bank	China
41	China Merchants Bank	China
42	Industrial Bank	China

Data Source: AIF

• Most International Regional Banks

Rankings	Regional Banks	Countries
1	Nordea Bank	Sweden
2	Arab Bank	Jordan
3	Ahli United Bank	Bahrain
4	United Overseas Bank	Singapore
5	Oversea-Chinese Banking Corporation	Singapore
6	Nova Ljubljanska Banka	Slovenia
7	Maybank	Malaysia
8	Standard Bank	South Africa
9	Development Bank of Singapore	Singapore
10	Mashreq Bank	The United Arab Emirates
11	Canadian Imperial Bank of Commerce	Canada
12	Bangkok Bank	Thailand
13	National Australia Bank	Australia
14	Abu Dhabi Commercial Bank	The United Arab Emirates
15	Nedbank	South Africa
16	State Bank of India	India
17	Bank of Baroda	India
18	Wooribank	the republic of Korea
19	Habib Bank	Pakistan

<b>Rankings</b>	<b>Regional Banks</b>	<b>Countries</b>
20	Commercial Bank of Ceylon	The People's Republic of Bangladesh
21	Banco do Brasil	Brazil
22	Bank Negara Indonesia	Indonesia
23	Halyk Bank	Kazakhstan
24	Banco Bradesco	Brazil
25	Bank Hapolim	Israel
26	Bank Mandiri	Indonesia
27	Islami Bank Bangladesh	The People's Republic of Bangladesh
28	Turkiye Garanti Bankasi	turkey
29	MCB bank	Pakistan
30	Bank Rakyat Indonesia	Indonesia
31	Siam Commercial Bank	Thailand
32	Allied Bank	Pakistan
33	China Guangfa Bank	China
34	Bank Central Asia	Indonesia
35	Pingan Bank	China

Data Source: AIF

## **New Era, New Trend, New Landscape**

### **The Internationalization of Chinese Enterprises**

*By* BEN SHENGLIN, GENG XIN, WAN FENG\*

#### **Introduction**

There is an open debate regarding globalization and deglobalization. Several deglobalization events happened in recent years, such as Brexit, the China-United States trade war as well as the COVID-19 pandemic, leading to the decline of economic trades and investments between countries, while China has been focusing on contributing to globalization. Up to now, China has signed 206 cooperation documents with 141 countries and 32 international organizations on jointly building the Belt and Road. Meanwhile, China signed the Regional Comprehensive Economic Partnership Agreement (RCEP) with other 14 countries on 15th November 2020, which also shows China's efforts in shaping new globalization. Being part of globalization, Chinese enterprises have started to do business abroad as well as to explore international expansion. In addition, more and more Chinese enterprises appear on the Fortune Global 500 list, such as 135 Chinese enterprises being ranked as Global 500 companies in 2021. This is the second time that the number of Global 500 companies in China exceeded that in the US.

In order to comprehensively investigate the international development of Chinese enterprises, the Zhejiang University International Business School (ZIBS) and the Cambridge Centre for Chinese Management (CCCM) in the Cambridge Judge Business School collaborated to develop the Degree of Internationalization (DOI) index for Chinese firms and jointly released the report on the internationalization of Chinese enterprises 2021. The DOI index and the report aim to convey the evolution, the status quo, and future trends of the internationalization of Chinese enterprises. Meanwhile, they contribute to the literature on the internationalization of Chinese enterprises as well as explore the best practice of internationalization among Chinese enterprises. The report also attempts to provide some guidance on the further actions of Chinese enterprises. The DOI index is designed to measure the degree of internationalization of Chinese enterprises from three dimensions: international strategy, international performance, and international branding.

#### **New landscape: the features of Top 20 most international Chinese enterprises**

The report focuses on analyzing the key features of Top 20 most international Chinese enterprises. The common features among Top 20 enterprises are their outstanding performance in manufacturing upgrades and technological innovation. On the one hand, Chinese manufacturers have been accelerating the process of transformation and upgrade, ready to expand globally. Among all the Top 20 enterprises, 12 are from the manufacturing industry, of which six are from computer, communication, and other electronic equipment manufacturers. On the other hand, the technological innovation being taken as the core driving force for internationalization has become the consensus of leading international enterprises. There are eight technology companies in the Top 20 list, all of which have made appreciable efforts to implement digitization and technological advancement as their core strategies.

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\*Ben Shenglin, Co-director of IMI, Dean of Zhejiang University International Business School; Geng Xin, Post-doctoral Fellow, Zhejiang University International Business School; Wan Feng, Associate Professor, Zhejiang University International Business School.



The DOI Top 20 enterprises are well-deserved leaders in internationalization. They own 52% of the total number of overseas branches. Besides, their average number of overseas branches is 4.3 times that of the remaining 80 enterprises. Speaking of overseas assets, 58% of the total overseas assets of all enterprises belong to these 20 enterprises, which amounts to 5.7 times the average of the remaining 80 enterprises. Their internationalization strategies are well-backed by their foreign asset resources.

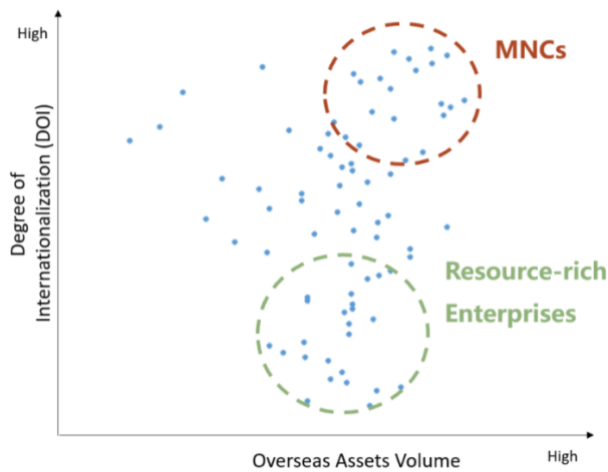
#### **International strategy: industrial characteristics matter**

The globalization strategies should be designed in accordance with the industry-specific features of enterprises. Regarding the number of countries and regions that the Chinese enterprises branched into, the top five industries covered within the sample are air transport, manufacture of special-purpose machinery, civil engineering, postal services, as well as internet and related service industries. In addition, internet companies have also been accelerating their international expansion and seeking greater overseas opportunities. Meanwhile, by leveraging their technological advantages, these companies have been continuously exporting internet as well as digital infrastructure services. For instance, Alibaba Cloud has built 49 zones ready for use in 18 regions around the world, including Europe, North America, Southeast Asia, and the Middle East. It makes Alibaba Cloud the largest cloud computing platform in Asia. Huawei has established 26 research and development (R&D) competency centers across the globe and equipped itself with more than 700 mathematicians, above 800 physicists, and over 120 chemists. It is worth mentioning that industries such as air transport and postal services are “born international” with their routes and operations located all over the world. These industries, therefore, have internationalization innately embedded in their company strategy.

#### **International performance: MNC vs resource-rich enterprises**

Ownership of overseas assets alone does not guarantee greater success in globalization. While the paths of internationalization for Chinese enterprises diverge, two types of companies emerged as majorities. Type I are multinational corporations such as Huawei Investment & Holdings and Lenovo Group Limited, which can be featured as “large and open”. This type of companies tend to own an appreciable amount of overseas assets and are early starters on overseas development, which has granted themselves edges in promoting both the scope and depth of their internationalization performance. Type II are resource-rich companies, holding a large amount of overseas resources but are less international. Typical examples include mining companies such as Luoyang Luanchuan Molybdenum Industry Group Co., Ltd and Yankuang Group Co., Ltd. Although companies within this sector tend to be well equipped in overseas assets and do operate globally, their brand recognition tends to be limited within their niche market.

Figure 1 Correlation between the overseas assets volume and the degree of internationalization (DOI)

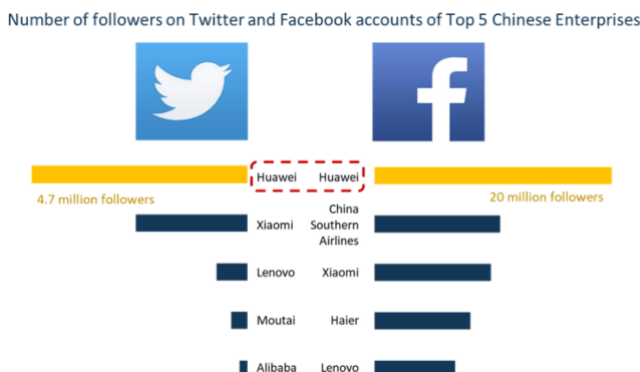


Source: Zhejiang University International Business School (ZIBS), The Cambridge Centre of Chinese Management (CCCM)

**International branding: consumer-goods producers are dominating**

Consumer goods companies tend to have easier access to international brand recognition. Seven out of the 10 most international companies in DOI are from this category, which also encompasses the top five companies in terms of social media (Twitter and Facebook) followers. Yet only 58 and 68 of the DOI Top100 companies have set up official Twitter and Facebook accounts, respectively. More efforts are called upon for Chinese enterprises to further promote and publicize themselves through mainstream international social media platforms.

Figure 2 Number of followers on Twitter and Facebook accounts of the Top 5 Chinese enterprises



Source: Zhejiang University International Business School (ZIBS), The Cambridge Centre of Chinese Management (CCCM)

### **The next move of Chinese enterprises' internationalization**

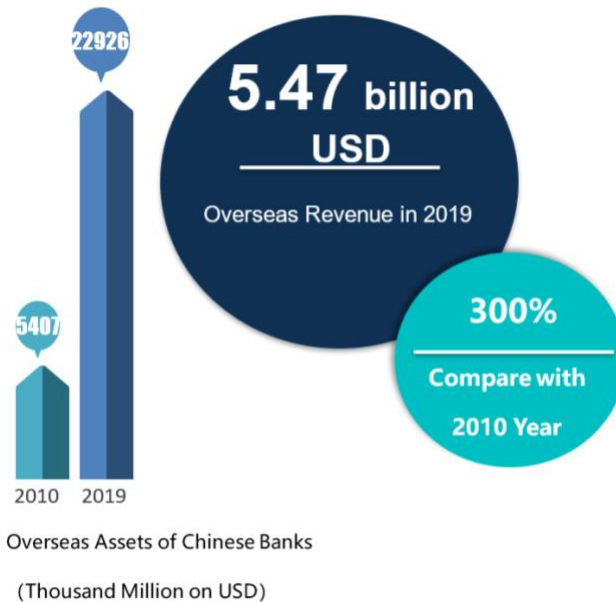
**Firstly, Chinese enterprises should seize post-pandemic opportunities by opening up.** The new development paradigm of China is featured by the “Dual Circulation”, where “domestic circulation plays a leading role and international circulation supports.” Chinese enterprises must embrace this new paradigm as it brings about great opportunities through multilateral cooperation initiatives such as the “Belt and Road Initiative” and the “Regional Comprehensive Economic Partnership (RCEP)” agreement. With such policy dividends, the timing is favorable for Chinese enterprises to collaborate with their overseas counterparts as long as thorough due diligence and a risk control plan are executed beforehand.

**Secondly, Chinese enterprises should align their international strategy with the strategy of the country. Chinese enterprises are suggested to explore market opportunities among the “Belt and Road” countries.** It is wise to focus on the “Belt and Road” countries which had promoted communications among multiple countries ever since its launch in 2015. The reason is that, on one hand, the population of “Belt and Road ” countries accounted for 62.4% of the world’s total (2019), which opens access to an enormous market for Chinese enterprises; On the other hand, investments from China to these countries have been already burgeoning since 2015: the total amount of investment to the “Belt and Road ” countries accounted for 12.6% of the overall outbound investment of China in 2015, and raised to 16.2% in 2020; newly signed construction contracts value accounted for 44.1% of the overall overseas contracts in 2015 and raised to 55.4% in 2020. With such experiences, Chinese enterprises will be dealing with a relatively lower level of risks.

**Thirdly, it is crucial for Chinese enterprises to promote the transformation from “made in China” to “created in China”. International branding will benefit from innovation as well as advanced craftsmanship.** “Go Global” strategy is committed to supporting Chinese enterprises investing worldwide and those persistently focusing on developing their competitive edge are able to go forward further by building a greater brand reputation in the global market. Huawei puts more than 10% of annual income into research and development, and its R&D staff accounts for 49% of the company’s human resources; Geely registers more than 1000 patents all over the world every year; Lenovo established its research institution back in 1999 and is working on the pioneering technologies of the information and communication industry ever since. To constantly nurture their business success and brand growth in the global market, the Chinese enterprises must be highly professional, extremely cautious, and fully dedicated to product quality, which are the key elements of the so-called “craftsmanship”.

**Fourthly, Chinese financial institutions will contribute to the internationalization of Chinese enterprises as well.** Chinese financial institutions had formed a great driving force during mere decades of internationalization. In the “2020 Bank Internationalization Index” released jointly by the Academy of Internet Finance (AIF) and Academy of Finance Research (AFR) of Zhejiang University and the University of Macau, it shows that in 2019, the overseas assets value of Chinese banks had reached 2.29 trillion USD with 54.7 billion USD overseas revenue, tripled the number in 2010. Such strong influencers must not be ignored as they will give financial edges to Chinese enterprises during their overseas expansions.

Figure 3 Overseas Assets Volume of Chinese Enterprises



Source: Zhejiang University International Business School (ZIBS), Zhejiang University Academy of Internet Finance (AIF), Zhejiang University Institute of Finance Research (IFR), University of Macau: “Will De-globalization Disrupt Banks' International Expansion? Bank Internationalization Report——2020 Bank Internationalization Index”

**Last but not least, Chinese enterprises should export “Chinese” by leveraging Fintech advantages.** Lately, the internationalization of Chinese enterprises has mainly focused on outward product sales and foreign investment. While this path allowed Chinese enterprises to accumulate certain branding and technological advantages, these enterprises tend to fall short on setting and exporting well-recognized industry standards. Therefore, it is important for them to enlarge their international impacts and export "Chinese standards" into the global market. According to the “Global FinTech Development Report 2020” released jointly by Zhejiang University-Ant Group FinTech Centre, the AIF, and the ZIBS, China has become one of the three global FinTech giants (China, US, UK) with its demand-pull model of FinTech development. Specifically, there have been more than 800 million digital payment users up to 2020 in China and many representative FinTech hubs, such as Beijing, Shanghai, Shenzhen, and Hangzhou. Therefore, it is of vital significance to encourage Chinese FinTech enterprises to go global, and to promote not only their products as well as brands but also technologies and standards.

### Conclusion

It is appreciated that more and more Chinese enterprises have achieved some success in internationalization, while Chinese enterprises still have some general problems needed to be solved. Currently, Chinese enterprises are leading by size but trailing in profitability. For instance, the total profit of Chinese enterprises ranked as Global 500 was lower than that of US companies. In addition, only two Chinese companies (Alibaba and Tencent) were ranked as BrandZ’s Top 10 most valuable global brands in 2021, which means Chinese enterprises also need to put more effort into gaining greater global recognition.

For Chinese enterprises, there is still a distance to really going global. In order to promote internationalization, they should keep communicating internationally and seize post-pandemic opportunities. Moreover, Chinese enterprises' overseas expansions should be in line with the strategy of the country. It is the best timing for Chinese enterprises to go global further, especially in the "Belt and Road" countries. Benefiting cooperation between China and partner countries and the policy and financial support of the Chinese government, Chinese enterprises face relatively lower overseas risk when they are doing business in those countries. In addition, it is important for Chinese enterprises to promote their core comparativeness by concentrating on developing advanced craftsmanship. By doing so, Chinese enterprises could achieve sustainable brand recognition in the international market. The internationalization of Chinese financial institutions also brings benefits to the internationalization of Chinese enterprises by properly using the overseas resource of Chinese financial institutions. Last, it is not the time that China just imported and followed the rules set up by the developed countries. Nowadays, China is also taking a leading place in some areas, such as FinTech. So, Chinese Fintech companies will be encouraged to go global along with exporting "China's Standards". Chinese President Xi Jinping pointed out, "multilateralism provides an effective way of upholding peace and promoting development". Therefore, China will continue to practice multilateralism and Chinese enterprises will perform well in telling China's stories on the global stage.

The report was first released by the Zhejiang University International Business School (ZIBS) and the Cambridge Centre for Chinese Management (CCCM) in the Cambridge Judge Business School in March 2021. For more information about the DOI index, the report as well as the list of Top 100 most international Chinese enterprises, please refer to the report on the Internationalization of Chinese Enterprises 2021.

## Hong Kong SAR, China

### Hong Kong's Positioning and Prospect as an International Financial Centre<sup>\*</sup>

*By* YI GANG<sup>\*</sup>

It's a great pleasure to participate in this joint seminar: Hong Kong's Positioning and Prospect as an International Financial Centre. On behalf of the People's Bank Of China (PBOC), I would like to extend my warmest welcome to all of you.

The PBOC has been working closely with the Hong Kong Monetary Authority (HKMA) in supporting Hong Kong's role as an international financial centre. Thanks to supports from our friends and colleagues in the financial sector, the financial cooperation between Hong Kong and Chinese mainland has seen remarkable progress in the following aspects:

First, a large number of mainland companies got listed in Hong Kong. Among all the listed firms in Hong Kong, more than half are from Chinese mainland, contributing over 80% of the market capitalization. From 2015 to 2020, Hong Kong topped the global IPO fund-raising list for 4 out of 6 years.

Second, the Securities Connect has been functioning well and enhanced over time. About 70% of the A-shares held by international investors were traded through Hong Kong. We recently launched Southbound Trading under Bond Connect, which will further enhance Hong Kong's role as the financial hub.

Third, Hong Kong has been leading the world in offshore RMB business. By far, Hong Kong contributes to nearly 50% of cross-border RMB payments, 60% of offshore RMB deposits, and 80% of offshore RMB bond issuance.

Fourth, the Greater Bay Area development helps enhance Hong Kong's role as an international financial centre. Last year, the PBOC with relevant authorities unveiled multiple measures to facilitate trade, investment and financing in the Area. This year, the Chinese government launched a plan to further develop the Qianhai Cooperation Zone. It will also provide support to Hong Kong's economic development.

Looking forward, we face both opportunities and challenges in developing Hong Kong as an international financial centre. As for opportunities, China's high-quality economic development will offer strong backing for Hong Kong. In recent years, Hong Kong has been actively exploring new opportunities in areas such as investment and financing under the Belt and Road Initiative (BRI), Fintech, and green finance. As for challenges, rising protectionism and the COVID-19 have taken their toll on global economic and trade activities. As a free-trade port, Hong Kong has felt such shocks keenly.

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<sup>\*</sup>This Speech was given at The People's Bank of China and Hong Kong Monetary Authority Joint Seminar "Hong Kong's positioning and prospect as an international financial centre", 9 December 2021.

<sup>\*</sup>Yi Gang, Governor of the People's Bank of China

The PBOC has been and will continue to be a firm supporter for Hong Kong's development as an international financial centre.

First, Hong Kong can tap its role as the gateway for Chinese mainland to the global market. We will keep improving financial market connection to better meet investors' needs. Hong Kong can further improve financial market services to reinforce its leading position in the global financial market.

Second, Hong Kong can provide greater support to the financial connectivity under the BRI. As the gateway for mainland companies to go global, Hong Kong can improve financial services to better assist these companies' engagement in the BRI. As the global asset management hub, Hong Kong can also attract more international investors in the joint development of BRI.

Third, Hong Kong can further develop RMB related assets and tools. Hong Kong plays a significant role in RMB internationalization. Building on the existing Stock Connect, Bond Connect, and Wealth Management Connect, Hong Kong can expand the list of RMB-denominated assets and improve risk management tools.

Fourth, Hong Kong can actively explore Fintech. One of first Innovation Hub Centres of the BIS is located in Hong Kong. The Centre is helping the PBOC, the HKMA, the Bank of Thailand, and the Central Bank of the UAE in building the m-CBDC Bridge Project.

The PBOC and the HKMA have also signed an MOU on Fintech Innovation and Regulation in the Greater Bay Area. Going forward, we can beef up cooperation in CBDC and Regtech to tap the potentials of Fintech.

Fifth, Hong Kong can vigorously develop green finance. Both the PBOC and the HKMA are members of the Network for Greening the Financial System (NGFS) and the International Platform on Sustainable Finance (IPSF). We will continue to support Hong Kong in developing its green finance system.

In the end, I would like to say a few words about recent fluctuations in the dollar bond market. Last Friday, the Evergrande Group issued a notice saying that it may be unable to meet guarantee obligation, which might have raised concerns to some Hong Kong investors. Here I'd like to mention that, as a well-developed international financial center, Hong Kong has already established an effective system of financial operations, providing well-defined legal provisions and procedures on how to deal with relevant issues. The risks caused by a few real estate firms in the short term would not undermine the market for the medium and long run. The PBOC is committed to creating a level-playing field. Companies issuing bond overseas and their shareholders will be urged to properly handle their debt issues, and meet their debt obligations in accordance with law and market principles. This is a market event. It should be handled in a market-oriented way based on law. The right and interest of creditors and shareholders will be fully respected in accordance with their legal seniorities.

# Assessment of the Strengths and Prospects of Hong Kong's Economic Growth

By E ZHIHUAN\*

The global economy recovers strongly in 2021, with GDP growth in all major economies exceeding their potential economic growth levels. Looking ahead to 2022, the global economy will not be able to escape the uncertainties brought about by the coronavirus pandemic, with economic growth and inflation likely to diverge between advanced economies and emerging markets due to differences in the progress and effectiveness of vaccination. As a typical small and open economy, Hong Kong has generally benefited from economic growth in Mainland China and easing policies in the United States. In the first three quarters of 2021, Hong Kong's GDP grew by 7% year-on-year. Despite a slight slowdown in the third quarter, the Hong Kong economy is expected to grow by more than 6% for the whole 2021, recovering from six consecutive quarters of contraction in 2019 and 2020 and returning to levels before the pandemic.

## 1. Hong Kong recovers in tandem with other major economies

As a typical small and open economy, Hong Kong's economy has always reflected the shifting dynamics of the global economic recovery and has been directly influenced by the growth dynamics and macro policy adjustments of Mainland China and the US. Globally, the underlying logic for economic growth in 2021 is the low base and stimulus effects of accommodative fiscal and monetary policies in coping with the economic downturn in the first half of 2020.

For the first three quarters of 2021, the US economy grew by an annual rate of 5.7%, outpacing its pre-pandemic growth by about 1.4%, reflecting recovery driven by economic reopening and easing policies. The pace of US GDP growth slowed in the third quarter, with the annual pace falling to 4.9% and the annualized quarter-on-quarter pace moderating to 2%. The supply chain was bottlenecked and unable to meet the demand from the economic reopening due to the recurrent waves of pandemic outbreak and severely disrupted supply chains in some sectors, with auto production and sales, inventory changes and residential investment reacting particularly strongly and to continue into the fourth quarter. Taking into account the effects of fiscal stimulus and ultra-loose monetary policy, the US economy is expected to increase 5.5% this year, below the International Monetary Fund's forecast of 6%.

Some segments of the US economy are still growing, with the October's Manufacturing Index from the Institute for Supply Management (ISM) and the Housing Market Index from National Association of Home Builders (NAHB) falling from their year-to-date highs of 64.7 and 84 respectively, but still hovered at high levels of 60.8 and 80, indicating that there is no significant change of the momentum of the US economic recovery. The University of Michigan's Consumer Sentiment Index fell to 66.8 in November from a high of 88.3 in April this year, due to the elevated inflation and the recurring waves of pandemic outbreak.

The US labour market continues to improve. The number of non-farm payrolls increased by 531,000 in October, in line with market expectations, and the figures for August and September were both revised upward. The monthly average number of non-farm payrolls added in the past six months reached 666,000, and the unemployment rate fell further by 0.2 percentage points to

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\* E Zhihuan, Member of IMI Academic Committee; Chief Economist, Bank of China (Hong Kong)



4.6% in October. Currently, comparing with their pre-pandemic levels, the unemployment rate is 1.1 percentage points higher, the number of existing non-farm payrolls is 4.2 million lower, and the labor force participation rate and employment-to-population ratio are 1.7 and 2.3 percentage points lower, respectively. The labor market indicators above have not yet returned to their pre-pandemic levels and are expected to continue to trend toward full employment in 2022.

The eurozone's economic growth in the first half of 2021 was relatively fast, and was affected less than expected by the repeated pandemic outbreaks. Recently, the IMF raised its forecast for the eurozone growth by 0.4 percentage points to 5% for 2021, while the forecast for 2022 remained unchanged at 4.3%, both significantly exceeding the average economic growth of the eurozone in recent years. In July 2021, the European Central Bank (ECB) reviewed its monetary policy framework, proposing six key points that would slightly increase the inflation target while placing greater emphasis on symmetry in response to the new environment of high inflation in the single currency zone and provided the policy basis for its continued ultra-loose monetary policy.

In the first three quarters of this year, the Chinese economy grew by an average rate of 9.8%, with a two-year average rate of 5.2%. Since the third quarter, China's merchandise exports, industrial production, fixed asset investment and retail sales have all slowed down due to the combined effects of the low base, tightened restrictions on social distances and economic activities following the outbreak of pandemic in some regions, double controls of energy consumption and restrictions on electricity consumption, as well as strengthened regulatory controls on several industries. It is expected that exports could continue to benefit from improving external environment in the fourth quarter, while industrial production and manufacturing investment will also grow. Some industries will face the adverse effects of rising raw material prices and double controls of energy consumption. Fixed asset investment will depend on fiscal, monetary, and real estate policy adjustments, consumption is also uncertain due to the pandemic and the recovery of the labour market. With the support of accommodative macro policy, low base and economic reopening, China's economy will grow about 8% in 2021.

Since 2021, Hong Kong's exports have performed well, benefiting from the reliance of major global economies on China's merchandise goods. External demand has maintained a relatively large contribution to economic growth in Hong Kong. At the same time, factors such as the contained local pandemic, the release of consumer vouchers and the low base of last year's economic growth have supported stronger consumption and boosted the performance of domestic demand.

Hong Kong's economy grew by an annual pace of 7% in the first three quarters of 2021, with signs of a slowdown in the third quarter. In terms of monthly data, Hong Kong's tourism industry remained frozen, service exports failed to improve, imports of goods grew higher than exports, and net exports contributed less to economic growth, partly due to a higher base in the third quarter of last year than in the first half, with a difference of 5.5 percentage points between the two.

## **2. Hong Kong's labour market improves significantly**

Since March 2021, Hong Kong's labour market has improved markedly due to the economic recovery, improvement in the local pandemic containment and residents' adaptation to social distancing measures, with the unemployment rate falling rapidly. The unemployment rate in Hong Kong further declined to 4.3% in August-October, down 0.2 percentage points from July-September, and down 2.9 percentage points from a high of 7.2% in December 2020-February 2021.

The rapid improvement in the labour market is conducive to a stable economic recovery. Meanwhile, the Hong Kong Vaccination Programme has started from the end of February 2021, and so far about 70% of eligible people have been vaccinated. Coupled with effective

anti-pandemic measures, the pandemic has been gradually under control and local economic activities have returned to normal level. Starting from August 2021, the government has issued different batches of consumption vouchers to further boost the performance of domestic consumption and drive the labour market improvement.

The unemployment rates in Hong Kong's retail, accommodation and food services, construction and manufacturing sectors have improved somewhat from their high levels at the beginning of the year, but the unemployment rates in August-October were still high at 6.9%, 6.4% and 6.1% respectively, indicating that the above sectors continue to be hit by stringent pandemic control measures, the continued suspension of tourism and the fact that international travel has not yet resumed. The unemployment rate of these sectors is 2.6 percentage points higher than the overall unemployment rate, indicating that the employment situation of some grassroots citizens continues to be grim.

The labour market performance reflects the dynamic evolution of shocks from the Covid-19 pandemic, with the overall unemployment rate in Hong Kong rising to 7.2% in December 2020-February 2021, a record high since the first quarter of 2004, and a sharp jump from the 2.8% in mid-2019.

Recently, Hong Kong's economic activities have gradually recovered and some of those who were unemployed earlier have re-entered the labor market. The labor force participation rate in July-September 2021 was 59.3%, 1.2 percentage points lower than the same period in 2019 before the pandemic, and this will drive the labour market toward full employment.

The Composite Consumer Price Index rose moderately by 1.7% in October. The continued economic recovery and rising import prices have increased short-term inflationary pressures, but the Hong Kong economy is operating below the level of production capacity to effectively control inflationary pressures, with underlying inflation rising by only 0.5% in the first ten months of the year.

### **3. Major global economies seek new growth paths in 2022**

The global economy will unlikely be free from the uncertainties brought by the pandemic. The advanced economies and emerging markets may show a double divergence of economic growth and inflation due to the differences in the progress of pandemic control and vaccination.

1) The race between further virus variations and the penetration and effectiveness of vaccines will redefine the logic of global economic growth in 2022.

The global economy in 2022 is likely to show a double divergence in growth and inflation between advanced economies and emerging markets due to differences in the progress of pandemic control and vaccination. Currently, it appears that despite the high vaccination rates in advanced economies and the announcement by Merck and Pfizer to develop new oral drugs to reduce the risk of hospitalization or death from the coronavirus, herd immunity has not yet been established and the rate of severe illness and death is still much higher than that of the common flu. The impact of the pandemic on the economy and service industry still needs to be observed.

2) Disruptions in the supply chain could lead to a longer-than-expected impact of price increases, exacerbating inflationary pressures and prompting advanced economies to reassess their monetary policies stance

Inflationary pressures have risen in the US since 2021, with the Federal Reserve's preferred measure of inflation, the Personal Consumption Expenditure (PCE) index and its core index rising 4.4% and 3.6% year-on-year in September to new highs since January 1991 and May 1991, respectively. The Consumer Price Index (CPI) and its core index rose 6.2% and 4.6% year-on-year in October to new highs since November 1990 and August 1991, respectively.

Food, used car, energy and housing prices rose by 5.3%, 26.4%, 30.0% and 3.5%, respectively, amid the supply and transportation disruptions and lower labour force participation rate.

Recently, the Federal Reserve has changed its judgment that inflation is transitory. Previously, inflation pressures were concentrated in durable goods, energy, hotel and airfares, but were associated with a low base, work-from-home arrangements, and supply chain disruptions. Inflation pressures of some of the earlier items with high price increases have moderated. Currently, short-term yields on US bonds have responded to the expected rate hikes, while long-term yields have risen less and the gap between 10-year and two-year yields on US government bonds has narrowed. However, the normalization of US monetary policy is a long road, and the accommodative monetary policy environment will not significantly change in the short term.

3) Easing policies in major economies have resulted in high debt and large fiscal deficits that are not sustainable. Shifts in monetary policy stance has been initiated, but the pace of it will continue to be disrupted by the development of the pandemic

At the Federal Reserve's November meeting, the Fed maintained the federal funds rate at 0% - 0.25% and announced that it would reduce its bond purchases to zero by mid-June 2022 by cutting USD10 billion of US Treasuries and USD5 billion of mortgage-backed securities each month. From November 2021 to mid-June 2022, the bond purchases will total USD420 billion, down from USD840 billion if without the tapering. The Fed's balance sheet will continue to expand, but at a slower pace, and is expected to grow to just over USD9 trillion by mid-2022, an increase of about 120% from the pre-pandemic level of USD4.15 trillion. A cycle of federal funds rate hikes will follow the completion of the Taper.

Inflation in Europe's major economies is under upward pressure, with the inflation rate in the eurozone rising to 4.1% year-on-year in October 2021, a significant acceleration from 3.4% in September and a new high since July 2008. In March 2022, the ECB will complete its pandemic emergency purchase programme (PEPP) as planned but may extend its asset purchase program of EUR20 billion per month and make new arrangements for the interface between the two. In 2022, inflation in the Eurozone is likely to remain elevated, limiting to a certain extent the room for further monetary easing by the ECB. Therefore, the ECB is expected to maintain its current monetary policy in the medium term and, depending on the future performance of inflation, to decide on the timing and extent of interest rate hikes. The global monetary environment will remain accommodative. Overall, the shift in monetary policy in Europe will lag behind other major economies and support a continued accommodative global monetary environment.

#### **4. China's economic growth continues to lead**

In 2022, China's economy will continue to grow, with slight adjustments of double control on energy consumption, industry regulation and growth stabilization policies, and a largely contained pandemic will support recovery in economic and social activities. On the one hand, its exports will continue to benefit from the global economic recovery, and the large-scale economic stimulus measures in Europe and the US and the disruption of production in some regions due to the pandemic will further boost the demand for Chinese goods, which will be conducive to the improvement of industrial production and investment in manufacturing. However, some industries are constrained by rising raw material prices and double control of energy consumption. Fixed asset investment will depend on fiscal, monetary, and real estate policy adjustments, while consumption will depend on the outbreak of the pandemic in individual regions and the prospects for labour market recovery, as well as the extent to which the overall income level of residents will rise.

There is still relatively large policy room to stabilize growth in China. Monetary policy has put more emphasis on flexibility, precision, reasonableness and appropriateness, with

self-interest as the main focus and stability at the forefront, performing cross-cycle adjustment, coordinating the policy convergence between this year and next, maintaining a reasonable abundance of liquidity and enhancing the stability of total credit growth. In October 2021, the growth rate of social financing fell to 10% from a high of 13.3% year-on-year in February, and the growth rate of money supply (M2) slowed to 8.7% from 10.1%. The growth rate of money supply and social financing basically matched the growth rate of the nominal GDP, helping small and medium-sized enterprises and industries in difficulties to continue to recover, and enhancing macro policy autonomy to maintain the RMB exchange rate at a reasonable balance level. The July cut of RRR is a precautionary measure to prevent a further slowdown in economic growth, to support SMEs against rising commodity prices and to offset the impact of weak fiscal policy growth, rather than the start of a new round of easing measures.

Recently, China launched a carbon emission reduction support tool to provide funds to banks that provide related loans, offering targeted easing support to offset downward pressure in the short term, while helping to achieve the goal of carbon emission reduction in the long term. At the same time, it will further leverage the leading role of measures such as relending, re-discounting and direct monetary policy tools for the real economy to support increased lending to small and micro enterprises and individual entrepreneurs. It will continue to maintain an orderly slowdown in credit growth and provide differentiated credit support to individual industries and enterprises, complemented by prudential supervision measures to address a range of financial stability issues related to housing, local government debt and shadow banking. A variety of monetary policy tools, such as medium-term lending facilities (MLF) and open market operations, will be used to maintain a reasonable level of liquidity, and the probability of a slight adjustment of the reserve requirement ratio (RRR) and a slight policy interest rate cut for the rest of the year is expected to be low.

The focus of fiscal policy in 2021 is restoring the economy, stabilizing employment, and increasing revenue. The fiscal deficit rate of about 3.2% and the size of new government special bonds similar to that of 2020 are more supportive than expected, and there is ample fiscal space in the second half of the year. In the first nine months of 2021, fiscal expenditure grew by only 2.3% year-on-year, fiscal revenue grew by 16.3%, while the issuance of local government special bonds accounted for about 84% of its annual quota, indicating that there is still room for fiscal policy support. In 2022, fiscal policy will continue to promote stable credit growth, which will be conducive to promoting investment growth in infrastructure and ensuring that the economy can transition to a normalized level in a stable manner.

The new era of China's economy is characterized by slower growth, tighter regulation, and deleveraging. The responsibility for economic regulation and risk management will fall on macro policies, while industry and regulatory policies will serve to achieve financial stability, structural adjustment, and long-term economic and social development needs. Regulation will also be adapted to the needs of new economic sectors and will balance profitability with social responsibility to achieve common prosperity, national interest, and security. In the future, fiscal and monetary policies will continue to play a major role in managing macroeconomic performance and controlling risks.

In the face of the unprecedented changes in the past hundred years, the 14th Five-Year Plan of China has creatively proposed the concept of promoting dual circulation, in which domestic circulation is a mainstay, and domestic and international circulation boost each other. The domestic circulation will strengthen internal reform, promote market-oriented reform of production factors, make up for the shortcomings in the production field, forge a long version, and gradually narrow the gap between the rich and the poor in the distribution field to achieve common prosperity. The international circulation will focus on opening-up, accelerating the opening of the financial market from the perspective of trade layout and production

liberalization, relaxing market access, and continuing to enhance the scope of RMB outreach and internationalization.

### **5. Continuing growth is expected of Hong Kong's economy in 2022**

In the long run, Hong Kong's role as a participant in the domestic circulation and a facilitator of the international circulation in the country's dual circulation pattern will bring constant impetus to economic development. The 14th Five-Year Plan clearly states that Hong Kong should consolidate its traditional strengths and enhance its status as an international financial centre, international shipping center, international trade center, trade and legal dispute resolution services center. At the same time, Hong Kong should create new strengths by building a center for innovation and technology, developing a center for cultural and artistic exchanges, a trade center for intellectual property rights, and consolidating its status as an international aviation hub. This provides a new entry point for Hong Kong's integration into national development. This year's Policy Address highlights the need to make good use of national support for the development of Hong Kong's four traditional centers, and to master the positioning of the four emerging centers, with new measures and breakthroughs to set the stage for Hong Kong's development.

In the short to medium term, Hong Kong's economic growth will still depend on changes in the surrounding environment.

The IMF expects the global economy to grow by 4.9% in 2022. The implied premise is that advanced economies are constrained by supply disruptions, emerging and developing economies are hit by the pandemic, and the spread of virus variants increases uncertainty about the development of the pandemic, making it difficult for the global economy and cross-border flows to fully return to normal and achieve a stable recovery in the near term, basically continuing the actual trajectory of 2021.

In 2022, from a global perspective, the impact of the coronavirus will continue, vaccination rates will increase and there will be breakthroughs in drug development. The impact of the repeated pandemic outbreaks on the global economic recovery remains to be seen, and the normalization of loose monetary policy will not significantly change the low interest rate and abundant liquidity environment, bringing support to the global and Hong Kong economies.

If inflation in advanced economies remains high in the future, the Federal Reserve may change its view that inflation is transitory, and then adjust the timing and pace of its bond purchases and interest rate hikes, which may trigger a new round of volatility in the financial markets, and we should remain highly alert to the external risks that may arise.

During the period when the pandemic is under good control and with effective risk control, Hong Kong can gradually expand the arrangement for Mainland residents to come to Hong Kong with exemption on quarantine, promote the recovery of tourism, further improve service exports, and jointly enhance the contribution of external demand to Hong Kong's economic growth. With the advancement of universal vaccination, social distancing measures such as the Gathering Restriction Order can be adjusted according to the changes of the pandemic to reduce the impact of the siege and mandatory quarantine on the consumption and services sectors, to contain its shocks on the real economy.

