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Established on December 20, 2009, IMI is a non-profit academic institution affiliated to China Financial Policy Research Center and the School of Finance of Renmin University.

Following the "general theory of macro-finance", IMI aims to become a world-class think tank, focusing on the studies of international finance, in particular the international monetary system and RMB internationalization. Despite its relatively short history so far, IMI has established itself as a leading research institution and important forum, where industry leaders, policy makers and academic experts from home and abroad share their insights and expertise.

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Special Column on China's NPC and CPPCC Sessions

Reform, Opening-up and People-centered Development will Continue to Drive Progress*

By CHINA DAILY EDITORIAL

In his report on government work, which opened this year's annual session of the National People's Congress, Premier Li Qiang introduced the hard-won achievements of 2024 and set a practical government agenda for 2025.

Despite the external pressures and internal difficulties, the economy made steady progress last year, and the major goals of socioeconomic development were "smoothly accomplished", he said. With the emphasis on stability, innovation and balanced growth, Li outlined a road map for China's high-quality development for 2025 that seeks to tap the potential of market economy while taking full advantage of the "visible hand" of the government. Underscoring the nation's resolve to maintain stability while pursuing progress, the report sets a target of "around 5 percent" GDP growth and the creation of over 12 million jobs.

At the heart of the report is a strong focus on boosting domestic demand, which is identified as the top priority for 2025. By stimulating consumer spending and encouraging private sector investment, the government aims to counter slowing economic growth and create a robust internal market.

Measures to increase personal incomes, reduce financial burdens and improve the consumption environment are aimed at unlocking the potential for diversified and upgraded spending. Efforts will also be made to boost private investment and green consumption to further drive demand and consolidate domestic consumption's role as the main engine of growth.

Innovation remains a cornerstone of China's development strategy. The report highlights fully leveraging the country's ability to mobilize resources nationwide to intensify the push for breakthroughs in core technologies in key fields, R&D advancements in frontier and disruptive technologies, and to accelerate forward-looking planning for major science and technology projects.

The advancement of strategic emerging sectors such as biomanufacturing, quantum technology, and 6G is to be fostered and service-oriented manufacturing promoted. To further unleash the potential of the digital economy, the integration of artificial intelligence will be promoted across industries. And by leveraging the strengths of high-tech enterprises and facilitating collaboration among industries, universities and research institutes, China aims to achieve breakthroughs in core technologies and enhance its global competitiveness.

To promote more balanced development, the central government will regulate local investment policies and promote coordinated industrial planning. By addressing local debt concerns and regulating irrational market competition, the government aims to boost regional development vitality while preventing overcapacity.

Fiscal and monetary policies are to be fine-tuned to support less-developed areas, and advance new urbanization and all-around rural vitalization.

Reforms in key areas will seek to remove institutional barriers, foster a fairer market environment, and stimulate the vitality of market entities, with the reform of State-owned enterprises to be deepened and policies and measures implemented that are designed to spur the growth of the private sector.

Li also indicated the government's willingness to provide more policy support for the property sector. With local debt considered to be less of a risk, the property market, a critical pillar of the economy, is to

* Published at China Daily on 5 March 2024.

receive targeted support with monetary policy instruments refined and new ones developed to provide stronger support for its healthy and sustainable development.

China's journey toward high-quality development is not just a national endeavor but a contribution to global stability and growth. By staying true to its new "innovative, coordinated, green, open and shared" development philosophy, China is poised to achieve the goals of its 14th Five-Year Plan (2021-25) and set an example for sustainable and inclusive development in the 21st century.

China's commitment to high-standard opening-up remains unwavering. By advancing opening-up in sectors such as telecommunications, healthcare and education, the government aims to attract foreign investment and strengthen international cooperation. Li indicated that pilot free trade zones are to be granted greater reform powers to improve the business environment in order to ensure that China remains a favored destination for global investors. High-quality Belt and Road cooperation is also being prioritized, with a focus on both large-scale projects and smaller, impactful initiatives that enhance public well-being.

Balancing immediate economic stability with longer-term strategic goals, the Government Work Report reflects the national leadership's clear vision for realizing high-quality development as the nation navigates the global headwinds and domestic challenges.

China Has Just Raised Its Debt Ceiling^{*}

By HERBERT POENISCH^{*}

Parliamentary sessions reveal everything is subordinate to growth

China's National People's Congress and the Chinese People's Political Consultative Conference met in early March to lay down the country's main economic targets for 2025. As expected, the main target is once again real gross domestic product growth at around 5% and consumer price index inflation of around 2%. This real growth will have to be achieved by an increase in the deficit to GDP ratio of 4%, up from the previous 3%. Special local government bond quotas will be allowed to increase by 4.4%, compared with 3.9% previously.

These debt indicators are comparable to the debt ceiling in the US and the Maastricht criteria in the euro area. China has always paid attention to limiting the general fiscal deficit to 3%. The local government financing requirement has always remained below the radar as local governments were not allowed to borrow. However, as the main source of local government revenues (some 80%), the allocation of land use has dried up since the onset of the real estate crisis and borrowing through local government financing vehicles has skyrocketed.

The Chinese government has addressed this problem by allowing sub-national governments to issue bonds within the local government bond quotas to swap their hidden LGFVs for official bond issues and to refrain from using this shadow financing channel to cover their current financing needs. The LGFVs were mainly held by banks and insurances. However, direct bank lending has also replaced the issue of LGFVs.

According to the most recent International Monetary Fund Article IV Consultations in mid-2024, China's general government borrowing rose rapidly to an estimated 60.5% of GDP in 2024 from 38.5% in 2019. Augmented debt, which includes LGFVs, has increased to 124% of GDP from 86.3%. The share of local government debt rose to more than 60% of GDP from close to 50%. The overall non-financial debt increased to 312% of GDP in 2024 from 245%, putting China among the most indebted countries.

On the reverse side of the coin, the increase in M2 money supply (annex 4 of the IMF report) is running at twice the growth in real GDP. At the same time the CPI is running close to deflation (negative in February 2025), a conundrum in itself.

Can China reach its growth target?

The recent parliamentary decisions tell us that everything is subordinate to the real GDP growth target of around 5%. However, this growth has to be supported by an accommodating monetary policy and by a higher debt to GDP ratio of 4% as adopted by the NPC.

The People's Bank of China has been pursuing this accommodative monetary policy already over the past two years to boost sagging economic growth. The bank purchased a record supply of newly issued government bonds last year, without calling it quantitative easing. However, this was suspended at the beginning of 2025 as yields fell to record lows and the renminbi depreciated. Regional banks and institutional investors continued buying these additional bonds issued. In early 2025, the PBoC also supplied record liquidity in the money market to support bank lending, which is supposed to pick up.

The open question is whether all these measures will stimulate real economic activities such as borrowing by the private sector to boost private consumption and investment. In view of the uncertain export prospects and lack of confidence in the domestic market, the growth objective might be even more elusive than before.

^{*} Published on 11 March 2025.

^{*} Herbert Poenisch is Senior Research Fellow, Zhejiang University, and former Senior Economist, Bank for International Settlements.