At present, the Hong Kong government is working hard to obtain traveler clearance with the Mainland to enhance the impetus of cross-border tourism and retail trade to the overall economic recovery. The government will continue to issue consumer vouchers in different batches in the fourth quarter, which will continue to boost consumption. It is expected that the Hong Kong economy and the employment market will further recover in this and next year, and the unemployment rate may decline further in 2022.

The Hong Kong government expects Hong Kong's economic growth to reach 6.4% in 2021, with the economy returning to 2019 levels. In 2022, the economy will be able to maintain a relatively stable growth rate and build up new momentum for long-term economic development.

## Tweak or Bleak<sup>\*</sup>

By ZHANG MING<sup>\*</sup>

China's GDP expanded by 18.3 percent and 7.9 percent in the first and second quarters of this year. It fell to 4.9 percent in the third quarter and is expected to dip further in the fourth quarter. Although the growth rate this year is expected to be the highest since 2011, we should not be too optimistic.

Compared with 2019, the average GDP growth rate for 2020 and 2021 stands at 5.1 percent, lower than the expected rate of about 6 percent. Statistics show the country's macro-economy faces significant downward pressure in the short run.

Among the three forces driving the economy, net exports have registered the strongest performance since the outbreak of the novel coronavirus, followed by investment, and lastly consumption.

The reason consumption is registering such a slow recovery is that the pandemic has hit the service industry particularly hard—and therefore its employees hard, most of whom belong to middle and low-income groups. Until these families' incomes rebound to the pre-pandemic levels, the recovery of consumption will remain sluggish. The year-on-year growth rate of social retail sales of consumer goods dropped from 8.5 percent in July to 2.5 percent in August, a worrying sign.

The slower consumption growth is associated with the resurgence of the pandemic in the summer. The figure rebounded to 4.4 percent in September, still at a low level.

Since the outbreak of the COVID-19 pandemic, the investment in real estate has performed better than that in infrastructure, while the investment in the manufacturing sector is even worse than that in infrastructure, because of the weak total demand both domestically and internationally. The purchasing managers index for the manufacturing sector has been on the decline for six months in a row, and fell below the 50 threshold in September, representing contraction. The recent power shortages across the country, too, have hit industrial production, the manufacturing sector and exports.

Since the second half of 2020, a series of measures have been introduced in China's real estate sector, such as the three balance sheet red lines that constrain property developers' debt burdens, control the concentration of bank loans, and centralized bidding and auction of urban land.

With these measures in place, investment in the real estate sector is expected to drop remarkably in the foreseeable future. In the first nine months of 2021, the year-on-year growth rate of infrastructure investment fell sharply to 1.5 percent, significantly lower than investment in real estate and manufacturing. Given the financing difficulties and strengthened monitoring of the debt default risk faced by the local governments, the investment in infrastructure is unlikely to rebound soon.

China's exports have grown strongly since the second half of 2020 because of a combination of factors. The pandemic has stimulated exports of medical and remote working equipment. As China was the first to largely bring the pandemic under control and resume production, there were few substitutes for Chinese exports. And global demand is recovering from the shock of the pandemic. But it is hard to sustain this momentum, as evidenced by the decline of new orders in recent months.

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<sup>\*</sup>This article first appeared in China Daily Global on November 2, 2021.

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Meanwhile, inflation is under control. The growth rate of the country's core consumer price index is still at a relatively low level, which indicates that weak demand remains a major problem. In September, the CPI grew by 0.7 percent year-on-year, and the producer price index by 10.7 percent. A closer look shows that the rapid growth of the PPI was not driven by demand, but by the rising prices of global bulk commodities. The core CPI—which excludes volatile food and energy prices and is deemed as a better gauge of the supply-demand relationship—only went up by 1.2 percent in September. It is estimated that the CPI will grow moderately in the near future while the PPI growth will decline.

In terms of the labor market, in the first nine months, the registered urban unemployment rate was 4.9 percent. However, the jobless rate for people aged 16 to 24 stood at 14.6 percent. Since 9 million college graduates will enter the job market this year, the country will face huge unemployment pressure. To create enough jobs for the vast new labor force, China is obliged to maintain its economy's growth rate.

The country's fiscal revenue rose by 18.4 percent year-on-year in the first eight months, while its fiscal expenditure grew by a mere 3.6 percent. From February to September, the growth rate of the M1 money supply decreased for eight months in a row. In July, total social financing grew by 1.08 trillion yuan (\$169 billion), the lowest since February 2020. The growth rate of total social financing was—17.1 percent and—16.4 percent in August and September respectively, indicating relatively tight money and credit supply.

In conclusion, it is possible that China's economic growth will lose steam faster than previously expected at the end of 2021 and the first half of 2022 unless the government adjusts its macroeconomic policy and maintains a relatively loose environment.

In terms of fiscal policy, the government should raise the proportion of central fiscal deficit in GDP, and expedite the issuing of local debts. Local governments should be urged to reduce taxes and fees for small and medium-sized enterprises and increase fiscal subsidies for low- and middle-income families by offering consumption coupons.

Amid the growing concern over a massive default of real estate developers following the default of Evergrande, the central bank should further lower the reserve requirement ration and inject liquidity into the market. It should also cut the medium-term lending facility rate to encourage commercial banks to lower the loan prime rate and loan interest rates for enterprises.



# Global Economy

## From Fragmentation to Cooperation: Boosting Competition and Shared Prosperity\*

*By* KRISTALINA GEORGIEVA\*

### Introduction

It's a real pleasure to be part of this truly global forum of competition policymakers—especially as you celebrate the milestone of 20 years of promoting rules-based competition.

Yours is a noble pursuit. Healthy competition is a great motivator, pushing businesses and people to peak performance. And, in turn, it boosts innovation and jobs, lifting productivity growth and living standards.

The state of competition has significant implications for macroeconomic and financial stability; thus, it has direct relevance for the work of the IMF. And, as policymaking becomes more specialized, it is even more important to explore how the policies that each of us works on impact the goal we share of fostering economic dynamism and growth. This is especially true as competition-driven dynamism will be vital for the strength of post-pandemic economies.

Yet, from our vantage point, we see a number of global trends that are dampening, not deepening, competition.

The 20th anniversary of this Forum is the perfect occasion to reflect on those big trends. Looking back, recent decades have been marked by a rise in market power. And that is a natural springboard to discuss newer global trends, driven by forces of fragmentation spanning trade and geopolitics. These are trends that, if left unaddressed, could further undermine competition and complicate the work of both competition and macroeconomic policymakers.

So, the question is: how do we move beyond growing fragmentation to the cooperative approach needed to boost competition and shared prosperity?

### Macroeconomic Harms from Excessive Market Power and Policies to Curb It

Let me start with a look back. Over the past twenty years or so, rising market power has hurt, not helped, investment and output. And it has further hurt workers by giving large firms undue influence in labor markets, and rewarding them with extraordinary profits. The IMF estimates that rising market power accounts for at least 10 percent of the decline in the share of income going to workers in advanced economies.

Next, and near to our hearts at the Fund, weaker competition risks making monetary and fiscal policy less effective. Why? Because companies with excessive market power often have huge cash piles—which makes them less responsive to market rates and fiscal stimulus.

Add to this the impact of the pandemic. While decisive action by governments to provide policy support has helped many smaller businesses survive, we have also seen anti-competitive

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\*Keynote Address by Managing Director Kristalina Georgieva at the OECD Global Forum on Competition

\* Kristalina Georgieva, Managing Director of IMF.

trends intensify. This crisis-related increase in market concentration could lower capital investment and innovation. And that could reduce the level of GDP in advanced economies by 1 percent in the medium term—a serious blow when we project growth rates in advanced economies to remain low in the medium term.

So, what can be done? How can governments curb excessive market power and foster stronger, more inclusive growth?

Let's start with some elements of competition policy frameworks that your countries have worked on. Germany and Austria have strengthened merger control by reviewing acquisitions of small players based on deal price. Australia and the United Kingdom have been conducting market investigations to identify and act on issues early.

Making labor markets more competitive is another key priority. For many countries, this means preventing “no-poaching” pacts between firms—or stopping non-compete clauses for lower-skilled workers in sectors such as retail and fast-food.

And better data portability and interoperability rules can make the digital economy more vibrant—just as phone number portability in the E.U. and U.S. boosted competition among mobile carriers.

The proposed E.U. Digital Markets Act and the American Innovation and Choice Online Act are driving useful discussions. And of course, for many of you, having adequate budgets to develop and enforce policy matters!

Even with a push on these policy fronts, efforts to address the rise in market power and, importantly, to counter the harm to competition, are not a short term endeavor. As competition policymakers you will need to persevere.

### Three Trends That Threaten Competition and Options to Address Them

Yet, as you continue to wrestle with rising market power, we see three emerging global trends that pose risks to competition—and risks to a resilient recovery from the pandemic. The imperative to counter these trends and make economies more dynamic is not your responsibility alone. Macroeconomic policymakers need also to be mindful of the risks to competition and the costs that follow.

The first of these trends is technological decoupling.

We face a growing ‘digital Berlin Wall’ built on import and export restrictions, and reduced cooperation in scientific research. That approach would leave everyone worse off—from economic powerhouses to poorer countries.

If some combination of the U.S., E.U., and China were to “decouple,” firms will find it increasingly difficult to compete as much as they do now. Already dominant tech players would gain even larger market shares, with fewer incentives to keep innovating.

Global tech standards could also break down, reducing the interoperability of tools that businesses rely on. And the ability to share data and build on each other's work would be further reduced.

In such a scenario, low- and middle-income countries would have to choose sides—and once they are locked in, they could face higher prices, worse service, and diminished prospects for development. And that would have global costs. Depending on the scenario, decoupling could see global GDP losses in the order of 3 to 6 percent over the next decade or so.

How can competition and trade authorities best advocate for keeping the tech sector “coupled” and avoid such a terrible loss?

Close collaboration with national security and cybersecurity agencies within countries is essential. Policymakers in areas like intellectual property rights and data privacy also bring valuable perspectives. Working together, you can give your countries' leaders a wider range of policy options that can help bridge divides.

More can also be done through the OECD and other multilateral fora to disseminate best practices and enhance cross-border coordination. There is limited value in one country addressing the anti-competitive behavior of a large tech firm if equally powerful foreign competitors remain untouched.

Now, turning to the second global trend: trade restrictions.

We all know that by reducing foreign competition, you end up with greater strains on supply chains, higher prices for consumers, less innovation, and diminished growth potential.

In 2019, the IMF estimated that tariffs either created or raised in the previous two years had reduced global GDP by 0.4 percent. These pre-pandemic restrictions largely remain in place, and they continue to hold back global output.

The good news is we have generally done better during the pandemic. To be sure, there were some problematic trade policies early on, but the crisis itself did not result in full-blown protectionism, especially in food, drugs, and medical supplies—to the credit of governments and, I am sure, many of you.

That said, restrictions in these areas have contributed to the massive vaccine inequity we see today, which has made the global recovery more uneven and fragile for all. And left us hostage to the risk of new variants—a risk sadly realized with the Omicron variant.

While there is good dialogue on easing the flow of vaccine exports to COVAX, there is still much work to do—both to ease pandemic-era restrictions and to jump-start the broader trade agenda.

In this regard, global reforms have been largely stalled. And we cannot take existing trade openness for granted.

The leadership of the WTO brings new energy as we seek progress on a range of issues—from trade-distorting subsidies and industrial tariffs that have long been a concern, to fast-evolving areas such as tradable services, investment, and e-commerce. And there is a real appetite for new agreements, as we saw last week, with the conclusion of the WTO Joint Initiative on Services Domestic Regulation.

Which brings me to the third global trend: climate.

Countries not only need to come together to stop global warming, they must work hard to avoid asymmetric, or uncoordinated, climate policies.

Think of large variations in carbon prices across markets that could distort competition, because some countries are not taking adequate mitigation policies. And “carbon leakage”—where efforts to cut emissions in one country lead production to relocate to another—could undermine countries’ incentives to raise their carbon prices.

Attempts to reduce leakage through border carbon adjustments present practical challenges. If not carefully designed and coordinated with partners, they could disrupt climate cooperation and even cause trade retaliation.

Instead, we need policies that send the right price signals on climate but do not undermine competition, trade, and investment. I look forward to working with the OECD and others on equivalency of different carbon pricing approaches.

We have made a proposal for an international carbon price floor among large emitters. It is efficient, practical, and flexible, allowing regulations as well as explicit pricing, and differentiation among countries based on level of development. And as well as ensuring adequate reductions in global emissions, the proposal should promote fairness and more evenhanded competition across industries and countries.

## Conclusion

That is a perfect note on which to wrap up: fairness and evenhanded competition. These matter globally and locally.

With the Fund's broad view of the world economy and our detailed view of each of our 190 members, we care about how policies interact, both positively and negatively, and how policies play out domestically and globally.

That is as true of competition policy as it is of many of the IMF's 'bread and butter' issues.

That is also why we believe it is so important to work together—be it the IMF and OECD, or countries coordinating policies, or national competition agencies working with macro policy officials in each country—because global competition depends on domestic policy action and global cooperation.

And to overcome the fragmentation that is driving the global trends that threaten competition, we need much stronger cooperation—within and across borders.

Together, let's spread the message far and wide—if you care about innovation, jobs, and broadly-shared prosperity, you must care about better competition policies.

# **Bottlenecks, Labour Markets and Inflation in the Wake of the Pandemic\***

*By* HYUN SONG SHIN\*

Supply bottlenecks have grabbed all the headlines recently, but the theme chosen by the Indonesian G20 Presidency (“Recover together, recover stronger”) also prompts us to consider the longer-term structural changes brought about by the pandemic and the policy measures deployed in response. This is particularly apt now, as we look ahead to future inflation developments. I will argue that longer-term structural issues, especially in the labour market, are crucially important in plotting the course ahead. For my remarks, I will draw on two recent BIS Bulletins that have addressed recent labour market developments and supply bottlenecks.

## **Bottlenecks \***

Let me start with a recap of where we stand on bottlenecks. Bottlenecks that started as supply disruptions due to the initial Covid shock in 2020 have this year morphed into something more persistent. Widespread reports of shortages have gone hand in hand with supply that appears to be running at full speed. Production of key manufactured inputs, such as semiconductors, now comfortably exceeds pre-pandemic levels. The same is true for many raw materials and freight volumes on key shipping routes.

As well as supply, two additional factors are key in understanding where we are. The first is the shift in the composition of demand away from services to manufactured goods, which tend to be more dependent on the smooth functioning of supply chains than are services. The second is the endogenous behavioural changes that have given rise to so-called bullwhip effects, whereby supply chain participants react to perceived shortages by ordering more, ordering earlier and by hoarding inputs. This kind of reaction is prudent and rational when considered in isolation but can lead to aggregate outcomes that are ultimately self-defeating.

A brief review of the main bottleneck-affected industries highlights the complex dynamics at work. The sharp swings in the prices of commodities such as lumber, iron ore and coal over the past year illustrate well how the current bottlenecks are not simply a uniform squeeze everywhere along the supply chain. Instead, we have seen commodities demand whipsaw as pressures emerged at different points in the supply chain, resulting in large price fluctuations (Graph 1, left-hand panel). For lumber, iron ore and coal, prices are well below peaks reached earlier in the year. Anecdotal evidence also points to localised gluts where the lack of storage capacity has depressed prices at key points.

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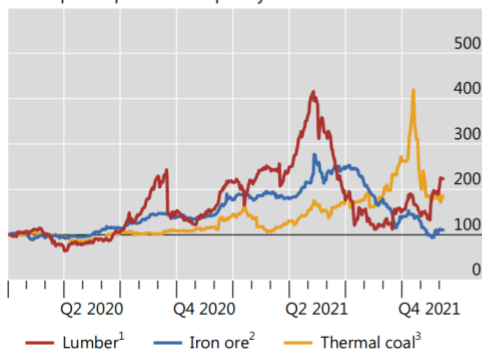
\*This speech was given at the G20 International Seminar “Recover together, recover stronger”, Bali, 9 December 2021.  
†Hyun Song Shin, Economic Adviser and Head of Research, Bank for International Settlements

Swings in commodity and shipping prices are suggestive of bullwhip effects

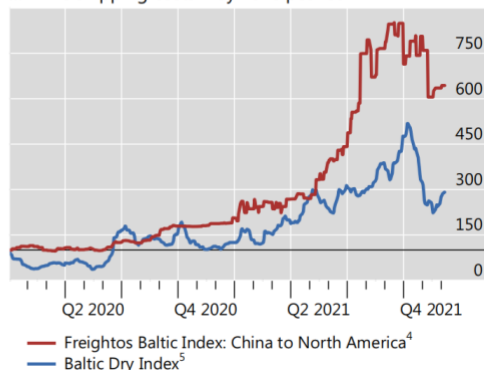
1 Jan 2020 = 100

Graph 1

Some price spikes were quickly reversed ...



... while shipping costs may have peaked



<sup>1</sup> Generic first futures price, random length lumber. <sup>2</sup> Iron ore 62% Fe CFR China spot price index. <sup>3</sup> Generic first futures price, Zhengzhou thermal coal. <sup>4</sup> Seven-day moving average. Daily containerised freight rate index. Index values are calculated by taking the median price for all prices with weighting by carrier. <sup>5</sup> Daily dry bulk shipping rate index. The Baltic Dry Index is a composite of the Capesize, Panamax and Supramax Timecharter Averages.

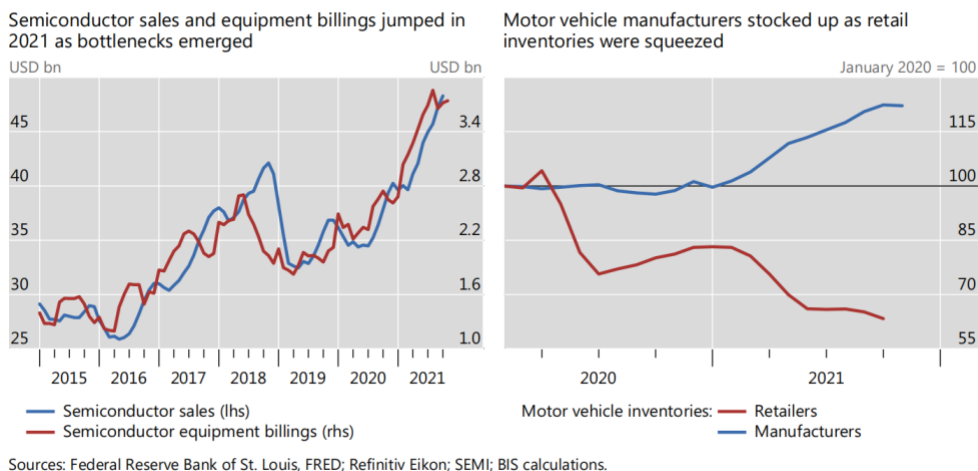
Sources: Bloomberg; Datastream; BIS calculations.

The case of shipping freight could be considered a more straightforward example of strong demand interacting with constrained supply, especially for trade between Asia and the United States. But here too prices have exhibited large fluctuations (Graph 1, right-hand panel). Shipping costs for bulk commodities rose sharply, only to retrace much of the gains later (blue line). More recently, container shipping prices have also started to decline (red line).

One sign that behavioural responses could be important comes from the pattern of inventories. The motor vehicle industry provides a good case study. Focusing on the United States, where we have the most comprehensive data, manufacturers' inventories are actually up slightly since the start of the pandemic, even as retail inventories have fallen significantly (Graph 2, right-handpanel). These contrasting trends may be symptomatic of bullwhip effects, as supply chain participants adjust in an uncoordinated manner, creating moving targets for others.

Indicators of supply chain pressures are far from uniform

Graph 2



The case of semiconductors is different again. Despite reports of disruptions at some specific factories, it is hard to find evidence of generalised contractions in supply. Changes in production relationships may also have exacerbated the behavioural responses, as firms that cancelled semiconductor orders early in the pandemic – automobile producers are the most cited example – found themselves at the back of the queue when demand returned. Indeed, available sales and billing data point to a strong increase in supply since the start of the pandemic (Graph 2, left-hand panel).

When taken as a whole, the signs point to strong demand that has outpaced supply capacity that is growing, but not growing fast enough. However, the key question is how much of this stronger demand can be attributed to the bullwhip effect. To what extent will the behavioural responses that gave rise to bottlenecks work in reverse to clear up backlogs once supply chain problems begin to ease? Depending on the answer, we may find that supply bottlenecks may be resolved faster than currently feared, just as they have persisted longer than initially expected.

### Inflation

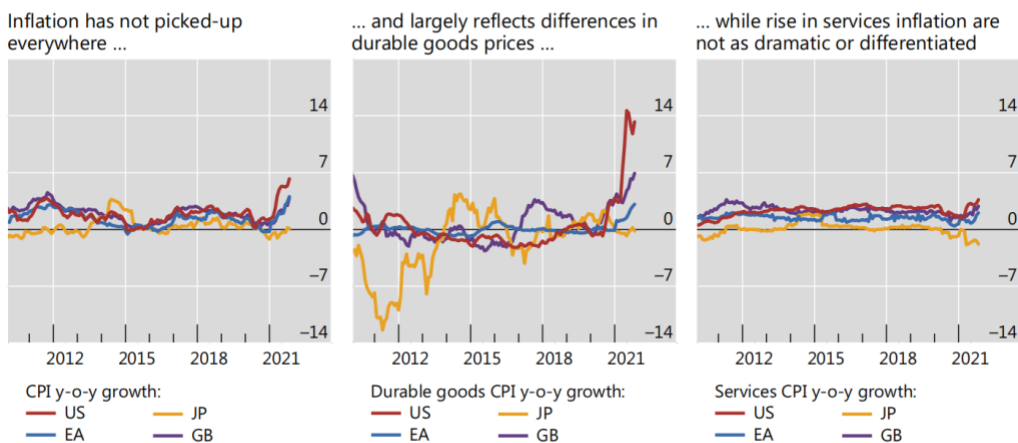
Let me now turn to inflation. Inflation has risen in many countries and bottlenecks have clearly played a significant role. But inflation has not risen uniformly (Graph 3, left-hand panel). Among advanced economies, the pickup in inflation has been most pronounced in the United States and the euro area, as well as in some emerging market economies, especially in Latin America. However, the increase in inflation has not been as evident in Asia. In Japan, consumer prices have barely grown over the past year. And inflation remains low in China.

As well as the differences across countries, the differences across product categories are also notable. Durable goods prices have risen especially sharply since the start of the year (Graph 3, centre panel), breaking the trend of low or negative price changes over much of the past few decades. The rise in the price of services has been much more modest, although it has picked up in recent months in some economies (Graph 3, right-hand panel), although not in Japan.

Durable goods drive the inflation rise

In per cent

Graph 3

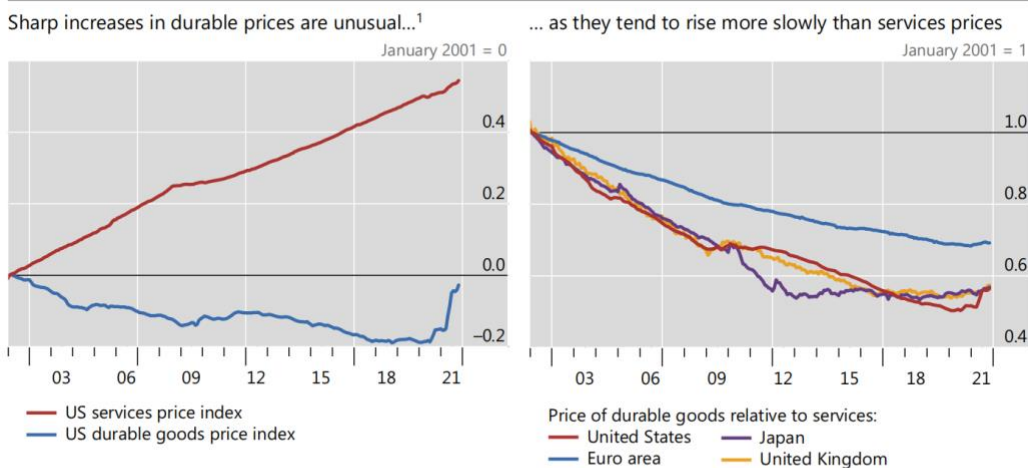


Sources: Federal Reserve Bank of St Louis, FRED; Eurostat; Portal Site of Official Statistics of Japan; UK Office for National Statistics; BIS calculations.

We should be wary of disregarding inconvenient price increases. Nonetheless, it is worth emphasizing how unusual the recent rise in durable goods prices is when set against the experience of well-established long-term price trends. As the left-hand panel of Graph 4 shows, the rise in durable goods prices in the United States in recent months is much larger than any other seen over at least the past two decades. Although the rise in durables prices in other countries has not been quite as large, a prolonged period in which durable goods prices rise faster than those of services represents a sharp break from the trend over recent decades (right-hand panel).

Price levels in services and durable goods

Graph 4



<sup>1</sup> Based on normalised logarithms.

Sources: FRED, Federal Bank of St Louis; national sources; BIS calculations.



However, there is something of a race against time. If the current inflation surge feeds a wage-price spiral reinforced by a possible unmooring of inflation expectations, bringing inflation under control will be a much more difficult task. That's why the labour market will be the key determinant of the course of inflation. This is where I would like to turn now.

### Labour markets

Labour market conditions across countries have shared some similarities as well as some striking differences.

The overall trajectory in total hours worked has been quite similar since the start of the pandemic. As you see in Graph 5, they fell by 10–20% in the middle of 2020. Following these sharp declines, total hours worked have rebounded much more quickly than after recent recessions, although they remain 2–5% below their pre-pandemic levels.

However, these similar declines in hours came about in strikingly different ways. There are three ways in which hours worked could fall. The first is an increase in unemployment. The second is a drop in average hours worked per employee. The third is a decline in the participation rate of the labour force. The respective roles of these three factors differ widely across economies. In the United States, the initial decline largely reflected a shift from employment into unemployment and, to a lesser extent, a move of workers out of the labour force. Although much of the rise in unemployment has been reversed, participation rates remain substantially below where they were before the pandemic, particularly for older workers.

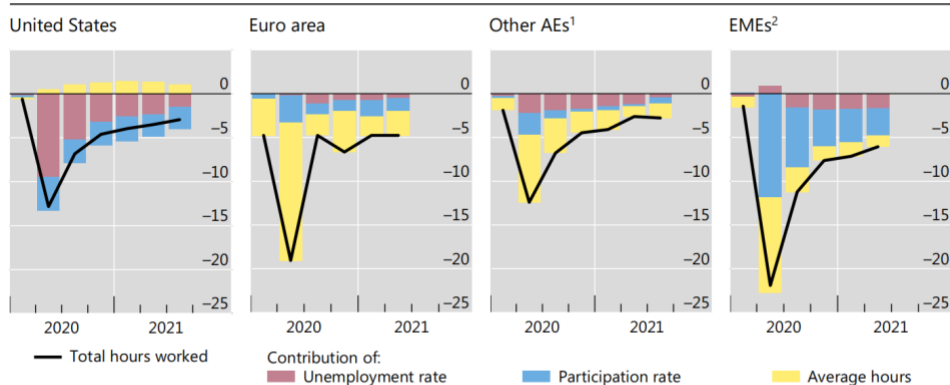
In most other advanced economies, the decline in hours worked reflected mainly a fall in average hours worked per employee, due largely to furlough schemes that kept worker-firm relationships intact.

In many emerging market economies, large numbers of workers left the labour force. Some of this could reflect a shift into the informal sector, although informal work was also hard hit by the pandemic.

Changes in hours worked since the start of the pandemic

Change in percentage points, since Q4 2019

Graph 5



<sup>1</sup> Simple average of AU, CA, GB, JP and SE. <sup>2</sup> Simple average of CL, KR, MX, PL and ZA.

Sources: Eurostat; ILO; national sources; BIS calculations.

However, I would like to draw your attention to one key observation. The differences in the way that hours worked declined have also influenced the shape of the recovery. Specifically, in countries that saw large rises in unemployment at the height of the crisis (such as the United States), the labour market has been slower to spring back to its pre-pandemic setting.

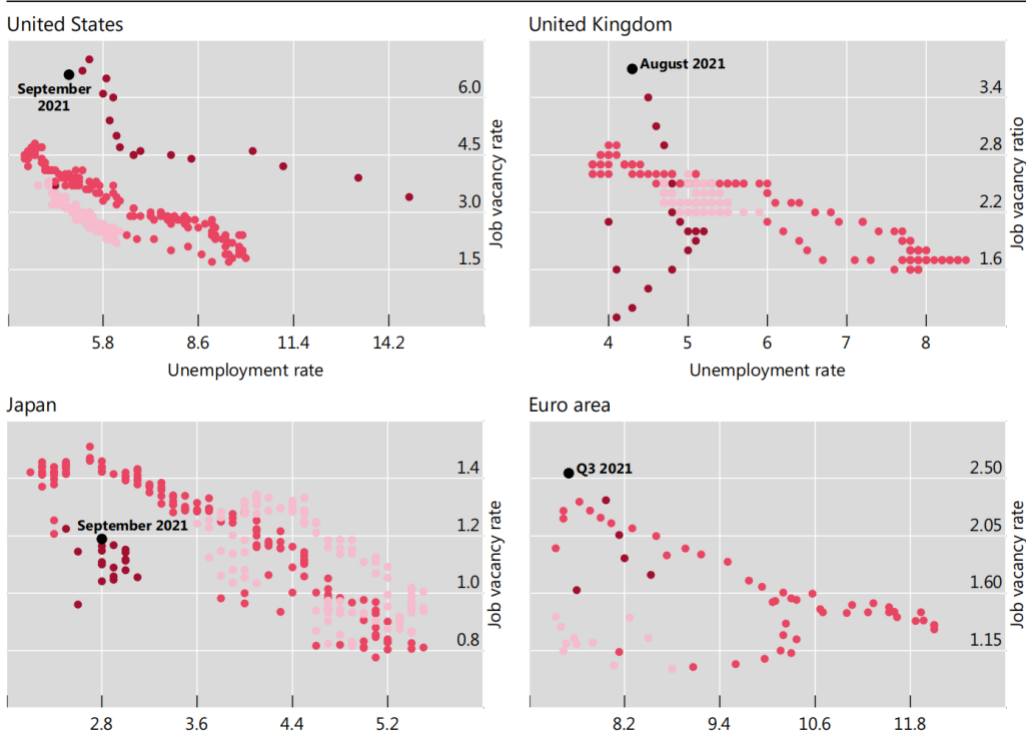
One way to see this is through the Beveridge curve, which shows the relationship between the unemployment rate and job vacancies. Normally, changes in economic activity would show up as shifts along the Beveridge curve, with stronger labour demand going hand in hand with lower unemployment and higher job vacancies. However, in the United States, the Beveridge curve has shifted out since the start of the pandemic (Graph 6, top left-hand panel). This means that many more job openings are on offer than previously for the same level of unemployment. The UK Beveridge curve has also started to drift out in recent months.

Importantly, no such rightward shift in the Beveridge curve is evident in jurisdictions such as Japan and the euro area, where worker-firm relationships remained largely intact.

Beveridge curves

In per cent

Graph 6



<sup>1</sup> Job vacancy rate computed as (number of job vacancies) / (number of occupied posts + number of job vacancies)\*100. Job vacancy ratio computed as three-month rolling average ratio of vacancies per 100 employee jobs. <sup>2</sup> For EA, Q1 2006; for GB, May 2001; for JP, January 2000; for AU, Q1 2000. <sup>3</sup> For AU and EA, Q3 2008. <sup>4</sup> For AU and EA, Q4 2008. <sup>5</sup> For AU and EA, Q1 2020. <sup>6</sup> For AU and EA, Q2 2020.

Sources: Datastream; national data; BIS calculations.

The conventional interpretation of the rightward shift in the Beveridge curve is a labour market mismatch between jobs and skills – say, due to the reallocation from the real estate sector after the Great Financial Crisis. To some extent, that may be true at present. At the same time, it is worth noting that job vacancies have risen most in some of the service industries that saw the largest job losses since the start of the pandemic. So, a simple sectoral reallocation story seems inadequate.

In any case, the contrast between the Beveridge curves across economies is very striking. In Japan and the euro area, there is no evidence of any deterioration of the jobs-skills match. Preserving the employment relationship appears to have kept the economy on a path where the

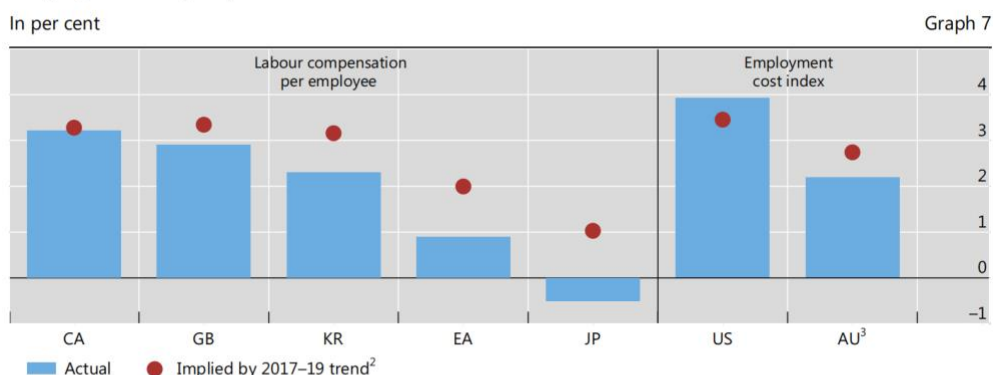
recovery is closer to bringing the economy to its pre-pandemic state, at least in terms of the Beveridge curve relationship.

Getting to the bottom of the reasons for this contrast in labour market outcomes is an important task ahead for policy makers. Perhaps one way to approach this question is to start from the premise that firms and workers are part of the intricate web of relationships in the economy with relationship-specific capital that acts as the “glue” for the economy as a whole. Barry Eichengreen has written eloquently on this issue.

The ties that bind all of us as colleagues, neighbours, workers and employers arguably go beyond the transactional nature of the weekly payslip. Once these relationships are broken, attempts to put the pieces back together will not be able to draw on the same reservoir of relationship-specific capital that was in place previously. A more systematic analysis that draws on more than simple, atomistic optimisation models beckons. However, the recent upward drift in the UK Beveridge curve from the middle of 2021 suggests that any simplistic explanation will be found wanting, as the UK had also implemented furlough schemes similar to euro area economies.

More immediately, how these differences in labour market functioning will translate into differences in wage growth will be important for inflation developments. Unfortunately, the underlying pace of wage growth is particularly hard to read at the moment because of pandemic-related shifts in the composition of employment and the effect of furlough schemes.

Wage growth vs pre-pandemic trends<sup>1</sup>



<sup>1</sup> Annualised growth between Q4 2019 and Q2 2021, except for the US and AU, where annualised growth between Q4 2019 and Q3 2021 are shown. <sup>2</sup> Annualised growth implied by extrapolating the linear trend of each series calculated between Q1 2017 and Q4 2019. <sup>3</sup> Wage price index.

Sources: OECD; Datastream; national sources; BIS calculations.

Nevertheless, across most advanced economies, average wage growth since the start of the pandemic looks to have been in line with its pre-pandemic trends, or a little below, although this data will not capture the effect of recent inflation increases on wage negotiations. It is notable, however, that in the United States, where labour market changes are most apparent, wage growth has picked up despite labour market conditions that appear weaker than before the pandemic (Graph 7).

The theme chosen by the Indonesian G20 Presidency (“Recover together, recover stronger”) is especially apt for today’s discussion because it prompts us to consider both short-term and longer-term structural changes. The supply bottlenecks are a short-term issue, especially if the bullwhip effect goes into reverse. In this case, just as supply bottlenecks have persisted longer than expected, they may be resolved faster than currently feared.

However, the key to gauging where global inflation is headed is in the labour market, and whether the reduced efficiency of matches exhibited in the Beveridge curves of some economies translates into a more sustained wage-price spiral. In this respect, longer-term structural issues are more important in understanding the current state of the global economy, especially when we consider future inflation developments.

#### Reference

<sup>1</sup> The views expressed here are mine, and not necessarily those of the BIS. I am grateful to Daniel Rees and Phurichai Rungcharoenkitkul for their efforts in putting together the analysis for this speech; to Nicolas Lemerrier and Alessandro Barbera for research assistance and to Egon Zakrajšek and helpful comments.

<sup>2</sup> See F Boissay, E Kohlscheen, R Moessner and D Rees, “Labour markets and inflation in the wake of the pandemic”, *BIS Bulletin*, no 47, October 2021 and D Rees and P Rungcharoenkitkul, “Bottlenecks: causes and macroeconomic implications”, *BIS Bulletin*, no 48, November 2021.

<sup>3</sup> [https://en.wikipedia.org/wiki/Bullwhip\\_effect](https://en.wikipedia.org/wiki/Bullwhip_effect)

<sup>4</sup> Barry Eichengreen, “The human capital costs of the crisis”, *Project Syndicate*, April 2020.

<sup>5</sup> See Bank of England, “How strong is pay growth?”, *Bank Overground*, 31 August 2021, and G Koester and E Hahn, “Developments in compensation per hour and per employee since the start of the COVID-19 pandemic”, *ECB Bulletin*, no 8, August 2020.

## Return of Cost-push Inflation May Lead to Stagflation\*

By BRIAN READING\*

Like Covid-19, transitory price shocks are contagious. They spawn wage demands and further price hikes among hard-hit workers and businesses. Even when a transitory shock is reversed, the final price increase is a multiple of the first, determined by an inflationary 'R'. This measures the retaliatory recapture of lost real income. If half the initial and subsequent real income losses are recaptured by wage and price increases ( $R=0.5$ ), price increases end up double the initial shock. If two-thirds are recaptured ( $R=0.67$ ), they triple. If  $R=1$  or more, an exponential wage-price spiral is triggered. The consequential wage and price increases are rarely reversed when the transitory rise is overturned. Downward spirals are rare except during a depression. Wages and prices ratchet up.

The lost lesson from the 1970s is that shocks, which sharply reduce real national disposable income, lead to cost-push inflation. Unlike demand-pull inflation, rising prices cause rising unemployment, instead of falling unemployment causing rising prices. Hence stagflation.

Tracking future inflation expectations is a snare and a delusion, not far removed from the rational man assumption. Whatever expectation for tomorrow's prices, inflationary pressure mostly comes from efforts to recapture yesterday's unexpected or unprotected losses. The response is a reaction to unexpected price increases. Tomorrow's expectations are also correlated with yesterday's increases.

In May of last year, I wrote an OMFIF commentary entitled 'Welcome to world of stagflation'. Forty-seven years ago I wrote an editorial in *The Economist* entitled 'The word is stagflation'. Much of what I wrote then remains true.

National real disposable income changes little each year, mostly rising. But major shocks can cause large global losses or redistribute income from spenders to savers. The Covid-19 pandemic is an example of the former. The 1970s oil price explosions exemplify the latter. Some oil exporters' surpluses rose by more than 100% of their national gross domestic product and could not be spent. Some importers' disposable incomes collapsed by more than 10%. The 2008 financial crisis and its aftermath largely affected income and wealth distribution. I leave it out of this analysis.

Norman Macrea, the late deputy editor of *The Economist*, brilliantly described demand-pull inflation as 'too much money chasing too few goods'. For the past three decades, many economic commentators seemingly supposed money-fuelled excess demand in labour and product markets was the single explanation for rising prices.

Monetarists blame money. Milton Friedman wrote that 'inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output.' This assumes velocity is constant or on a predictable trend. In reality, monetary stringency is more certain to curb product (and asset) price inflation than profligacy is to raise product prices.

Major shocks are trend-benders. Cost-push inflation upends the correlation between inflation and unemployment from negative to positive. The impact of productive potential is uncertain. Higher wages may cut employment more than output, raising productivity while leaving per capita GDP lower. The demand-deflationary consequences of cost-push inflation reduce output relative to potential, meaning inflation accelerates as a negative output gap widens.

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\* Brian Reading was an Economic Adviser to UK Prime Minister Edward Heath and the first Economics Editor of *The Economist* in 1972. He is a Member of the OMFIF Advisory Board.

Cost-push inflation is the missing dimension in the oxymoronic conventional wisdom spouted by too many economists. With apologies to Norman Macrea, it can be described as ‘too many claimants chasing too little income’. Following a shock fall in income, workers, companies, pensioners, beneficiaries, finance ministers and foreigners can respond in three ways.

1. Spending may be maintained by saving less or borrowing more. This can support demand during a temporary loss of income, notably a budget deficit, but is not a solution to a permanent loss.

2. Spending may be cut, such as in private retrenchment or public austerity. This merely recycles and enhances (through insolvencies) income losses.

3. Efforts can be made to recapture losses or defend income. This is the genesis of a wage, price, pensions, benefits, tax and exchange devaluation spiral.

Income claims can be legal (inflation-proofed public and private defined benefit pensions or indexed bonds); pursued through market power (private sector wages and prices); or through political power (public sector wages linked to private ones, benefits, state pensions and indexed taxes). Market and political considerations rival each other ratcheting up prices.

A concept can be borrowed from the Covid pandemic. Each sector and individual within them have an ‘R’ value, the ratio of recaptured income to lost income in a year. If collectively half real income is lost ( $R=0.5$ ), prices rise by double the initial inflationary shock. If one-third is lost ( $R=0.67$ ), prices triple. If none is lost ( $R=>1$ ) the upward spiral becomes exponential. After years of globally-aided modest inflation, wage R has moderated (stagnant real wages and increased profit shares) and indexation has become more frequent. The former is likely to change.

A stagflationary spiral needs increasing monetary fuel, including governments’ ability to sustain deepening deficits with borrowing, otherwise budget  $R=1$ . Without fuel, inflation freezes out in stagnation or slump. The longer fiscal profligacy and low interest rates are maintained, the greater the rise in prices and the more savage the ultimate reckoning. While central bankers cling to the notion that price increases are transitory and resist tightening for fear of a financial crisis, they support and distort unsustainably overvalued equities, bonds and houses. A crash is now inevitable. The price of independent central banking is to be blamed for withdrawing the punch bowl. The warning from the 1970s and 1980s is the sooner the better.

## BoE's November Decision Showcases Flexible Response to Covid Climbdown\*

By KATHARINE NEISS\*

The Bank of England's November policy meeting arrived with markets expecting the Monetary Policy Committee to raise Bank Rate for the first time since 2018. Given the solid recovery of the UK economy following a successful vaccination campaign, it seemed reasonable to expect that some extraordinary stimulus could be removed and for Bank Rate to return to the same level as in March 2020, when the UK headed into its first lockdown. The expectation of policy tightening also seemed consistent with the more hawkish tone from BoE Governor Andrew Bailey as inflation outturns reached 3.1% in September — a deviation of more than 1 percentage point from the MPC's 2% inflation target.

Yet, the MPC surprised markets and voted to keep the current policy. It cited the labour market as a key factor in the decision, given the considerable uncertainty regarding the number of workers on furlough over the summer and that the programme only ended in September. It was an open question as to whether the momentum in the UK recovery was strong enough to reabsorb those workers who were coming off the furlough scheme. However, record job vacancies and the previous week's announcement by Rishi Sunak, chancellor of the exchequer, of more fiscal spending suggested the decision was finely balanced. A rise in Bank Rate — delayed longer than markets expected — remains on the cards over the coming months, should the economy evolve in line with expectations.

This outlook certainly contrasts with those for other major central banks. The US Federal Reserve has only just started to taper asset purchases, let alone signal higher interest rates, and the European Central Bank is poised to announce further policy easing early next year. So, why is the Bank of England so far ahead in terms of normalising policy?

First, global supply chain issues — whether they are energy, manufacturing or labour shortages — have been magnified in the UK due to Brexit. Empty forecourts, lengthy petrol queues, limited availability of food basics, such as frozen vegetables and pasta, and rationed blood tests are everyday realities in the UK in 2021.

Second, the UK does not have a history of below-target inflation, which cannot be said for the US and the euro area. In fact, over the decade prior to the pandemic, average UK inflation was generally in line with the BoE's 2% target. Therefore, unlike the Fed or the ECB, the BoE does not currently see the need to run the economy hot to re-anchor inflation expectations to its target.

Against that backdrop, and if the economy evolves largely as the MPC is expecting, we expect to see a gradual removal of the extraordinary stimulus that existed over the past 18 months. This will start with a rise in Bank Rate to 0.5% over the course of 2022, followed by a gradual reduction in the central bank's balance sheet. The latter policy move is expected to come earlier than those of other central banks, as the BoE has signalled a desire to manage its balance sheet countercyclically, rebuilding its buffers as the economy recovers in an attempt to fight the unknown battles of tomorrow. The policy goal will be to straddle the line of facilitating the economic recovery, whilst nipping any hint of current inflationary pressures feeding through to a wage-price spiral in the bud.

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\*This article first appeared in OMFIF Commentary on November 11, 2021.

\* Katharine Neiss is Chief European Economist at PGIM Fixed Income.

But there are risks to this outlook. On the downside, pre-emptive policy tightening and the assumption that shrinking the balance sheet will be broadly neutral for financial conditions could short circuit the nascent recovery and force the BoE to reverse its position. This is a live risk as the pandemic lingers, global growth eases and higher taxes and energy prices weigh on demand. The Bank will need to be mindful of growing signs of cyclical weakness when setting policy in real time.

On the other hand, there is a risk that policy is behind the curve, prompting the Bank to normalise policy more quickly and keep a lid on inflation. This is a particular risk to the UK given the acute uncertainty regarding the supply side of the economy amid significant data gaps. For example, estimates of the number of UK workers still on furlough over the summer were recently revised higher, pointing to greater labour market slack than the central bank was expecting. And with the disruption of official net migration data due to Covid-19, an unknown number of European Union nationals have left the UK since the start of the pandemic. The only thing that seems clear from other metrics, such as the labour force survey, is the likelihood that the departure numbers could be large and macroeconomically meaningful. If true, then that would point to a greater erosion of labour supply than is currently known.

Going forward, further volatility in UK rates should not be surprising. The potential volatility reflects both the uncertain UK macro-outlook and the challenges around engineering a smooth exit strategy from the extraordinary pandemic-related monetary support of the last 18 months. Given the exceptional nature of the pandemic shock and what is currently known about UK macro-fundamentals, the BoE's conservative and cautious approach towards a limited and gradual policy normalisation is warranted. But if the facts change, then the policy outlook will need to change as well.



# Monetary Policy

## The Impact of Monetary Policy Normalisation on Asia<sup>\*</sup>

*By* AGUSTÍN CARSTENS<sup>\*</sup>

I want to thank the organisers, and in particular the People's Bank of China and SAFE, for inviting me again to join this prestigious annual Financial Street Forum.

Policy normalisation is coming

Today I want to talk about policy normalisation following Covid-19, and the effect this is likely to have on Asia and emerging market economies in general.

Stepping back to the early months of 2020, as it increasingly became clear that we faced a global pandemic, policymakers responded forcefully. Central banks and fiscal authorities worked in close concert to prop up their economies. For central banks, this often meant cutting policy rates to all-time lows and using so-called unconventional policy tools. Some emerging market central banks bought government bonds for the first time. Fiscal authorities also reacted strongly, backstopping incomes in struggling industries with measures that, together, amounted to more than a fifth of GDP in some cases.

These policy measures have clearly had their intended effect: they put a floor under economic activity and laid the basis for the hoped-for recovery. But they have also contributed to exceptionally accommodative financial conditions. We've seen this reflected in booming stock markets, exceptionally low credit spreads and accelerating real estate prices across many markets.

Now some countries are starting to move towards "policy normalisation", including in North America and Europe. Compared with many emerging market economies (except China), they suffered from the pandemic relatively early on but have generally made more progress with vaccinations, which has relieved pressure on healthcare facilities. They have been enjoying a faster than usual recovery and above-target inflation, to the point of raising questions about inflation persistence.

The improvement in the economic fortunes of these advanced economies has been broadly positive for emerging markets: stronger global growth has increased demand for their exports, especially of manufactured products, while rising commodity prices have provided a further boost to commodity exporters.

Normalisation may tighten global financial conditions

But policy normalisation – when it comes – could have a large impact on Asia, and on emerging market economies more generally. We know that financial conditions in emerging markets move with the global ones. And we see evidence of this in regional markets' sensitivity to the expected speed of monetary policy tightening in the United States and elsewhere.

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<sup>\*</sup>This speech was given by Agustín Carstens at Bank for International Settlements, Beijing Financial Street Forum 2021, 20 October 2021.

<sup>\*</sup>Agustín Carstens, General Manager, Bank for International Settlements

The main reason is that monetary policy affects global financial conditions. We've already remarked on the rapid rise in asset prices, seen worldwide. Much of this has been backed by increasing debt levels, which raises concerns about financial stability. Especially where debt increases occur in the non-bank financial sector, there can be "hidden leverage" and liquidity mismatches lurking beneath the surface. Archegos Capital Management provides a good example.

It held large and concentrated positions based on derivatives contracts and reportedly lost 20 billion US dollars in just two days, before being closed in March this year. This resulted in large losses for leading international banks. Closer to home, financial markets continue to monitor the developments surrounding Evergrande Group.

Of course, the issue is not about any individual company, since businesses failing is a fact of economic life. Instead, it is about the systematic growth of debt that we've seen across economies, and indeed the world.

Just how vulnerable are emerging markets to tightening global financial conditions? Well, that depends. The "taper tantrum" of 2013 – when there were signs that the Federal Reserve would reduce its quantitative easing programme introduced in the wake of the Great Financial Crisis – provides one example of this. It saw capital outflows from many emerging markets, large exchange rate depreciations and a sharp rise in funding costs.

Policymakers can help to protect emerging market economies from tightening financial conditions

So are we destined to see a repeat – a taper tantrum 2.0 – this time? Not all such episodes are alike: the consequences of policy normalisation depend on both underlying economic conditions and the policy responses.

Today, emerging markets are better placed to withstand tightening global financial conditions than in the past. First, many have higher foreign exchange reserve buffers, which can provide a certain degree of comfort in the face of capital outflows. Relatedly, some countries, especially in Asia, have persistent current account surpluses, providing a steady stream of foreign currency income.

Second, central banks and regulatory authorities have been actively using both micro- and macroprudential policies to make their financial systems more resilient. Last, but by no means least, monetary policy frameworks in emerging markets are much stronger than in the past. During the pandemic, these have delivered "good" macroeconomic outcomes, helping to assure the anchoring of inflation expectations and increasing the room for manoeuvre for central banks.

But there are some lingering causes for concern. Many countries are running large fiscal deficits, and public debt is rising, although much of this is due to necessary pandemic measures. Even when this debt is issued in local currency, economies could face heightened capital flow volatilities when market sentiment weakens, especially if a large portion of the debt is held by foreign investors. I've referred to this elsewhere as "original sin redux".

In addition, corporations in emerging market economies continue to issue debt in foreign currencies. Policy normalisation is likely to see a strengthening of the dollar and euro against regional currencies, potentially challenging the debt servicing and refinancing capacity of heavily indebted corporates. Household debt has also been rising rapidly in many economies, in part fuelled by booming real estate markets. History suggests that this tends to raise downside economic and financial stability risks over the medium term.

So what can central banks do to manage the fallout from normalisation? The exact mix of tools and their sequencing will be country-specific. But clear and timely communication is crucial for all. Emerging market central banks can draw on their experience with a broad set of tools, as outlined in recent BIS working group reports.

First, foreign exchange intervention can serve as a line of defence against excessive currency volatility, supported by capital flow management tools if needed.

Second, balance sheet operations can help to stabilise financial markets, and provide an extra degree of freedom when policy rates are low.

Third, refinancing operations for financial institutions, including non-bank financial institutions, can be used to restore market functioning if necessary.

Finally, macro- and microprudential measures can complement monetary policy in stabilising domestic financial conditions and bolstering financial resilience.

In the longer term, there are additional measures that can help to facilitate an efficient allocation of resources and ensure robustness. These include the development of deeper domestic financial markets to reduce reliance on external financing, and the greater adoption of best-practice international regulatory and supervisory standards.

### Conclusion

The bottom line is that the pandemic's end will bring a fresh set of policy challenges. In many ways, China is in the vanguard, as one of the first economies to rebound from its Covid-induced slump. We look forward to continuing to learn from your experiences here as normalisation continues.

Thank you for inviting me to share my thoughts with you. I wish you all the best for your discussions over these three days. While the questions are different from those of last year's forum, what hasn't changed is my desire to join you in person soon.

## **New Monetary Policy Tools for Emerging Market and Developing Economies\***

*By LI BO\**

I am very pleased to welcome you to this panel discussion on the use of new monetary policy tools in emerging markets and developing economies, or EMDEs.

Unconventional monetary policies—including asset purchases—have been used extensively in advanced economies for some time, especially in the aftermath of the global financial crisis. These policies have helped to ease stress and improve market functioning. But in an environment where interest rates were constrained by the effective lower bound, large-scale asset purchase programs also importantly aided monetary policy transmission and provided needed stimulus to support faster recoveries and boost inflation toward central bank targets.

Since the pandemic, we've seen many EMDE central banks joining their advanced economy counterparts in deploying asset purchase programs, along with other unconventional policies. But since most of them still have room to cut interest rates, the range of policy tools has been narrower—little reliance, for instance, on negative interest rates—and the motivation for the use of these tools has been related more to easing financial stresses than to providing macro stimulus.

So far, at least, these ventures into unconventional policy seem to have been quite successful. EMDE central banks have managed to lower government yields and significantly reduce financial market stress, while avoiding noticeable capital outflow and depreciation pressures, which was a concern that often held them back from using these tools in the past. Given this overall positive experience, it seems likely that EMDE central banks may consider asset purchases during future episodes of market turbulence.

But we should be cautious and remember that our experience with asset purchase programs is still relatively limited. Moreover, these policies also come with considerable risks, some of which may be accentuated in the EMDE context given their often more limited market depth and less well-developed institutional frameworks. I want to highlight three risks in particular:

- First, EMDE central banks will have to decide on how much maturity, credit, and exchange-rate risk they are willing to take upon their balance sheets.

- Second, they will have to consider the risks of fiscal dominance that may be associated with large-scale purchases of government securities (especially if done on the primary market), as well as the broader governance challenges and political pressures that may emerge if central banks support nonbank financial institutions, or set up funding for lending programs aimed at supporting particular sectors.

- Finally, many central banks must now address the challenge of exiting from these programs without triggering financial market instability and without running afoul of political pressures to minimize Treasury borrowing costs—political pressures that are likely to be all the more acute in the current environment of rising interest rates and high public debt.

In short, the key question is whether and how EMDE central banks can benefit from asset purchase programs—and possibly other unconventional tools—while containing risks in the

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\*Opening Remarks by Deputy Managing Director on the panel discussion on the use of new monetary policy tools in emerging markets and developing economies.

\* Li Bo, Deputy Managing Director, IMF.

three areas I just mentioned. A recent IMF departmental paper led by Tobias and colleagues provides some important insights, but this is going to be a continuous learning process.

## **Monetary and Fiscal Policies: In Search of a Corridor of Stability\***

*By* CLAUDIO BORIO\*

Monetary and fiscal policies, as deeply entwined functions of the state, face a looming dual long-term challenge. They need to regain policy headroom so as to be able to effectively fulfil their macro- stabilisation role. And once those safety margins are restored, the policies need to remain firmly within a “corridor of stability”, in which neither can endanger the other or push it to the limit. Navigating the path ahead will require a mix of “opportunistic normalisations” and structural reforms to raise long-term growth.

The Covid-19 crisis has highlighted the nexus between monetary and fiscal policies. Faced with an unprecedented economic collapse, monetary and fiscal authorities acted in unison to stabilise markets and shore up activity. Monetary policy deployed its power to create and distribute liquidity; fiscal policy its power to transfer resources and spend. Together, they prevented a much deeper contraction and laid the basis for the recovery (BIS 2020). The two policies have worked smoothly together so far. But this happy state is unlikely to continue indefinitely.

The fault lines lie in the interwoven structure of the two policies, which inevitably encroach on each other’s territory. Both policies have a first-order impact on financial conditions, economic activity and inflation. And the nexus between them becomes even tighter, more mechanically, through interlocking balance sheets – income transfers to and from the government and central bank purchases of government debt. The ultimate reason for this tight relationship is that both policies reflect the state’s privileged command over resources, through the power to tax or issue money (Borio and Disyatat (2021)). That power can be a major force for good, when it provides the stable foundation for a thriving economy, but it can also cause great harm, when it leads to inflation as well as financial and macroeconomic instability.

What does the journey ahead look like? What are the hazards along the way?

When considering these issues, the debate often focuses on the interaction between monetary and fiscal policies in near-term macroeconomic stabilisation – the policy mix (Bartsch et al (2020)). This issue no doubt matters. But it pales in comparison to a looming dual longer-term challenge. First, there is a need to regain policy room for manoeuvre so as to be able to carry out effectively that macro- stabilisation function in the first place. This means operating with comfortable safety margins, which will allow each policy to address inevitable future recessions and equally inevitable unexpected shocks. Second, once those safety margins are re-established, there is a need for the two policies to remain firmly within a “corridor of stability”, in which neither of them can endanger the other or push it to the limit. Fiscal sustainability is essential in this context.

### **Managing the interaction: the exceptional starting point of the journey**

What makes the journey ahead so hazardous is the exceptional starting point. In no phase in history have nominal interest rates been as low as they are now. Real interest rates have never

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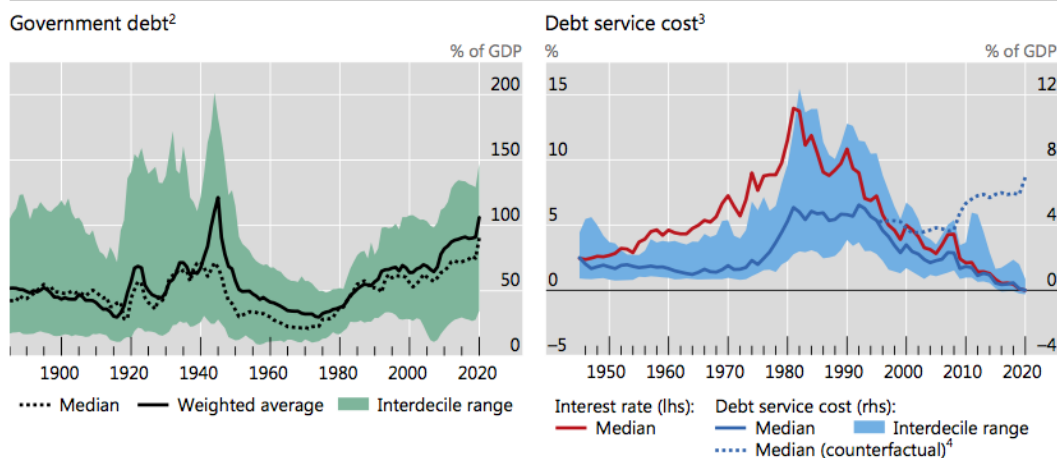
\*Article by Mr Claudio Borio, Head of the Monetary and Economic Department of the BIS, and Mr Piti Disyatat, Assistant Governor, Monetary Policy Group, Bank of Thailand, in VoxEU.org, published on 10 November 2021.

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been negative for as long, even during the exceptional Great Inflation era. Central bank balance sheets have been as high only during wars. At the same time, after a relentless rising trend since the mid-1980s, government debt has, globally, reached levels not seen since World War II (Graph 1, left-hand panel) – no doubt another historical peak. And despite this, service costs have fallen to a trough (right-hand panel). The debt burden has never felt so light.

Government debt and service cost<sup>1</sup>

Graph 1



1 Sample consists of AR, AT, AU, BE, BR, CA, CH, CL, DE, DK, ES, FR, GB, GR, IN, IT, JP, NL, NO, NZ, PT, RU, SE and US. Statistics are computed using a smaller set of countries when data is not available. 2 General (if not available central) government core (if not available total) debt at nominal (if not available market) value. Latest available quarter for 2020. 3 Government debt-to-GDP multiplied by the simple average of short-term and long-term interest rates. 4 Median debt service had interest rates stayed at 1995 level.

Sources: Borio and Disyatat (2021).

It is quite common to describe this situation as “the New Normal”. Clearly, though, it is anything but. What has so fundamentally changed in the global economy since its inception that we should expect current conditions to prevail without generating forces to upend them? In fact, policymakers’ task is arguably to ensure a smooth transition to a new, more resilient, path (Borio (2021a)).

### Managing the interactions: the hazards ahead

The much diminished policy headroom in the monetary and fiscal spheres poses risks. The ultimate, most damaging, hazard is a kind of “instability trap”. In this scenario, rather than taking advantage of low rates to adjust, governments take the opportunity to raise debt further – a risk underlined by the belief that the New Normal will ensure structurally low borrowing costs. In turn, higher government debt (alongside higher private debt) makes it harder to raise interest rates, as the economy becomes less able to bear them. Indeed, after such a long time with very low rates, the economy has adapted to them. This process can be self-reinforcing and reduce both fiscal and monetary policy headroom over time.

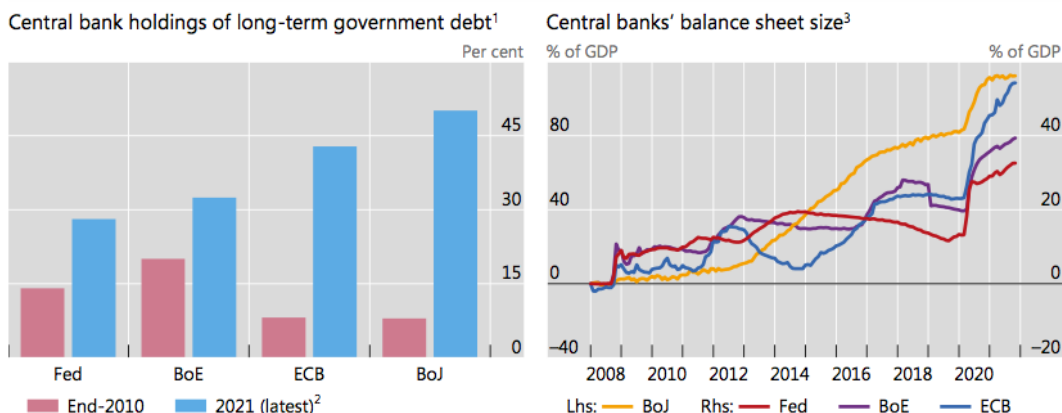
The above reasoning turns the usual argument on its head. In this scenario, it is not so much that interest rates are structurally and exogenously low so that governments can afford higher debt. Rather, the belief that they are structurally and exogenously low encourages policies that

end up validating those rates. The difference in perspective is hardly immaterial: it is the difference between a stable and an unstable economy.

To get a sense of the orders of magnitude involved, imagine that interest rates rose back to their mid-1990s levels. This was after inflation had been conquered, so that rates had declined to historically typical levels. In that scenario, government service costs in relation to GDP would be higher than during World War II (Graph 1, right-hand panel, dotted line).

Central bank balance sheets grow larger as government debt purchases soar

Graph 2



<sup>1</sup> Estimates of central bank holdings of long-term government securities as percent of the total outstanding. <sup>2</sup> For ECB, as of August 2021; for the Bank of England (BoE), Q1 2021; for the Bank of Japan (BoJ) and the Federal Reserve, September 2021. <sup>3</sup> Cumulative changes in total balance sheet size since 1 January 2008, as a percentage of four-quarter moving sum of quarterly GDP.

Sources: ECB; Bank of England; Bank of Japan; Board of Governors of the Federal Reserve System; United Kingdom Debt Management Office; Datastream; national data; BIS calculations.

One reasonable objection to this counterfactual is that it does not take into account that a large, and possibly growing, chunk of government debt now has a long maturity. But this argument fails to consider that central banks have purchased large amounts of that debt (Graph 2, left-hand panel) – by far the main force behind the surge in their balance sheets (Graph 2, right-hand panel). Central bank purchases of long-term government debt financed with bank reserves (QE) raise the sensitivity of fiscal positions to higher interest rates (eg Borio and Disyatat (2010), Greenwood et al (2014)). From the perspective of the consolidated public sector balance sheet – aggregating the balance sheets of the central bank and the government – the purchases amount to a large-scale debt management operation: the public sector retires long-term debt and replaces it with overnight debt (bank reserves) (Graph 3). Higher interest rates on reserves cut central bank profits (or raise losses) and hence depress remittances to the government.



Graph 3: How long-term government debt may in fact be overnight

Government		Central Bank		Consolidated	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
↑ Long-term assets	Short-term bills	↑ Long-term bonds	↑ Overnight debt	↑ Long-term assets	Short-term bills
	↑ Long-term bonds				↑ Overnight debt

The figure shows what happens to the consolidated government-cum-central bank balance sheet if the government issues long-term debt (green rectangle) purchased by the central bank and financed with interest-bearing bank reserves (de facto overnight debt – orange rectangle).

Source: Borio, C and P Disyatat (2021): "Monetary and fiscal policy: privileged powers, entwined responsibilities", *SUERF Policy Note*, no 238, May.

Government debt may appear long-term, but in fact it is not. In the largest advanced economies the share of marketable government debt now exceeds 80% and can be as high as almost 100%. But once the large-scale central bank purchases are taken into account, as much as some 30–50% of that debt is already de facto overnight.

### Managing the interactions: policies towards the final destination

Navigating the path ahead will require well-grounded policies with a clear medium-term orientation and conducted with a great deal of deft. The fact that normalisation is a joint task complicates matters significantly. Along the long path ahead, the two policies will at times be working at cross purposes, putting pressure on each other. Higher interest rates increase the size of the required fiscal adjustment, and fiscal consolidation puts pressure on monetary policy to remain accommodative for longer.

Such tensions can be partly alleviated by staying attuned to economic developments and implementing “opportunistic normalisations”. For fiscal policy, as the history of successful reductions in government debt-to-GDP ratios indicates, it is essential not to miss the window of opportunity provided by the prevailing favourable interest rate-economic growth differentials through fiscal consolidation once the post-pandemic recovery is well under way. (BIS (2021)). This is also important to reduce the risk of fiscal dominance. For monetary policy, reflation can go hand in hand with the gradual withdrawal of stimulus (Borio (2021b)) – as many central banks have already begun to do.

Fundamentally, though, the only way of improving trade-offs is to raise long-term growth. And this cannot be done through monetary or fiscal policy; reinvigorating structural reforms remains a priority. It is hard to imagine that an economy can allocate capital efficiently and thrive with real interest rates persistently negative. Favourable interest rate-growth differential should reflect higher growth, not lower real interest rates.

These policies provide the best chance for the economy to reach the right destination: one in which both monetary and fiscal policies have regained safety margins and operate firmly within a corridor of stability. Along such a corridor, the two policies could finally operate “consistently”, avoiding the risk of long-term and hard-to-reverse damage to institutional credibility to which an unbalanced reliance on one of the two can give rise. The final destination of the journey would be the foundation of a resilient economy – a place to call home.

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## Basis for Recovery\*

By E ZHIHUAN\*

The European Central Bank re-examined its monetary policy in July, slightly raising the inflation target to 2 percent instead of the current target of just below 2 percent, and allowing room to overshoot the target when needed, to cope with high inflation and provide a policy basis for the continued implementation of its ultra-loose monetary policy.

The ECB is expected to maintain its current monetary policy over the medium term and determine the timing and extent of interest rate increases depending on the inflation situation in the future. Overall, Europe's monetary policy shift will lag behind other major economies and support the global monetary environment continuing to stay loose.

The core connotation of the ECB's policy changes, its first in nearly two decades, was to continue to use the Harmonized Index of Consumer Prices as its index to evaluate price stability, and to increase the inflation target from "below, but close to, 2 percent" to an official inflation goal of 2 percent.

The re-examination also reaffirmed that 2 percent inflation is the medium-term target, with overshoots allowed. While nominal interest rates are confined to zero below the 2 percent target, strong or sustained monetary policy measures are needed to prevent low inflation from becoming entrenched, including allowing inflation to stay slightly above the target for a transitional period. The ECB is incorporating house prices into its calculation of the inflation rate, and will encourage efforts to combat climate change via its bond-purchase programs and collateral framework.

Obviously, the ECB's adjustment of its monetary policy is meant to prevent inflation from persistently falling below the target and becoming entrenched, that is why it raised its inflation target from "below, but close to, 2 percent" to a specific 2 percent, with overshoots allowed.

The ECB's tolerance of temporary and moderate inflation overshoots does not represent an average inflation target, and will not push inflation above the target to offset past shortfalls, but rather it will tolerate inflation overshoots as a byproduct of past efforts to raise inflation.

Indeed, the ECB reviewed its monetary policy strategy in 2003, when the eurozone faced problems such as slowed productivity, and the global financial crisis.

European economic growth has continued to decline and the actual equilibrium interest rates have remained low in recent years, due to influences such as globalization, digitalization and climate change. Today, the COVID-19 pandemic continues to take a heavy economic toll. Driven by factors such as rising energy prices and supply bottlenecks, inflation in the eurozone rose to 4.1 percent year-on-year in October, its highest level since July 2018 and much higher than the 3.4 percent in September.

At its monetary policy meeting in October, the ECB decided to continue to complete its emergency anti-epidemic bond purchase program (PEPP) in March 2022 as planned, but a separate Asset Purchase Program (APP) of 20 billion euros (\$24 billion) per month will be continued.

The re-examined monetary policy framework increases the scope for the ECB to adjust policy rates to achieve its objectives, which could better support the European economic recovery. The monetary policy objective of the ECB is to maintain price stability in the eurozone, and on that basis, to support the economic policies of the European Union, promote balanced economic

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growth, employment and social progress, and even protect and improve the environment. The ECB wants to ensure prudential supervision of credit institutions and stability of the financial system.

Moreover, the ECB continues to maintain its loose monetary policy will benefit the global economic recovery. At present, the high inflation rate in the eurozone limits the ECB's room for further easing of monetary policy to some extent. Therefore, it is expected that the ECB will maintain the established monetary policy unchanged for some time in the future. If the inflation rise slows next year then it may begin to consider raising interest rates in 2023.

# Digital Economy

## The Present and Future of Money in the Digital Age\*

*By* FABIO PANETTA \*

The topic of this speech – the present and future of money in the digital age – has certain unique features. It is an age-old topic, because we have been talking about money for millennia, from the times of Ancient Greece and pre-Republican Rome. But at the same time it is a topical issue, because the digital revolution is transforming the role and the nature of money.

It is a subject for specialists: economists, lawyers, and technology experts. Yet it concerns each and every one of us. We all use money in one form or another – every day, and often several times a day. And we are all involved in the changes currently under way.

At the international level the digitalisation of money and payments is being examined by the G7 and the G20. In Europe, it is frequently discussed by Finance Ministers in the Eurogroup. It is on the agenda of the European Commission and the European Parliament. It was addressed by the heads of state or government at the Euro Summit last March. And it is of course central to the agenda of the European Central Bank (ECB).

This strong focus can be explained by the far-reaching changes that are under way. Digitalisation is changing the way we work, interact with each other and use our time. It is changing consumption habits, social relations, and our very culture. It is, in effect, changing the way we live.

Money and payments are also undergoing rapid change. Innovative tools are emerging. Not so long ago, cash was more or less the only way to make an immediate purchase. Today, however, we have grown accustomed to using forms of private digital money such as online bank transfers, payment cards and applications on our smart phones or watches. These are changes that directly affect the role of central banks.

In October the Eurosystem opened the investigation phase for the possible introduction of a digital euro: electronic money issued by the central bank.

If a digital euro were issued, it would have significant consequences. It would have not only economic and financial repercussions, for instance as regards the transmission of monetary policy, financial stability, and the operation of the international monetary system. It would also have wider relevance for global geopolitical equilibria and the fundamental rights of individuals, such as the right to privacy.

In my speech today, I will illustrate the key characteristics and implications of this new money. And I will then discuss how we can maximise its benefits and reduce its risks.

The digital euro: what it is (and isn't)

The digital euro would be a form of sovereign money provided by the ECB in electronic format. It would be used by anyone – households, businesses, commercial outlets – to make or receive retail payments throughout the euro area. It would give citizens the same services they

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\*Lecture given at Federcasse (Federation of Italian Cooperative Credit Banks), Rome, 10 December 2021.  
\*Fabio Panetta, Member of the Executive Board of the ECB.

now obtain from paper banknotes: access to a secure payment instrument that is cost-free, easy to use and universally accepted within the euro area.

The digital euro would complement cash, not replace it. It would provide people with fuller and easier access to electronic payments, promoting financial inclusion. Unlike cash, it could be used not just for people to transfer money to each other or for purchases in commercial outlets, but also for online purchases. And as it would be a central bank liability, the digital euro would, like banknotes, be free of any risk, be it market risk, credit risk, or liquidity risk.

## Crypto-assets and stablecoins[1]

The digital euro has nothing to do with crypto-assets such as Bitcoin.

As it would be issued by the central bank, the value of the digital euro would be guaranteed by the State. Crypto-assets, on the other hand, are not issued by any accountable entity: they are notional instruments with no intrinsic value, which do not generate income flows (such as coupons or dividends) or use-value for their owners. They are created using computing technology and their value cannot be ensured by any party or guarantee. Crypto-assets are exchanged by operators whose sole objective is to sell them on at a higher price. They are, in effect, a bet, a speculative high-risk contract with no supporting fundamentals. That is why their value fluctuates wildly; hence crypto-assets are not fit to perform a currency's three functions: means of payment, store of value and unit of account.

The value of crypto-assets is growing rapidly and currently stands at over 2,500 billion dollars.[2] That is a significant figure with the potential to generate risks to financial stability that shouldn't be underestimated. For example, it exceeds the value of the securitised sub-prime mortgages that triggered the global financial crisis of 2007-2008.

In spite of the substantial sums involved, there is no sign that crypto-assets have performed, or are performing, socially or economically useful functions. They are not generally used for retail or wholesale payments, they do not fund consumption or investment, and they play no part in combating climate change.

In fact, there is clear evidence that they do the exact opposite: crypto-assets can cause huge amounts of pollution and damage to the environment.[3] And they are widely used for criminal and terrorist activities, or to hide income from the eyes of the tax authorities.[4] Moreover, they provide legitimate investors with no protection whatsoever against IT or cyber risks.[5] On the whole, it is difficult to see a justification for the existence of crypto-assets in the financial landscape.

## The digital euro also differs from stablecoins.

These are digital instruments whose value is linked to that of a portfolio of low-risk assets (reserve assets) such as currencies or securities. Without appropriate, rigorous regulation, stablecoins too are unfit to perform the functions of money: as they are low-risk but not risk-free, they are particularly vulnerable to possible runs in the event that holders experience a loss of faith.[6]

Their dissemination could influence monetary policy implementation and undermine the efficiency of the securities markets.[7] For example, one of the most widespread stablecoins promises "stability" by investing in low-risk assets such as commercial paper, and holds a large proportion of the stock of these instruments in circulation. In a situation of stress, large-scale sales of assets in response to a sudden increase in redemptions could generate instability throughout the commercial paper market. This phenomenon could spread to other stablecoins and related sectors, eventually finding its way to the banks that hold the stablecoins' liquidity.

These risks could be amplified by a lack of transparency around the composition of reserve assets, by a lack of checks on conflicts of interest between issuers and holders of stablecoins,[8]

by cases of fraud[9] or mismanagement,[10] and by the link between stablecoins and crypto-assets[11].

In sum, stablecoins are not therefore so “stable”, and that’s why I have previously referred to them as “unstable coins”.[12] In fact, a third of stablecoin initiatives launched on the market in recent years have not survived.[13]

The risks posed by stablecoins would be reduced if reserve assets could be held entirely in the form of risk-free deposits at the central bank.[14] However, this would limit monetary sovereignty as one of the key tasks of the central bank – money creation – would in effect be delegated to private operators. They would perform that task with the aim of maximising profits, rather than fulfilling public interest objectives such as inflation control and the cyclical stabilisation of the economy. Furthermore, the use of money would become expressly or implicitly onerous. This would affect access to a vitally important service which central banks have been providing to citizens for centuries on behalf of the State for free and in the general interest.

If they are kept within a framework of effective rules and checks, some privately issued digital finance instruments can increase the efficiency of payments, especially international payments. Europe is at the forefront of regulation, supervision and oversight of digital finance[15]. In countries outside Europe calls for stricter controls are becoming louder.[16]

But the largely uncontrolled development of digital finance – in particular decentralised finance[17] – and cross-border interlinkages mean that further action at the global level would be desirable.

In the circumstances I have described, a digital euro would bring stability to the world of digital finance.

#### Why we need central bank digital money

For the ECB, the need to explore the introduction of a digital euro arises from the evolution of people’s payment habits. The way we make our purchases has been changing, especially since the start of the pandemic.[18] Two trends are emerging.

The first is the tendency to use digital instruments.[19] Many of us regularly make payments using cards or apps on our mobile devices.

The second is online shopping. Consumers are buying goods and services – food, clothing, package holidays – not only in bricks and mortar local shops, but more and more on the internet.[20]

Cash is increasingly used as a store of value and decreasingly as a means of payment.[21] The cash stock has continued to increase, driven by the precautionary demand for cash. However, only about 20% of the stock is now used for payment transactions, down from 35% 15 years ago.