Proactive Fiscal Policy Projects Confidence^{*}

By LI YANG

Apart from setting the annual growth target of this year at around 5 percent, the same as that of the past year, which the country managed to realize, another noticeable point of the Government Work Report submitted to the country's top legislature for deliberation on Wednesday is that the country's Cabinet proposes to set the Chinese government's deficit ratio at around 4 percent this year, 1 percentage point higher than last year.

The deficit ratio is a major weather vane to measure the orientation of fiscal policy. In the past decade, the government deficit ratio of China has fluctuated between 2.3 percent and 3.8 percent.

The proposed increase in the deficit ratio is a strong signal that China will implement a more active fiscal policy this year in the face of the external and internal headwinds. A more proactive fiscal policy, if well implemented, will be conducive to promoting steady and sustainable growth of the economy.

The raising of the deficit ratio, an important means of macroeconomic regulation and a common practice in countries around the world to strengthen countercyclical regulation of the macroeconomy, is expected to help the government effectively smooth economic fluctuations.

Raising the fiscal deficit ratio can effectively expand the scale of fiscal expenditure, and the expansion of government spending will have a multiplier effect, stimulating demand from all sectors of society and further boosting economic recovery.

This is conducive to stabilizing employment and can better support scientific and technological innovation, and promote the optimization and adjustment of the economic structure.

Despite the immediate effect it can produce, the raising of the deficit ratio is by no means a hasty decision. The policymakers have done a lot of homework before determining the proposed deficit ratio. In the process, they will have comprehensively considered factors such as the overall needs of national development, the macroeconomic growth potential, macroeconomic regulation arrangements, the fiscal revenue and expenditure situation, and medium-and long-term fiscal sustainability.

Despite this, the country's lawmakers can still carry out further deliberation and analysis on the proposal to determine how the increased government spending should be used to better realize its intended effect.

Notably the Chinese government's debt ratio is lower than that of major economies as well as the emerging market countries. Its debt risks are generally controllable, providing it with enough room and necessary conditions for enhancing the deficit ratio.

^{*} This article first appeared on 7 March 2025.

China's Economy

The Strategic Contest in China–U.S. Macroeconomic Policy^{*}

By XIAO GENG^{*}

Editor's Note

On February 19, 2025, the 8th Annual World Finance Forum and 2025 Academic Symposium on Global Economic and Financial Trends was held in Xuhui, Shanghai. With the theme “Seeking Anchors of Peace, Stability, and Growth in a World of Crisis, Turbulence, and Transformation,” the forum brought together over 200 global leaders from the fields of economics and finance, heads of financial institutions, scholars, and business representatives to explore the path and prospects of the world economy and finance in 2025.

At the thematic session titled “The Leap of Cross-Border Payments and the Rise of Digital Currencies,” Professor Xiao Geng—Professor of Practice and Associate Dean at the School of Public Policy, Chinese University of Hong Kong (Shenzhen), and Chairman of the Hong Kong Institution for International Finance—delivered a keynote speech. He unveiled the hidden functions of money as a regulatory instrument and as the foundation of asset pricing, and warned of the risks stemming from imbalances in monetary power between China and the United States amid intensifying Strategic Contest in China–U.S. Macroeconomic Policy.

What follows is a curated transcript of Professor Xiao's remarks.

Money as a Regulatory Instrument and Anchor of Asset Pricing

According to traditional theory, money serves three primary functions:

- (1) a unit of account,
- (2) a medium of exchange,
- (3) a store of value.

However, in today's world, money plays two additional but often overlooked roles. The first is its function as a regulatory instrument—for example, the United States exercises long-arm jurisdiction largely through the regulation and control of the dollar-based financial system. The second is its value as the anchor of asset pricing—a function that underpins how assets are valued across markets.

These two hidden roles of money have become increasingly significant amid current global macroeconomic shifts. Problems arising from these roles are also becoming more pronounced—such as the weaponization of monetary regulation and the disconnect between monetary value in financial markets and its real-world purchasing power. These developments mark a clear departure from the mechanisms and standards envisioned under the Bretton Woods system established after World War II.

What does it mean for money to function as a regulatory instrument in the era of digital economies? If digital currencies cannot be regulated, they are unlikely to serve as money in the traditional sense. Instead, they would be more like collectibles—similar to antiques—with limited monetary utility. For digital currencies to function as real money, deep involvement from central banks and governments is essential.

Money as the Foundation of Asset Pricing: A Stark Contrast in China–U.S. Macroeconomic Policies

Today, what needs to be emphasized is the foundational role of money in asset pricing—as the root infrastructure that supports valuation systems. Why highlight asset pricing now? Because the contrast between how the U.S. and China approach currency-based pricing models has become increasingly pronounced.

^{*} This article was originally written in Chinese and has been translated into English by Liu Chenyang.

^{*} Xiao Geng, Chairman of the Hong Kong Institution for International Finance, is a professor and Director of the Institute of Policy and Practice at the Shenzhen Finance Institute at The Chinese University of Hong Kong, Shenzhen.

For an extended period, the United States has pursued a strong-dollar policy, coupled with aggressive macroeconomic stimulus and high returns on dollar-denominated assets—a comprehensive package of monetary and fiscal measures. In contrast, China has followed a markedly different path in recent years: a weak-RMB policy, limited macro stimulus, and low returns on domestic assets. This policy mix in China remained largely unchanged until September 2024. The sharp divergence between China and the U.S. in macroeconomic strategy has had serious consequences. Why are so many Chinese companies going global? Simply put: go global or go left behind. At home, businesses face two major macroeconomic challenges: persistent deflation, and the depreciation of the RMB relative to the U.S. dollar.

The U.S. dollar, as the world's primary reserve currency, has in recent years strayed far from the characteristics such a currency is expected to uphold. A global reserve currency is not supposed to coexist with 8% inflation, fiscal deficits ranging from 8% to 14%, and a staggering \$35 trillion in government debt. The current macroeconomic conditions in the U.S.—and the dollar's behavior within them—undermine its credibility as a reserve currency and make it difficult to imagine building any future Bretton Woods-like system based on the dollar. In response, China, Europe, and others countries have no choice but to go their own way.

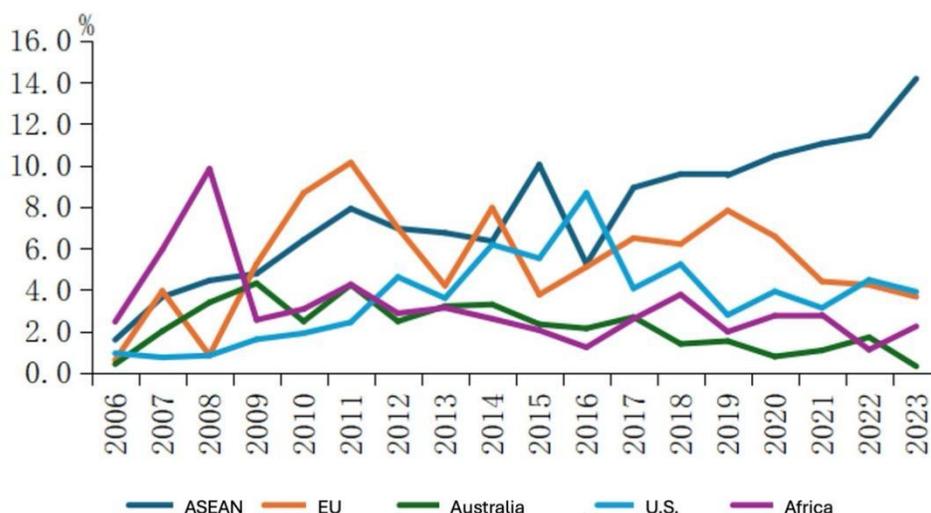
For China, the top priority is to preserve the RMB's role as a foundation for asset pricing—which means avoiding a depreciation trend against the U.S. dollar. If such a depreciation takes hold, then China's real estate market, equity market, and even human capital may all face downward revaluation at the macro level. This kind of systemic macro-level devaluation goes beyond what economic agents can rationally anticipate. It cannot be explained by economic fundamentals alone. Rather, it reflects a convergence of external geopolitical pressures and internal policy misalignment. If foreign capital withdraws, the RMB tends to depreciate in the highly speculative global foreign exchange markets. However, the actual share of foreign investment in China's economy is relatively low. According to basic economic principles, a currency with stronger purchasing power should be more valuable. Yet, the domestic purchasing power of the U.S. dollar is effectively declining due to inflation, while the RMB's domestic purchasing power is effectively rising due to deepening deflation in China. So why is the RMB losing value against the dollar in international currency markets? From the perspective of traditional economic logic, it simply doesn't make sense.

According to international trade and payment theory, the currency of a trade surplus country—like China—should appreciate, while the currency of a trade deficit country—like the United States—should depreciate. Yet in reality, the opposite is happening: the U.S. dollar is appreciating, while the RMB is depreciating. This economically irrational depreciation of the RMB has led to a striking outcome: Chinese exports have become too cheap. So cheap, in fact, that many countries find it hard to believe that such high-quality products could be offered at such low prices. As a result, some Chinese goods—such as electric vehicles and solar products—have captured 60% to 80% of global market share.

The relatively low prices of Chinese exports are not directly caused by deflation, but rather stem from a combination of multiple factors, such as weak domestic demand and exchange rate dynamics. When demand at home weakens for various reasons, Chinese companies face mounting pressure in the domestic market and naturally look abroad to expand their business. In overseas markets, products are typically priced in U.S. dollars. If dollar-denominated assets offer higher short-term returns, Chinese investors may engage in carry trades—selling RMB assets in favor of dollar assets. This behavior, in turn, leads some outbound companies and investors to develop a cognitive bias: the belief that investing abroad, particularly in U.S. dollar assets, is a guaranteed path to higher returns. Ironically, this forced internationalization only further accelerates the broad depreciation of the RMB and RMB-denominated assets, deepening China's overall asset deflation.

Against this backdrop, the RMB—as one of the key currencies in the global economy—faces two major challenges. First, how can the People's Bank of China effectively regulate digital currencies? Second, how can the central bank and the Ministry of Finance ensure that the RMB's asset pricing system remains stable and insulated from deflation and exchange rate depreciation? These two functional challenges have not received the attention they deserve in the past.

Changes in the proportion of China's direct investment across major economies



Source: Yicai Research Institute; Wind

Macroeconomic Trends Under China–U.S. Competition and China’s Policy Response

Looking ahead, deflation and currency depreciation have become two major straitjackets, posing serious threats to macroeconomic stability.

After several years of enduring deflationary pressure and persistent expectations of RMB depreciation, households, businesses, and local governments are now widely facing tight liquidity conditions—hindering both investment and consumption. The core issue is this: their savings and asset values have already been eroded by deflation and currency depreciation, yet they are still burdened with relatively high debt repayments. This mismatch has further deepened structural tensions between the government, society, and the broader market. While economically advanced cities like Hangzhou and Shenzhen may still be able to support select key enterprises against the tide, the majority of regions and companies continue to struggle under mounting pressure.

At this point, China must prioritize the preservation of the RMB’s foundational role in asset pricing, ensuring there is no sustained depreciation trend against the U.S. dollar. Without sound policies addressing this core monetary issue, it will be difficult for other micro-level or structural policies to deliver their intended effects. As long as deflation persists and the abnormal depreciation of the RMB remains unresolved, the average value of RMB-denominated assets will remain suppressed, dragging down the property market, equity market, and even human capital. Therefore, a bolder shift in macroeconomic policy is urgently needed—one that moves more decisively toward moderate inflation and RMB appreciation, to support sustainable and stable economic growth.

China – Positive Looking Forward – 2025 and Beyond*

By PETER KOENIG*

The Chongyang Institute for Financial Studies at Renmin University of China (RDCY) has successfully completed several studies in 2024 which contributed to China's success story for 2024, and, in addition had an international flair.

Main studies included,

- Policy briefs for key decision-makers;
- Hosting,

(i) the Tongzhou Global Development Forum, drawing over 1000 participants, to discuss the future of global development, security, and sustainability; (ii) the China-Latin American and Caribbean (LAC) States Roundtable on Human Rights in Rio, Brazil;

- RDCY's global presence, visiting 17 countries, engaging with political leaders, strengthening global partnerships, and advocating for peaceful cross-border collaboration; and

- Finally, contributing to Chinese and international academia with the publication of multiple books and articles translated into several languages, on burning international socioeconomic issues, such as international finance, development economics and reforms, with outlooks to 2029, 2035 and 2050.

The studies vision of the future are providing a formidable reflection of China's continuous outstanding socioeconomic performance domestically as well as internationally.

The outlook for China in 2025 and beyond, is as bright as it was in 2024.

In 2023 China embarked on her sixth reform since 1979. It involves economic restructuring by modernization and further opening-up. China's periodic reforms mean extraordinary flexibility for adjusting her 1.3 billion-people-economy to ever-changing international circumstances.

In 2025 and beyond, China's focus will remain on Global South markets, including the nine-country BRICS association, as well as on the different ASEAN Free Trade Agreements and on APEC. The Asia-Pacific Economic Cooperation is an intergovernmental organization, promoting trade and investment in the Asia-Pacific region. APEC is closely linked to the Belt and Road Initiative (BRI).

At the same time China will concentrate on her huge domestic market.

These forward-looking strategies may render China more robust and independent from the sanctioning dollar-economy, while opening new markets in the Global South, i.e., in Africa and South America.

Chinese international competitiveness is practically unbeatable. Therefore, president-elect Donald Trump's tariff-threats, copied by vassalic Europe, will hardly impact China's economic growth. To the contrary, the west is losing an important trading partner. The European Union is blocking a formidable opportunity for Europe's stable trade and growth, thereby pulling western economies further down the drain.

Because of these nonsensical western globalist policies, the west has been declining for at least the last three decades, accelerating to warp speed in the last 5 years.

Independently of President Trump, a new era is dawning which may change everything, and President Xi's idea of a new Eurasian market, initiated by the BRI, may reemerge for the benefit of all.

Meanwhile, BRI will continue moving forward. In November 2024, the new, fully China-funded, and managed Peruvian port of Chancay was inaugurated under the banner of BRI. The merchant harbor, one of the largest on the South American Pacific Coast, is expected to pool exports and imports of several South American countries, thereby promoting new markets and economic growth for Latin America, as well as Asia, including China.