Cash purchases are therefore decreasing. If this trend were to continue, banknotes would eventually lose their central role and become a marginal means of payment. Even central banks’ efforts to continue to supply banknotes would not be enough to preserve that role in the face of insufficient demand for cash as a means of payment. Citizens could therefore lose a simple, safe and reliable means of payment that is provided for free by the State and universally accepted.

This would create a need to introduce a public digital currency.

But let me say, first, that not everyone agrees with this hypothesis. Some people feel that public digital currency would be redundant, given the vast supply of private electronic payment instruments available.[22] But this theory fails to recognise the central role of public money (that is, central bank money) in the economy.[23]

Confidence in savings held as private money is largely determined by the strength of central bank money – the monetary anchor – and by the convertibility of private money into public money. Central bank money is a safe form of money that is guaranteed by the State, by its

strength, its credibility and its authority. Other forms of money consist of private operators' liabilities;[24] their value is based on the soundness of the issuer and is underpinned, in the last analysis, by the promise of one-to-one convertibility with risk-free central bank money.[25]

This promise can prove to be ephemeral – for example when private issuers manage their capital or liquidity imprudently. It must therefore be repeatedly confirmed through the conversion of private to public money. For instance, our readiness to deposit our money with banks is underpinned by the knowledge that we can go to a branch or cash machine and withdraw cash from our deposits. This tells us that our money in the bank is safe. It reassures us that we will be able to convert private money (deposits) into public money (cash) in the future too. Bank runs and financial crises start when confidence in the convertibility of private money disappears.

In practice, many people are unaware of the differences between public and private money. This is what economists call “rational inattention”.[26] However, people know that banknotes protect them from the consequences of intermediaries potentially defaulting and they make their payment and savings choices accordingly.

This does not mean that the safeguards put in place to protect savings – legislation and banking supervision, deposit insurance schemes, capital markets supervision – are not important. On the contrary. They must, however, be flanked by convertibility to ensure the orderly conduct of payments, the stability of the financial system and the soundness of the currency.

Without the anchor of sovereign money, people would have to constantly monitor the safety of private money issuers in order to value each form of money. This would undermine the functioning of the payments system and confidence in savings. History shows that access to public money is essential to instil confidence in private money, ensure the correct functioning of the payments system and safeguard financial stability. Periods in the past when various forms of private money co-existed in the absence of sovereign money – for example the free banking episodes of past centuries – were marked by recurrent crises.[27]

Today, citizens hold central bank money in the form of banknotes. As I mentioned previously, in the future – in a digitalised world – cash could lose its central role. Central banks must therefore ensure that central bank money is fully usable and can retain its role as a payments anchor. That is the primary objective of the digital euro.

## Benefits of the digital euro

The digital euro is therefore essential to the orderly conduct of payments in a digital world. But the decline in the use of cash is not the only factor that could transform the payments market. Other factors, also significant, have prompted the ECB to study the issuance of a digital euro[28].

## Monetary, financial and political sovereignty

First, there is the need to assert our sovereignty in the monetary and financial fields, in keeping with the goal of safeguarding our strategic autonomy as established by the European Council.[29] The ability to make payments safely and efficiently, without external influence, is a fundamental need for the economy and for society as a whole, especially in a large jurisdiction like the euro area.

Two-thirds of digital retail payments in Europe are currently brokered by foreign operators.[30] Looking to the future, digital currencies issued and controlled outside the euro area – by private actors or foreign countries – could grow in importance, to the point of replacing existing means of payment.

The European financial system would thus be subject to decisions made by foreign actors and this in turn would place our legislative and regulatory powers at risk. A payments system based



on technologies and practices designed, managed and supervised elsewhere would undermine the ability of the European authorities to exercise their supervisory control. Such a system could be under-protected from external threats, including IT threats. It would expose people, businesses and states to the danger of the improper use of confidential information. It would make the information needed to combat unlawful activities harder to trace.

And the list could go on. But it is clear that a payments system and financial sector dominated by foreign operators would be unfit to support the single currency, and simply unimaginable in the world's second economy.

The “colonisation” of the European payments system is not an imminent danger. But nor is it a remote one, given the speed at which digital finance is changing. Since early 2020 the value of stablecoins in circulation has risen from 5 to 120 billion dollars.[31] At the same time, the Big Tech[32] companies have expanded their financial business. The convergence of these two tendencies – the growth of stablecoins and Big Tech's expansion in the finance sector – could have a drastic impact on the functioning of financial markets and supplant traditional intermediation and payment services. And that would give rise to the risks I described earlier.[33]

To prevent these dangers we need to adjust the regulatory and supervisory framework. But that is not enough. The transformations under way should be governed by providing innovative and efficient financial services capable of meeting the emerging need for immediacy in our society, as well as the more general trend of digitalisation of the economy. The introduction of a digital euro would be a step in that direction.

#### Sovereignty and the international role of the euro

A digital euro accessible to foreign users would cut the cost of using our currency in cross-border payments and increase its suitability as a global invoicing currency. This would increase the international role of the euro, thereby strengthening Europe's strategic autonomy, lessening the global domination of the dollar and reducing global dependency on a single source of liquidity. It would strengthen the “Brussels effect”: the influence exerted by the EU on the international stage by asserting and advancing its principles, decisions and institutional and legal practices.[34]

ECB analyses show that the effects of this would be significant but less important than the fundamental drivers of the international role of a currency, such as the size of the underlying economy, its economic policies, the development of its capital markets, and the efficiency of its institutions.[35]

#### Protecting confidentiality

Individuals have a fundamental right to privacy, which is enshrined in national and European regulations.[36] In the public consultation conducted by the ECB in 2020, 43% of respondents ranked privacy as the most important aspect of the digital euro, well ahead of other features.[37]

Such a focus on privacy comes as no surprise. Misuse of confidential data that can be inferred from payments could lay bare private aspects of our lives such as our political leanings, sexual orientation or state of health. This could impinge on personal liberties and interfere with the rights of individuals and with the rules that underpin the functioning of a modern liberal democracy.

The data contained in digital payments are frequently used by private companies for various purposes. Some payment companies are moving from a fee-based business model to a data-driven business model in which services are supplied free of charge in order to obtain detailed information on customers.

Digital payments therefore put privacy at risk and may give rise to misuse of confidential information. Data protection regulations aim to prevent abuses but cannot always keep pace with technological innovation, as was demonstrated by the case of Cambridge Analytica.

If it were offered by an independent public institution such as the central bank – which has no interest in exploiting payment data for any purpose – the digital euro would enhance confidentiality in electronic transactions by protecting against unwarranted intrusions. Sound transparent governance that complies with the national and European regulations would ensure that information on users is only used for permitted purposes, such as combating illicit activities.

Confidentiality is distinct from anonymity.[38] Digital payments could ensure different levels of confidentiality,[39] to be defined in line with general interest objectives. The technical experiments conducted by the Eurosystem confirm this possibility.

In any case, cash will remain available. Consumers will be able to continue to make anonymous payments with banknotes if they wish to do so.

## Competition and efficiency

The European digital payments market is highly concentrated. Two US intermediaries handle two-thirds of card payments, while another US operator dominates online payments. Digital payments seem to be expensive for many users and are in fact mainly used by people with medium to high incomes.

The digital payments market could become more concentrated in the future owing to the expansion of the big tech firms, which have already shown a tendency to adopt anti-competitive behaviours.[40] Benefiting from their very large number of customers, network effects and economies of scale, these operators could obtain very large market shares.[41]

This could cause traditional intermediaries to exit the market and damage competition, leading to an increase in fees and a deterioration in the quality of services with effects on other sectors such as insurance services and credit, and also on commerce itself.[42] In such a context, traditional anti-trust measures may prove to be ineffective given the length of time needed for the investigations and the speed at which the digital economy is advancing.

A digital euro would directly boost competition by making a free and easy to use digital means of payment available to everyone. But it would also have an indirect effect: the option to use the new form of money would allow European intermediaries – including small intermediaries which typically have less capacity for innovation – to offer products with a higher technological content at a competitive cost, making them better able to compete with global operators.

## Effects on the monetary and financial system

The digital euro can bring about significant changes in the monetary and financial system which should be analysed in depth in order to assess how to design the new form of money in a way that harnesses its benefits and avoids undesired effects. I will now recall the main topics that are central to the Eurosystem's deliberations.

## Monetary policy

Depending on its features, the digital euro could influence monetary policy.

One important aspect is the possible application of interest rates. A digital euro earning no interest would replicate the characteristics of cash; with no limits on holdings[43] it would prevent the central bank from applying rates below zero, so savers – by holding digital euro – would avoid negative returns without bearing the risks and costs of owning huge quantities of banknotes. Conversely, if interest was payable on the digital euro it could strengthen the transmission of monetary policy, but there would be a risk of diverting bank funds.

The impact on monetary policy would also depend on the reallocation of private financial wealth that the digital euro will bring about. Switching funds out of banknotes and into the new form of money would change the composition of central bank liabilities, without other significant effects.

On the other hand, if the digital euro attracted deposits (and the banks did not have the unencumbered reserves to cope with the outflow of funds), it could affect the cost and supply of credit and the transmission of monetary policy through bank balance sheets. The central bank could mitigate or eliminate these effects by increasing refinancing of banks or through asset purchases, thereby expanding its own balance sheet.

This list of possible effects could continue, analysing in greater detail different potential remuneration methods,[44] possible compensatory measures and aspects such as the impact on the central bank's balance sheet and on seignorage.

But the main consideration is that the digital euro project does not aim to change how monetary policy is implemented. The changes that it will bring will depend on its features, which should be carefully studied and defined, but they would not interfere with the actions of the central bank.

#### The banking and financial system

The digital euro could affect banks' activities and the functioning of the financial system. In addition, if it is incorrectly designed, it could result in tensions and instability.[45] This could crowd out banks from the payments market. In addition, in the absence of limits to its use, it could attract large volumes of deposits. This could make banks' funding unstable and more costly and have a negative impact on their profitability and credit offering. Ultimately, it could affect the real economy.

The risks would be greater in times of crisis. If there were doubts about the soundness of intermediaries, savers could transfer their funds out of bank deposits and to the central bank quickly and free of charge, including for large amounts. This could trigger a "digital run" on bank branches. The possibility of this happening could encourage savers to reduce their bank deposits, even during normal times.[46]

However, these risks would only materialise if the instruments put in place to protect financial stability – banking supervision, deposit insurance and the central bank as the lender of last resort – proved to be ineffective.

Above all, these risks can be kept in check by designing the digital euro in an appropriate manner in order to control its use as a form of investment. The debate on this issue focuses on two scenarios. The first foresees the setting of a ceiling on the amount of digital euro that can be held by individual users[47], or on aggregate transactions, i.e. on a weekly or monthly basis – to limit the outflow of bank deposits into the new form of money.[48] The second is based on a two-tier remuneration system which discourages holding digital euro in amounts above a certain threshold.[49]

These constraints would make the digital euro an efficient means of payment available to everyone while ensuring that it would not be used excessively as a form of investment that would crowd out other financial instruments, particularly bank deposits. Their introduction would remove the risk of instability, thus safeguarding financial intermediation.

But in assessing the impact of the digital euro it would be wrong to assume that tomorrow's financial system will be like today's, because it will be different, even without the digital euro. In the absence of government intervention, the system could be dominated by major global players, primarily big tech, who will be much less concerned than the central bank about the stability of the financial system. If properly designed, the digital euro will therefore avoid worse scenarios, thus conferring stability on the financial system.[50]

To ensure the project's success, in order to avoid instability, the digital euro will be introduced in close cooperation with euro area intermediaries who will be authorised to handle the distribution and provision of services to the public, and it will be compatible with the additional services that they offer. This will stimulate innovation: the new form of money will provide intermediaries with a regulatory infrastructure capable of connecting systems that are currently separate, such as retail payment schemes, the digital identity, the digital signature and electronic receipts. This would make advanced payment methods available, such as programmable payments, online purchases subject to delivery of the product, payments based on the use of a certain good or service, or automatic cash transfers to and from the government.

Building on these payment innovations, the digital euro can act as a driver for modernising the financial and economic system as a whole and making it more efficient, extending the use of technology in dealings between households, firms, intermediaries and the government.

### The international monetary and financial system

A digital euro that can be used without any constraints by non-residents could affect the structure and functioning of the international monetary and financial system through two channels.[51]

First and foremost, it could increase the international transmission of shocks and exchange rate volatility, by influencing capital flows.[52] This would occur because its liquidity, low risk and potential rate of remuneration would make the digital euro attractive to international investors, reinforcing the relationship between exchange rates and interest rate differentials – the so-called uncovered interest rate parity – and amplifying portfolio adjustments triggered by monetary shocks.

The effects would be considerable for emerging economies that have strong trade or financial ties with the Single Market, as they would be more exposed to effects stemming from the euro area. These countries' central banks would be forced to take more decisive action in dealing with monetary or real shocks, suffering a loss of autonomy as a result.

Second, the digital euro could spread in third countries to the extent that it would crowd out local currencies, leading to a digital "euro-isation", which could hamper the transmission of monetary policy and lead to financial instability. The risks would be greater for emerging economies that have weak currencies and economic fundamentals, and close trade and financial ties[53] with the Single Market and which are integrated into global value chains.[54]

### Conclusion

The digital euro project can be a success if we can ensure effective multi-level cooperation.

Public authorities will have to work closely with private operators – consumers, intermediaries, firms and merchants – to understand their needs and how to meet them. Only then can we avoid two opposite risks: being “too successful” and crowding out intermediaries and private financial instruments, or being “not successful enough” and generating insufficient demand.

As regards ties with private operators, we engage with user discussion groups, with committees made up of banking and payments experts, and with technology experts. For the ECB, the aim of the project is not to enter the retail payments market but to offer an efficient, secure and low-cost form of digital money which intermediaries can use to satisfy citizens' needs.

Our task will be easier if there is genuine cooperation within the private sector itself, between intermediaries in all euro area countries, to launch pan-European payment initiatives capable of offering services across the entire euro area, of strengthening the ability to compete with the major international operators and of consolidating Europe's autonomy.

Cooperation within the public sector is crucial for defining the characteristics of the digital euro and for reconciling the conflicts arising from several objectives: the right of individuals to confidentiality versus the public interest in maintaining the level of transparency required to combat illicit activities; the benefits of allowing the digital euro to be widely used versus the need to safeguard financial intermediation; and the benefits from the widespread international distribution of the new form of money versus the need to avoid instability in other countries.

Some choices relate to monetary policy and the payments system and fall within the remit of the Governing Council of the ECB. Others relate to more general issues, such as the protection of privacy, which require the involvement of Europe's co-legislators. There is already intensive cooperation between the ECB, the European Parliament, the European Commission and the Eurogroup.

Lastly, there is a need for close cooperation at the global level. Around 80 countries are currently assessing the introduction of a digital currency. International cooperation is needed to define shared principles on economic and regulatory issues and to connect the various projects. This type of approach will enable us to build an efficient system for international payments in the future by providing low-cost services to multiple sections of the world's population experiencing hardship, including migrants, thus promoting financial inclusion. The ECB is part of the initiatives launched by the G7, the G20 and the Bank for International Settlements.

The digital euro is an ambitious and complex goal that can improve the efficiency of the economic and financial system. We must make it a driver of stability and inclusive progress, capable of strengthening ties between economies and financial systems at the global level and of overcoming gaps and barriers between countries.

#### Endnotes

1. The definition of crypto-assets can include assets that are not liabilities of any issuer, and stablecoins. The classification used in the text keeps these two categories separate.

2. See International Monetary Fund (2021), *Global Financial Stability Report, "COVID-19, Crypto, and Climate. Navigating Challenging Transitions"*, October, and Panetta, F. (2021), "Stay safe at the intersection: the confluence of big techs and global stablecoins", speech at the conference on "Safe Openness in Global Trade and Finance" organised by the UK G7 Presidency and hosted by the Bank of England, October.

3. For example, producing and trading Bitcoin alone wastes huge amounts of energy: the equivalent of the entire annual energy consumption of a country with millions of inhabitants like Switzerland.

4. It is estimated that the amounts of crypto-assets exchanged for criminal purposes are substantial, surpassing 2.8 billion dollars for Bitcoin alone in 2019 (see Chainalysis (2020), "The 2020 State of Crypto Crime", January). Other analyses in 2020 show that the volume of criminal activity exceeded 3.5 billion (see Ciphertrace (2021) "Cryptocurrency crime and anti-money laundering report", February). These studies are backed up by various operations carried out in recent years by Europol and Interpol to break up criminal organisations engaged in money laundering and selling weapons and drugs using crypto-assets.

5. There have been several cases of holders of crypto-assets losing all their savings after having lost their blockchain passwords.

6. Stablecoins can usually be converted to cash. Conversion mechanisms differ, however, from those of bank deposits or electronic money. In the case of bank deposits, one-to-one convertibility is based on deposit insurance schemes, financial legislation, and prudential supervision. The value of e-money holdings is protected by the fact that customers' funds must be deposited with third parties in cash format. The lack of such mechanisms could fuel runs on stablecoins if holders – who bear the risks of fluctuations in the value of reserve assets – expect

a significant decrease in the redemption price or perceive the issuers as being incapable of absorbing losses.

7. See Panetta, F. (2020), “The two sides of the (stable) coin”, speech at Il Salone dei Pagamenti, November.

8. See the report prepared by the President’s Working Group on Financial Markets, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency “Report on Stablecoins”, November 2021.

9. See Mizrach, B. (2021), “Stablecoins: Survivorship, Transactions Costs and Exchange Microstructure”.

10. See Commodity Futures Trading Commission press release, “CFTC Orders Tether and Bitfinex to Pay Fines Totaling \$42.5 Million”.

11. In September 2021, approximately three quarters of exchanges of crypto-assets on trading platforms involved stablecoins. In that sense, stablecoins are also tainted by the illegal activities associated with crypto-assets.

12. See Panetta, F. (2021), interview with Financial Times, conducted by Martin Arnold, 20 June.

13. See Mizrach, B. (2021), *op. cit.*

14. See Panetta, F. (2020), “From the payments revolution to the reinvention of money”, speech at the conference organised by the Deutsche Bundesbank on “The Future of Payments in Europe”, November.

15. The European Commission recently introduced a Proposal for a Regulation on Markets in Crypto-assets (MiCA). The ECB has updated its Payment Instruments, Schemes and Arrangements (PISA) supervisory model for electronic payment products to include digital payment tokens such as stablecoins.

16. With regard to the United States, see “Report on Stablecoins”, (2021), *op. cit.*, and the remarks of the Securities and Exchange Commission Chair, Gary Gensler, before the Aspen Security Forum, August 2021.

17. Decentralised finance (DeFi) is designed to provide financial services without intermediaries, using smart contracts on blockchain and stablecoins to facilitate the transfer of funds. See Bank for International Settlements (2021), “DeFi risks and the decentralisation illusion”, BIS Quarterly Review, December.

18. See Panetta, F. (2021), “Cash still king in times of COVID-19”, keynote speech at the Deutsche Bundesbank’s 5th International Cash Conference, Frankfurt am Main, June.

19. If given the choice, almost half of euro area consumers would prefer to pay with cashless means of payment, such as cards. See ECB (2020), “Study on the payment attitudes of consumers in the euro area (SPACE)”, December.

20. Internet sales in the euro area have doubled since 2015. In August 2021 the Eurostat index of retail sales via internet or mail order houses (seasonally and calendar adjusted, index 2015=100) stood at 206.

21. See Zamora-Pérez, A. (2021), “The paradox of banknotes: understanding the demand for cash beyond transactional use”, Economic Bulletin, issue 2, ECB, Frankfurt am Main.

22. See Waller, C.J. (2021), “CBDC: A Solution in Search of a Problem?”, speech at the American Enterprise Institute, Washington, D.C., August.

23. For an analysis of the role of public money in the economy, see Panetta, F. (2021), “Central bank digital currencies: a monetary anchor for digital innovation”, speech at the Elcano Royal Institute, Madrid, November.

24. For example, deposits are a liability for banks.

25. One-to-one convertibility with the common monetary anchor is what makes these regulated forms of money convertible with each other at par and is why they are perceived as interchangeable when making payments.

26. See Sims, C. A. (2003): “Implications of rational inattention”, *Journal of Monetary Economics*, 50(3), pp. 665-690.

27. See Eichengreen, B. (2019), “From commodity to fiat and now to crypto: what does history tell us?”, NBER Working Paper Series, No 25426, January; Rolnick, A.J. and Weber, W.E. (1983), “New evidence on the free banking era”, *American Economic Review*, Vol. 73, No 5, pp. 1080-1091.

28. This paragraph only covers the main benefits of a digital euro. For a full analysis see ECB (2020) “Report on a digital euro”, October.

29. The heads of state or government espoused the principle of European strategic autonomy at the summit of 2 October 2020.

30. ECB (2019), Card payments in Europe, April.

31. See Panetta, F. (2021), “Stay safe at the intersection: the confluence of big techs and global stablecoins”, speech at the conference on “Safe Openness in Global Trade and Finance” organised by the UK G7 Presidency and hosted by the Bank of England, October.

32. The term Big Tech refers to technological giants such as Google, Amazon, Facebook and Apple (GAFA).

33. See Panetta, F. (2020), “The two sides of the (stable) coin”, speech at Il Salone dei Pagamenti, November; Panetta, F. (2020), “From the payments revolution to the reinvention of money”, speech at the Deutsche Bundesbank Conference on the “Future of Payments in Europe”, Frankfurt am Main, November.

34. See Bradford, Anu (2012), “The Brussels effect”, *Northwestern Law Review*.

35. See ECB (2021), “Central bank digital currency and global currencies”, The international role of the euro, Frankfurt am Main, June.

36. The right to privacy is enshrined in the European Charter of Fundamental Rights.

37. The other features highlighted in the consultation were the security of payments and usability throughout the euro area, which were ranked first by 18% and 11% respectively.

38. See Panetta, F. (2021), “A digital euro to meet the expectations of Europeans”, introductory remarks at the ECON Committee of the European Parliament, April.

39. The degree of privacy could vary, for example, depending on the amount of the digital euro transaction or whether the payment takes place remotely or in person.

40. See “Investigation Of Competition In Digital Markets: Majority Staff Report And Recommendations”, United States Congress, House Of Representatives, Committee On The Judiciary, 2020 [https://judiciary.house.gov/uploadedfiles/competition\\_in\\_digital\\_markets.pdf?utm\\_campaign=4493-519](https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519)

41. See Panetta, F., (2020), “The two sides of the (stable) coin”, op. cit.

42. For example, in November 2021 Amazon announced to customers in the United Kingdom that from 2022 it would cease to accept Visa credit cards issued in the United Kingdom and offered affected customers a discount of GBP 20 on their next purchase via an alternative payment method.

43. See the paragraph on the effects on the banking and financial system.

44. With a rate of return that is fixed or variable, only positive or even negative, the same as or different from the key ECB interest rates, etc.

45. The impact of the digital euro on the banking and financial system is explored in greater detail in Panetta, F. (2021), “Evolution or revolution? The impact of a digital euro on the financial system”, speech by Fabio Panetta at a Bruegel online seminar, February.



46. See Kumhof, M. and Noone, C. (2018), “Central bank digital currencies – design principles and balance sheet implications”, Staff Working Paper, No 725, Bank of England, May.

47. See Panetta, F. (2018), “21st century cash: central banking, technological innovation and digital currencies”, in Gnan E. and Masciandaro, D. (eds.), *Do We Need Central Bank Digital Currency?*, Conference Proceedings 2018/2, SUERF, pp. 23-32.

48. For example, individual users could be allowed to hold a maximum of €3,000, with a provision for amounts above this threshold to be transferred automatically to a bank account.

49. For example, a certain rate of return could be established for amounts up to €3,000, with penalising remuneration set for amounts above that figure. This proposal was put forward in Panetta, F. (2018), “21st century cash: central banking, technological innovation and digital currency”, in Gnan E. e Masciandaro, D. (eds.), *Do We Need Central Bank Digital Currency?*, Conference Proceedings 2018/2, SUERF, pp. 23-32; Bindseil, U. (2020), “Tiered CBDC and the financial system”, Working Paper Series, No 2351, ECB, Frankfurt am Main, January; and Bindseil, U. and Panetta, F. (2020), “Central bank digital currency remuneration in a world with low or negative nominal interest rates”, *VoxEU*, October. An in-depth analysis of how we could avoid the digital euro being used excessively as a form of investment is outlined in Bindseil, U., Panetta, F. and Terol, I. (2021), “Central Bank Digital Currency: functional scope, pricing and controls”, Occasional Paper Series, No 286, European Central Bank, December.

50. At the same time, the digital euro could make it easier for the authorities to intervene in times of stress, for example by providing the central bank with real-time data on aggregate savings outflows.

51. The impact of the digital euro on the international monetary and financial system is explored in greater detail in Panetta, F. (2021) ““Hic sunt leones” – open research questions on the international dimension of central bank digital currencies”, speech at the ECB-CEBRA conference on international aspects of digital currencies and fintech, October.

52. See Ferrari, M., Mehl, A. and Stracca, L. (2020), “Central bank digital currency in an open economy”, CEPR Discussion Paper Series, No 15335, October; and Committee on Payments and Market Infrastructures, BIS Innovation Hub, International Monetary Fund and World Bank (2021), “Central bank digital currencies for cross-border payments: Report to the G20”, July.

53. See Aviat, A. and Coeurdacier, N. (2007), “The geography of trade in goods and asset holdings”, *Journal of International Economics*, Vol. 71, No 1, pp. 22-51.

54. See Ikeda, D. (2020), “Digital Money as a Unit of Account and Monetary Policy in Open Economies”, Discussion Paper Series, No 20-E-15, Institute for Monetary and Economic Studies, Bank of Japan, December.



## Exploring a Digital Euro<sup>\*</sup>

By JENS WEIDMANN<sup>\*</sup>

### 1 Introduction

A very warm welcome to this joint symposium of the Bundesbank and the People's Bank of China. The main theme of our conference is "Fintech and the global payments landscape – exploring new horizons."

I am delighted that we have brought together such a wealth of experts in this field, with representatives of academia, fintech companies, commercial banks, central banks, government and supervisory authorities amongst our number. Sharing our respective thoughts and experiences is to the benefit of all parties involved. I would also like to thank the People's Bank of China for co-hosting this conference.

Unfortunately, the pandemic forces us to hold it as a digital event. If we had been able to meet here in person, I would have recommended a visit to the Bundesbank's Money Museum and the current numismatic special exhibition on the topic of "Money Creators. Who decides what's money?" In the dawning age of digital currencies, that is a highly relevant question indeed. Crypto tokens and other innovations in finance are challenging established views on what constitutes money.

The exhibition takes a historical perspective and thereby teaches us important lessons about creating money in the future. For example that our success as a money creator depends on the trust of those who are supposed to use that money. That it is not necessarily the state that creates money but that creating money means having power. And that the form and use of money has always been changing.

Paper money, for instance, was first introduced in China about a thousand years ago. This innovation eventually transformed the payments system. Today, digitalisation is on the cusp of overhauling payments.

Central banks have to work out how to respond to this challenge. One possibility is the issuing of central bank digital currencies (CBDCs). According to a survey by the Bank for International Settlements (BIS), the share of central banks conducting work on CBDC for general or wholesale use rose to 86% last year. Many of them have made significant progress.

In the public debate, CBDCs that can be used by consumers and businesses have taken centre stage. And it is on such retail CBDCs that I would like to focus in my talk. The People's Bank of China has been playing a pioneering role in the development of such a digital currency and we are looking forward to gaining fresh insights into its projects.

### 2 A digital euro

Two months ago, the Eurosystem launched a project to investigate key questions regarding the design of a CBDC for the euro area. The aim of the investigation is to prepare us for the potential launch of a digital euro. Experiments have already shown that, in principle, a digital euro is feasible using existing technologies.

However, introducing CBDC is not an end in itself. There are various conceivable reasons why a central bank might introduce a digital currency. And its intended purpose will have important implications for its design: it is a matter of "form follows function". Accordingly, future CBDCs may differ in form and functionality across currency areas.

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<sup>\*</sup>Opening speech at the digital conference "Fintech and the global payments landscape – exploring new horizons", virtual, 14 September 2021.

<sup>\*</sup>Jens Weidmann, President of the Deutsche Bundesbank and Chair of the Board of Directors of the Bank for International Settlements.

Of course, CBDCs should only be issued if the perceived benefits outweigh any potential drawbacks or risks. Thus, a digital euro needs to provide a clear value added to euro area citizens.

To start with, CBDC is often expected to lower transaction costs and to raise efficiency in payments, financial markets and the real economy. It could also stimulate innovative services and give rise to new business models.

Moreover, a key factor in my view is that a digital euro would enable consumers and businesses to pay with central bank money in a digital environment. This is a unique feature that the private sector cannot replicate. As my ECB colleague Fabio Panetta has stressed, a digital euro would have “no liquidity risk, no credit risk, no market risk,” in this way resembling cash.

Thus, private households and firms would be given an additional way of using public money, just as the use of cash is waning. Indeed, according to a representative Bundesbank survey, the share of cash payments in point of sale transactions made by German consumers dropped from 74% in 2017 to 60% last year. Admittedly, the pandemic may have had an impact on payment behaviour that could fade again. But the underlying trend is clear. And some experts recommend preparing for a future in which cash may no longer be king.

Beyond safety, another feature of cash that many people value highly is its anonymity. You don’t need to identify yourself when you pay cash. It is therefore not surprising that in a public consultation of the Eurosystem both consumers and professionals considered privacy the most important feature of a digital euro.

The protection of privacy would thus be a key priority in terms of maintaining people’s trust. European data protection rules would have to be complied with. Nevertheless, a digital euro would not be as anonymous as cash. In order to prevent illicit activities such as money laundering or terrorist financing, legitimate authorities would have to be able to trace transactions in individual, justified cases.

Overall, the declining use of cash is a major reason for many central banks to consider offering CBDC. But let there be no mistake about this: the Eurosystem will continue to provide access to banknotes as long as people want cash. A digital euro would be meant to complement cash, not to replace it. The goal would be to broaden the choice of payment means available to consumers in a world that is becoming more and more digital.

You may be familiar with a piece of proverbial advice: check that the ladder is leaning against the right wall before climbing it. That’s a warning that should be heeded when it comes to CBDC, too. We need to think carefully about what the purpose would be in issuing digital central bank money. And we have to mind and curb the risks that its introduction may imply.

For example, since CBDC is a substitute for bank deposits, at least to some extent, it might bear important risks for the functioning of the financial system and the implementation of monetary policy. If, in times of crisis, consumers were to rush to exchange their sight deposits for CBDC on a massive scale, financial stability could be jeopardised.

Depositors could also shift their funds into CBDC only gradually and over a long period. In this scenario, banks would still lose a convenient source of stable funding. To make up for it, they may increasingly turn to other sources like the bond market or to the central bank to finance their activities. This may affect the amount of credit which commercial banks supply to the economy. The impact on the equilibrium depends on various factors and is not clear-cut to predict.

Still, the established roles in the financial system could be transformed. And this could apply to more than just commercial banks. The central bank might end up directly interacting with consumers, attracting deposits on a grand scale and extending its balance sheet substantially. Hyun Song Shin from the BIS has pointed out that the central bank could leave “a much larger footprint” on the financial system because of this.

We have a two-tiered monetary and banking system with a clear division of tasks between the central bank and commercial banks. According to Princeton economist Markus Brunnermeier, it is “probably the most pronounced public-private partnership we have in our economies.” It should not be gambled with.

However, this does not call for banks to be protected like an endangered species, either. On the upside, CBDC could spur on competition among banks and promote new services. Some banks might also become more cautious and reduce the potential for banking stress.

But designing CBDC involves curbing its risks. In order to prevent excessive withdrawals of bank deposits, it has been suggested that a cap be placed on the amount of digital euro that each individual can hold. Or that digital euro holdings in excess of a certain limit could be rendered unattractive by applying a penalty interest rate.

Proposals like these highlight the difficult trade-offs central banks face. CBDC should be designed in a way that allows its users to reap its potential benefits as fully as possible, while keeping its risks and potential side effects at bay. It should be sufficiently attractive for users to accept it. At the same time, CBDC should not be too attractive since, otherwise, it might disrupt the financial system.

The design of a potential digital euro is still vague. It may not be a jack-of-all-trades. To my mind, a gradual approach might make sense given the risks involved – that means a digital euro with a specific set of features and the option to add further functionalities later.

### 3 Cross-border interoperability of CBDCs

One feature lending appeal to CBDCs would be their use for cross-border payments. At the moment, such transactions are still relatively inefficient and expensive. In a joint report, a group of international institutions recently emphasised that “faster, cheaper, more transparent and more inclusive cross-border payment services would deliver widespread benefits to citizens and economies worldwide.”

However, if a digital euro were accessible for non-residents, this could impact on capital flows and euro exchange rates. In the event of high foreign demand, a digital euro would substantially extend the balance sheet of the Eurosystem. Broad-based international use could also drive a “euroisation” of financial systems in other currency areas. And, by the same token, the issuance of CBDC by foreign countries could have converse effects on the euro area.

What this calls for is international and multilateral collaboration. Or, put simply, finding some common ground. In my view, it is crucial that CBDCs function together, not against each other. Enabling cross-border payments through interoperability should be an important element of all the ongoing discussions on CBDC.

At the G20 level, discussions have already started. And the report that I mentioned earlier suggests different degrees of possible cooperation, ranging from basic compatibility with common standards to the establishment of international payment infrastructures.

I think that enhancing cross-border payments should also be an important topic at the G7 level under the German presidency next year. We should take that opportunity to delve deeper into the international aspects of CBDCs. Connected with each other, CBDCs could make a real difference to the efficiency of cross-border payments.

### 4 Regulating bigtech

Game-changing qualities of money are nothing new. More than 2,600 years ago, in what is today Turkey, the kingdom of Lydia minted the first coins the world had ever seen. According to the American anthropologist Jack Weatherford, the invention of coins fostered a “variety and abundance of commercial goods that quickly led to another innovation: the retail market.”

Neighbouring Greece not only adopted these innovations, but centred its public life on the marketplace – the agora. In Weatherford’s view, “Greece (...) arose from the marketplace and commerce. Greece had created a whole new kind of civilization.”

To what extent the digitalisation of money will be a game-changer, remains to be seen. Digitalisation can improve transparency, as consumers are able to gain an overview of the market with just a few clicks. But it could also serve to concentrate power and cripple competition.

In recent years, private stablecoin initiatives have intensified concerns about the increasing role of bigtech firms in payments and their growing market power in general. The large digital platforms feature strong network effects and economies of scale that can facilitate market concentration. Once a provider becomes dominant in its market, it could hamper competition, dictate higher prices and push up profit margins at the expense of consumers.

What distinguishes the digital platforms of today from networks created in the past is the special role played by data. Large volumes of data – “big data” – allow platforms to identify patterns, create profiles and predict behaviour. For instance, an academic study found that, once you have given 300 “likes”, Facebook may know you better than your friends and family do.

Customer data can help to improve the services of platforms or to better target advertising. But they are also a treasure trove that can help platform providers to eke out a competitive edge in other markets. Moreover, by creating entire ecosystems, bigtech firms could enhance network effects and customer experience, thereby stimulating user activities, which generate yet more data.

Thus, self-reinforcing loops and “lock-in” effects may tie users to one platform and exclude competitors. Some observers have been reminded of “Hotel California”, the famous song by the American rock band “The Eagles”: it’s such a lovely place, with plenty of room; but once inside you can never leave.

If competition is hampered by the rising market power of bigtech firms, this needs to be addressed by competition law and policy in a reliable way. Concerns regarding data protection fall beyond the scope of central banks, too.

However, some important issues in digital finance are part of banking supervision. In this respect, it’s a matter for central banks and financial regulators, too. The more so as here market dominance can quickly turn into systemic relevance. Just think of a platform that provides crucial services to a large number of banks.

In the case of bigtech, the traditional demarcations that separate the roles of regulating institutions involved may become blurred. The different actors should therefore collaborate more intensively – both within jurisdictions and, with respect to global platforms, also across borders.

I would consider the establishment of broad supervisory colleges an appropriate approach. Such “cross-disciplinary, cross-geographic colleges” could enhance information exchange and cooperation.

Overall, the state has to set robust ground rules for competition and make sure that everybody plays by those rules. At the end of the day, both governments and markets should serve people – not the other way around. I am also convinced that regulatory policy should help people use their personal data as they see fit and ultimately strengthen consumer sovereignty.

Here, too, a digital euro could be instrumental. The Eurosystem has no commercial interest in user data or behaviour. A digital euro could therefore help to safeguard what has always been the essence of money: trust.

## 5 Beyond CBDC

Distributed ledger technology (DLT) is often seen as harbouring great potential, for instance when it comes to enabling programmable payments. Indeed, a programmable payment medium would be practical for applications like smart contracts, machine-to-machine payments, internet-of-things-payments or pay-per-use payments.

But this is not necessarily a case for CBDC. An alternative solution might be for the private sector to tokenise commercial bank money. The EU's proposed "MiCa" regulation establishes a framework for payment tokens that the private sector can work within to develop payment solutions needed in a digitalised economy.

Still, recipients of large payments may prefer settlement in central bank money since it harbours no risk of default. If we were able to build a bridge between private blockchain networks and the existing payment infrastructure, DLT-based trade could be settled in central bank money without requiring CBDC. This is why Bundesbank experts are investigating a "trigger solution", which could allow smart contracts to trigger conventional TARGET2 transactions.

Another possibility would be for central banks themselves to issue a token to be used by commercial banks. Such a wholesale CBDC could, for example, complement innovative ways of exchanging and settling financial assets. Given that the tokenisation of assets is becoming increasingly prominent in the world of finance, such a central bank token could provide an important benefit.

In any case, the Eurosystem will further investigate the potential of innovations beyond CBDC and continue to improve its existing payments infrastructures. At the same time, we should make sure that our activities in the field of digital currency do not discourage the private sector from developing convenient and efficient applications for consumers and businesses.

In a market economy, offering innovative payment solutions to the public and interacting with customers is primarily a task for the private sector. Central banks' task is to provide critical infrastructures as a basis for others to develop and supply their services, thereby acting as a catalyst.

## 6 Conclusion

In the 13th century, the Venetian merchant Marco Polo travelled to Asia and later gave a vivid account of the wonders he had seen. In particular, he described how something resembling sheets of paper was made from the bark of mulberry trees and was universally accepted as money throughout China.

Polo's reports were met with sheer disbelief in Europe. It was only centuries later that paper money became common in Europe, too. The innovations we are talking about today will spread much faster.

Central banks need to be at the cutting edge of technology. Otherwise, they cannot provide the backbone of payment systems and offer safe and trusted money for the digital age.

This has prompted all major central banks to start exploring issuance of CBDC. However, our success as a money creator will depend not so much on speed, but on the trust of those who are supposed to use the money.