* Published on 7 January 2024.

* Peter Koenig, economist geopolitical analyst. He is a non-resident Senior Fellow of the Chongyang Institute of Renmin University, Beijing. Peter Koenig is a geopolitical analyst and a former Senior Economist at the World Bank and the World Health Organization (WHO), where he worked for over 30 years around the world. He is the author of *Implosion – An Economic Thriller about War, Environmental Destruction and Corporate Greed*; and co-author of Cynthia McKinney's book "When China Sneezes: From the Coronavirus Lockdown to the Global Politico-Economic Crisis" (Clarity Press – November 1, 2020).

In the years ahead, China's position and strive for peaceful growth and peacefully connecting the world in time of wars and conflicts, is exemplary and may lead China to take on a more important role in mediating for international Peace-making.

Open China Continues to Drive Global Growth*

By MAYA MAJUERAN*

China's economy exhibited remarkable resilience and adaptability in 2024, maintaining its growth momentum and achieving a growth of 5 percent despite the domestic and external challenges. The growth rate is in line with the government's GDP growth target of "around 5 percent". According to the National Bureau of Statistics data, China's GDP reached 134.91 trillion yuan (\$18.80 trillion) in 2024.

The Chinese government has implemented several policies to boost domestic demand and maintain financial stability. These policies have not only facilitated growth in key economic areas, including industrial output, but also, to some extent, helped stabilize the real estate market.

Through targeted reforms, fiscal support, strengthened trade relations, promotion of innovation and implementation of strategic economic initiatives, China has boosted domestic confidence. These developments have consolidated China's pivotal role in shaping the global economy and influencing technological advancement.

China accounted for nearly 30 percent of global economic growth last year, profoundly impacting the global economy. China's contribution reaffirms its status as a leading economic powerhouse, and highlights its critical role in advancing international trade, fostering investment and driving technological innovation.

China's foreign trade reached a record high in 2024, with its total value reaching 43.85 trillion yuan, up 5 percent year-on-year. Exports increased by 7.1 percent year-on-year to 25.45 trillion yuan while imports grew by 2.3 percent to 18.39 trillion yuan.

China's growth generates ripple effects across multiple sectors, including manufacturing, technology and services. Its strong economic performance stabilizes global markets, creates demand for exports from other countries, and helps the economic recovery of regions most affected by the COVID-19 pandemic.

China's contribution to global growth in 2024 further cemented its prominent role in post-pandemic global recovery. Notably, China's growing imports are helping developing countries to boost their exports and expedite their economic recovery. By granting zero-tariff treatment to all least-developed countries with diplomatic ties with China, the country has shown its commitment to fostering global economic development and acting as a responsible economic partner.

This policy not only strengthens trade ties with these countries but also helps them integrate into the global economy, promoting sustainable growth and helping reduce poverty. A major driver of Chinese exports continues to be the Global South, especially countries involved in infrastructure projects under the Belt and Road framework. In fact, in 2024, Belt and Road countries accounted for more than 50 percent of China's total foreign trade for the first time. This underscores the growing importance of the Belt and Road Initiative in strengthening trade ties and economic cooperation between China and other developing countries, consolidating the country's role as a key player in global trade and infrastructure development.

China has been expanding its export markets in the Global South, promoting mutually beneficial trade. While the Global South seeks access to China's vast market for its raw materials, China's investment in infrastructure under the Belt and Road framework creates for these countries critical development opportunities, fostering economic growth and connectivity. This synergy not only strengthens trade ties but also promotes sustainable development and economic cooperation, benefiting both China and its trade partners in the Global South.

China's exports to the United States now account for 15 percent of the total, down from 20 percent in 2018, which shows China is not solely reliant on the US for its exports' growth. At the same time, China remains the most cost-effective source of many products imported by the US, significantly benefiting US consumers and manufacturers. As a matter of fact, this dynamic supports many US jobs, highlighting the interconnectedness and mutual benefit of the China-US trade relationship despite the shifting global dynamics.

The diversification of China's foreign trade underscores its growing focus on expanding ties with the Global South and Belt and Road-partner countries, and shows that the country is reducing its reliance on the traditional Western markets, the US and the European Union in particular.

* This article first appeared at China Daily on 18 January, 2025.

* The author is director of BRISL, an independent and pioneering Sri Lanka-based organization that specializes in the Belt and Road Initiative.

More important, China's rapid technological advancements cannot be hindered by unethical trade barriers or baseless investigations, measures often perceived as attempts to curb China's peaceful rise. China will continue to promote innovation and strengthen its position as a global leader in trade and technology, while diversifying its export portfolio by focusing on high-tech products, including electric vehicles, 3D printers and industrial robots, all of which are experiencing strong growth — thus transforming the country from a manufacturer of low-cost goods to a global leader in advanced technology and innovation.

New forms of trade, such as cross-border e-commerce, are booming, extending China's reach in the global market. Given the rising protectionism, trade tensions and geopolitical challenges, concerns about the future of globalization are growing. Yet free trade remains a cornerstone of a competitive global economy, because free trade promotes prosperity, generates socioeconomic benefits and creates more jobs.

By fostering more efficient and competitive industries, free trade enables countries to thrive in an interconnected world. China's continued commitment to open trade and economic cooperation underscores its role as a stabilizing force in the global economy and a proponent of shared growth and development.

Therefore, the US and the EU should focus on fostering healthy competition with China rather than adopting protectionist policies to curb China's rise, because that will hinder innovation and economic progress. Instead of building trade barriers and adopting restrictive policies, they should invest in research and development, especially in the high-tech sector, to enhance their global competitiveness. By advocating for open trade, establishing strategic trade and investment partnerships, and adopting innovation-driven policies, the US and the EU can create economic opportunities that benefit their people and businesses. A competitive approach, instead of a confrontational attitude, will help them build economic resilience and gain global leadership.

Economic Globalization

To Answer Three Key Questions about Economic Globalization^{*}

By HUAN YUPING

In the face of a sluggish world economic recovery, the rising threat of protectionism, and the widening gap between the rich and the poor, discussions around economic globalization are increasing within the international community. At the center of discussion, there are three main questions as follows.

Has economic globalization stagnated or regressed?

Economic globalization has not stagnated or regressed, but continues to develop against headwinds.

According to the Global Trade Update published by the United Nations Conference on Trade and Development (UNCTAD), global trade is on track to hit a record \$33 trillion in 2024, marking a 3.3 percent annual growth. It has demonstrated strong resilience, largely driven by digital trade and trade in services.

Despite unbridled unilateralism and protectionism, and some countries' obsession with "decoupling and severing supply chains" and building "small yard with high fences," the overall global landscape shows that businesses around the world continue to thrive within the interconnected supply, industrial and value chains. The World Openness Report 2024 indicates that the rise and evolution of global value chains reflect the inherent rationale of economic globalization, which is driven by digitalization, green economy, and services sector.

Globally, political consensus and policy measures to promote open development are steadily increasing.

The high-quality implementation of the Regional Comprehensive Economic Partnership (RCEP) has delivered increasingly prominent development dividends to member countries. The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has not waned despite the withdrawal of some country; instead, it has attracted more countries to join.

African countries are accelerating the implementation of the African Continental Free Trade Area (AfCFTA), which was enacted in several African nations, including South Africa, Ghana, and Kenya in 2024. The 31st APEC Economic Leaders' Meeting also reached an important consensus on upholding the multilateral trading system and advancing regional economic integration.

How to view the headwinds and undertones facing economic globalization?

Despite headwinds and undertones, economic globalization has always been the general trend.

Historically, the global economy was thrown into disarray by two world wars, which severed international trade routes. The subsequent nearly half-century-long Cold War divided the world into two distinct camps, hindering economic exchanges and disrupting the flow of resources.

However, in the long run, these disruptions did not prevent the world from returning to the path of economic globalization. This is because economic globalization is an objective requirement of growing social productive forces and a natural outcome of advancement in science and technology - a fact that no one can change.

The current headwinds against economic globalization are largely a result of political shifts within a few countries and do not signify a change in the fundamental logic that economic globalization promotes global welfare.

According to the World Trade Organization (WTO), between 1996 and 2021, a high trade share of GDP was strongly linked to faster economic growth in low- and middle-income economies. This fully proves that openness is the only path toward prosperity and development for every country.

^{*} This article first appeared on 26 January 2025.

Today, the world is moving faster to embrace a digital, green and smart economy, building up powerful energy for further expedition of economic globalization down the road.

WTO statistics show that the global exports of digitally delivered services reached \$4.25 trillion in 2023, up nine percent year-on-year, accounting for a record 54.2 percent of world services exports.

Besides, green and sustainable development has become a global consensus, with global annual renewable capacity additions increasing by almost 50 percent in 2023.

Mark Leonard, director of the European Council on Foreign Relations, noted that due to accelerated reforms in energy and technology, the world is experiencing "re-globalization" rather than "de-globalization."

How to resolve the issues and challenges brought by economic globalization?

Economic globalization is at a new crossroads. It must be guided carefully to maximize its benefits and ensure its sound and sustainable development.

The World Trade Report 2024 warns that mounting protectionism threatens to unwind 30 years of progress in closing income gaps between the poor and the rich. Both the United Nations and the International Monetary Fund have recently cautioned that rising tariffs could hamper global economic growth. All countries, especially major economies, should uphold the general trend of open development, resist protectionism, and build an open world economy.

To resolve the challenges brought by economic globalization, the key lies in promoting a universally beneficial and inclusive economic globalization. It is important to address the development imbalances between and within countries resulting from the global allocation of resources, and ensure that different countries, classes, and communities can all participate in and benefit from economic and social development, so as to take economic globalization to a new phase that is more dynamic, inclusive, and sustainable. This requires wisdom and decisive action from governments of all countries.

China has blazed a path of pursuing common development through opening up. Its active participation in economic globalization has not only driven its own development but also provided immense development opportunities to other countries.

China's experience demonstrates that promoting a universally beneficial and inclusive economic globalization can contribute to shared development of all countries in the world. This is why China is committed to pursuing a mutually beneficial strategy of opening up, expanding voluntary and unilateral opening up in an orderly manner, steadily expanding institutional opening up, and pushing for an open world economic system.

Economic globalization is a sure way for human society to achieve development and an irreversible trend of the times. All countries must possess the wisdom to recognize this overarching trend, and the determination and confidence to work with it, so as to join hands in promoting a universally beneficial and inclusive economic globalization.

Internationalization of Capital Market Gathers Pace with Plan*

By ZHANG ZHOUXIANG

The action plan for stabilizing foreign investment in 2025, unveiled by the Ministry of Commerce and the National Development and Reform Commission on Wednesday, could play a major role in optimizing the business environment and attracting foreign direct investment.

According to the plan, China will formulate policies to allow foreign-funded enterprises to use profits earned in China for reinvestment. It will also allow foreign investors to use domestic loans for equity investment, making it convenient for multinational corporations to establish headquarters-type institutions in China.

Encouraging foreign capital to enter the domestic capital market will help stabilize international capital flows. Several economists have pointed out that China's listed enterprises, such as those in high-end manufacturing, new energy, and e-commerce, are globally attractive. The new regulations will accelerate the process of foreign capital "discovering" them, and promote the internationalization of shareholder structures of these companies.

Equity investment is characterized by long-term holding and strategic cooperation. With their interests linked to Chinese enterprises, these foreign investors will pay more attention to the development of Chinese enterprises.

At a deeper level, long-term shareholding by foreign capital will promote the improvement of listed company governance by introducing international management experience, technological standards, and market resources, thereby driving the internationalization of the capital market.

In January, China's actual use of foreign investment amounted to 97.59 billion yuan (\$13.43 billion), a month-on-month increase of 27.5 percent. During the same period, actual investments in China by the United Kingdom, the Republic of Korea, the Netherlands and Japan increased markedly.

Those foreign investors coming to China more than a decade ago were lured by its market size. What attracts them more now should be the innovation potential.

* This article first appeared on 21 February 2025.

Reinvigorating Global Growth through Productivity Reforms^{*}

By NIGEL CLARKE^{*}

This is the Year of the Snake—a year of renewal and transformation. A fitting symbol, given the pace of change around us.

Patterns of trade and capital flows are shifting. AI is rapidly advancing. Trade is no longer the engine of global growth it used to be. Divergences across countries are widening. And governments worldwide are shifting their policy priorities.

Meanwhile, global growth is steady but underwhelming. Our five-year ahead growth forecast remains at 3.1 percent—well below the pre-pandemic average of 3.7 percent.

This is largely due to declining productivity growth. Total factor productivity, which measures the ability to create more outputs with the same inputs, has been growing at a slower pace since the 2008-09 global financial crisis.

Reviving medium-term growth

My focus today, therefore, is on how to revive medium-term growth. The path to success lies in pursuing structural reforms to raise productivity.

This applies to all countries. In ageing societies—where the share of the working-age population is shrinking—productivity growth has a vital role to play in maintaining living standards.

It also applies to emerging market and developing economies trying to close the gap with richer countries. To provide better jobs and a higher stand of living, they too need to ignite productivity growth.

Without ambitious steps to enhance productivity, global growth is set to remain far below its historical average.

So, what can we do? Let me focus on two priorities that are especially relevant for Asia.

First, innovation. We know that productivity growth increases with technological advances—advances made possible through investments in research and development, a proxy for innovation effort.

Technology transfer, scientific collaboration and policies that fund basic research can foster the kind of innovation we need for long-term growth. And can have a sizeable impact when combined with closer public-private cooperation. In fact, our research shows that productivity growth in advanced economies can increase by 0.2 percentage point a year with a hybrid policy that boosts public research expenditure by a third and doubles subsidies to private research. Because these are average numbers only, the increase could be even higher in emerging markets and developing countries.

Investments in AI are a case in point. No longer an emerging technology, AI is beginning to revolutionize industries and reshape economies. We estimate that AI could boost global GDP growth between 0.1 and 0.8 percentage points per year in the medium term, depending on how it is adopted.