I wish you all a fruitful debate at this joint symposium of the Bundesbank and the People's Bank of China.

## Multi-CBDC Arrangements: Transforming Words into Works\*

*By* AGUSTÍN CARSTENS\*

It is my great pleasure to join you today for Hong Kong Fintech Week. I would like to thank the Hong Kong Monetary Authority and the other organisers for inviting me to participate. Hong Kong SAR is a special place for the BIS. It is the home for our Asia-Pacific regional office, and for one of our first three Innovation Hub Centres. Its vibrant fintech ecosystem is a constant source of innovation and inspiration.

Today, I would like to focus my remarks on the merits of central bank digital currencies (CBDCs) as a mechanism for improving cross-border payments and settlements.

We all know the complaints about the current framework for cross-border payments. The correspondent banking system is slow, opaque and expensive. The development of CBDCs holds the promise to address these problems.

It is worth remembering that CBDCs are the best way to promote the public interest in the area of digital money. Money is a public good. A country's monetary system must ultimately be based on a currency issued by the central bank for the good of the public.

Around the world, central banks are working hard on CBDCs, both wholesale and retail. Three retail CBDCs have already gone live. Pilots in 25 jurisdictions are under way. And conceptual work is ongoing in many countries.<sup>2</sup> There are many choices to be made in designing a retail CBDC. These are ultimately a matter for the national authorities based on domestic considerations. But they also have international implications.

The unique features of central bank money – settlement finality, liquidity and integrity – can be extended beyond borders. CBDCs offer the promise of a cross-border framework for payments and settlements that is stable, efficient and coherent. And they offer a worthy alternative to private sector projects like stablecoins.

Whether for domestic or cross-border use, CBDCs should embody three guiding principles.<sup>3</sup> First, coexist with other types of money. Second, do no harm to financial or monetary stability. And third, promote innovation and efficiency.

CBDCs can improve the efficiency of cross-border payments, but only if countries work together.<sup>4</sup> Multi-CBDC arrangements are an important example of cooperative arrangements between central banks that can improve the cross-border payments system. How? By improving compatibility, interlinking or integrating national payment systems.<sup>5</sup>

Three different models can be considered.

The first model promotes greater compatibility between different national payment systems. Harmonised regulatory frameworks, market practices and messaging formats can make it easier for these systems to interoperate.

But integration can go even further. A second model contemplates linking two domestic payment systems together. Technical interfaces will allow the two systems to interoperate.

The third model is the most ambitious. Beyond interlinking domestic systems, central banks could establish a single multi-CBDC system. They would create a jointly operated payment system upon which they would each issue a CBDC. The CBDCs could be traded between central banks and financial institutions. In this way, they could settle cross-border payments while bypassing the correspondent banking system.

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\*Speech by Agustín Carstens, General Manager of the BIS, Hong Kong Fintech Week, 4 November 2021

\*Agustín Carstens, General Manager of the BIS

I personally never cease to wonder about the promise that these models hold. Nor does the BIS Innovation Hub. With projects mCBDC Bridge, Dunbar and Jura, the Hub combines the good "old" of economics and governance with the better "new" of technology to understand the practicalities of such arrangements.

Project mBridge in our Hong Kong Centre is a case in point. It is an example of the third model I just described: a jointly operated platform. Together with partner central banks in China, Hong Kong, Thailand and the United Arab Emirates, in the project's most recent phase we investigated whether a new DLT cross-border payment network could reduce the cost and increase the speed of cross-border payments.

Indeed, the answer is yes! The prototype achieved a substantial improvement in cross-border transfer speed from multiple days to seconds. Second, the cost of such operations for users can also be reduced by up to half.

The prototype let participating central banks control the flow of their CBDC and monitor transactions and balances of their issued CBDC with programmable levels of transaction privacy and aspects of automated compliance. It used algorithms and smart contracts to improve liquidity management along the transaction chain – as opposed to individual correspondent banks having to manually estimate supply and demand and pre-fund their own individual accounts. This is a paradigm shift in how cross-border payments are currently managed. For countries with limited access to the correspondent banking network, this could be a game changer.

But the exploration of multi-CBDC arrangements issues does not end there. The prototype is now being further developed, with a focus on scalability, operational governance, multi-currency liquidity mechanisms and privacy controls. I am sure you will hear more in the next session of the conference.

Our work on multi-CBDC arrangements is closely linked with the G20 efforts to improve cross-border payments. While CBDCs hold a lot of promise for the not too distant future, improvements in other areas of the cross-border payments programme<sup>6</sup> are key. We also need to explore in parallel interoperability between fast payment systems – which the BIS Innovation Hub is also investigating with Project Nexus.

It is certainly true that there is great scope for technological innovation. As the guardians of the monetary system from their vantage point at the core of cross-border payments ecosystem, central banks have a critical role in these multi-CBDC arrangements. International collaboration is key to make it work for the benefit of all. The BIS is uniquely placed to support this work.

1 See BIS, "CBDCs: an opportunity for the monetary system", Annual Economic Report 2021, Chapter III, June 2021.

2 See Rise of the central bank digital currencies: drivers, approaches and technologies (bis.org).

3 See Group of central banks, Central bank digital currencies: foundational principles and core features, October 2020.

4 See BIS Innovation Hub, Committee on Payments and Market Infrastructures, International Monetary Fund and World Bank, Central bank digital currencies for cross-border payments – report to the G20, July 2021.

5 See R Auer, P Haene and H Holden, "Multi-CBDC arrangements and the future of cross-border payments", BIS Papers, no 115, March 2021.

6 See Financial Stability Board, Enhancing Cross-border Payments: Stage 3 roadmap, October 2020.

## **The Fight for Your Digital Wallet\***

*By* MARCELO PRATES\*

The monetary landscape is being transformed by an increasingly aggressive fight for your digital wallet. What started slowly with bitcoin in 2008 and gained traction with Facebook's Libra in 2019 has now become an inevitable reality: private digital currencies are here to stay.

Even conservative central bankers have started looking more seriously at issuing a widely available digital version of sovereign money to fend off the private attacks. As things stand, the main types of digital currencies are offering options that can be used together – at least for now.

For retail payments at the national level, digital forms of sovereign money – notably bank deposits – don't have strong competitors, even if for no other reason than practicality. If you're in the US and all prices are denominated in dollars, it's costly, if not impossible, to use your pounds or euros when buying a coffee.

It's thus hard for a monetary challenger to enter the domestic space for retail payments, making central bank digital currencies a perfect fit for this space. CBDCs can become a valuable choice of digital money and payments for at least two types of people and businesses: those who cannot afford the private options available (from bank deposits and debit cards to cryptocurrencies and stablecoins); or those who disagree with the conditions imposed by private issuers of digital currencies (regarding the use of personal data, for example) and would still prefer the public option.

For cross-border payments, sovereign currencies lose much of their appeal, even if put on a blockchain. With almost 200 sovereign currencies available, each subject to different rules and controls, sending money abroad involves currency conversions that are usually time-consuming, slow and expensive.

The main problem is not the lack of technology to make international payments easier and faster, but the lack of political coordination. It's hard to bring hundreds of countries to the same table and ask them to reach a consensus on anything, much less on the regulation of money and international transactions.

Bitcoin, in contrast, appears a strong competitor for international payments. As bitcoin is unbacked, has no issuer and isn't linked to any jurisdiction, a bitcoin in a Japanese wallet can be transferred to an American wallet and then to a Brazilian wallet in no time and with relatively low cost.

However, bitcoin's volatility and its challenges around scaling might tip the balance in favour of stablecoins. In addition to facilitating cross-border transfers, these American cousins of the more traditional (and more regulated) e-money options can be used as a gateway to the decentralised finance world, the alternative financial system running in a parallel universe under its own rules.

The main risk of stablecoins is that they tend to be stable in name only. You have to trust the issuer of the stablecoin to invest the money backing the coin in short-term and low-risk assets so that it can guarantee the 1:1 parity at all times.

Although this risk management strategy can be simple to execute, it's hard to maintain. The temptation to find more profitable ways to invest the money backing the coin may be irresistible for some issuers, especially when under no or low regulation and supervision.

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\* Marcelo Prates is a central bank lawyer and researcher.



As central banks have learned over the years, usually the hard way, issuing money is easy; keeping it stable is the tricky part, especially when the issuer's primary concern isn't achieving stability but making a profit or financing side projects.

Against this backdrop, it's hard to believe that sovereign currencies will continue to enjoy the monetary dominance they've retained over the last century or so. With central banks, financial institutions, fintech start-ups, big tech companies and crypto enthusiasts resorting to cutting-edge ideas and technologies to offer their view on the future of money, it'll be all but impossible to avoid monetary fragmentation and competition.

The monetary future will bring multiple digital currencies running on different systems and networks across the world. And in this fast-approaching future, interoperability will be crucial. Building the bridges connecting monetary systems and payments networks will be more important than designing the 'killer app' for digital currencies or creating the master network for all payments.

So far, monetary co-existence seems to be the way forward, with digital wallets holding various currencies, public or private, that can be seamlessly saved or spent according to the owner's preferences and needs. But what could change this reality? A private digital currency issued by a big bank, corporation or tech and adopted globally for retail payments could upset this balance and determine a winner in the money wars. Here's to a good fight!

# Sustainable Development

## Six Balancing Acts for the World to Achieve Sustainable, Green Development\*

By LIU JUN\*

·Business as usual with a coat of green paint is not enough to ensure the survival of future generations

·Moving to a green economy is a process full of vision, value, cooperation and hard work that can turn creative destruction into creative construction

Go green before green goes. Otherwise, the “green swan” - a devastating climate event with far-reaching social, economic and financial impact - is likely to shock humanity in a disruptive way, much like its cousin the “black swan”. Climate change is real and the challenges are too severe to be ignored, even temporarily.

The core of climate risk mitigation lies in transitioning from a brown economy to a green one. A brown economy prioritises economic performance over environmental capacity. Its self-reinforcing nature requires a dramatic correction and reconstruction.

According to the Banque de France, a business-as-usual approach could see climate change cut global GDP by 12 percent through to 2100. Therefore, a green economy is essential and a more sustainable substitute.

A green economy, according to the UN Environment Programme, is one that brings about improved human well-being and social equity while reducing environmental risks and ecological scarcity.

A green economy is not about “greenwashing” - disguising carbon emissions under a coat of green paint - or “greenflation”, or striving for green goals without any budgetary constraints. Going green in both heart and deed is required.

Six relationships need to be balanced to achieve sustainable, green development. First, there is balancing sustainable development and geopolitical competition.

The UN’s Sustainable Development Goals call for a global partnership to combat climate change, but that is lacking at the moment. At the 2009 Copenhagen climate summit, developed economies pledged US\$100 billion a year by 2020 for developing countries, but they have failed to deliver.

Another example is that US-China cooperation on climate change often encounters setbacks. The United States views China's electric vehicle batteries as a threat and included high-capacity batteries in its review of supply chains earlier this year.

Second, there is balancing decarbonisation with development needs. Historical emissions and different stages of development must be taken into account. The US and Europe have contributed the majority of global emissions since the Industrial Revolution.

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\* Liu Jun, Member of IMI Academic Committee, President of Bank of Communications.

Ultra-low emissions technology and clean-coal systems have demonstrated some promise. In 2020, China's carbon dioxide emissions per kilowatt-hour of thermal power were down by 20.6 per cent compared to 2005 levels.

Fourth, there is balancing mature, emerging and future technologies. The International Energy Agency has developed a maturity model with 11 levels covering more than 400 green technologies. Only 6 per cent are at full maturity while 60 percent are below the demonstration level, which is referred to as the “valley of death”.

Few technologies have a proven record of large-scale, tangible decarbonisation. Technology development requires generational progress, with feedback from former generations improving the feasibility of their successors. If certain technologies boast theoretical effectiveness yet overlook scalability, they are unlikely to contribute much.

Fifth, there is balancing environmental and non-environmental factors. Green development is not solely an environmental issue but can be social, political and technological as well. Renewable energy projects sometimes trigger “not in my backyard” sentiments when social and public interests come into play.

Besides, efforts from all nations might not translate to global action as progress and commitment differ from country to country. In the pursuit of carbon neutrality, only about a dozen countries have set legally binding targets while five have proposed legislation in the works. The rest have only issued policy agendas.

In terms of technology, what is true for individuals is not always true for the whole. Hybrid electric vehicles are seen as a green option because of their lower emissions, but drastic growth in their numbers could lead to an overall rise in emissions even without including the added emissions from electricity generation.

Finally, there is balancing losses and gains over the generations. Climate change affects multiple generations as the actions of previous generations translate to present-day pain. Since 2000, flood-related disasters have risen by 134 per cent and the number and duration of droughts by 29 per cent compared with the previous two decades.

With that in mind, we should ensure the right of survival for future generations. Even as we try to reduce emissions, global temperatures are likely to increase by 1.5 degrees Celsius in the next 30 years. The vast majority of today's teenagers will still be alive in 2050-they are not some irrelevant future generations but our children and grandchildren.

The green economy transformation is a process full of vision, value, cooperation and hard work. Through this, creative destruction can be turned into creative construction.

## **Building a One-Earth Balance Sheet\***

By ANDREW SHENG AND XIAO GENG\*

*While all politics is local, it is shaped by a fast-changing global landscape. Only a one-Earth balance sheet – a bottom-up reset of how we measure global wealth – can ensure that countries work toward a better future for all.*

The 2008 global financial crisis changed the way the world looks at balance sheets. Now, an even more profound transformation is needed – one that recognizes the limits of narrow national-level accounting.

Balance sheets balance. This is the beauty of double-entry bookkeeping: an economic entity's assets must ultimately be equal to its liabilities. When they are not – when the income from assets, including the ability to secure additional finance, falls short of liability-related obligations – crises become inevitable.

For many decades, economists did not pay much attention to the stocks of assets and liabilities contained within balance sheets. Instead, they focused on flows, such as GDP, savings, and trade.

That changed in 2008. The global financial crisis reminded the world that when liabilities are hidden in off-balance-sheet vehicles or offshore, they end up becoming, in the words of the American investor Warren Buffet, “financial weapons of mass destruction.” As it turned out, macro disasters have micro and local components, which policymakers had ignored or missed.

After the global financial crisis, the OECD began nudging its member countries to produce national balance sheets that would enable authorities to monitor not only fiscal and trade surpluses or deficits, but also the size of private and public debts and leverage ratios. Today, most G20 countries produce national balance sheets, albeit of varying quality.

But, in our globalized world, economies don't operate independently of one another. That is why McKinsey Global Institute (MGI) has compiled a “global” balance sheet comprising the assets and liabilities of the world's ten largest national economies – Australia, Canada, China, France, Germany, Japan, Mexico, Sweden, the United Kingdom, and the United States – which together account for 60% of global income.

In the first two decades of this century, this shared balance sheet has ballooned, despite tepid global GDP growth. Total assets grew from \$440 trillion (about 13.2 times GDP in 2000) to more than \$1.5 quadrillion in 2020. And the economy's net worth (assets minus liabilities) grew from \$160 trillion to \$510 trillion (a 219% increase).

At the consolidated global level, net worth is equivalent to the value of real assets, because financial assets and liabilities cancel each other out. But, because the price of money is influenced by the quantity of money (which commercial and central banks create by increasing debt), that value grows as interest rates and rent yields fall.

Since 2000, low interest rates have fueled asset-price increases above inflation, with saving and investment accounting for only 28% of total growth in net worth. As a result, net worth in 2020 was nearly 50% higher, relative to income, than the long-run average for the 1970-99 period. This highlights the financial sector's crucial role in determining the value of real assets, and thus the importance of accounting for the financial sector in policymaking.

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Xiao Geng, Member of IMI Academic Committee; Professor, Shenzhen Finance Institute, the Chinese University of Hong Kong; President, Hong Kong Institution for International Finance.

MGI explains that it “borrows” the balance sheet – “a fundamental tool from the corporate world” – to assess the global economy’s health and resilience. And its “global” balance sheet is a good first step. But it is missing two crucial components: natural and human capital.

As it stands, few countries include natural or human capital in their balance sheets. It is thus impossible to say to what extent the expansion of net worth since 2000 came at the expense of natural capital or social well-being (such as through increased inequality).

With the adoption of the United Nations System of Environmental-Economic Accounting – Ecosystem Accounting this year, the stage is set for better natural-capital reporting. But the framework’s implementation has been delayed, and accounting of social inequalities is still lacking. Fortunately, environmental, social, and governance data are increasingly available – not least from corporations – and can serve as building blocks for more comprehensive balance sheets.

With national balance sheets that account for natural and human capital, policymakers would be far better equipped to make decisions that advance the well-being of their citizens and the environment. Yet, for maximum impact, national balance sheets must be consolidated into a single one-Earth balance sheet.

A one-Earth balance sheet would enable the world to improve overall resource allocation, deliver public goods, and ensure more inclusive development. For example, some worry that preserving and enhancing natural and human capital would mean accepting very low economic growth or even “degrowth.” But not all economies need rapid growth. Developing and emerging economies with younger populations do, because income growth is vital to poverty reduction. But advanced economies with aging populations can maintain high standards of living without it.

This demonstrates how a one-Earth balance sheet can help us to avoid the tragedy of the commons, when countries pursue beggar-thy-neighbor policies, at the expense of global public goods. But such a balance sheet would also go a long way toward averting the tragedy of the horizon: when countries lack incentive to pursue policies today to ensure the well-being of future generations, especially by tackling climate change. By building duration into balance sheets, the time dimension forces us all to take a longer-term view.

For this to work, the one-Earth perspective must be embraced at all levels. After all, global progress – for example, toward achieving the goals set out in the Paris climate agreement and reaffirmed at the recent UN Climate Change Conference (COP26) in Glasgow – can be more than the sum of local achievements.

All politics is local. But it is shaped by a fast-changing global landscape. Only a one-Earth balance sheet – a bottom-up reset of how we measure global wealth – can ensure that countries work toward a better future for all.

## **The Post-coal Economic Opportunity\***

*By* DANAË KYRIAKOPOULOU\*

As we approach the COP26 meeting in Glasgow, the race is on to ‘consign coal power to history’. The end of coal power generation is a climate – and economic – imperative. There can be no healthy economy without a healthy planet.

The science is clear: the Intergovernmental Panel on Climate Change predicts that investments in unabated coal will be halted by 2030 in most 1.5°C projections. The International Energy Agency’s roadmap to achieve net zero by 2050 describes the phase-out of unabated coal by 2030 in advanced economies and by 2040 globally as ‘key milestones’.

Chinese President Xi Jinping’s announcement at the United Nations General Assembly that China will stop building new coal-fired projects abroad brought us one big step closer to fulfilling this objective. Xi’s pledge adds China to a growing list of countries committed to ending overseas coal financing, including South Korea and the G7 earlier this year. Germany’s likely new government has reportedly agreed to exit coal by 2030 as part of coalition negotiations.

China’s step is by far the most important. Many coal projects remain highly dependent on international finance, and China is the largest public finance provider for overseas plants. It has over 40GW of coal in 20 countries in the pre-construction pipeline.

There are questions on how far-reaching the pledge will be in practice. First, does it refer to ‘financing’ alone – as in the case of the G7 – or will it also capture insurance and underwriting, technology transfer and the involvement of Chinese labour in coal construction projects? Second, when will it come into effect and will it apply to plants already under construction? Third, will it apply only to public finance or include commercial banks and state-owned enterprises too?

The elephant in the room remains China’s domestic activity. In 2020, China commissioned 38.4GW of new coal plants. This is more than three-quarters of the global total. To speed up action, China should update its commitment made in 2015 to peak its carbon emissions by 2030 and bring the date forward to 2025. This is both feasible and in the best interests of China and the global economy on which its development depends.

The retreat from coal is at times misinterpreted as being at odds with the objectives of economic development and poverty reduction in emerging and developing economies. This is rooted in its historical role as the primary energy source for industrialisation that has supported the structural transformation, productivity and employment growth of many economies. But the opportunities for returns from the transition to a net-zero and climate-resilient economy suggest that coal is not necessary to economic development.

Joint analysis by the IEA and the International Monetary Fund estimates that the proposed increase in clean energy, energy infrastructure and energy efficiency would result in a ‘global GDP 4% higher in 2030’. And these predictions likely underestimate the true impact as they are cautious on endogenous technical progress and do not reflect the health benefits and associated productivity increase.

Moreover, there is strong investment and employment rationale for the energy transition. As pointed out in a report by the Grantham Research Institute for Climate Change and the Environment, ‘New solar/wind and storage are likely to become cheaper than existing coal/gas

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plants in a growing number of geographies by 2030, resulting in a strong economic pull for them to account for the majority of electricity generation by 2030.’

It is imperative that these benefits and opportunities are shared widely, both within and across countries. International co-operation will be crucial and must be guided by the dual objectives of net zero and development. The balance has so far been uneven. In 2019, only a quarter of climate finance focused on adaptation. Despite the need for international solidarity, official development assistance barely rose in 2020. It is equivalent to 1% of the economic stimulus measures mobilised by countries to support the recovery from the Covid-19 crisis.

Voices of concern from developing economies are growing louder. The Alliance of Small Island States Leaders’ Declaration, issued in September, asks for ‘scaled up, adequate, predictable and long-term support from the international community to adapt, and address the loss and damage caused by the adverse effects of climate change.’

US President Joe Biden’s commitment to doubling US climate finance to \$11.4bn by 2025 is a key step in this direction. In the final days leading up to COP26, developed economy leaders must follow this example. They should make a collective commitment to double climate finance and deliver on the Paris agreement target of \$100bn per year to support a green recovery.

These investments will drive sustainable growth and improve living standards around the world. They demonstrate that, when it comes to the planet – and the economy – we all do better when we all do better.

## **COP26 Must Prompt Action on Net Zero Commitments\***

*By* TAMARA SINGH\*

The capital and finance innovation panel at COP26's innovation hub saw many challenges being put to financiers across the globe, testament to the frustrations of citizens at the perceived lack of effort. At 'one minute to midnight', lip-service can no longer be tolerated and the time has come for net zero commitments to be underpinned by action.

The panel considered what would be needed to deploy resources to avoid the 'uncontainable' public anger that may loom before us. The conclusion? Go big or go home. The time has come for our financial system to expand from one that has served the few to one that serves everyone.

First, we must redefine the fiduciary concept into one that does not provide excuses and goes beyond restricting negative actions to a positive duty to act. The proposals in Aviva Investors' white paper 'Harnessing the international financial architecture to deliver a smooth and just transition' warrant consideration.

A convention on fiduciary duty and climate change should be developed to enable financiers to act, rather than to passively wait for a mandate to be defined for them. Public organisations, such as the Organisation for Economic Co-operation and Development and International Monetary Fund, must take active steps to promote change. Collaboration between public and private institutions must give voice to and implement recommendations from the Coalition of Finance Ministers for Climate Action and Network for Greening the Financial System.

Second, we must redefine portfolio themes from siloed verticals into holistic collections that recognise the interconnectedness of human existence. Oversimplifying the complex and investing in related segments in isolation has proven to result in suboptimal resource allocation. We have to invest in long-term sustainable value and apply existing concepts, such as diversification, to meet today's needs. Why build transportation hubs without also investing in the associated production facilities, education and essential services needed to elevate a community? The focus on investing on the basis of most-return creates an imbalance in risk distribution, as pointed out by Ed Cox of the West Midlands Combined Authority, with public organisations bearing the risk of innovation and community outcomes, while private organisations reap the rewards from lower risk investments.

This brings us to policy. A common complaint is that well-advised projects gain more traction, while the connected ecosystem might be neglected. This is where policy-makers may be missing an opportunity. With much physical rebuilding taking place, there are opportunities to require projects, such as the creation of charter cities and the development of cities such as Ibu Kota Negara, be treated as test beds for the development of wholly connected, green cities. Consistent with endeavours like the European Union's mission 100 climate neutral and smart cities by 2030, this would give policy-makers a collaborative space in which they could create and deploy practices bearing in mind the future of their communities.

This would also give investors the chance to correct mistakes in today's markets. We could design for equality of access and opportunity, and for the preservation of culture and heritage, while creating incentives for shared prosperity. There are already ways we can see this happening: France tied state aid for carbon intensive industries to emission-reduction requirements and Denmark denied aid to companies who use offshore tax havens. These steps take us towards problem-solving and away from enabling. Yet, as Cox highlighted, it remains

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\* Tamara Singh is Adviser and former Head of Asia Pacific at OMFIF.



difficult for local governments to engage with investors on these opportunities. The International Finance Corporation's advisory services and the Global Steering Group for Impact Investment's national advisory boards could help build bridge these gaps.

Finally, we should redefine return expectations and time horizons for this return. Investors need accepted frameworks under which they can appropriately rate what we have not previously valued. Our focus has been on financial reward and we are only beginning to recognise environmental impacts. Conversations about just transitions and social factors make it clear that this is changing. The questions are how much and how soon.

Together, these changes create a context in which institutions are supported in transitioning their portfolios and helping their stakeholders to change. Institutions need to be properly incentivised, with rewards for deals that support transition and penalties for those that do not. Policy-makers also need to be incentivised. Governments still plan to extract more than twice as much coal, oil and gas in 2030 than can be tolerated to meet the safest temperature goals in the Paris accord. Members of organisations like the OECD and G20 should consider positions on sustainability and how they enable transition.

The panel ended by discussing how these incentives could be designed. A mechanism to bring future value into the present is needed to help the deployment of finance. Many possibilities exist, such as a citizens' dividend or tokens representing securitised future value that can be appended to existing financial products and redeemed as milestones are realised. New relationships should be forged between economic actors to tackle today's challenges. However, we don't think or act extensively enough. We are improving but, with the planet burning, it's time for moon shots. The trouble is that financial institutions are not valued for thinking big; they are valued for their results and stability. This has cemented mindsets that no longer serve us well amid a changing climate.

At COP26, David Attenborough, the British broadcaster and naturalist, told world leaders that 'the stability that we all depend on is breaking'. We must respond and experiment with new mechanisms and operating principles. We need to act to address the problems of today, as well as create systems that can better accommodate complexity and adapt. If there was ever a time where it was apt to say that time and tide wait for no man, it is now.

## Book Review

### Foreword to Covid-19 and the Structural Crises of Our Times

by Andrew Sheng\*

*By* ANDREW SHENG\*

The pendulum swings in multiple planes. A political pendulum swings from Left to Right and back again. Economic pendulums swing from order to disorder (crises) and back again. Lim Mah-Hui and Michael Heng's book dissects the COVID-19 pandemic as multiple crises at the health, economy and finance, environment, political and global levels. Welcome to the age of mega disruptions.

2020 was an important year in the sixty-year Chinese lunar cycle, known as Gengzi year, usually associated with disaster and crises. 1840 was the outbreak of the Opium War; 1900 Boxer Rebellion, 1960 great famine following the Great Leap Forward, and the 2020 pandemic on top of tense US-China relations. But the pandemic was global, with serious setbacks deepening all the cracks revealed in earlier crises: 1997 Asian financial crisis, 2007 global financial crisis and the failed reforms since. As the British academicians replied when the Queen asked why no one saw the 2007, "no one had the imagination...".

Perhaps it was because academic and policy makers were so engrossed in their individual silos that they could never see the whole cracking and changing before their own eyes. They were blinkered and lacked the imagination to connect the dots.

This Lim and Heng (LH) book is a welcome and timely addition to the literature on probably the most devastating event of the 21st century. The pandemic is re-defining and shaping the trajectory of economics, politics, society and planetary ecology for the rest of the century. There is no normal.

The COVID-19 coronavirus is emblematic of our current ills, because if we do not control a microscopic virus, it will control the macroscopic world. What is unfolding is a desperate struggle of power, not just between the medical profession and the virus, but also between nations and markets, since whoever controls the virus controls the economy, and whoever controls the economy and the pandemic better, may end up as the winner in the global race. For every vaccine that is invented, the virus mutates further.

But of course, it is not so simple. When the pandemic broke out in China, the West thought it was China that would stumble. But it turned out that the two states at the top of the Global Pandemic Readiness Index, the United States and Great Britain, ended the year 2020 with 400,000 and 100,000 deaths instead, whereas China and East Asia, notably Japan, South Korea and Taiwan had 4,636, 5,912, 1,448 and 9 deaths respectively. ASEAN countries had uneven results, with a million infected in Indonesia (30,770 deaths) whereas Singapore (29), Thailand

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\*Foreword of the book *Covid-19 And The Structural Crises Of Our Time* which is written by Lim Mah-Hui and Michael Heng Siam-Heng, published by ISEAS, Singapore.

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(79), Vietnam (35) and Malaysia (809) did relatively better. Of course, almost all economies suffered negative growth in 2020, with the notable exceptions of China, Taiwan and Vietnam.

Below the surface of geopolitical rivalry, medical chaos, social protests and distress and growing climate disasters lie deeper issues that this book explores. Chapter 1 on the Great Transformation dissects the deep schism between two Austria-Hungarian thinkers who shaped market ideology for the rest of the 20th century. Both rejected Soviet totalitarianism and were refugees in United Kingdom and the US. Hayek the economic philosopher pushed for free market forces, whereas his contemporary political economist Karl Polanyi analysed how market forces and their contradictions created the Great Transformation since the Industrial Revolution. He argued that the market is part of an economy, which is part of society, which is part of a greater planet. To use market forces (a reductionist part) to explain and manage politics, society and ecology (the whole) is not only intellectually fallacious, but destructive in consequence, as later events showed.

Although both had best-selling books (*The Road to Serfdom* by Hayek and *The Great Transformation* by Polanyi), it was Hayek who won the Nobel Laureate in 1974 and whose influence in neoliberal ideology became dominant post 1980s. But deep down it was an ideological struggle between state versus market. The economics profession never accepted Polanyi fully, and their beacon since the New Deal in 1934 was John Maynard Keynes, who argued for state intervention in terms of fiscal policy to get out of the liquidity trap. Neoclassical economists abhorred state intervention, thinking that the market will revert back to equilibrium, but as Keynes showed, the lack of aggregate demand required government intervention to replace consumer demand and private investment, when investors preferred to remain liquid because of uncertainty (liquidity preference).

When Keynesian economics faltered because of excessive spending leading to inflation, in the early 1980s, the Chicago School led by Milton Friedman, Hayek and others influenced the thinking of U.S. President Ronald Reagan and U.K. Prime Minister Margaret Thatcher to shift government policy towards free markets. The tide had turned away from socialist intervention toward capitalism with a vengeance. It was no coincidence that after the turmoil of the Chinese Cultural Revolution, China embarked on capitalism with Chinese socialist characteristics in 1978.

This debate between state versus market within China has very ancient origins. Amongst the Taoist tradition, there has always been a complex interactive debate between action (you wei or to intervene) and non-action (wu wei or letting nature or markets take their own course). Just as Western democrats use the Magna Carta of 1215 AD as the watershed between democracy and autocracy, Chinese historians mark the Salt and Iron Debate of 81 BC as the decision point between state intervention (in form of state enterprises and monopoly taxes) and private market forces. By taking that path, China ended up with more state-led governance systems. Europe used private pirates and state-chartered companies (East Indies and Dutch East Indies) to conquer colonies and markets. Ancient China had to raise money from state-owned enterprises) to fight both external invasions as well as dealing with internal imbalances. Today, democratic governments rely on monetary creation by central banks to fill budget deficits.

Neoliberals preach small governments, but in reality, government has grown bigger and bigger in every economy, including the United States. Hayek in his Nobel Laureate lecture argued against the Pretense of Knowledge, warning economists not to be misled by certainty, when there are unknown unknowns. He should have known that the neoliberal philosophy he preached has a “Pretense of Free Markets”, where in reality governments are growing larger in terms of taxation, debt and regulation every day. When central banks dominate in financial markets by holding the bulk of sovereign debt and also market paper, and concentrated tech platforms and a handful of banks and asset managers are larger than the rest of the market put together, where is the free market that neoliberals preach?

LH correctly identified that since then, even capitalism had morphed from industrial capitalism to managerial capitalism, and today its financialised capitalism form that is devouring not just society, but even the planet. In Chapter 2, they delve into the history and evolution of pandemics to appreciate how different systems cope or do not cope with the coronavirus that may be with us for quite some time. This part is well researched and helpful to readers to appreciate how what appears to be a surprise was indeed predictable, and yet how unprepared all bureaucracies and systems were to cope with these Black Swan events.

Black Swan events are those that are small in probabilities but have large impact. The pandemic was more like a Grey Rhino, one that many epidemiologists had predicted would happen and was charging right at us, but no one could anticipate when it would charge. Perhaps one reason why countries were unprepared was because the pandemic was a Black Elephant, meaning that not only was its impact devastating, but it was a huge problem like an elephant in the room that no one wanted to talk about nor address. Each silo blamed the other for being unprepared when the crisis came. The whole did not work.

In short, this is a complex systemic crisis, with deeply entangled and entrenched causes and effect. Its solution therefore will not be simple.

In Chapter 3, LH moved from a health analysis into an assessment and evaluation of the economic rescue, stimulus and their consequences. Few could doubt that the COVID exposed all the economic frailties and inadequacies of the current national and global systems. The cracks that appeared in the Asian and global financial crises were papered over and were now wide open and raw, erupting in anger of the masses and populist extremes in political form. The “objective, idealistic, positive” neoliberal ideology that argued for free markets and minimal government suddenly was exposed as an elitist propaganda for their own interests, in which justice, democracy, rule of law and freedom were preached, but instead very flawed and rigged outcomes were delivered.

Most of all, the neoliberal ideology revealed that when interest rates fall to zero or negative, quantitative mechanisms to allocate efficient resources start to fail. When markets are highly concentrated, politics become manipulated as Nobel Laureate Joseph Stiglitz puts it: “Of the 1%, by the 1% for the 1%” all in the name of the people.

Polanyi was proved right that markets do not solve everything. Quantitative economics and money ignored the fact that in human life and nature, morality plays as important a role in any decision as individualist greed. The lion does not consume more than what it needs but man can destroy the planet through his capitalist greed. The pandemic showed that the rich can go online, whereas the poor have to go out and work in all the jobs that expose them and their families to sickness, destroying their jobs and security. Vaccines that are priced at market cannot be afforded by the majority. The post-COVID economy is dominated by Big Government and Big Tech.

In Chapter 4, the authors explore whether we have sown the seeds for the next financial crisis. With global financial markets at all-time high, with spectacular bubbles in cybercurrency Bitcoin, penny stocks like GameStop, there is an important debate whether the liquidity generated by central banks to combat the pandemic and prevent financial crisis can be sustainable. When interest rates become zero, it loses its value as an allocator of financial resources, as current models of valuation use discounted cash flow (DCF) which depends on an interest rate. But at near zero or negative discount rate, the valuation goes towards infinity and cannot be reliable.

I thought that following the recurrence of financial crises every decade, 1997 and 2007, the next financial crisis would erupt in 2017. What erupted instead was not financial but political, in the form of Brexit and Trump’s election. Thus, any evaluation of the current state of affairs would show that the origins of today’s crisis have multiple roots. LSE Professor Michael Mann attributed human affairs today to four sources of social power: ideological, economic, military

and political. But in the larger order of man and nature, I would add another two – ecological and technological.

Increasingly, scientists have traced the origins of the pandemic to climate change and demographics, as human live in closer proximity to animals, where the viruses jump zootonically. The neoliberal free market ideology is flawed because it derives from an Anglo-American belief in freedom at individual level to enjoy limitless resources. That is possible when you can conquer resources through colonialism and later ideologically through financialised capitalism.

But there is a planetary limit when globalisation covers the whole planet, and consumption by one part in excess of its share can only be achieved by exploiting resources through debt. Excess consumption of planetary resources is only possible through further debt creation, which is why climate change and increasing carbon emission is tied to financialised capitalism and monetary printing.

In short, our One Planet cannot sustain every Indian, Chinese, African, Asian or Latin American enjoying the same standard of living and carbon emission per capita of Americans or Europeans. Neoliberalism promises much but cannot deliver in practice. We need a wholly different model or worldview.

The creation of that worldview cannot be top-down, because no one is genius enough to appreciate the exploding complexity today. It will be mostly bottom-up as the masses and individuals begin to realise that what is needed is not only changes at the collective level, but also individual responsibility to the collective and the planet. Narcissistic individual freedom not to wear a mask has been responsible for hundreds of thousands of deaths. Individuals have freedom, but also responsibilities. Societies have freedoms but also responsibilities. Getting the balance right has never been easy.

The political part of the LH analysis comes in Chapter 5, explaining the rise of populism and the democratic retreat. This debate is increasingly entrenched in the US-China rivalry, where both sides begin to demonise each other. Thankfully, the Biden Administration realises that cooperation is needed because the larger issues of climate change, pandemic and global economic recovery cannot be achieved by any nation alone. Welcome to the “Age of Coopetition”, both cooperation and competition at the same time.

In Chapter 6, the book explores possible futures. This is an important contribution because what comes next is an interaction between different forces. The authors have been influenced by Polanyi in seeing the market as economic tool, social institution and eventually a market society. They see a Triple Movement rather than the Polanyi Double Movement, but correctly identify the obstacles as political as well as global regulatory coordination and governance. The triple movement will be shaped by market forces, state-led social protection, and emancipation of civil society, which will play an important role to check the flaws of either state or market. The authors hope for stronger global governance, but is it possible when societies are so polarised and divided?

Are we letting another serious crisis go to waste? The future can be described as three possible paths – good, bad and ugly. The good is the ideal, what most wish for, but of course your ideal may be my nightmare. The bad is more of the same, when governments and individuals cling onto their “golden past” and simply muddle through. The ugly is when everyone starts fighting each other, and we end up with nuclear Armageddon or a burning planet.

Harvard economist Dani Rodrik presented his famous Trilemma as a two out of three choice between national sovereignty, democracy and globalisation. LH sees the trilemma as between a nationalist-populist neoliberal market; social-democratic market; and market authoritarianism. In dealing with climate change, geographer Geoffrey Mann and Joel Wainwright argue that the solution may be four alternatives: Capitalist Climate Leviathan or Climate Behemoth, or non-capitalist Climate Mao or Climate X.

Mann and Wainwright see the Hobbes Leviathan as the capitalist sovereign or autocrat who addresses the climate issue; Climate Mao as the anti-capitalist authoritarian China that addresses climate change; Climate Behemoth as the anti-sovereign, capitalist and anti-climate mass that denies climate change. Climate X is an anti-capitalist, anti-climate mass movement that sees protests and boycott as the way forward.

Mann and Wainwright are ecologists who are increasingly frustrated by the politics of climate change. Jargonistic categorisation aside, the four alternatives are not attractive to everyone, especially those who love democracy (hate autocracy) but cannot get agreement on climate action because half the population is in the denial or opposition mode. What Trumpism has shown is that the social divide is not just between climate deniers and activists, but also between those who do not believe in science and rationality. This suggests that democracy may have huge difficulty in addressing climate change, which is why ecologists are now flirting with Climate Leviathan or Climate Mao.