Second, boosting productivity through better resource allocation. The movement of labor and capital toward more productive firms and industries has long been an important source of overall productivity growth. As workers move from farms to factories, for example, their productivity increases dramatically. So too do their income and living standards, with spillovers to the whole economy.

There are many ways countries can achieve a better allocation of resources, including by implementing policies aimed at increasing the mobility of workers, such as re-skilling programs. And more importantly, by strengthening market forces, which create the necessary incentives, through prices and wages.

Asia provides an example of how such reforms can fuel growth. Over the past few decades, Asia prospered as employment and production moved from agriculture to manufacturing. Now, the region contributes over 60 percent of global growth, and is home to some of the world's largest, most innovative companies.

Continued success, however, requires continued reforms.

Reforms such as strengthening the private sector. Entrepreneurs drive creativity and innovation, investing in sectors with the highest returns. To create the environment they need to thrive, it's important that there's a level playing field between the private sector and state-owned enterprises.

For many Asian countries, including China, reforms also involve expanding the services sector.

^{*} Remarks by Deputy Managing Director Nigel Clarke at the China Development Forum, Beijing, China, March 23, 2025.

^{*} Deputy Managing Director.

Services are a potentially important new source of growth. The sector has already drawn about half of the region's workers, up from just over a fifth in 1990.

And productivity in some services sectors is high. In fact, our analysis shows that Asia's labor productivity in financial services is four times higher than in manufacturing, and it's twice as high in business services.

China

In China, reallocating resources to services would have another important benefit: by creating jobs and increasing incomes, it could help boost consumption. A welcome goal that is also a top priority of the government.

While household consumption as a share of GDP in China has risen, it is still among the lowest compared to OECD countries. A sustained increase in consumption's share of GDP could lead to continued rapid gains in living standards and provide a welcome lift to global demand. This rebalancing of demand also requires reforms to reduce the need for precautionary savings, especially by middle- and lower-income households.

Overall, our analysis suggests that a comprehensive package of reforms to boost consumption and lift productivity could raise China's potential growth by about 1 percentage point per year over the medium term. That translates into a level of GDP that is close to 20 percent higher than our baseline by 2040.

The IMF's role

Through our policy advice, lending and capacity development, the IMF has consistently supported countries in establishing macroeconomic and financial stability as a foundation for growth.

To further help in this endeavor, we have formed a new IMF Advisory Council on Entrepreneurship and Growth. The goal is to get new ideas on how countries can ease regulatory barriers, adapt tax systems to a more business-friendly environment, and incentivize long-term savings, so countries have more to spend on innovation.

In this Year of the Snake, let's embrace change and focus on reforms and policies to revive growth. This will lead to better prospects for people everywhere.

IMF Managing Director Kristalina Georgieva's Statement at the Conclusion of the First Meeting of the G20 Finance Ministers and Central Bank Governors*

By KRISTALINA GEORGIEVA*

I would like to thank the Government of South Africa for hosting this week's G20 meeting, and Minister Godongwana and Governor Kganyago for their leadership in shepherding a focused discussion on our shared global economic challenges.

There was one resounding common theme I heard during our discussions: the need to reinvigorate global growth in an environment characterized by limited macroeconomic policy space and heightened policy uncertainties. Against this backdrop, I see important opportunities to advance the reforms needed to deliver lasting global economic prosperity.

Global Outlook: Low Growth, High Debt

We project global growth at 3.3 percent this year and next—steady but well below historic average and in the context of high public debt levels. Underlying this, we see divergences widening across economies, with growth in the U.S. stronger and a somewhat more gradual pick up in the EU than previously expected. In emerging markets and developing economies, growth in 2025 broadly matches last year's performance.

The global disinflation process continues. With the gradual cooling of labor markets and energy prices expected to decline further, headline inflation is projected to continue its trajectory toward central bank targets.

At the same time, uncertainty with regard to economic policies is high. Governments around the world are shifting policy priorities. There are significant policy changes in the United States, in areas such as trade policy, taxation, public spending, immigration, and deregulation, with implications for the U.S. economy and the rest of the world. Governments in other countries are also adjusting their policies. The combined impacts of possible policy changes are complex and still difficult to assess but will come into clearer view in the months ahead.

Risks are also diverging. In the short-term, there is some upside potential in the U.S., where positive sentiment could boost activity. But, overall risks are to the downside for most other economies, including the risk of policy-induced disruptions to the disinflation process or capital outflows from emerging market economies.

Domestic Policies to Boost Growth

With the outlook for growth stuck at its lowest in decades, the central task is to craft policies that provide a strong foundation for higher and more durable growth.

Macroeconomic and financial stability must be preserved to enable growth. To that end, countries must manage multiple pressures: contain short-term risks, rebuild buffers, lift medium-term growth prospects.

For central banks, the focus remains fully restoring price stability, and to do so while supporting activity and employment.

On the fiscal side, most countries need to put public debt on sustainable path and rebuild fiscal buffers. While mobilizing more domestic revenues is crucial in many countries, it is equally important to promote more efficient public spending. The two go hand-in-hand to ensure that countries have the fiscal space to meet future shocks and provide the basis for higher future growth.

Critically, it is important that countries embrace ambitious reforms to lift productivity and enhance growth prospects. The specific priorities will vary from country to country, but in general this calls for a pivot toward supply side policies: cutting red tape, increasing competition and encouraging

* International Monetary Fund Managing Director Kristalina Georgieva delivered the following remarks at the first meeting of the G20 Finance Ministers and Central Bank Governors 27 February, 2025, in Cape Town, South Africa.

* International Monetary Fund Managing Director

entrepreneurship, strengthening education systems, smart regulation that can encourage risk-taking and rapid but safe advances productivity-enhancing technology, such as AI.

Cooperative Actions to Boost Growth

While domestic reforms are essential, many countries cannot go it alone. Stepped up external support is vital to help countries implement reforms, through capacity development and concessional external support, and actions to crowd-in more private inflows.

There is also an urgent need to address debt challenges. A few countries may need to restructure their debt, while many more face high interest payments and refinancing needs that cripple their ability to invest in their future. A key step is to improve the predictability and timeliness of restructuring processes, building on the significant progress already achieved, including under the Common Framework. We also need to help countries with sustainable debt but faced with elevated interest payment and refinancing needs that crowd out their capacity to invest in education, health or infrastructure.

The IMF has a role to play. Through policy advice, capacity development, and lending where relevant, we help countries maintain or restore macroeconomic stability and implement sound policies needed for durable growth. We will continue to play a leading role on debt through our debt sustainability analyses and our support for international efforts to address debt challenges, including the Global Sovereign Debt Roundtable.

We remain committed to helping our member countries achieve greater prosperity and stability.

Regional

The Economic Outlook and Monetary Policy in the Euro Area^{*}

By LUIS DE GUINDOS^{*}

In my remarks last year, I expanded on monetary policy in the face of high inflation risks. The outlook was then still being shaped by the easing of pandemic-related supply constraints and by the energy price shock. Inflation had fallen rapidly from its peak in autumn 2022, but we needed to keep monetary policy sufficiently restrictive to ensure a timely and sustainable return of inflation to our 2% target.