How will the future evolve? The answer is that we must have the humility to admit that we do not know. We are in the phase of moving from unipolar to multipolarity, because from biological sciences, we know that monocultures are fragile and unsustainable. All life comes from diversity, from genes to memes. Since the United States is no longer the unquestioned hegemon with dominant economic, military, ideological and political power, let alone leading command of technological and ecological/resource capacity, there is a thousand flowers blooming. We are all hybrids, evolving and changing into more complexity, even as we try to reduce such chaos and complexity into simplicity that we can understand.

This book is an important contribution to the debate over our futures. If our teachers and the best and brightest from the West are wrong, or at least very unsure of themselves, what should the Rest do? This book forms part of that conversation and search for the paradigm that will shape our own destinies, hopefully without the baggage of the past. It is extremely painful to recognise our own failings. We have been wearing rosy glasses of the 20th century to look at the dark and yet light landscape of the 21st century. Neoliberalism pointed towards the light, but did not reveal its dark side.

That is why all “-isms” are thought-constructs that do not conform to reality. Democracy, capitalism, autocracy, socialism etc. are labels that have different meanings to different people. These labels are opium for the masses, so that the powers that be who manipulate the media and ideology benefit in their consolidation and concentration of power. What we have learnt is that quantitative science cannot explain the world, because there is always an emotional, qualitative side to man and nature that interacts to form a new reality. Science has created today augmented or artificial realities or intelligence. These are being used not necessarily rationally but also in anger against each other. Reality is changing even as our perceptions change.

Humans and Nature are One. The world cannot be broken down artificially into parts which do not add up, because the partialists (those who divide the world into parts) can never see the whole. We live in an organic giant, open complex system that is always changing, and we simply do not know for the better or for worse.

This is why the authors should be congratulated for opening up new vistas to examine the coming complexity, perhaps even chaos. Read, enjoy and reflect.

# Working Paper

## Monetary Policy Transmission with Two Exchange Rates of a Single Currency: the Chinese Experience<sup>\*</sup>

By HE QING, IIKKA KORHONEN AND QIAN ZONGXIN<sup>\*</sup>

**Abstract:** *In emerging market economies, transmission of monetary policy through the foreign exchange market is complicated by the coexistence of financial restrictions and arbitrages. Using China as an example, we show that the coexistence of exchange rate interventions, capital controls and an onshore-offshore exchange rate differential makes the long run equilibrium in the currency market nonlinear. Disturbances to this nonlinear long run equilibrium could offset the impact of monetary policy actions on domestic price stability. Omitting such nonlinearity leads to biased inference on the effectiveness of monetary policy.*

JEL Classification: E52; F31; F41

**Keywords:** CNY; CNH; Monetary policy; Capital controls

### 1. Introduction

Over the past decades, participation of emerging market countries in global financial market has generated a great deal of attention in the field of international macroeconomics. Different from developed countries, the emerging market economies often suffer from financial repression and tend to be more vulnerable to international economic shocks, which can complicate the exchange rate channel of monetary policy transmission. As surveyed by Frankel (2010), literature usually distinguishes emerging market economies from advanced economies by the existence of an imperfect financial sector, capital controls and opportunities for international arbitrage. Therefore, ignoring these features can prove costly. However, data for international financial market arbitrage is usually unobserved for most emerging market countries, which makes these important issues yet to be fully understood.

Emergence of China's renminbi (RMB) offshore market provides a unique opportunity to explore the exchange rate channel of monetary policy transmission. China's rapid economic growth not only increases its economic impact on the rest of the world but also increases the importance of its currency in international financial market. According to the recent BIS triennial central bank survey (BIS, 2016), the daily average turnover of RMB transactions increased from almost nothing to \$202 billion between 2007 and April 2016. RMB became the 8<sup>th</sup> most traded currency, and account for about 4% of global foreign exchange transactions. The increasing transaction volume of RMB has also created a huge offshore RMB market. However,

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due to the existence of capital controls and currency market interventions in the onshore RMB market, there are usually gaps between the offshore (CNH) and onshore RMB exchange rates (CNY). These gaps lead to large arbitrage transactions on the differentials of the CNY-CN H exchange rate. In this paper, we study China's monetary policy transmission in the context of two exchange rates of a single currency, RMB.<sup>1</sup>

It is well-established that monetary policy actions transmit to inflation rate through the currency market. An expansionary monetary policy depreciates the home currency, leading to an increase in domestic price of imported goods and an expansion in exports. Over time this will expand output, and, consequently, price level. For a typical emerging market economy, this transmission channel is complicated in two aspects. First, many emerging market economies, like China, do not allow the exchange rate to adjust fully. When there is an explicit or implicit exchange rate target, the impact of monetary policy on the currency market is at least partially sterilized. Sterilization will at least partially offset the expansionary effect of the monetary policy actions. Second, for macro-prudential purpose, many emerging economies, like China, have capital controls. When monetary policy changes relative returns between the home currency and foreign currencies, limitations on capital flows will restrict changes in exchange rate and the subsequent changes in output and price level (In addition, barriers to capital mobility create asset price differentials between the home country and international financial market<sup>2</sup>. As emerging market countries are more integrated in global financial market, there are increasing arbitrage transactions that try to avoid a country's capital controls (Montecino, 2018). It is particularly relevant for China due to the coexistence of offshore and onshore RMB markets. Any shock that occurs either in the offshore or onshore currency market, can create arbitrage opportunities between these two markets. These arbitraging activities can create unexpected fluctuations in the RMB exchange rates, which in turn, may push output and the aggregate price level to a direction which contracts the targets of the central bank.

Based on the discussions above, we first identify a long run equilibrium relationship between the offshore and onshore RMB exchange rates, economic fundamentals and capital control measures in China. On the basis of the identified long run equilibrium in the currency market, we further explore China's monetary policy transmission in the context of this long run equilibrium relationship. We also study the impact of a disequilibrium shock in the currency market on inflation expectations. Then, we discuss whether it is feasible for the central bank to use its monetary policy actions to offset such an impact.

Our study contributes to two separate strands of literature. First, in the literature on purchasing power parity, or PPP (Taylor and Taylor, 2004; Hong and Phillips, 2010), the long-run relationship between exchange rate and the PPP fundamental are usually assumed to be linear. Even if nonlinearity is considered, it is usually modeled as nonlinear adjustments to a linear long-run relationship. However, as we have discussed above, a typical feature of emerging market economies is the existence of capital controls. For a country with capital controls, the impact of changes in the fundamentals on the exchange rate might vary with the degree of capital account openness. In this scenario, the long-run relationship itself will be nonlinear. Moreover, as argued by Hong and Phillips (2010), a linear approximation to the nonlinear cointegration relationship is not meaningful because there are no constant means of the non-stationary time series around which we can calculate the linear approximation. Using the newly developed nonlinear cointegration test of Vogelsang and Wagner (2016), we formally identify a nonlinear long-run equilibrium relationship between the CNY-CN H exchange rate differential, capital controls and economic fundamentals implied by the purchasing power parity

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<sup>1</sup> There are a few papers on the dynamic relationship between the offshore and onshore RMB exchange rates (e.g. Cheung and Rime, 2014; Owyong *et al.*, 2015). However, no study has explored the implications of that dynamic relationship on the transmission of monetary policy.

<sup>2</sup> One example is that the multiple listings of same stock in home countries and international financial market.



(PPP). We demonstrate that omitting nonlinearity leads to misleading conclusions about China's monetary policy transmission. Since many emerging market economies have similar capital control measures to China, our results demonstrate the importance of capturing the nonlinearity in the long run equilibrium of their currency markets. This has obvious implications for the analysis of their monetary policy as well.

Second, we extend the empirical literature on monetary policy transmission in open economies and especially in emerging markets. A popular empirical method used in monetary policy analyses is the linear vector autoregression (VAR) model. In the open economy context, Eichenbaum and Evans (1995), Kim and Roubini (2000), Faust and Rogers (2003), Scholl and Uhlig (2008), Bjornland (2009), Kim and Lim (2016) use VAR to study the responses of exchange rate to monetary policy shocks. Those studies focus on short run dynamics and do not explicitly identify the long run relationship between the exchange rate and PPP fundamentals. However, as we have discussed above, disturbances to the long run equilibrium in the currency market might lead to exchange rate fluctuations which affect the central bank's target variable such as inflation. Because those papers do not identify the long run equilibrium in the currency market, they are silent on the impact of the disequilibrium shocks in the currency market. Chong *et al.* (2012) extend the local projection method of Jorda (2005) to a cointegrated system and show that impulse response analysis of shocks to the long run equilibrium can be calculated even without imposing any structural restrictions on the VAR system. We extend and apply the method of Chong *et al.* (2012) to calculate the impulse responses of inflation expectations to a disturbance to the long run relationship in the currency market. Chong *et al.* (2012) focus on a linear cointegrated system. As a result, their approach is more suitable for advanced economies where the relationship between the exchange rate and PPP fundamental are more likely to be linear. However, due to capital controls, the long run equilibrium in the currency market might be nonlinear. For this reason, we extend the approach to allow for a nonlinear long run equilibrium relationship in the currency market. We believe that this extension is useful for monetary policy analyses of other emerging market economies which have similar capital controls to China.

Chong *et al.* (2012) use a reduced-form vector error correction model (VECM) and show that this model is adequate for identification of impulse responses to disturbances to the long run equilibrium in the currency market. However, it is not suitable for the calculation of impulse responses to monetary policy shocks. Previous literature suggests that identification of structural policy shocks is important for policy analysis. A reduced-form VECM or VAR model usually generates misleading policy implications (Kuttner, 2001; Cochrane and Piazzesi, 2002; Bernanke and Kuttner, 2005). We use a combination of survey data and financial markets data to identify exogenous policy shocks. As suggested by the literature (Kuttner, 2001; Cochrane and Piazzesi, 2002; Bernanke and Kuttner, 2005), using survey data and financial markets data allows us to identify structural policy shocks. Thus, our study has clear policy implications.

We find a nonlinear long-run relationship between the CNY-CNH exchange rate difference and the PPP fundamental. The impact of the economic fundamentals on the exchange rate changes with the degree of capital account openness. More specifically, an increase in expected inflation in China relative to the US should depreciate the RMB against the US dollar (USD). However, capital account in mainland China is not fully open. As a result, depreciation of the onshore RMB is less than the depreciation of the offshore RMB. In other words, the onshore CNY exchange rate increases less than the offshore CNH exchange rate. Therefore, there is a negative relationship between the CNY-CNH difference and the PPP fundamental. This negative correlation is weaker when the capital account is more open because the reaction of CNY to the economic fundamental is less different from the reaction of CNH.

Based on the identified long-run relationship between the RMB exchange rates, capital controls and inflation expectations, we are able to study the implications of the deviations from

this long-run equilibrium relationship on inflation expectations. Using a modified version of the local projection methods of Chong *et al.* (2012), we calculate impulse responses of inflation expectations to a disturbance to the long-run relationship. We find that when the CNY exchange rate is too high compared to its long-run equilibrium level, inflation expectations rise. Therefore, disequilibrium in the currency market can affect the price stability target of the central bank. Despite this, we still find that expansionary monetary policy effectively raises inflation expectations. Moreover, we do not find a significant impact of monetary policy on the equilibrium relationship in the currency market. Therefore, disequilibrium on the currency market does not completely prevent the Chinese monetary policy to affect inflation expectations. However, impact of a typical surprise in the monetary policy on inflation expectations is economically small. When disequilibrium in the currency market causes undesired changes in inflation expectations, it is difficult to offset the impact of such a shock by countervailing monetary policy actions. Capital control measures or currency market interventions might be needed to restore the currency market equilibrium so that inflation expectations can be stabilized.

The rest of this article is set out as follows. Section 2 presents the institutional setting and policy measures of the PBC. Section 3 introduces our methodology and describes the data. Section 4 presents the empirical results. Section 5 concludes.

## 2. The offshore RMB market and policy measures in China

### 2.1 The offshore RMB financial market

The pace of RMB internationalization accelerated after the financial crisis of 2008. To facilitate the external use of RMB, China announced a pilot scheme to ease the restrictions on cross-border trade settlement using RMB in mid-2009. This has created a RMB pool outside mainland China, and helped the development of the RMB offshore financial market.

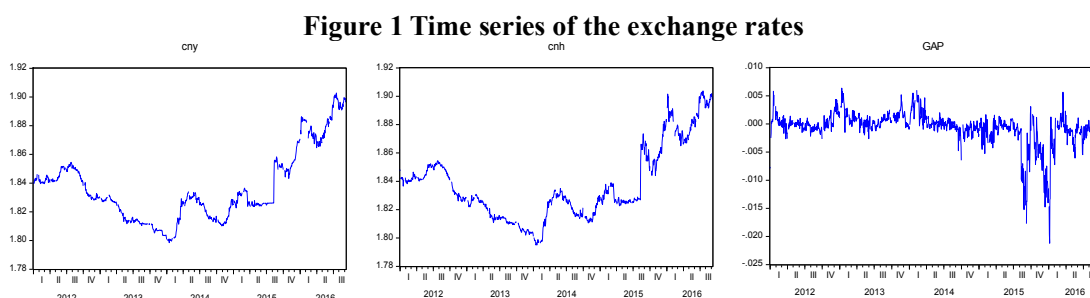
Offshore delivery scheme for offshore RMB-linked products was launched in July 2010. The People's Bank of China (PBC) and Hong Kong Monetary Authority signed a supplementary memorandum of transactions of RMB products in Hong Kong in July 19, 2010. Since then, Hong Kong has become the prime offshore RMB center. The offshore market experienced a rapid expansion. Despite its initial restriction to Hong Kong market, this scheme was quickly broadened to other offshore financial centers over the next five years<sup>3</sup>. The daily average turnover of RMB transactions increases from almost nothing to 202 billion between 2007 and April 2016. RMB is already the 8<sup>th</sup> most actively traded currency in the 2016 BIS survey (BIS, 2016).

Despite the rapid growth of offshore RMB transactions, the flow of RMB between mainland China and the offshore market is still subject to a number of restrictions. China's degree of capital account openness was relatively low according to the Chinn-Ito index (Chinn and Ito, 2018). China has created a number of schemes to allow for a manageable opening up of capital account in both capital inflows and outflows, such as Qualified Foreign Institutional Investor (QFII) and Renminbi Qualified Foreign Institutional Investor (RQFII). The fund movements under these scheme need to be permitted by the PBC (Funke *et al.*, 2015). In addition, despite the continuous market oriented reform, the onshore Chinese foreign exchange market (CNY market) is still highly regulated. PBC only granted a limited market participants access to the wholesale market. By the end of the sample period, the movements of exchange rate are subject to a trading band of  $\pm 2\%$  around the central parity rate, announced by the PBC. By contrast, RMB is able to flow freely across different offshore financial centers outside mainland China. More importantly, unlike RMB transactions in the onshore Chinese foreign exchange market

<sup>3</sup> In these years, the offshore use of RMB has spread to London, Singapore, Chinese Taipei, Frankfurt and other financial centers.

(CNY market), which are in many ways influenced by the PBC, the offshore market (CNH) is a free market. The offshore RMB is freely floating and accessible for all offshore participants. These facts mean that there are two distinct markets for a single Chinese currency, the RMB.

Figure 1 presents the time series graphs of the logarithm of CNY, the logarithm of CNH, and the CNY-CN H difference since December 30 of 2011 when the Chinese government started to give quotas for investment in the mainland capital market using offshore RMB. The movements in CNH and CNY appear to have nonlinear trend components. In the first half of the sample, there is a downward trend in both CNY and CNH rates. With strong expectations of RMB appreciation, the CNY exchange rate was only allowed to vary in a narrow band on a daily basis. As a result, RMB appreciated gradually. Interestingly, even if there is no band imposed on the CNH market, we also observe a downward trend, which implies that arbitraging behaviors across markets closely link those two exchange rates. In the second half of the sample, both CNY and CNH experienced an upward trend. Although CNY and CNH rates have broadly similar trends in their movements, there are persistent deviations between CNY and CNH rates. Interestingly, we observe that the gap between CNY and CNH is positive on average when there is a downward trend, while it is negative on average when there is an upward trend. The CNY-CN H difference is on average 0.00072 (in logarithm) in the first half of the sample and -0.00206 in the second half of the sample. This results from the differences in capital controls and foreign exchange market interventions between the onshore and offshore market. In the onshore market, capital flows are subject to quotas and the CNY is regulated to fluctuate in a narrow band. In the offshore market, capital movement is free and the CNH exchange rate can flexibly change. With those differences, CNH appreciates more than the CNY when there are appreciation expectations. In other words, the CNH exchange rate decreases more than the CNY, so the CNY-CN H difference tends to be positive. The CNH exchange rate also increases more than the CNY when there are depreciation expectations, leading to a negative CNY-CN H difference.



Notes: CNY and CNH are log values. Gap is the difference between CNY and CNH.

## 2.2 Policy measures in China

The CNY exchange rate is determined by transactions in the China Foreign Exchange Trade System, which is effectively managed by the PBC<sup>4</sup>. At the start of each trading day, a reference CNY exchange rate (central parity rate) is announced and the daily fluctuations of the CNY exchange rate are restricted to a narrow band around this reference rate. To integrate the two markets better, the daily trading band of CNY was widened to  $\pm 1\%$  relative to the reference rate in April 2012, and further widened to  $\pm 2\%$  in March 2014. The CNY reference exchange rate is a weighted average of major dealers' quotes. However, in practice, there was limited flexibility for the dealers to make the quote. On August 11 of 2015, the PBC announced a reform which

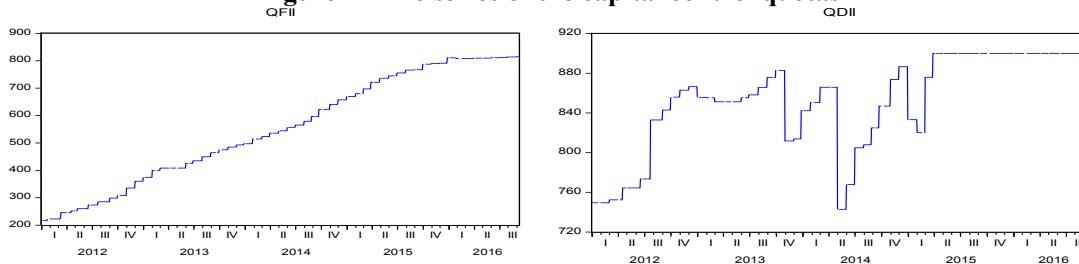
<sup>4</sup> According to the China Foreign Exchange Trade System (CFETS), the market participants are mainly composed of domestic banks, financial companies and subsidiaries of foreign banks.

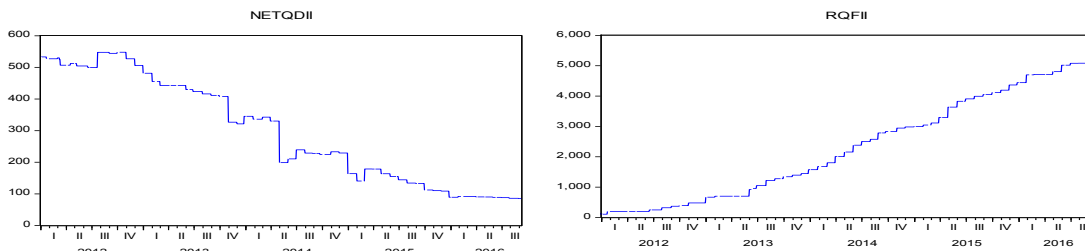
gives more flexibility for the formation of the reference rate. But the daily change of CNY exchange rate still has to lie within the  $\pm 2\%$  band.

The Chinese government launched a number of schemes to gradually open up the capital account in a controlled manner, which influences the availability and demand of RMB in the offshore market. Qualified Foreign institutional investor (QFII) scheme were launched in December 2002. Under this scheme, QFIIs are allowed to convert foreign currency to RMB and invest in a number of mainland RMB-denominated financial instruments. Qualified Domestic Institutional Investor (QDII), launched in 2006, allowed more domestic financial institutions to invest in offshore financial products. Since December, 2011, offshore RMB can be used to make investment in mainland China, through the RMB Qualified Foreign Institutional Investors (RQFII) program. This allows approved non-residents to participate in the onshore equity and bond market using offshore RMB, subject to an aggregate quota. This quota is expanded in 2013. Compared to QFII and QDII, RQFII investments do not need to convert between RMB and foreign currencies. However, the investment opportunities granted by the RQFII scheme can affect the incentive of offshore market participants to hold RMB. Therefore, changes in the RQFII quotas can also potentially affect the RMB exchange rates.

Figure 2 shows the time series graphs of QFII, QDII, and RQFII. We also report the difference between the QDII and the QFII (NETQDII). This difference reflects the net capital outflow allowed when currency conversions between RMB and foreign currencies are needed. The net capital outflow allowed through the QDII (net of QFII) window has a nonlinear trend. There was a declining trend until the end of 2015 when the level of capital market openness through this window stabilizes. There are still small changes after 2015, but daily changes compared to before are tiny. The initial declining trend in NETQDII was driven by the increasing trend in the QFII quota. Compared to QFII, the QDII quota was fluctuating in a narrow range before 2015 and there was no obvious trend in it. This reflects the more prudent attitude of the State Administration of Foreign Exchange (SAFE) towards capital outflows. Since March 26 of 2015, the QDII quota has remained constant. The changes in the QFII quota also have become quite small since 2016. The smaller changes in the quotas suggest that the Chinese government has become more conservative towards capital movements, which is related to the stock market turmoil in 2015 and the rising concern about financial stability. Moreover, there was large depreciation pressure on CNH in January 2016. The slowdown of capital account liberalization was also a reaction to the currency market movements. For RQFII, the growth of the Quota accelerated since the second quarter of 2013. The RQFII has an approved quota of 511.34 billion RMB by the end of Sep 2016 with 169 institutional participants.

**Figure 2 Time series of the capital control quotas**

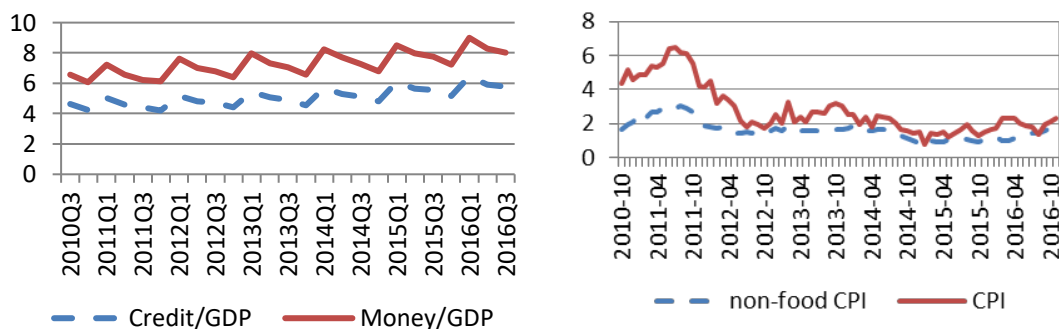




Notes: The units of QFII, QDII, and NETQDII are 100 million US dollars. The unit of RQFII is 100 million RMB.

These exchange rate and capital account policies might have influenced domestic economic objectives as well. Figure 3 depicts the time series of China’s consumer price index (CPI) inflation, money supply (M2)-to-GDP ratio and credit-to-GDP ratio since the third quarter of 2010. Despite the obvious seasonality, there was clearly an upward trend in both the money supply-to-GDP and credit-to-GDP ratio. The expansion of money and credit supply relative to the economic size, however, does not bring inflation. The CPI inflation rate peaked in July 2011, and then declined from 6.5% to less than 3%. As is well-known, China’s CPI inflation rate is dominated by food prices. The non-food CPI inflation rate declined to less than 2%. The producer price index (PPI) inflation was negative between March 2010 and August 2016, which implies that there was not enough effective demand for manufacturing goods. Why monetary and credit expansion seemed not very effective in containing deflation? We shall explore whether disequilibrium in the currency market was one of the reasons.

**Figure 3 Time series of China’s CPI, money and credit growth**  
M2/GDP and credit/GDP      CPI and non-food CPI



Notes: data are from the Chinese Bureau of Statistics. Units for the price indices are percentages.

### 3. Data and Methodology

#### 3.1 Data

Our sample use daily data in the period from December 30, 2011 to March 31, 2016 for which daily data are available. We use daily data for two reasons. First, the CNH exchange rate data starts from August 26, 2010. The RQFII quota data starts from December 30, 2011. Using monthly or quarterly sample generates small sample biases. Second, with daily data, we can precisely identify surprise macroeconomic news to market participants using the announcement date of the data. We shall explain this in more details below. Actually, using monthly data might even omit important policy impacts. For example, suppose a structure policy shock has significant positive impacts on the change rate of the exchange rate on a few days in a month

while the impacts are not significant on the other days. A monthly-data analysis might tell that the policy has no impact on the exchange rate. However, those positive responses of the exchange rate returns actually raise the level of the exchange rate. Without following declines in the exchange rate returns, the level of the exchange rate will be persistently higher in that month. Very often, it is the level of the exchange rate that concerns the government. For example, the Chinese State Administration of Foreign Exchange pays attention to exchange rate movements because there is a concern that a depreciated currency leads to capital flight. In this case, it is the expectation on a prolonged period of higher exchange rate which matters.

We collect daily data of CNY, CNH, QFII, QDII, and RQFII quotas from the Wind database. To construct our policy surprise variables (explained in more details below), we also collect survey data on macroeconomic forecasts in China from the Wind database.

### 3.2. Modeling the long-run equilibrium relationship

We assume that the exchange rate between two currencies is determined by the purchasing power parity in the long run (for a discussion on this, see e.g. Taylor and Taylor, 2004). More specifically, if the CNY and CNH markets are fully integrated, we have

$$\text{CNY}_t = \text{CNH}_t = p_t^{\text{CN}} - p_t^{\text{US}}, \quad (1)$$

where  $\text{CNY}_t$  is the logarithm of the CNY exchange rate against dollar at time  $t$ ,  $\text{CNH}_t$  is the logarithm of the CNH exchange rate,  $p_t^{\text{CN}}$  and  $p_t^{\text{US}}$  are respectively the log price level in China and the US.

However, due to capital controls and currency market interventions in mainland China, the CNY and CNH market are not fully integrated. More specifically, capital inflows to the mainland Chinese capital market are limited by the quotas of QFII and RQFII; capital outflows from the mainland Chinese capital market are limited by the quota of QDII. By contrast, capital market in Hong Kong is open to non-residents. Besides the QFII, QDII and RQFII, currency exchange under current account and foreign direct investment (FDI) account are also more restricted in the CNY market (Funke *et al.*, 2015). As we have discussed, there are also more interventions in the CNY market. As a result, market reactions to fundamental economic news are more constraint in the CNY market compared to the CNH market. This creates a gap between the CNY and CNH exchange rate. For brevity, let us call  $p_t^{\text{CN}} - p_t^{\text{US}}$  the PPP fundamental. Suppose the PPP fundamental increases, both CNY and CNH exchange rate should increase. However, due to capital control, CNY will increase less than the CNH. Therefore, the CNY–CNH difference decreases. However, this decrease in the difference will be smaller, if there is less constraint on capital movement in the CNY market. Therefore, we have the following nonlinear long-run relationship:

$$\begin{aligned} \text{CNY}_t - \text{CNH}_t = & a_0 + a_1(p_t^{\text{CN}} - p_t^{\text{US}}) + a_2 \text{NETQDI}_t + a_3 \text{RQFII}_t \\ & + a_4 \text{NETQDI}_t * (p_t^{\text{CN}} - p_t^{\text{US}}) + a_5 \text{RQFII}_t * (p_t^{\text{CN}} - p_t^{\text{US}}) + e_t, \end{aligned} \quad (2)$$

where  $\text{NETQDI}_t$  is the difference between QDII and QFII quota, which measures the net capital flow allowed when the foreign investors have to convert between RMB and USD,  $\text{RQFII}_t$  is the RQFII quota, which measures the net capital inflow allowed when the investment currency is in RMB. Because the necessity for currency conversion could matter for the impact of capital flows, we treat RQFII differently from QFII. There are also capital control measures under the current account and FDI account. Compared to the NETQDII and RQFII, changes in those measures are less frequent. Their impact will be absorbed in the vector of deterministic

terms  $a_0$ . Because the PPP fundamental can still affect the CNY exchange rate even if capital flows through the capital market is not allowed,  $a_1$  is not necessarily zero. Finally,  $e_t$  is the cointegration error.

Ideally, we would control for QDII and QFII separately as well. However, QDII, QFII and RQFII quotas are usually jointly determined by the SAFE's preferences over capital account openness, exchange rate stability and other macroeconomic concerns. Therefore, those measures are highly collinear. Controlling the three capital control measures separately on the right-hand side (RHS) thus causes identification problems. Actually, we encounter a matrix singularity problem when all three measures are put on the RHS. To circumvent this problem, we use QDII and QFII to construct the net capital outflow quota, NETQDII. We also regress RQFII on NETQDII and use the residual as the orthogonalized proxy of RQFII. Doing this better identifies the coefficient of NETQDII and RQFII. Our results from the impulse response analysis are robust if we do not use regression to orthogonalize RQFII.<sup>5</sup>

In practice, inflation data are only reported at a monthly frequency. However, market participants update their inflation expectations more frequently because they often have to trade more frequently than monthly. Hence, we use market-implied inflation expectations in our daily-data model. For the US, we use the treasury inflation protected securities (TIPS)-implied 5-year inflation expectations which are directly available from the FRED database. As there is no TIPS market in China, we estimate the market inflation expectations using the term structure model of Rudebusch and Wu (2008). More specifically, we use their yields-only model for the obvious reason that the macroeconomic information used in their macro-finance model is not available at the daily frequency. Yao and Tan (2011) show that inflation expectations derived from this term structure model match survey-based inflation expectations data in China quite well at the monthly frequency. The Chinese term structure data are obtained from the China Central Depository & Clearing Co., Ltd.

Substituting  $p_t^{CN} - p_t^{US}$  by the difference between the estimated inflation expectations of China and the US,  $INFDIFF_t$ , we obtain the following model:<sup>6</sup>

$$\begin{aligned} \Delta Y_t = & \Delta H_t + a_0 + a_1 INFDIFF_t + a_2 NETQDII_t + a_3 RQFII_t \\ & + a_4 NETQDII_t * INFDIFF_t + a_5 RQFII_t * INFDIFF_t + e_t. \end{aligned} \quad (3)$$

Model in equation (3) can also be justified from economic theory. In sticky-price models (Dornbusch, 1976; Frankel, 1979) of exchange rate determination, expected relative inflation rate affects the current-period exchange rate.

Note that, we restrict the coefficient of CNH in the equation (3) to 1. This identification has two advantages. First, the estimated model has clearer economic interpretation. It illustrates the impact of a change in the PPP fundamental or capital control measures on the CNY-CN H exchange rate difference. Second, from a theoretical perspective, the right hand side variables determine both CNY and CNH. Without the restriction we impose, the model suffers serious multicollinearity problems, because CNH is collinear with all the determinants of RMB exchange rates! Therefore, the identification of the coefficients is problematic. Even if we can still produce estimated coefficients, the economic interpretation of those coefficients is not clear.

As shown by Hong and Phillips (2010) and Vogelsang and Wagner (2016), the existence of nonlinear terms in the cointegration relationship is difficult to test because the potential endogeneity of the regressors in the cointegrating equation and error serial correlation requires

<sup>5</sup> Additional results are available upon request.

<sup>6</sup> Due to slow price adjustment, the relative price levels could be replaced by relative inflation rates for theoretical reasons as well (see Rossi (2013)).



biases corrections to the standard test statistics to allow for asymptotic chi-squared inference. Vogelsang and Wagner (2016) propose a Ramsey test which has an asymptotic chi-squared distribution on the basis of their Integrated Modified OLS (IM-OLS) estimator (Vogelsang and Wagner, 2014). Therefore, a Wald-type test can be applied. More specifically, consider the cointegrating regression as follows:

$$\begin{aligned} y_t &= X_t' \beta + u_t, \\ X_t &= X_{t-1} + v_t \end{aligned} \quad (4)$$

where the error terms  $U_t$  and  $V_t$  fulfill a functional central limit theorem, and are potentially correlated with each other. Obviously, when  $U_t$  and  $V_t$  are correlated, the regressors are endogenous.

Vogelsang and Wagner (2016) show that the OLS estimator of the following equation is consistent and has a zero mean Gaussian mixture limiting distribution.

$$SY_t = SX_t' \beta + SM_t' \gamma + X_t' \alpha + w_t, \quad (5)$$

where  $SY_t = \sum_{j=1}^t y_j$ ,  $SX_t = \sum_{j=1}^t X_j$ ,  $SM_t$  is similarly defined as a partial sum of the cross

products of elements in  $X_t$ ,  $W_t$  is the error term.

After estimating equation (5), chi-squared tests can be applied to test the significance of  $\beta$  and  $\gamma$ .<sup>7</sup> Obviously, when the null hypothesis of  $\gamma = 0$  is rejected, we can conclude that the long-run equilibrium relationship is nonlinear. We shall apply this IM-OLS test to our model (3) in the empirical analysis.

### 3.3. Impulse response analysis

Chong *et al.* (2012) suggest that conditional on that a cointegration relationship is found in the data, we can calculate the impulse responses of the economic system by the following two local projections.

$$\begin{aligned} e_{t+h} &= A_1^h e_t + \Phi_1^h \Delta Y_t + \dots + \Phi_p^h \Delta Y_{t-p+1} + \eta_{t+h}, \\ \Delta Y_{t+h} &= B_1^h e_t + \Psi_1^h \Delta Y_t + \dots + \Psi_p^h \Delta Y_{t-p+1} + \varepsilon_{t+h}, \end{aligned} \quad (6)$$

where  $h=1, \dots, H$  is the forecast horizon. More specifically, the first equation in (6) describes linear projections of the  $h$ -step-ahead equilibrium errors on the current equilibrium error and the current and past values of the endogenous variables. Similarly, the second equation in (6) describes linear projections of the  $h$ -step-ahead values of the endogenous variables on the same set of variables.  $\eta_{t+h}$  and  $\varepsilon_{t+h}$  are error terms. Jorda (2005) introduces the local projection method as an alternative to calculate the impulse response functions using VAR. This method consistently estimates the impulse responses of a system of stationary variables. Its advantage over traditional VAR is that it does not require a specific model specification, so avoids potential specification errors. The two local projections in (6) are extensions of the Jorda (2005) approach to non-stationary dynamic systems. One nice property of the local projection system in (6) is that the  $h$ -step impulse responses of endogenous variables to a disturbance to the long-run equilibrium relationship can be simply calculated as  $B_1^h + \Psi_1^h \beta$ , where  $\beta$  is the vector of

<sup>7</sup> See the appendix for technical details of the test.



cointegration coefficients. The impulse responses to the shocks in  $\varepsilon_{t+1}$  are  $B_1^h \beta' + \Psi_1^h$ . To control for the nonlinearity, the interaction term  $NETQDI_t * INFDIFF$  is added to the right hand side of the local projection systems in (6).

In a typical exchange rate model as the one studied by Chong *et al.* (2012), the interest rate difference between two countries is added to  $\Delta Y_t$  to capture the uncovered interest rate parity (UIP) effect. In this context, impulse response functions (IRFs) to the interest rates may be interpreted as the impact of the interest rate policy. However, the error terms in the reduced-form system (6) are not structural. In other words, they might be a combination of deeper structural economic shocks. Therefore, the economic interpretation of the IRFs is difficult. Moreover, Cochrane and Piazzesi (2002) point out current changes in the interest rates may have been anticipated by the market participants. In this case, the current exchange rates already contain information on those anticipated interest rate changes and we will not observe any responses of the exchange rates to the interest rate changes. To overcome those difficulties, we substitute the usual interest rates in the exchange rate models by two surprise monetary policy measures.

The US monetary policy shock is estimated as the difference between the announced federal funds rate changes and the anticipated changes implied by the futures market for federal funds. Detailed explanation of the construction of this variable is given by Kuttner (2001) and Bernanke and Kuttner (2005).

Unfortunately, there is no futures market for the Chinese interbank funds. Instead, we use survey data to construct our surprise monetary policy indicator of China. As is well-known (He *et al.*, 2013; Cheung *et al.*, 2016; He *et al.*, 2016), interest rate policy in China was not as frequently used as quantity-based policies. Money supply and credit supply are closely monitored and regulated by the central bank. The Wind database surveys the major financial institutions in China on key macroeconomic variables including M2 growth and the flow of credit supply on a monthly basis. Hence, we can construct the money supply shock and credit supply shock by the difference between the realized data and the median survey of the forecasts. Since the People's Bank of China has better control over credit supply than the money aggregate, we use the credit supply shock in our benchmark model. However, our results are robust if we use the M2 shock as the monetary policy indicator.

In addition to the two monetary policy variables, we also control for two surprise indicators of real activities. Scotti (2016) demonstrates that an aggregate index of surprise news on real activities significantly affects asset prices. We use his US surprise index, *Ussurp*, as a control variable in our model. There is no aggregate index of surprise news on real activities in China. We use the difference between realized industry production and survey median forecast of industry production, *Industry\_cn*, instead. Data on *Ussurp* is from Scotti (2016). Survey median forecast of China's industry production is from the Wind database.

In summary, our extended system of local projections is as follow:

$$\begin{aligned} e_{t+h} &= A_1^h e_t + \Phi_1^h \Delta Y_t^{ex} + \dots + \Phi_p^h \Delta Y_{t-p+1}^{ex} + \eta_{t+h}, \\ \Delta Y_{t+h} &= B_1^h e_t + \Psi_1^h \Delta Y_t^{ex} + \dots + \Psi_p^h \Delta Y_{t-p+1}^{ex} + \varepsilon_{t+h}, \end{aligned} \quad (7)$$

where  $\Delta Y_{t+h}$  is a vector of the following variables,  $\Delta ONY_{t+h}$ ,  $\Delta ONH_{t+h}$ ,  $\Delta INFDIFF_{t+h}$ ,  $\Delta NETQDI_{t+h}$ ,  $\Delta RCFI_{t+h}$ ;  $\Delta Y_t^{ex}$  adds  $\Delta INFDIFF_t * NETQDI_t$ , *Credit\_cn*,

*Interest\_us*, *Ussurp*, and *Industry\_cn* to  $\Delta Y_t$ . Here, we use *Credit\_cn* and *Interest\_us* to denote the surprise credit supply in China and surprise federal funds rate (FFR) change in the US,

respectively. Note that, because the surprise variables are by construction exogenous, we do not need to put them on the left hand side of the equations<sup>8</sup>.