Today, the euro area is in a very different place. Having cut interest rates four times since last June, by a total of 100 basis points, we have made substantial progress in bringing inflation back to target. At the same time, the balance of macroeconomic risks has shifted from concerns about high inflation to concerns about low growth. The outlook is clouded by even higher uncertainty, driven by potential global trade frictions, macroeconomic fragmentation, geopolitical tensions and fiscal policy concerns in the euro area. As the new year starts, it is imperative to work towards resolving the various conflicts happening in the world.

Today I will outline how the Governing Council is taking this uncertainty into account in its assessment of the inflation and growth outlook, and how a sound financial system is vital in supporting monetary policy. I will then explain the rationale behind the monetary policy decisions that we took in December and how we will approach policy decisions over the coming months.

Inflation

The good news is that the disinflation process is well on track. Headline inflation came down quickly in 2023 from the double-digit figures we saw at the end of 2022, as the impact of energy and supply-side shocks faded. The decline in 2024 was more gradual but clearly in the right direction, with inflation averaging 2.4% over the year. The slight increase in inflation in December owing to energy-related base effects had been expected. Core inflation also declined over the past two years, falling from 5% in 2023 to 2.8% in 2024.

Most measures of underlying inflation continue to suggest that inflation will settle near our 2% medium-term target on a sustained basis. One of these measures, our Persistent and Common Component of Inflation, for example, which has the best predictive power for headline inflation over the one to two-year ahead horizon, has been around 2% for more than a year. Domestic inflation, which closely tracks services inflation, has edged down, but it remains high (at more than 4%) mostly because wages and prices in certain sectors are still adjusting to the past inflation with a delay. Wage growth has also been moderating.

The December Eurosystem staff projections expect inflation to average 2.1% in 2025 and to return sustainably to our target rather early in the projection horizon.

Economic activity

The outlook for the euro area economy, however, remains weak and subject to significant uncertainty. Output grew above expectations in the third quarter of 2024. This was mainly driven by

^{*} Speech by Mr Luis de Guindos at the 15th edition of Spain Investors Day, Madrid, 15 January 2025.

^{*} Luis de Guindos, Vice-President of the European Central Bank.

an increase in consumption, which partly reflect one-off factors that boosted tourism over the summer, and by firms building up inventories. The latest information suggests that the economy is losing momentum. Surveys indicate that manufacturing is still contracting and growth in services is slowing, as still-high energy prices, regulatory costs and the lagged effects of previous monetary policy tightening continue to bite. Firms are holding back on investments, and exports remain weak, with some European industries struggling to remain competitive. The labour market remains resilient, with employment growing in the third quarter of 2024, again by more than expected, and the unemployment rate remaining at its historical low of 6.3% in October. Overall, the December projections see growth in 2024 at 0.7%.

Looking ahead, the conditions are in place for growth to strengthen over the projection horizon, although less than was forecast in previous rounds. As the catching up of wages continues and as inflation falls, rising real wages should lead to stronger household spending. More affordable credit should boost consumption and investment. Provided trade tensions do not escalate, exports should also support the recovery as global demand rises. Growth is projected to be just above 1% in 2025 and to move slightly up to modest levels in 2026 and 2027.

Nevertheless, the risks to economic growth remain tilted to the downside. The risk of greater friction in global trade could weigh on euro area growth by dampening exports and weakening the global economy. In particular, the outlook is characterised by high uncertainty around future trade policies in the United States, political and fiscal policy uncertainty in some large euro area countries as well as global geopolitical risks. In fact, over the past year the European Commission's uncertainty index has reached its highest level to date. Furthermore, with formal budget submissions from several euro area countries still pending, projecting the future fiscal policy stance is challenging.

This environment of very high uncertainty could dent confidence and dampen the recovery in consumption and investment. Such pessimism is visible, for instance, in consumer expectations. While real household income increased both in 2023 and 2024 according to national accounts, only little more than a third of respondents to our latest Consumer Expectations Survey see their real income as having increased or at least stayed the same. Whereas only about 10% of households indicate an increase in perceived real income, in reality more than half of the households surveyed experienced an increase in their real income, when inflation is netted out from their self-reported nominal income.

Financial stability

In this volatile economic environment, we see elevated financial stability vulnerabilities.

High valuations and concentrated risks leave financial markets vulnerable to adverse dynamics, which could be exacerbated by non-banks. Non-bank financial intermediaries have remained resilient to recent bouts of market volatility, supporting market-based finance in the euro area. However, broader market shocks could trigger sudden investment fund outflows or margin calls on derivative exposures. Given relatively low liquid asset holdings and significant liquidity mismatches in some open-ended investment funds, cash shortages could result in forced asset sales amplifying the fall in asset prices. While generally limited, pockets of elevated financial and synthetic leverage in some entities, like hedge funds, may add to spillover risks.

Simultaneously, sovereign vulnerabilities are increasing. Despite recent reductions in debt-to-GDP ratios in some euro area countries, fiscal challenges persist in several others. They are exacerbated by heightened policy and geopolitical uncertainty and structural issues such as sluggish potential growth. We therefore need to keep monitoring risks to financial stability carefully, including those stemming from recent increases in sovereign yields in the United States, the United Kingdom and, though more moderate, in the euro area.

On a more positive note, euro area banks are strong. Their resilience has been underpinned by solid capital ratios, robust liquidity buffers and high bank profitability. The latter may have reached its peak, however, as net interest margins are already declining while credit losses are gradually rising.

In this uncertain macro-financial environment, preserving bank resilience remains crucial. Existing releasable macroprudential capital buffer requirements and adequate borrower-based measures should be maintained to ensure that banks can absorb any future shocks. At the same time, the policy

framework for non-banks should be improved from a macroprudential perspective to strengthen the sector's resilience. Finally, to mitigate the current risks to sovereign debt sustainability, it is important to implement the EU's revised economic governance framework fully, transparently and without delay. Given the structural challenges related to low potential growth, the consolidation of public finances will need to be designed in a growth-friendly way.

Conclusion

Let me conclude. In December we decided to further moderate the degree of monetary policy restriction, lowering the key ECB interest rates by 25 basis points. This decision was based on our updated assessment of the inflation outlook, the dynamics of underlying inflation and the strength of monetary policy transmission. We are also continuing the process of balance sheet normalisation. In December the last repayment of the targeted longer-term refinancing operations was completed and reinvestments were discontinued.

We are determined to ensure that inflation stabilises sustainably at our 2% medium-term target. Given the high level of uncertainty, we will continue to follow a data-dependent and meeting-by-meeting approach to determining the appropriate monetary policy stance. The high level of uncertainty calls for prudence. In particular, severe global trade frictions could increase the fragmentation of the world economy, uncertainty about fiscal policy and its present challenges could weigh on borrowing costs, and renewed geopolitical tensions could affect energy prices. We are therefore not pre-committing to a particular rate path. If the incoming data confirm our baseline, the policy trajectory is clear, and we expect to continue to further reduce the restrictiveness of monetary policy.

Asia's Next Growth Frontier*

By KRISTALINA GEORGIEVA*

Those who have been to Tokyo's Skytree know that it has the best views of the city. And like so much in Japan, it's an engineering masterpiece. Gazing across Tokyo's skyline, it's hard to imagine just how much the city—and the country—has changed in the 80 years since the Bretton Woods Institutions were established.