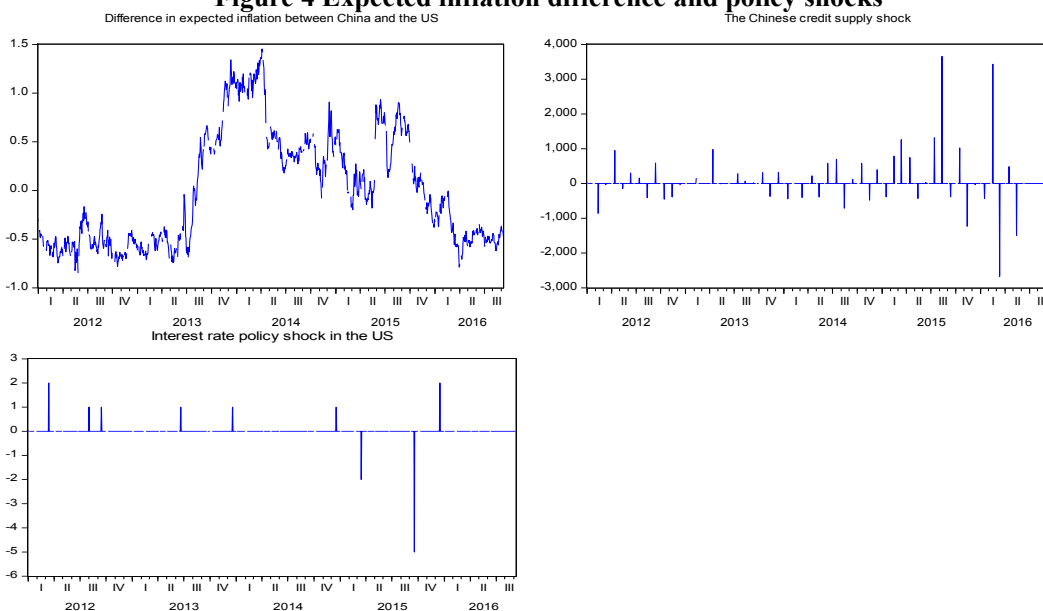
#### 4. Empirical findings

##### 4.1 The expected inflation difference and surprise policy variables

The upper-left panel of Figure 4 plots the time series of  $INFDIFF_t$ . The expected inflation difference between China and the US in the first half of the sample was, on average, negative (-0.09 percent). This implies that the exchange rate should decrease. However, the average expected inflation difference turned positive (0.10 percent) in the second half of the sample. The relatively high inflation expectation in China should lead to a higher exchange rate. However, due to the exchange rate and capital account regulations, the adjustment is a gradual process. Therefore, we observe downward trends in the CNY and CNH exchange rates in the first half of the sample and upward trends in the second half of the sample. This reasoning is consistent with the time series plots of the CNY and CNH exchange rates in Figure 2.

Figure 4 also shows the time series plots of the Chinese credit supply shock and US interest rate policy shock.

**Figure 4 Expected inflation difference and policy shocks**



Notes: The unit of INFDIFF is percentage. The policy shocks data are based on authors' calculations. The unit of the Chinese credit supply shock is 100 million RMB. The unit of the US interest rate policy shock is basis point.

##### 4.2. Long run equilibrium relationship

Before cointegration test, it is necessary to test whether the variables in model (3) are truly I(1) variables. Table 1 summarizes the unit root test results. Clearly, the unit root hypothesis is not rejected for all the level variables in model (3). On the other hand, the first differences are shown to be I(0) variables. Therefore, it is suitable to perform a cointegration test for model (3). We

<sup>8</sup> We control the interest rate of the US. Someone may be concerned that the interest rate gap between China and US is more relevant. To check the robustness, we use the interest rate gap to re-estimate our regressions. It turns about that our primarily results are qualitatively unchanged.

remove quadratic deterministic trends from CNY, CNH, NETQDII and RQFII before our cointegration analysis.

**Table 1 Unit root test results**

	CNY	CNH	NETQFII	RQFII	INFDIFF
Level	-0.7669	-1.5545	-2.6308	-2.8331	-1.4497
First difference	-29.23***	-30.61***	-24.14***	-31.19***	-30.46***
Trend in test	Yes	Yes	Yes	Yes	No

Notes: The test is the augmented Dicky-Fuller test. The null hypothesis assumes a unit root. The lag length of the test is selected by the Schwarz information criterion. We denote statistical significance at the 1%, 5%, 10% percent by \*\*\*, \*\*, \*, respectively. The row “Level” corresponds to the test t-statistics for the level of the variables. The row “First difference” corresponds to the test t-statistics for the first difference of the variables. The row “Trend in test” tells whether the test includes a deterministic trend. All tests include an intercept.

Using the nonlinear cointegration technique of Vogelsang and Wagner (2016), we identify the following long run relationship:<sup>9</sup>

$$\begin{aligned}
 CNY_t = & CNH_t - \underbrace{0.0017}_{(p=0.0104)} INFDIFF_t - \underbrace{0.0588}_{(p=0.1054)} NETQDII_t - \underbrace{0.0963}_{(p=0.8270)} RQFII_t \\
 & + \underbrace{0.3392}_{(p=0.0030)} NETQDII_t * INFDIFF_t.
 \end{aligned}
 \tag{8}$$

The *p*-values in the parentheses under the estimated coefficients are the ones for the tests of the zero-coefficient null hypothesis. The interaction term between *RQFII* and *INFDIFF* is not significant if it is included. Moreover, *RQFII\*INFDIFF* is not only correlated to the level variables, *RQFII* and *INFDIFF*, but also correlated to the other interaction term. Therefore, the addition of this variable also makes the multi-collinearity problem more serious. As a result, all individual coefficients appear to be insignificant when two interaction terms are added. Therefore, we report the estimated model without *RQFII\*INFDIFF* here. As expected, an increase in the expected inflation difference raises the RMB exchange rates, but to a less extent on *CNY* because of the capital control, so *INFDIFF* has a negative sign. The negative impact of *INFDIFF* is smaller if more capital outflow is allowed for. This is because for a given level of expected inflation increase, the *CNY* exchange rate can increase more. One concern is that the traditional cointegration test may not work for the case with interaction terms of two unit roots, as they are not unit roots anymore. To provide further evidence on the nonlinear relationship, we

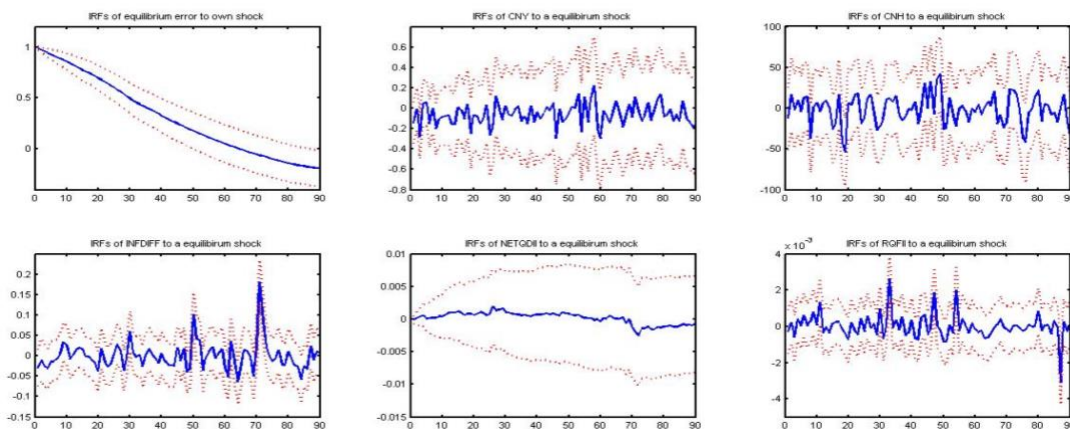
<sup>9</sup> Note that, to make the coefficients of the quotas visible within four digits, we have changed the units of the NETQDII and RQFII quotas to 10000 US dollar and 10000 RMB, respectively.

implement an additional test on the stationary of the residuals in Equation (8). The unreported unit root test for the residuals rejects the unit root hypothesis<sup>10</sup>

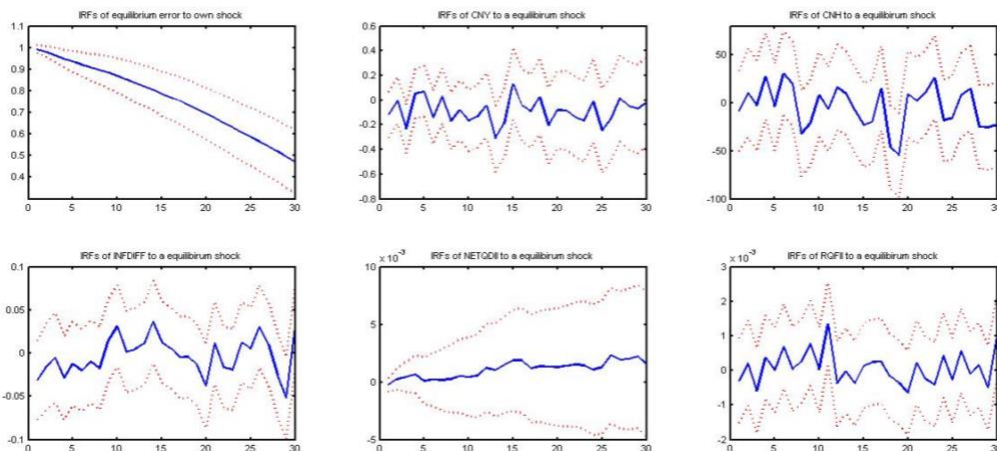
**4.2. The impact of a disturbance to the long-run equilibrium relationship**

Figure 5 and Figure 6 present impulse response functions of the error correction terms and first differences of *CNY*, *CNH*, *INFDIFF*, *NETQDII* and *RQFII* to a one-unit shock to the equilibrium relationship. Figure 5 present the IRFs up to 90 days. To facilitate the interpretation of the more immediate responses, we separately report the IRFs up to 30 days in Figure 6.

**Figure 5 Impulse responses to the disequilibrium error (90 days)**



**Figure 6 Impulse responses to the disequilibrium error (30 days)**



<sup>10</sup> This result is available upon request.

The first observation from those Figures is that a temporary shock to the long-run relationship has a very persistent impact. The IRF of the error correction term does not converge within 90 days, consistent with the literature (Taylor and Taylor, 2004; Chong *et al.*, 2012).

Second, disequilibrium on the currency market seems to have little impact on the inflation expectations in the first month following the disequilibrium shock. The impulse responses are not significantly different from zero on most days within that month. However, the shock significantly raises inflation expectations within a quarter. More specifically, our indicator of expected inflation difference rises by 0.1 percent on day 50 and 0.18 percent on day 71 after a 1 percent over-depreciation of the *CNY*. Note that there are no subsequent significant drops in the *first difference* of *INFDIFF*. Therefore, the *level* of inflation expectations in China has been persistently higher than the before-shock periods since those two days. Those movements in the expected inflation are helpful for the restoration of the long-run equilibrium. The disequilibrium shock makes the *CNY* exchange rate too high relative to the level implied by fundamentals. Rises in expected inflation close the gap.

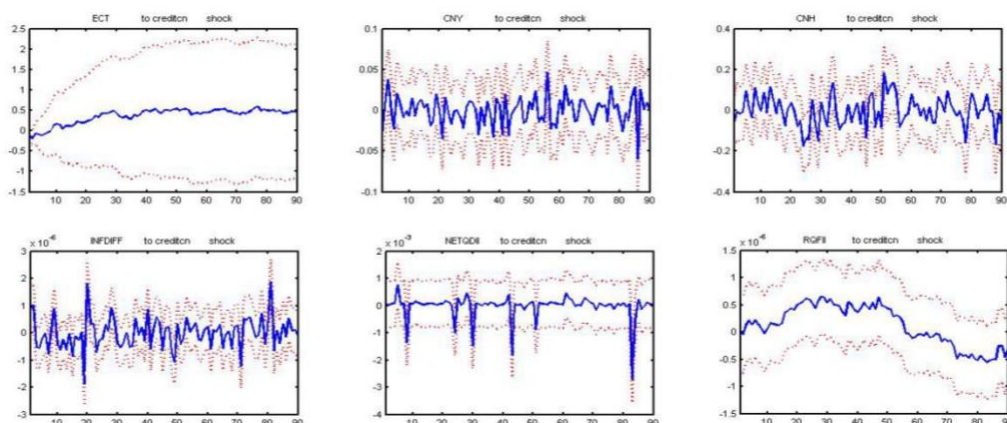
By contrast, there are no notable significant responses of the exchange rates to the disequilibrium shock. Note that the IRFs of *CNH* have big magnitudes, but the intervals are also very wide and almost always cover zero except on day 18 and 19. On those two days, the upper bounds of the 95% confidence interval are negative, which implies that *CNH* appreciates on those two days. These responses are in the “wrong” direction because the shock makes the *CNY* exchange rate too high relative to the *CNH* and we need the *CNH* exchange rate to rise as well to restore equilibrium. Therefore, the equilibrium is obviously not restored by the movements in the *CNH*.

The IRFs of *CNY* are also mostly insignificant except on day 3 when the upper bound of the 95% confidence interval is negative. This implies that *CNY* appreciates on that day. Because the equilibrium error over-depreciates the *CNY* relative to the level implied by the long-run equilibrium relationship, a *CNY* appreciation corrects the error. However, the magnitude of the response is small (in the range from -0.4947% to -0.0690%).

### 4.3. The impact of a surprise credit expansion in China

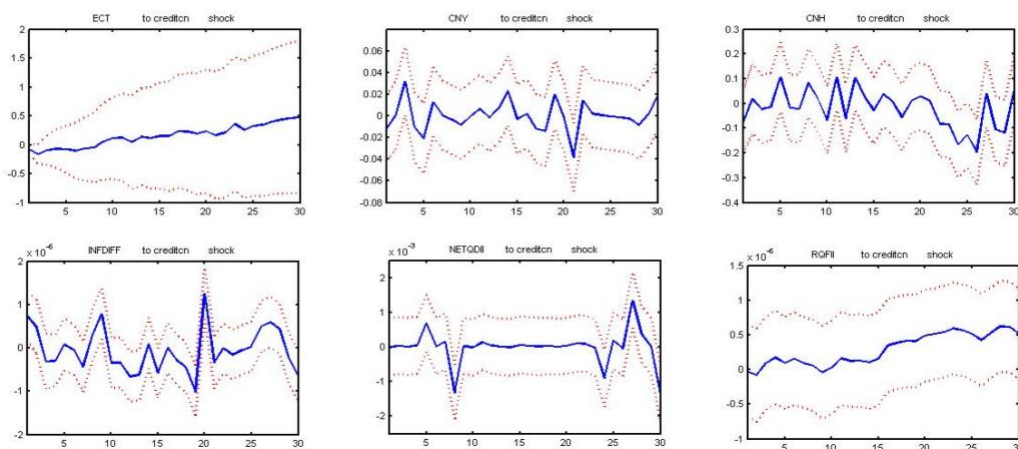
Figure 7 and Figure 8 summarize the IRFs of equilibrium error and endogenous variables to a one-unit increase in the credit supply in China up to 90 and 30 days, respectively.

**Figure 7 Impulse responses to a one-unit shock of credit supply in China (90 days)**



Notes: ECT denotes the disequilibrium error; CNY, CNH, INFDIFF, NETQDII and RQFII are first differences. Values on the horizontal axis are the numbers of days after the shock. The variables on the vertical axis are the responses. The dashed lines are the 95% intervals.

**Figure 8 Impulse responses to a one-unit shock of credit supply in China (30 days)**



Obviously, the expansionary credit shock has no significant impact on the equilibrium error. Hence, there is no evidence that credit policies in China contribute to currency market disequilibrium. Moreover, the credit shock effectively raises inflation expectations. The impact responses are largest on day 20 and 81. On day 20 and 81 after a 1-trillion RMB increase in the credit supply, inflation expectations in China (relative to the US) are raised by 0.0182 percent and 0.0189 percent, respectively. The magnitudes of the impacts are small but persistent. Note that the IRFs are in first differences. Without significant negative IRFs after those two days, the level of inflation expectations is persistently higher. Those findings suggest that disequilibrium in the currency market does not have a significant impact on the transmission of credit policy shocks to inflation expectations. However, these results do not mean that disequilibrium in the currency market does not affect the central bank’s ability to maintain price stability. As we have found in the last subsection, a one-percentage over-depreciation of *CNY* can create daily changes in inflation expectations to a scale about 10 times bigger than a one-trillion RMB credit surprise. Although monthly credit increase in China can be larger than one-trillion, creating a surprise credit supply is far more difficult because a large part of the credit supply could be anticipated by the market. The largest Chinese credit supply shock in our sample is 365.68 billion RMB (Figure 4). This means that a moderate shock to the equilibrium of the currency market can easily offset the impact of a large-scale credit policy on the inflation expectations. This finding helps us understand the phenomenon shown in Figure 3. Despite the persistent increase in money and credit supply, China’s inflation rate remains low. Currency market disequilibrium might have disturbed the expansionary monetary and credit policy from working.

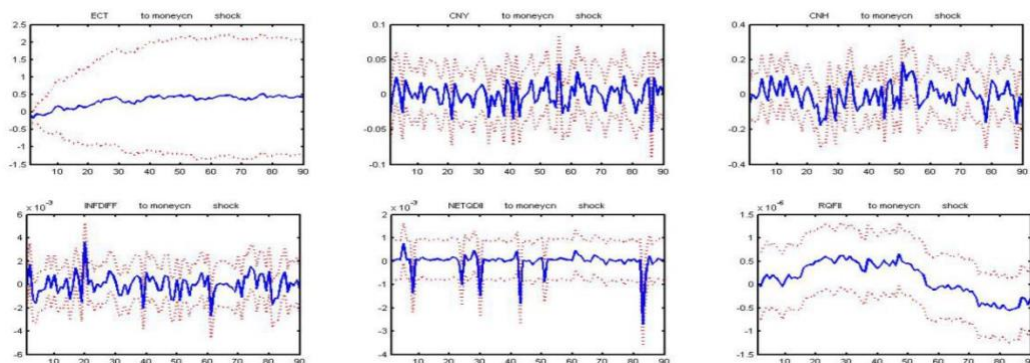
#### 4.4. Robustness of the impulse responses functions

So far, we have used credit supply as the monetary policy variable in China. In this subsection, we show that our qualitative results on monetary policy transmission are unchanged if shocks to aggregate money supply growth rate are used. Figures 9 reports the IRFs of the equilibrium error and endogenous variables to a one-unit increase in the M2 growth rate in China up to 90 days (to save space, we do not separately report the IRFs of the first 30 days for the robustness tests). A



surprise increase in the money growth rate leads to a significant increase in inflation expectations on day 20. By contrast, no significant IRFs of the exchange rates are found. Therefore, monetary policy is effective in affecting inflation expectations and does not bring significant distortions to the currency market. However, as what we find before, the magnitude of the responses of the inflation expectations are small. The largest response of inflation expectations to a one-percent money growth shock is only 0.006 percent.

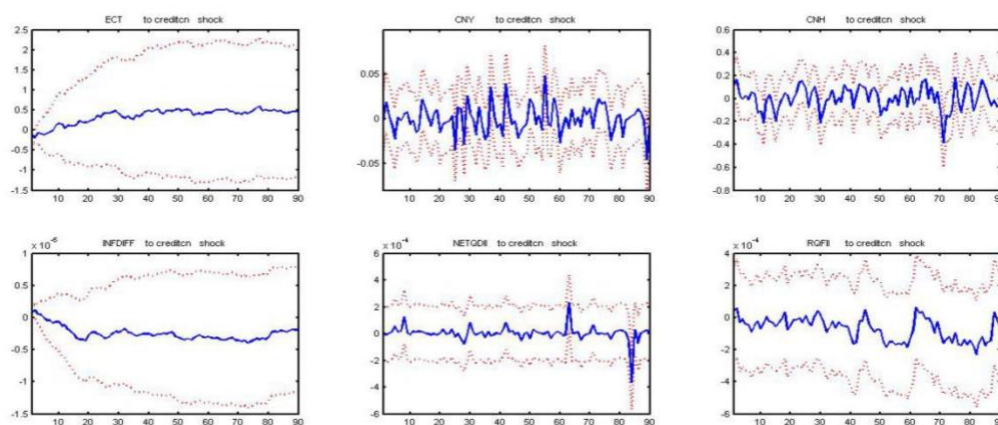
**Figure 9 Impulse responses to a one-unit shock of money supply in China (90 days)**



#### 4.5. The importance of the nonlinearity

Most empirical studies on the long-run relationship between the exchange rate and PPP fundamental assume a linear relationship. In this subsection, we demonstrate that in a country like China, where capital control exists, the potential nonlinear relationship might affect the qualitative results of the subsequent policy analysis and lead to faulty inferences and policy decisions. Figure 10 reports the IRFs of the equilibrium error and endogenous variables to a one-unit increase in the credit supply in China up to 90 days in a linear model. Those IRFs suggest that the credit supply shock has no impact on the inflation expectations in China which we have seen to be false.

**Figure 10 Impulse responses to a one-unit shock of credit supply in China (linear model)**



Notes: ECT denotes the disequilibrium error; CNY, CNH, INFDIFF, NETQDII and RQFII are first differences. Values on the horizontal axis are the numbers of days after the shock. The

variables on the vertical axis are the responses. The dashed lines are the 95% intervals.

## 5. Conclusion

With rapid development of RMB as an international currency, offshore RMB markets were created for financial transactions among non-residents since 2010. Over the past several years, the CNH market experienced a rapid development, but the persistent difference between CNY and CNH rates has led to massive speculations and complicates the aggregate environment in which the PBC's policy instruments work.

In this paper, we find a nonlinear long-run relationship between the onshore and offshore RMB exchange rates as well as the expected inflation. The nonlinearity is caused by China's capital control policies and currency market regulations in the mainland. We demonstrate that failure to capture the nonlinearity generates misleading conclusions on the transmission of monetary policy shocks to inflation expectations.

Based on the identified long-run relationship, we calculate the impulse responses of inflation expectations to a disturbance to the long-run relationship. It shows that disequilibrium in the currency market can affect the price stability target of the central bank. More specifically, although monetary policy shocks in China can still effectively change inflation expectations, the magnitudes of the effects are small. Discretionary monetary policy might fail to fight deflation and recession when the currency market is in disequilibrium. This is because the impact of a moderate-size equilibrium error in the currency market on inflation expectations is much larger than the impact of a typical surprise credit supply or money shock. Therefore, measures have to be taken to maintain currency market equilibrium if the central bank want its policy instrument to effectively manage inflation expectations.

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**Appendix. Technical notes for the test for nonlinear cointegration relationship**

In this appendix, we briefly introduce the technical details of the test for nonlinear cointegration relationship of [Vogelsang and Wagner \(2016\)](#). Define the vector of regression coefficients in equation (5) as  $\theta$  and denotes its OLS estimator by  $\tilde{\theta}$ . Proposition 1 of [Vogelsang and Wagner \(2016\)](#) shows that as the sample size goes to infinity, the limiting distribution of  $\tilde{\theta} - \theta$  is normal distribution with mean zero and variance matrix  $V_{IM}$ . The variance matrix can be estimated by  $\hat{\omega}_{uv} A_{IM}^{-1} (\tilde{S}\tilde{X}' \tilde{S}\tilde{X})^{-1} C' C (\tilde{S}\tilde{X}' \tilde{S}\tilde{X})^{-1} A_{IM}^{-1}$ , where  $\tilde{S}\tilde{X}$  is the vector of regressors in equation (5),  $A_{IM}$  is a scaling matrix,  $C = [c_1, \dots, c_T]'$ ,  $c_t = SS\tilde{X}_T - SS\tilde{X}_{t-1}$ ,  $SS\tilde{X}_t = \sum_{j=1}^t S\tilde{X}_j$ ,  $u_t, v_t$  in equation (4) follows a functional central limit theorem  $T^{-1/2} \sum_{t=1}^{\lfloor rT \rfloor} \eta_t \Rightarrow B(r) = \Omega^{1/2} W(r)$ , where  $\eta_t = [u_t, v_t]'$ ,  $r$  lies in  $[0, 1]$ .  $\omega_{uv} = \Omega_{uu} - \Omega_{uv} \Omega_{vv}^{-1} \Omega_{vu}$ .

Give the above results, [Vogelsang and Wagner \(2016\)](#) show that the linearity of the cointegrating relationship could be tested by the following Wald-type tes statistics:

$W_R = \tilde{\gamma}' [R A_{IM} \hat{V}_{IM} A_{IM} R']^{-1} \tilde{\gamma}$ , where  $R$  is the selection matrix corresponding to  $\gamma \in \theta$ . Proposition 2 of [Vogelsang and Wagner \(2016\)](#) shows that this statistics has a chi-squared distribution.

# Urban Wage Inequality: The Reform of State-Owned Enterprises in China's Great Transition\*

By SUN SHIYU, CHU XIXI AND LIU XIANGBO\*

**Abstract:** *Along with the further reforms of state-owned enterprises (SOEs), urban China has experienced an evident increase in wage inequality. Using provincial-level data for the period 1993–2013 and individual-level data from five waves of the China Household Income Project from 1988 to 2013, this paper investigates how the SOE reform affects wage distribution in urban China by considering three mechanisms: wage determination, ownership structure and institutional segmentation. The results of this study show that overall inequality increased with the reduction of SOEs' share in the economy. Moreover, through a detailed Oaxaca–Blinder re-centred influence function decomposition, this experiment obtains consistent and robust results. Based on the theory of soft budget constraint, this study demonstrates that the increase in urban wage inequality has been mainly caused by wage structure effects. Since the SOE reform in the 1980s, the wage determination mechanism has changed with the increase in the return of the labour force to education. During this period, institutional segmentation was of less significance in explaining the wage gap between SOEs and non-SOEs. Furthermore, the accelerating ageing process of China's population had no significant effects on the trajectory of urban wage inequality throughout this period.*

**Keywords:** Wage inequality; urban China; soft budget constraint; Oaxaca-Blinder re-centred influence function decomposition

## 1. Introduction

Since the economic reform of 1978, China has experienced a remarkable transition from an underdeveloped, planned economy to a bellwether of other emerging market economies. China's gross domestic product (GDP) increased from 1,230 billion yuan (in 2013 price-adjusted yuan) in 1978 to 59,296 billion yuan in 2013, accounting for 20% of the global GDP. In addition, the real GDP per capita has showed a more than 32-fold increase since 1978, reaching 43,684 yuan in 2013.

During this great transition, the reform of state-owned enterprises (SOEs) has been a major component of the overall economic reforms in urban China. Prior to the reforms, nearly the entire urban labour force worked in the state sector. During the period covered by this study, SOEs bore a heavy burden from maintaining redundant employment and large social welfare costs (Lin, Cai, and Li 1998). SOE wages had initially been determined by the national standardised grading system based on an equality criterion. Following the economic reform and opening-up of 1978, the Chinese government launched the SOE reform to improve the efficiency and performance of SOEs.

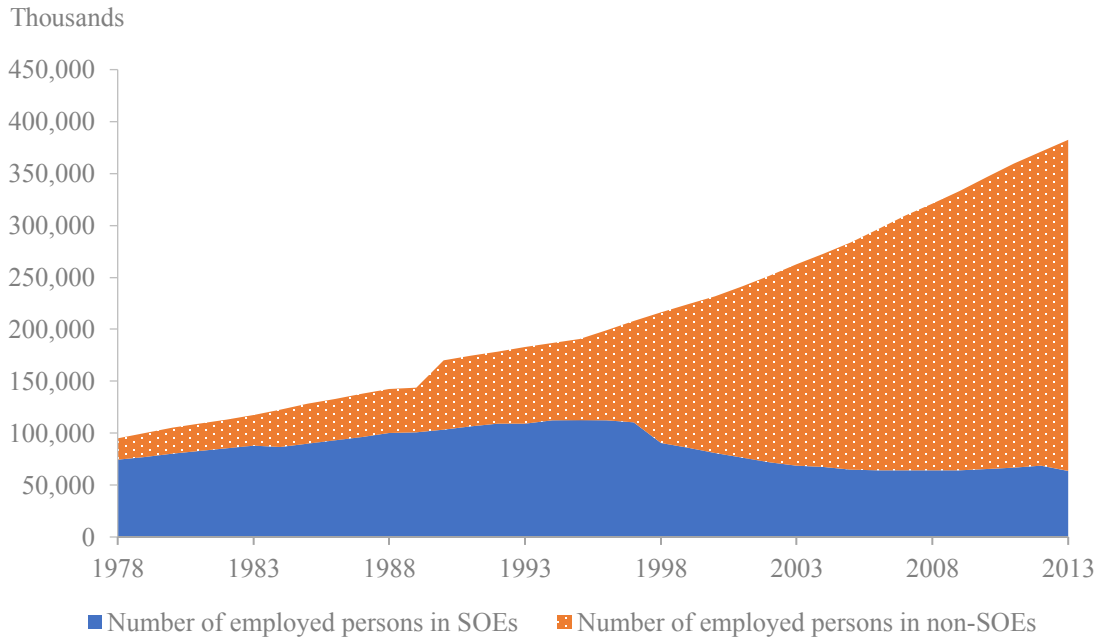
The SOE reform included two main aspects: the wage determination mechanism and the ownership reform. The Chinese government granted greater autonomy to SOE managers, redressed the labour market segmentation, encouraged the development of non-SOEs and promoted SOE privatisation over the study period. As a result, the number of workers in SOEs in urban China declined from 74 million in 1978, comprising 80% of the total employees, to 62 million in 2013, accounting for 30% of the total employees (see Figure 1). Average earnings in

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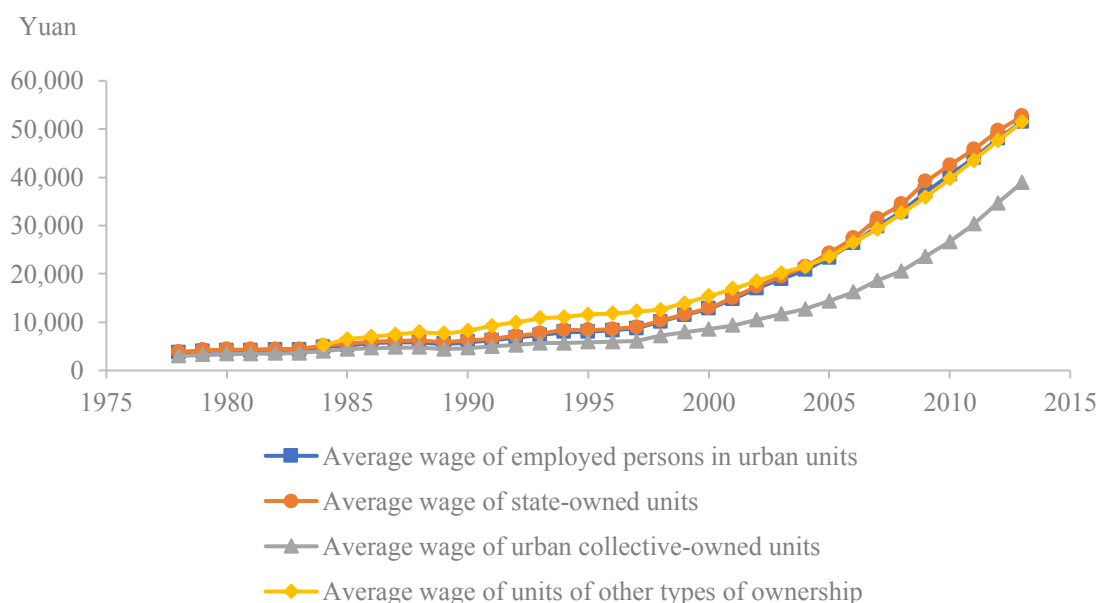
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the state sector increased by 14 times over the same period (see Figure 2). Following the great transition, the SOE share in China’s economy has declined; however, the assets of firms under state ownership still comprised the majority of the economy (Piketty, Yang, and Zucman 2019). At this point, China has established a basic market economic system to keep public ownership in a dominant position but with a development of diverse ownerships side by side.



**Figure 1.** Number of employees in urban China, 1978–2013.  
Data sources: China Statistical Yearbook, 1978–2013.



**Figure 2.** Urban wage dynamics, 1978–2013.  
Data sources: China Statistical Yearbook, 1978–2013.

However, in the course of the SOE reform, wage inequality in urban China dramatically changed. In 1988, the Gini coefficient in urban China was 0.215, but by 2013, it had grown to 0.374. The SOE reform has stood at the centre of rising urban wage inequality since the 1980s.

This article examines whether the SOE reform has caused a rise of wage inequality in urban China based on wage determination, ownership structure and institutional segmentation. Specifically, this study pursues two types of empirical analyses. The first empirical analysis is conducted at the regional level. A data panel is constructed to represent provincial-urban-level wage inequality using data from the *China Statistical Yearbook*, the *Provincial Statistical Yearbook* and the *China City Statistical Yearbook* over the period 1993–2013. Using the fixed effect model, this study reveals that there is a positive, significant relationship between the SOE reform and urban wage inequality. However, the results of the first dataset analysis do not provide a detailed story about how the SOE reform contributed to the rising urban wage inequality through various mechanisms across different periods. To get a full picture of the SOE reform, the second part of our empirical analysis is conducted at the individual level using data from the five waves of the China Household Income Project (CHIP) survey. Based on the soft budget constraint hypothesis proposed by Kornai (1979), this study tests three potential mechanisms behind the market reform: wage determination, ownership structure and institutional segmentation. By adopting the Oaxaca–Blinder re-centred influence function (OBRIF) decomposition, we find strong evidence that increasing wage inequality in urban China over the study period was induced by wage structure effects (including the wage determination effect and institutional segmentation effect). As the SOE reform progressed, the return to education increased generally, and institutional segmentation between the state and non-state sectors gradually diminished. Moreover, this study also examines the effect of an ageing population on urban wage inequality. However, the results are not significant.

Increasing wage inequality in China and the reform of SOEs are among the most important phenomena associated with China’s great transition. Numerous studies have examined each of these issues separately, while few have investigated these issues together. To the best of our

knowledge, the present study is one of the very few to analyse the effect of SOE reforms on wage inequality in urban China during the great transition. In addition, this article appears to be one of the few thus far to identify a causal mechanism in the framework of increasing wage inequality from the perspective of soft budget constraint.

This paper proceeds as follows. The following section reviews the related literature on the SOE reform and wage inequality in urban China. The next section introduces the analytical framework and presents a brief history of China's SOE reform. The subsequent section details provincial data and the CHIP dataset. Then, it further presents our empirical analysis, including analytic strategies, with the results based on both the regional and individual levels. The final section presents conclusions.

## 2. Literature review

The reform of SOEs is a key topic used to explore the changes of wage inequality in urban China. Based on Chinese urban household surveys, Xu and Zou (2000) conclude that there was increasing wage inequality with the reduction of SOE share in GDP from 1985 to 1995. Knight and Song (2003) demonstrate a rapid growth of urban wage inequality by decomposing the wage differentials in 1995 and 1999 and find that China's economic reform generated greater segmentation among varied types of ownership. Démurger et al. (2006), by applying CHIP data, show the similar results for 1995–2002. Using the same data set, Xia et al. (2014) suggest that apparent changes in employment by ownership widened the urban wage gap in China from 1995 to 2002 based on the Machado and Mata decomposition (Machado and Mata 2005) method. However, for the period from 2002 to 2007, Song and Li (2010) demonstrate that the SOE reform narrowed the segmentation between the state and non-state sectors, with the wage structure effect accounting for more than 60% of wage differentials in 1988 but 25% in 2007.

Moreover, the changes in wage differentials by ownership are often viewed to be the key driver of the increase in inequality. Démurger, Li, and Yang (2012) find that earnings gaps across ownerships had been declining over the study period. Recently, based on the quantile regression, Gustafsson and Wan (2020) investigate the evolution of urban wage inequality over the 1980s and 2010s and find the existence of a wage premium in the state sector.

## 3. The analytical framework and background

This section introduces an analytical framework based on the soft budget constraint hypothesis and then briefly describes the history of SOEs from 1978 to 2013. It focuses on the reform of the wage determination mechanism and ownership structure.

### *The analytical framework*

This study develops a theoretical framework based on the soft budget theory (Kornai 1979) to explain the trajectory of rising wage inequality. Under this framework, we propose that the SOE reform affects wage distribution in urban China through the following three mechanisms: wage determination, ownership structure and institutional segmentation.

Based on a strong soft budget constraint, there was an outstanding feature of the labour market before the market reform in China: wage setting favouring egalitarian among employees.

In a planned economy, the government sought to maximise multidimensional objectives such as equality, employment stability and social welfare. The soft budget theory implies that SOEs accepted government orders and bore such strong policy burdens in exchange for government policy protection and subsidies. SOEs tended to set wage standards in favouring egalitarian rather than performance and to guarantee the job security of workers so as to ensure stability and social welfare. In such a situation, SOEs had a lower price elasticity of factor demand. Wages did not reflect differences in workers' abilities and performances in the planned economy.

Moreover, before the market reforms in China, SOEs dominated almost all the industrial

sectors and provided most job opportunities in the labour market. Meanwhile, most positions were centrally allocated in the employment of SOEs. There lacked external competition which might challenge SOEs' dominant position in the economy. Thus, the employment and wages of SOEs were less sensitive to changes of the macroeconomic environment. As a result, in the planned economy the wage differentials between skilled workers and unskilled workers were small, and the wage inequality was little.

After the market reform, the situation has changed. On one hand, less policy burden and government policy protection lead to an increase in the price elasticity of the demand for production factors. In order to survive, SOEs have to adjust the employment and wage standards according to performances, macroeconomy and market environment. On the other hand, the development of both privately-invested enterprises and foreign-invested enterprises influence SOEs. The performance-based wage determination in private enterprises and foreign-invested enterprises attracts highly skilled labour force from SOEs and in the labour market. Thus, the changes of ownership structure induce changes in the employment structure. To maintain competitiveness with their opponents, SOEs alter the employment mechanism and wage determinants.

As the wages in the public sector become less egalitarian and more sensitive to productivity, the return to education and the requirement for experience of workforce in SOEs rise. On the other hand, market-oriented employment and wage determination mechanisms decrease the welfare of unskilled workers, exacerbating the wage gap between skilled workers and unskilled workers.

Notably, with the market reforms, institutional segmentation has arisen due to weak soft budget constraints. SOEs can access funding and credit more easily supports from banks compared with their private counterparts and have a lower price elasticity of factor demand based on paternalism with the government. It cannot be presumed that SOEs determine wages and employment competitively to respond to and to reflect labour productivity. Considering the possible monopoly factors, institutional segmentation between public and private sectors can be greater. However, the differentials caused by institutional segmentation will decrease as more radical market reforms are implemented.

### ***Background***

In accordance with our analytical framework, the SOE reform in China has mainly focussed on two components: the wage setting and ownership structure.

Prior to the economic reforms of the late 1970s, there was no formal labour market in China; almost the entire labour force was employed in the state-owned and collective enterprises in urban China. Under the planned economy, the government implemented a centralised job placement system, and SOEs bore a heavy policy burden in providing employment and social security for their workforce (Lin, Cai, and Li 1998; Lin and Tan 1999). The SOE wage determination mechanism was decided according to a national standardised grading system based mainly on the principles of equality and valuing seniority over education and skill (Knight and Song 2003; Meng 2012). SOEs in this period were over-staffing and inefficient and had heavy social protection burdens and difficulties in turning a profit.

Since the reform and opening-up of 1978, rather than undertaking rapid and complete privatisation, the Chinese government has launched a series of gradual, incremental reforms aimed at enhancing incentives, promoting efficiency and increasing SOE profits. From 1978 to 2013, the SOE reform can be divided into three phases.

The first stage spanned 1978 to 1993, and the theme of this stage was decentralisation. The government granted more autonomy to managers of SOEs (Yusuf, Gunasekaran, and Wu 2006), whereas there was no change in the ownership and responsibilities of SOEs (Rawski 1994; Xia et al. 2014). In the 1980s, the SOE reform focussed on introducing competition into management

and stimulating workforce performance through variable pay and bonuses (Coady and Wang 2000; Meng 2000; Shirley and Xu 2001). However, at this stage, the autonomy of SOEs in wage determination was still restricted by a performance pay quota (initially, only 5% of the total wage spending). Due to remaining egalitarianism, bonuses were often distributed within work units on an average basis. On the other hand, non-SOEs were allowed to grow after 1978, marking a gradual rise of the private sector in China (Brandt and Rawski 2008).

The second stage spanned from 1993 to 2003, and the key theme of this period was privatisation. Faced with an increasingly complex overseas and domestic environment, more radical SOE reforms became imperative. The Third Plenary Session of the 14th Central Committee of the Communist Party of China formally proposed building a socialist market economic system, establishing a modern enterprise system with clear ownership, property rights and responsibilities, the separation of firm management from the government function, and scientific management. This became an important policy direction in the SOE reform, and the role of the private economy was formally recognised. The implementation of the Company Law in 1994 provided a strong legal guarantee for SOEs' privatisation. During the 15th National Congress of the Communist Party of China in 1997, state ownership was regarded as one of the 'pillars' of China's economy and, meanwhile, a push to privatise SOEs began in earnest (Qian 1999). Moreover, in 1999 China announced that the principle of SOE reforms was to 'seize the large and release the small' (Lin 2001; Xu, Zhu, and Lin 2005; Hsieh and Song 2015). Specifically, the Chinese government retained SOEs in strategically important industries, such as national defence, telecommunications and transportation (Lin, Cai, and Li 1998), and even strengthened larger SOEs with greater production capacity or fixed assets. Meanwhile, the government pushed shareholding conversions for smaller SOEs, which were gradually transformed or sold to the private owners (Jefferson and Su 2006; Xu, Lu, and Gu 2014). Moreover, at this stage, the lifelong relations between SOEs and their workers began to break down, and SOEs reformed wage distribution according to workers' performance. A large number of workers were laid off or became unemployed. As a result, the number of SOE employees decreased by 50% (about 28 million) and the number of SOEs dropped from more than 120,000 in the mid-1990s to fewer than 32,000 by 2004 (Naughton 2007).

The third stage was from 2003 to 2013. In this period, the Chinese government strengthened SOEs' regulation and supervision. In 2003, the ongoing wage reform granted SOEs more autonomy in determining the level and distribution of the wages of managers and workers. However, the overall contractual regime governing wages and salaries was constructed to prevent unreasonable pay in central SOEs (Xia et al. 2014). In 2005, the government lifted the ban on the circulation of SOE equity in the stock market and promoted a further reduction of barriers to their market entry and stimulated private investment (Démurger, Li, and Yang 2010). This equity division reform was also called the secondary privatisation (Liao, Liu, and Wang 2014). Moreover, at this stage, a rapid increase in foreign direct investment (FDI) and the rise of foreign-owned enterprises in China led to more competition in the product market (Gustafsson and Wan 2020).

#### **4. Data**

##### ***Regional-level data***

The provincial panel data were constructed from multiple sources. This study collects related information on wage inequality in urban China from the various years of the *China Statistical Yearbook*. In addition, information about SOEs comes from the various years the *Provincial Statistical Yearbook* and the *China City Statistical Yearbook*.

Since we are unable to measure urban wage inequality directly at the provincial level, we define the wage gap by calculating the differences of annual average wage growth rates between



the state and non-state sectors. Furthermore, we use the share of SOEs as the indicator of SOE reforms.

**Individual-level data**

This study constructs the sample from the CHIP survey, an ongoing project initiated by the China Institute for Income Distribution of Beijing Normal University. The CHIP survey contains a wealth of information on families and individuals in urban China. The CHIP survey is also a longitudinal survey and includes five waves (1988, 1995, 2002, 2007 and 2013). All the five waves cover the observations from Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Guangdong, Chongqing, Sichuan, Yunnan and Gansu, varying substantially in geographic, economic and social characteristics. The CHIP includes an urban module, a rural module and a migrant module. There are four different ownership types: DPEs (domestic private enterprises), SOEs (state-owned enterprises), FIEs (foreign-invested enterprises) and UCEs (urban collective enterprises). Beyond this, we look into the wage elements, including the basic wage, bonus, allowance, subsidy, and overtime and special wage.

To make the samples comparable and representative, we limit our sample to the provinces covered in all the five survey waves and introduce the shares of the urban, rural and migrant population in each group to reweight the data. Moreover, to obtain precise estimations, we apply sample restriction criteria. First, we drop all individuals working in the labour market without wages and exclude the self-employed and owners of private enterprises from the analysis since our measure of wages is based on employed workers only. Second, we include people aged 16–60 years in the sample. Third, all individuals' wages are measured at their 2013 levels according to the consumer price index (CPI). Table 1 presents sample mean descriptive statistics of the main variables. It is obvious that the percentage of labour force in SOEs has declined over the great transition. This reflects the changes in ownership structure.

**Table 1.** CHIP descriptive statistics, 1988–2013.

	1988	1995	2002	2007	2013
Log value of wage	8.6577 (0.4504)	8.9735 (0.6239)	9.5278 (0.6579)	10.1534 (0.7177)	10.3694 (0.7316)
Male	0.5221 (0.4995)	0.5273 (0.4993)	0.5557 (0.4969)	0.5760 (0.4942)	0.5711 (0.4950)
Han	0.9626 (0.1898)	0.9571 (0.2027)	0.9613 (0.1930)	0.9903 (0.0981)	0.9555 (0.2061)
Schooling years	10.4466 (3.0188)	11.5591 (2.7120)	12.3426 (2.6422)	12.9922 (2.8057)	11.7341 (4.4476)
Working experience	20.3530 (10.7300)	19.3450 (9.4761)	20.3819 (9.5920)	19.7928 (10.7305)	21.7235 (11.4404)
Ownership					
DPE	0.0052 (0.0717)	0.0068 (0.0822)	0.2135 (0.4098)	0.3243 (0.4682)	0.3683 (0.4824)
SOE	0.7863 (0.4100)	0.8239 (0.3809)	0.6914 (0.4620)	0.5633 (0.4960)	0.5358 (0.4988)
FIE	0.0037 (0.0609)	0.0126 (0.1117)	0.0235 (0.1515)	0.0468 (0.2113)	0.0369 (0.1885)
UCE	0.2049 (0.4036)	0.1566 (0.3635)	0.0717 (0.2579)	0.0656 (0.2475)	0.0590 (0.2357)
Occupation					
Manufacturer	0.5369 (0.4987)	0.3941 (0.4887)	0.3010 (0.4587)	0.1722 (0.3776)	0.1269 (0.3329)
Office worker	0.2378 (0.4257)	0.2130 (0.4094)	0.3409 (0.4740)	0.4400 (0.4964)	0.4545 (0.4980)
Officer or manager	0.0651 (0.2467)	0.1170 (0.3215)	0.1113 (0.3146)	0.0754 (0.2641)	0.0561 (0.2302)
Professional or technician	0.1595	0.2280	0.2239	0.2510	0.2331

	(0.3661)	(0.4196)	(0.4169)	(0.4336)	(0.4228)
Others	0.0008	0.0479	0.0228	0.0614	0.1294
	(0.0275)	(0.2136)	(0.1494)	(0.2401)	(0.3357)
Industry					
Primary	0.0098	0.0169	0.0122	0.0113	0.0124
	(0.0986)	(0.1289)	(0.1099)	(0.1056)	(0.1106)
Manufacturing	0.4337	0.4189	0.2627	0.1939	0.1662
	(0.4956)	(0.4934)	(0.4401)	(0.3954)	(0.3722)
Mining and geological survey and prospecting	0.0404	0.0104	0.0592	0.0102	0.0372
	(0.1970)	(0.1014)	(0.2360)	(0.1006)	(0.1892)
Construction	0.0349	0.0295	0.0334	0.0343	0.0427
	(0.1836)	(0.1693)	(0.1796)	(0.1821)	(0.2022)
Transport/communications/posts /telecommunications	0.0684	0.0503	0.0796	0.1393	0.1424
	(0.2524)	(0.2186)	(0.2707)	(0.3463)	(0.3495)
Wholesale and retail	0.1429	0.1423	0.1024	0.1240	0.0633
	(0.3499)	(0.3494)	(0.3032)	(0.3296)	(0.2434)
Public utilities and real estate	0.0234	0.0377	0.0128	0.0494	0.0430
	(0.1512)	(0.1906)	(0.1123)	(0.2168)	(0.2029)
Social services and welfare	0.0457	0.0469	0.1498	0.1545	0.1574
	(0.2088)	(0.2114)	(0.3568)	(0.3615)	(0.3642)
Education and media	0.0733	0.0754	0.0942	0.0819	0.1086
	(0.2606)	(0.2640)	(0.2921)	(0.2742)	(0.3111)
Scientific research and technical services	0.0209	0.0248	0.0188	0.0272	0.0103
	(0.1429)	(0.1556)	(0.1357)	(0.1628)	(0.1012)
Finance and insurance	0.0156	0.0198	0.0279	0.0411	0.0380
	(0.1238)	(0.1394)	(0.1647)	(0.1985)	(0.1913)
Public sectors	0.0851	0.1206	0.1262	0.0921	0.1439
	(0.2791)	(0.3257)	(0.3320)	(0.2892)	(0.3510)
Others	0.0060	0.0064	0.0209	0.0408	0.0347
	(0.0771)	(0.0799)	(0.1431)	(0.1977)	(0.1830)
N	17,212	10,597	9,322	5,766	6,861

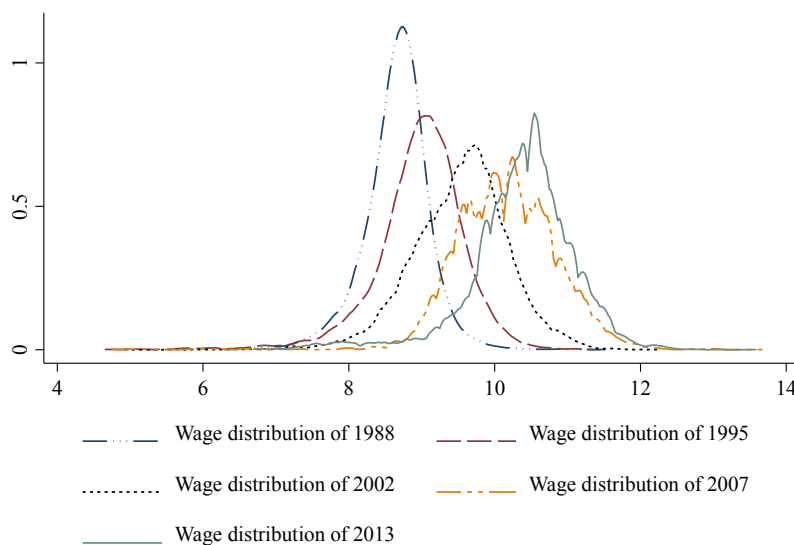
Data sources: CHIP 1988, 1995, 2002, 2007, 2013 urban household survey.

As for the changing distribution of wages, Table 1 shows a general picture of the dramatic increase in urban wage inequality from 1988 to 2013. This pattern is shown in a more direct way in Table 2. The Gini coefficient increased dramatically, from 0.2349 in 1988 to 0.3737 in 2007. Then, it decreased to 0.3419 in 2013. In addition, the kernel densities of log wages in Figure 3 very clearly illustrate that wages have grown rapidly between each pair of years under this study. It also shows that the distribution had become more unequal until 2007.

**Table 2.** Urban wage inequality, 1988–2013.

	1988	1995	2002	2007	2013
Gini coefficient	0.2349	0.2979	0.3388	0.3737	0.3419
Q90-Q10	1.0268	1.3878	1.5844	1.5834	1.5560
Q90-Q50	0.4540	0.6191	0.7189	0.7983	0.7018
Q50-Q10	0.5728	0.7687	0.8654	0.7851	0.8542
N	17,212	10,597	9,322	5,766	6,861

Data sources: CHIP 1988, 1995, 2002, 2007, 2013 urban household survey.



**Figure 3.** Wage distribution from 1988 to 2013.

Data sources: CHIP 1988, 1995, 2002, 2007, 2013 urban household survey.

### 5. Empirical analysis

In this section, we estimate how the SOE reform has empirically contributed to the increasing urban wage gap. The empirical results based on the regional-level data reveal the association of the SOE reform with wage inequality. The individual-based datasets enable us to test our analytical framework directly and provide a more comprehensive explanation by considering three mechanisms: wage determination, ownership structure and institutional segmentation.

#### *Effects of SOE reforms on urban wage inequality*

This subsection presents the methodology and empirical results of the effect of SOE reforms on urban wage inequality based on the provincial-level sample. In addition, this study uses the data of the ageing population to test the robustness of our results.

Based on the regional-level data, this study adopts the fixed effects model to analyse the effect of the increasing SOE share on earning inequality in China. The model adopted in this part follows the classical human capital theory developed by Mincer and Polachek (1974).

$$y_{it} = \alpha_t + \alpha_i + \beta_1 share_{it} + X' \varphi + \varepsilon_{it} \quad (1)$$

where  $y_{it}$  reflects the wage inequality at region  $i$  in year  $t$ ,  $\alpha_t$  is time fixed effect, and  $\alpha_i$  is regional fixed effect. In addition,  $share_{it}$  is the share of SOEs' assets in total assets, indicating the continuous economic reform in the state sector. Thus,  $\beta_1$  is the main concern in our model, and  $X'$  are control variables that are related to the regional wage inequality. Following this, the sample we use consists of information about the wage gap, CPI, GDP, share of SOEs' assets in total assets, and the ratio of college students for the years 1988–2013.  $\varepsilon_{it}$  is the disturbance. Standard errors are clustered at the provincial level.

In modelling the changing urban wage inequality, we can put forward several broad explanations following the previous studies. Our independent variables are divided into several categories: (1) skill-biased technological change: capital accumulation (Berman, Bound, and Machin 1998); (2) openness: trade (Helpman, Itskhoki, and Redding 2010) and FDI (Berman and Machin 2000); (3) human capital development; and (4) macro-economic policies: CPI (Xu and Zou 2000).

Baseline results

The reform of introducing a market-oriented wage determination mechanism has enlarged wage differentials among workers. As the first column of Table 3 shows, the relationship between the share of SOEs' assets in total assets and wage inequality is significantly negative, indicating that the SOE reform has enlarged the urban wage inequality.

**Table 3.** Effects of SOE reforms on urban wage inequality.

Variables	Wage Inequality	Wage Inequality
Share of SOE	-0.0946*** (0.0335)	-0.0921*** (0.0334)
Capital accumulation	0.3264*** (0.0549)	0.3544*** (0.0574)
Trade	-0.0355*** (0.0071)	-0.0354*** (0.0071)
CPI	0.1633* (0.0831)	0.1591 (0.0830)
Share of college students	0.0294*** (0.0107)	0.0319*** (0.0108)
FDI	0.0409*** (0.0085)	0.0419*** (0.0086)
Ageing population		-0.0456 (0.0279)
Constant	4.0000*** (0.6903)	4.2787*** (0.7103)
Fixed effect	Yes	Yes
N	580	580
R <sup>2</sup>	0.2458	0.2479

Notes: \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Standard errors are reported in parentheses. Standard errors are adjusted for clustering at the province level. The data of Chongqing is combined with Sichuan, the data of Hainan is combined with Guangdong.

*Robustness check*

Previous studies have focussed on the effects of a changing population structure on wage inequality. Lam and Levison (1992) describe how the age profile distinctly shapes earnings inequality in the US and Brazil. Deaton and Paxson (1994) show that, in an economy of experiencing both rapid economic growth and population ageing, the impact of population ageing on inequality is very significant. Based on Japanese household survey data from the 1980s, Ohtake and Saito (1998) demonstrate that nearly half the increase in income inequality in Japan can be attributed to population ageing.

Like other countries, China faces rapid population ageing. Only 9% of the population was over the age of 65 in 1990, but by 2030 this proportion is estimated at about 22%, doubling over a

mere 40 years. Thus, we control for the proportion of people aged over 65 in our empirical model. The results (the second column in Table 3) show that the effect of SOE reforms is robust, but the relationship between population ageing and urban wage inequality is not significant.

### ***Detailed decomposition of wage inequality***

The regression results of the last section do not fully describe the relationship between the SOE reform and wage inequality in China. To completely understand and address rising wage inequality in urban China during the great transition, we need to investigate how and why the reform has increased inequality based on the individual-level data.

#### *Empirical methodology*

The Oaxaca-Blinder decomposition method has been widely used (Oaxaca 1973). However, the decomposition results based on this method have been limited to mean decomposition and suffered from a potential bias caused by different reference group settings. The OBRIF decomposition is first introduced by Firpo, Fortin, and Lemieux (2009) and can overcome the pitfalls of the traditional methods and thus allow us to comprehensively calculate urban wage inequality. Equation (2) is the key function of RIF, where  $Y$  is the urban wage in this study  $f(\cdot)$  is the density, and  $q_\tau$  reflects the quantile. The decomposition of unconditional quantiles  $v(Y)$  proceeds as Equation (3) presents. After the decomposition, the differences between two groups are attributed to two sections: composition effect (explained part)  $\Delta X$  and structure effect (unexplained part)  $\Delta S$ .

$$RIF(Y; q_\tau) = q_\tau + \frac{\tau - I(Y \leq q_\tau)}{f_Y(q_\tau)} \quad (2)$$

$$v^1(Y) - v^0(Y) = [v^1(Y) - v^{01}(Y)] + [v^{01}(Y) - v^0(Y)] = \Delta S + \Delta X \quad (3)$$

Moreover, by using the extended reweighting methodology (DiNardo and Pischke 1997), we reweight the wage distribution of non-SOEs workers to make it similar to that of SOEs workers. This facilitates better investigation of the SOE reform in income inequality and estimation of the possible segmentation between the state and non-state sectors.

#### *Baseline results*

We decompose the changing of the Gini coefficient into a composition effect and a wage structure effect. These results are presented in Table 4 by the categories of variables. It is clear that, for both the composition effect and wage structure effect, the SOE reform plays an important role in explaining increasing urban inequality in China. This is consistent with the results based on the provincial data analysis.

There are three comments on this result. First, increasing wage inequality in urban China over the study period was mainly induced by the wage structure effect. Second, the composition effect linked to ownership indicates changes in the ownership structure (the share of SOEs declines while the share of non-SOEs increases) had contributed to the rising urban wage inequality from 1988 to 2013. Finally, the wage structure effect results from the combination of changes in wage determination, institutional segmentation and other factors. We will estimate these three potential mechanisms empirically in the next section.

#### *Robustness check*

As in the robustness check presented in the last section, we consider the effect of a changing population structure on wage inequality in urban China. Specifically, we add the proportion of people over 65 in the total population to our empirical analyses. Our results (see the second column of Table 4) are robust, but the relation between population ageing and urban wage inequality is not significant.

**Table 4.** Detailed decomposition of inequality evolution from 1988 to 2013.

Inequality measures	Gini	Gini (Robustnesscheck)
Overall differential	0.1070*** (0.0220)	0.1070*** (0.0201)
Composition effect	0.0427*** (0.0099)	0.0430*** (0.0094)
Wage structure effect	0.0643*** (0.0217)	0.0640*** (0.0225)
Composition effect		
Ownership	0.0233*** (0.0065)	0.0233*** (0.0065)
Schooling years	0.0026 (0.0024)	0.0026 (0.0028)
Work experience	0.0014* (0.0008)	0.0014 (0.0009)
Male	-0.0004 (0.0005)	-0.0004 (0.0005)
Han	0.0004 (0.0005)	0.0004 (0.0004)
Occupation	0.0081** (0.0038)	0.0082** (0.0035)
Industry	0.0073** (0.0036)	0.0073** (0.0032)
Aging population		0.0002 (0.0002)
Wage structure effect		
Ownership	0.1688*** (0.0255)	0.1686*** (0.0207)
Schooling years	0.0468** (0.0202)	0.0467** (0.0210)
Work experience	0.0878*** (0.0128)	0.0875*** (0.0126)
Male	-0.0092* (0.0049)	-0.0090* (0.0052)
Han	-0.0591*** (0.0221)	-0.0589** (0.0241)
Occupation	0.0173*** (0.0064)	0.0174*** (0.0059)
Industry	-0.0323 (0.0305)	-0.0324 (0.0255)
Aging population		0.0004 0.0010
Constant	-0.1558*** (0.0570)	-0.1562*** (0.0587)

Notes: \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Standard errors are reported in parentheses.

### ***Mechanisms***

Based on the results of the detailed decomposition displayed in Table 4, in this subsection, we

estimate the Mincer function (Mincer and Polachek 1974) and decompose urban wage inequality by year to explain the trajectory of rising wage inequality. To explain rising income inequality in urban China, this paper proposes three convincing potential mechanisms: wage determination, ownership structure, and institutional segmentation.

### *Wage determination mechanism*

In order to better understand wage determination in urban China, we estimate wage functions separately for each of the five years under study.

During the period of the planned economy, the combination of wage scales favoured seniority. The results shown in Table 5 indicate that, after the market-oriented reform, human capital has played an increasingly important role in wage determination (Appleton, Song, and Xia 2005), and the return of the labour force to education generally increased. However, the return of the labour force to education has dropped after 2007. The explanation for the fall in the return to education may lie in the marked expansion of tertiary education starting in 1999, which reduced its scarcity value in the following decade (Appleton, Song, and Xia 2014).

In terms of the return to the value of work experience, the pattern is contrary to our theoretical framework. One possible explanation is that, in the planned economy, the SOE wage determination mechanism was decided by the government, based mainly on the principles of equality and valuing seniority over education and skills. Thus, the return to the value of work experience was higher in 1988. However, since the retrenchment within the state sector in the later 1990s, old workers were significantly more likely to be laid off than others (Appleton et al. 2002), and this caused the decline in the value of work experience among workers. Then in 2013, the return to the value of work experience bounced up.

**Table 5.** Wage determination function.

	1988	1995	2002	2007	2013
Schooling years	0.0251*** (0.002)	0.0334*** (0.003)	0.0600*** (0.004)	0.0769*** (0.006)	0.0592*** (0.007)
Work experience	0.0494*** (0.002)	0.0549*** (0.003)	0.0310*** (0.005)	0.0105** (0.004)	0.0381*** (0.004)
Square of work experience	-0.0007*** (0.000)	-0.0009*** (0.000)	-0.0003** (0.000)	-0.0001 (0.000)	-0.0006*** (0.000)
Ownership (Reference: SOE)					
FIE	0.3247*** (0.071)	0.4572*** (0.138)	0.3448** (0.122)	0.3525*** (0.102)	0.2728*** (0.049)
UCE	-0.1247*** (0.029)	-0.1805*** (0.046)	-0.2532*** (0.025)	-0.0726 (0.053)	-0.0936* (0.045)
DPE	-0.2781*** (0.085)	-0.0201 (0.179)	-0.1021*** (0.032)	-0.1258*** (0.033)	-0.0940** (0.034)
Male	0.1034*** (0.010)	0.1161*** (0.015)	0.1152*** (0.015)	0.2074*** (0.017)	0.2257*** (0.019)
Han	0.0177 (0.038)	0.0680 (0.052)	-0.0409 (0.029)	0.2859 (0.190)	0.1071 (0.062)
Occupation (Reference: Manufacturer)					
Office worker	0.0620*** (0.014)	0.0470 (0.037)	0.0038 (0.027)	0.0256 (0.027)	0.0427 (0.053)
Officer or manager	0.1110*** (0.017)	0.1387*** (0.035)	0.1641*** (0.046)	0.3403*** (0.056)	0.2440*** (0.049)
Professional or technician	0.0853*** (0.018)	0.1249*** (0.034)	0.1642*** (0.034)	0.2010*** (0.035)	0.2349*** (0.036)
Others	-0.3915*** (0.129)	-0.0532 (0.037)	-0.1699** (0.075)	-0.0917 (0.066)	0.0459 (0.053)

Industry (Reference: Primary)					
Manufacturing	0.0197 (0.048)	0.0263 (0.077)	-0.1122** (0.049)	-0.0029 (0.084)	0.0752 (0.058)
Mining and geological survey and prospecting	0.0084 (0.062)	0.0317 (0.103)	0.0325 (0.041)	-0.0472 (0.099)	0.1363* (0.069)
Construction	0.0372 (0.045)	0.0570 (0.079)	-0.0169 (0.101)	0.0276 (0.069)	0.1708** (0.075)
Transport/communications/posts /telecommunications	0.0809 (0.079)	0.1358 (0.087)	0.0859 (0.072)	0.0898 (0.069)	0.0718 (0.066)
Wholesale and retail	0.0404 (0.087)	-0.0166 (0.082)	-0.1733** (0.071)	-0.0337 (0.078)	0.0727 (0.072)
Public utilities and real estate	-0.0563 (0.078)	0.0548 (0.100)	0.1423 (0.091)	0.1747** (0.061)	0.0813 (0.090)
Social services and welfare	-0.0140 (0.057)	0.1220 (0.081)	-0.0580 (0.066)	-0.1066 (0.060)	-0.1089 (0.076)
Education and media	-0.0356 (0.046)	0.0991 (0.074)	0.0697 (0.050)	-0.0024 (0.061)	-0.0797 (0.075)
Scientific research and technical services	0.0171 (0.046)	0.0795 (0.095)	0.2473** (0.105)	0.0868 (0.137)	0.1845*** (0.053)
Finance and insurance	-0.0018 (0.042)	0.3029*** (0.070)	0.1722* (0.086)	0.2339*** (0.062)	0.2381*** (0.061)
Public sectors	-0.0446 (0.057)	0.0592 (0.079)	0.0601 (0.055)	0.0875*** (0.024)	-0.0464 (0.083)
Others	-0.0945 (0.080)	-0.0446 (0.057)	0.0219 (0.135)	0.1333 (0.075)	0.1056 (0.079)
Constant	7.6840*** (0.081)	7.7280*** (0.128)	8.3018*** (0.081)	8.5375*** (0.216)	8.9149*** (0.092)
N	17,212	10,597	9,322	5,766	6,861
R <sup>2</sup>	0.324	0.233	0.263	0.225	0.214

Notes: \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01. Standard errors are reported in parentheses.

As shown in Table 5, different types of ownership tend to have distinct wage-setting mechanisms. In fact, the substantial increase in the return to skills provides a channel that leads to the overall urban wage inequality. We prove this pattern through the RIF regression by comparing the different wage determination mechanisms between SOEs and FIEs (see Table 6). This result is consistent with the literature (e.g. Démurger, Li, and Yang 2010). Prior to the market reform, the relation between education and wages was weak in the public sector (Gustafsson and Wan 2020), and SOEs encouraged egalitarianism in wage setting during this period. Lin, Cai, and Li (1998) explain that SOEs bore a heavy burden from the retirement pensions and the costs of social welfare and redundant workers. During this time, the objective of SOE managers was not maximisation of profits but maximisation of the stability and welfare of workers based on the soft budget constraint theory. Walder (1987) finds that even in the case of operating losses, SOEs still issued high bonuses to employees through bank loans. However, in the private sector, workers' payment was determined mainly by productivity.



**Table 6.** RIF regression based on quantile.

	Q10		Q50		Q90	
	SOE	FIE	SOE	FIE	SOE	FIE
Schooling years	0.0521*** (0.002)	0.1163*** (0.025)	0.098*** (0.002)	0.1144*** (0.012)	0.1145*** (0.003)	0.0970*** (0.015)
Work experience	0.0606*** (0.001)	0.0762*** (0.022)	0.050*** (0.002)	0.0320*** (0.010)	0.0247*** (0.003)	0.0476*** (0.013)
Square of work experience	-0.0009*** (0.000)	-0.0013** (0.001)	-0.001*** (0.000)	-0.0004 (0.000)	-0.0000 (0.000)	-0.0007* (0.000)
Male	0.0841*** (0.008)	-0.0022 (0.129)	0.098*** (0.011)	0.2228*** (0.060)	0.1741*** (0.015)	0.1976** (0.077)
Han	-0.0030 (0.020)	0.1048 (0.370)	0.063** (0.028)	0.1515 (0.172)	0.1611*** (0.037)	-0.2200 (0.222)
Office worker	0.0772*** (0.011)	0.4528*** (0.175)	0.049*** (0.016)	0.5322*** (0.081)	0.2951*** (0.021)	0.4247*** (0.105)
Officer or manager	0.1178*** (0.016)	0.1809 (0.308)	0.006 (0.022)	0.5203*** (0.143)	0.1814*** (0.030)	0.5318*** (0.184)
Professional or technician	0.0975*** (0.013)	0.4246** (0.193)	0.003 (0.018)	0.6251*** (0.090)	0.2913*** (0.024)	0.5866*** (0.116)
Others	0.2030*** (0.025)	0.3760 (0.277)	0.548*** (0.035)	0.6949*** (0.129)	0.8312*** (0.047)	0.3392** (0.166)
Manufacturing	-0.0392 (0.033)	-0.5645 (0.679)	-0.131*** (0.046)	-0.0484 (0.315)	-0.2700*** (0.062)	-0.0742 (0.407)
Mining and geological survey and prospecting	0.0740** (0.037)	-0.2414 (0.954)	0.091* (0.052)	0.0397 (0.443)	0.0984 (0.070)	0.5679 (0.572)
Construction	-0.0242 (0.039)	-0.3468 (0.842)	-0.065 (0.054)	-0.1393 (0.391)	0.0381 (0.073)	-0.4641 (0.505)
Transport/communications/posts /telecommunications	0.0631* (0.035)	0.1006 (0.697)	0.240*** (0.048)	0.2777 (0.324)	0.2504*** (0.065)	0.0224 (0.418)
Wholesale and retail	-0.1247*** (0.034)	-0.7134 (0.688)	-0.180*** (0.048)	-0.2524 (0.320)	-0.3135*** (0.064)	-0.2857 (0.413)
Public utilities and real estate	-0.0481 (0.041)	-0.5237 (0.725)	-0.024 (0.058)	0.2048 (0.337)	0.0198 (0.077)	-0.1161 (0.435)
Social services and welfare	0.0467 (0.035)	-0.5588 (0.742)	0.280*** (0.048)	-0.2644 (0.345)	0.1814*** (0.065)	-0.1249 (0.445)
Education and media	-0.0246 (0.034)	-0.4307 (0.925)	0.079* (0.048)	-0.2628 (0.430)	0.0272 (0.064)	-0.4702 (0.555)
Scientific research and technical services	0.0070 (0.040)	-0.4042 (0.807)	-0.096* (0.056)	0.0362 (0.375)	0.0056 (0.075)	-0.1517 (0.484)
Finance and insurance	0.1083*** (0.039)	-0.1362 (0.777)	0.408*** (0.055)	0.4379 (0.361)	0.4016*** (0.074)	0.3613 (0.466)
Public sectors	-0.0104 (0.034)	-0.3668 (1.031)	0.089* (0.047)	0.0403 (0.479)	0.0761 (0.063)	-0.2662 (0.618)
Others	0.1749*** (0.045)	-0.7164 (0.777)	0.828*** (0.062)	-0.3787 (0.361)	0.7363*** (0.084)	-0.5324 (0.466)
Constant	7.0045*** (0.044)	6.9807*** (0.863)	7.141*** (0.061)	7.7348*** (0.401)	7.9729*** (0.082)	9.2217*** (0.518)

Notes: \*p< 0.1, \*\*p< 0.05, \*\*\*p< 0.01. Standard errors are reported in parentheses.

### *Ownership structure*

In terms of the importance of changes in ownership structure in explaining increasing urban wage inequality, the composition effect linked to ownership displayed in Table 7 captures this point. The results manifest that the proportion attributed to the ownership structure had

considerably increased from 1988 to 2007. In other words, the reallocation of labours from the public sector to the private sector had played a major role in increasing urban wage inequality.

**Table 7.** The effects of the changes of ownership structure on inequality.

Inequality measures	1995-1988	2002-1995	2007-2002	2013-2007
Overall differential	0.0630*** (0.0091)	0.0410*** (0.0131)	0.0348* (0.0072)	-0.0008 (0.0011)
Composition effect	0.0026 (0.0035)	0.0017 (0.0030)	0.0109 (0.0099)	0.0004 (0.0003)
Wage structure effect	0.0604*** (0.0085)	0.0392*** (0.0135)	0.0238 (0.0148)	-0.0012 (0.0012)
Ownership (Composition effect)	0.0014* (0.0008)	0.0068*** (0.0023)	0.0091** (0.0044)	0.0002 (0.0002)
Ownership (Wage structure effect)	0.1583*** (0.0417)	0.0237 (0.0431)	0.0042 (0.0146)	-0.0018 (0.0011)

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are reported in parentheses.

### *Institutional segmentation*

As mentioned in our analytical framework, institutional segmentation consists of two parts: one is the segmentation between SOEs and non-SOEs, and the other is the monopoly. Though we cannot identify the characteristics of the segmentation and monopoly between SOEs and non-SOEs directly due to data limitation, the wage structure effect of decomposition between SOEs and non-SOEs can capture the wage inequality caused by institutional segmentation from 1988 to 2013.

Table 8 shows that there exists a sizable institutional division between SOEs and non-SOEs. However, with the development of market reforms, the explanatory power of wage structure effects had decreased gradually over the study period (55.38% in 1988, 45.11% in 1995, 30.76% in 2002, 29.44% in 2007, and 14.14% in 2013), which is consistent with our analytical framework.

**Table 8.** Decomposition of the wage gap between SOEs and non-SOEs.

	1988	1995	2002	2007	2013
Overall differential	0.2257*** (0.0363)	0.2984*** (0.0627)	0.3472*** (0.0382)	0.2204*** (0.0359)	0.2652*** (0.0283)
Composition effect	0.1008*** (0.0109)	0.1638*** (0.0127)	0.2403*** (0.0191)	0.1555*** (0.0306)	0.2277*** (0.0257)
Wage structure effect	0.1250*** (0.0308)	0.1346** (0.0592)	0.1068*** (0.0301)	0.0649*** (0.0245)	0.0375*** (0.0360)

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are reported in parentheses.

The extant studies have tried to demonstrate the cause for institutional segmentation. Following the ‘seizing the large, releasing the small’ principle, the economic reform after 1999 has turned many large SOEs into firms with greater monopoly capabilities. As a result, SOEs dominate the key economic sectors, such as telecommunications, banking, energy and transportation. They have the power to steer prices and retain monopolistic profits. The wage expense in the monopoly sector is not in accordance with the marginal product of labours. Researchers confirm that the remaining monopolistic SOEs typically capture sizable rents and improve the wages of their employees through rent sharing (Knight and Song 2003). Even during mass layoffs, these firms had raised the wages of their workers (Appleton, Song, and Xia 2005). Based on the 1985-1992 firm data, Meng (2000) finds that retained profits were the main determinant type of wages in SOEs. The industrial or administrative monopoly is the source of

the ‘premium’ in the state sector, which enjoys excess profits and uses the profits to increase the wages. This is mainly because the state-owned monopoly sector relies on the possession of resources and administrative privileges, and because it adopts non-market measures to obtain excess profits and increase employees’ wages. At the same time, through a monopolistic control of market prices, the cost of high wages and high profits within the sectors are passed directly on to consumers or the government.

## 6. Conclusions

This study uses the regional-level panel data and individual-level data from the five CHIP surveys to estimate the impact of SOE reforms on wage inequality in urban China. The results show that the overall inequality increased with the reduction in the share of SOEs. Moreover, via detailed decomposition, this study generates consistent and robust results. We construct a theoretical framework based on the theory of soft budget constraint by considering three potential mechanisms, i.e. wage determination, ownership structure and institutional segmentation, to explain these findings. Over the study period, increasing wage inequality in urban China was mainly caused by the wage structure effect. After the market reform, the return of the labour force to education has increased generally, and institutional segmentation is of less significance in explaining the wage gap between SOEs and non-SOEs. As for the change in the ownership structure, it plays an important role in explaining the trend of wage inequality. However, an increase in ageing population has no significant effect on the trajectory of urban wage inequality.

This study has several limitations. One is the measurement error at the top of the wage distribution in the income survey (Piketty, Yang, and Zucman 2019). This may have led to underestimations of wage inequality. Another problem is that, due to sample limitations in the early rounds of the CHIP surveys, we cannot identify the effect of wage inequality on rural–urban migrants from 1988 to 2013, for which we exclude the group of rural–urban migrants in our analysis. In fact, the increase in rural–urban migrants during the study period profoundly affected urban wage inequality (Zhang and Wu 2017). Even though this sample is restricted to individuals with urban household registration (*hukou*), they have been also influenced, either positively or negatively, by the migrant population in terms of wage determination (Appleton, Song, and Xia 2014).

Considering the monetary value of *hukou*, it is difficult to determine the extent to which these results are biased (Xing 2012). Despite these limitations, however, the results of this study point to a relationship between the SOE reform and wage inequality in urban China.

Moreover, China will soon implement the ‘Three-year Action Plan’ from 2020 to 2022 to further strengthen competition and advance the privatisation of SOEs. There is no doubt that this reform will further affect the wage determination mechanism, ownership structure and institutional segmentation. Considering the potential negative shocks to the labour market caused by a continuously ageing population, future research on SOEs will thus become ever more imperative.

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