After World War II, Japan invested heavily in infrastructure and manufacturing and introduced sweeping reforms. These set the country on a path to becoming an economic powerhouse.

Inspired by Japan's success, other countries in Asia followed suit. Today, the region contributes over 60 percent of global growth, and is home to some of the world's largest, most innovative companies.

Of course, Asia is a very diverse continent, with a mix of advanced economies, emerging and frontier markets, and small island states. Demographics and income levels vary too.

But across the region, openness and deepening economic ties have been crucial to countries' success.

The world is changing, however. Many countries face weaker growth prospects and are saddled with high public debt. The COVID-19 pandemic and recent geopolitical developments have brought into focus the importance of security of supplies. Trade is no longer the engine of global growth it used to be. And we are in the midst of massive transformations, from rapid advances in AI to changing patterns of capital flows and trade.

Against this background, governments worldwide are shifting their priorities. The new US administration is rapidly reshaping its policies on trade, taxation, public spending, deregulation, and digital assets. And other governments are also recalibrating their approaches and adjusting their policies.

The future of growth

How should countries in Asia adapt? Let me highlight three opportunities.

First, the shift toward services-led growth. While trade in goods has flattened, service flows are surging. In fact, services have already drawn about half of the region's workers, up from just 22 percent in 1990.

Economists have traditionally thought of services as less productive than manufacturing. Our research suggests otherwise. Asia's labor productivity in financial services is four times higher than in manufacturing, and twice as high in business services.

Second, digitalization and AI. The demand for digital products and services in the region has accelerated quickly and is on track to continue growing faster than the region's GDP. Japan's Rakuten, China's Alibaba Group, and Indonesia's GoTo Group now rival e-commerce giants Amazon and Walmart.

In AI development, Japan and China are racing ahead, followed closely by South Korea and Singapore. This could be an important boost for productivity. In Singapore, for example, an estimated 40 percent of jobs could be made more productive by AI. The country has several digital economy agreements now in place, enabling digital companies in the region to connect and share data more easily.

That brings me to my third point: greater regional cooperation and trade. On the surface, it might look as if the world is retreating from integration. But regionally, countries are leaning in.

Over the past four decades, intra-regional trade in Asia has increased by 43 percent. Today, more than half of Asian trade is regional.

The trend is the same for foreign direct investment. FDI from Asian countries to Japan, for example has nearly doubled over the past decade, as market opportunities in Japan's technology sector grow.

Together, the shift toward services, digitalization and AI, and greater regional integration can lift growth. But to harness these opportunities, the region will need to carefully navigate domestic developments and global changes.

The IMF's role

* At a conference on Asia and the IMF: Resilience through Cooperation, Tokyo, Japan, March 5, 9AM JST
* IMF Managing Director

That is where the IMF comes in. We strive to be trusted partners to our member countries, provide country-specific advice and safeguard the stability of the global economy. Our work spans economic analysis, policy advice, financing and capacity development.

And as the world economy has changed, we too have evolved. From managing fixed exchange rates in the 1970s, to active surveillance of countries' economic and financial policies and more systematic coverage of spillovers.

More recently, our thinking on capital flow management and foreign exchange interventions has changed, and we've upgraded our lending toolkit to include more flexible instruments tailored to emerging market economies.

Thanks in large part to Japan's support, we are also offering more support to low-income countries, especially in capacity development, and a stronger presence around the world through our regional technical assistance centers.

We are grateful to Japan for the deep engagement in thinking about the future of the Fund. Today's discussions are an important part of that.

My colleagues and I are keenly interested in ideas and reflections on:

- how we can best support our members, especially the most vulnerable among them, to grow and build economic resilience;
- how to tailor more of our advice to support countries' efforts to deepen regional collaboration, by thinking through our strategic engagement with groups like the ASEAN, the Pacific Island countries, as well as medium sized and larger economies; and
- how to strengthen the global financial safety net. We're assessing how IMF facilities can be further improved to support resilience in our member countries. And we are working closely with regional arrangements to enhance crisis prevention and response capabilities.

We know from experience that reforms are hard, but we also know they can steer countries towards stronger and durable growth and can achieve a more stable and prosperous global economy.

You can count on the IMF in this journey.

Cooperation

The Future of Cooperation^{*}

By FAJAR HIRAWAN^{*}

Donald Trump's return to the White House as the 47th president of the United States introduces significant uncertainties to the global economic landscape. His "America First" doctrine, characterized by aggressive inward-looking policies, could disrupt international trade, elevate inflation and constrain global monetary policies. For Indonesia, these shifts present both challenges and opportunities in navigating bilateral ties with China and broader South-South cooperation amid escalating major-power competition.

Amid the challenges posed by Trump's new administration, Indonesia sees opportunities to deepen its economic and strategic ties with China. This cooperation can serve as a counterbalance to US protectionism and contribute to Indonesia's long-term development goals.

One avenue for strengthening this relationship lies in infrastructure development through the Belt and Road Initiative. China's Belt and Road projects in Indonesia, such as the Jakarta-Bandung High-Speed Railway and the Morowali Industrial Park, exemplify the potential for high-impact investments. These projects enhance connectivity across Indonesia, create jobs and stimulate local economies, providing a buffer against external economic pressures. By leveraging such initiatives, Indonesia can drive infrastructure modernization and foster regional growth.

Trade and investment between Indonesia and China have also seen significant growth. As of 2023, the bilateral trade volume reached \$139.26 billion. This substantial increase underscores the robust economic ties and mutual strategic interests. Furthermore, Chinese investment in Indonesia is noteworthy, with many Chinese companies operating across various sectors, including manufacturing, agriculture and minerals. In 2023, China's total investment in Indonesia exceeded \$7 billion, making it one of the top foreign investors in the country.

In addition to trade and investment, technological collaboration presents another area of opportunity. China's advancements in fields such as 5G, artificial intelligence and e-commerce provide Indonesia with the means to accelerate its digital transformation. Collaborative efforts in digital infrastructure development, R&D centers and capacity-building initiatives can enhance local innovation, improve competitiveness and position Indonesia as a leader in the region's digital economy.

Beyond its bilateral ties with China, Indonesia can leverage South-South cooperation to diversify its economic partnerships and reduce its dependency on major powers. Regional integration through the Regional Comprehensive Economic Partnership offers Indonesia a platform for strengthening trade and investment ties with the Association of Southeast Asian Nations, China, Japan, the Republic of Korea and other key partners. As Southeast Asia's largest economy, Indonesia is well-positioned to benefit from streamlined tariffs and enhanced regional supply chain integration.

Collaboration with other emerging economies, such as India, Brazil and South Africa, also presents valuable opportunities. These partnerships enable trade expansion, technology sharing and collective action in global governance reforms. Initiatives such as the BRICS+ framework can further enhance Indonesia's economic and geopolitical influence, ensuring its voice is heard on the international stage.

Issue-based cooperation within the South-South framework adds another layer of opportunity. In addressing climate change, joint efforts with China and other emerging economies in renewable energy,

^{*} This article was published at China Daily on 21 January 2025.

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sustainable finance and forest conservation can support Indonesia's green growth agenda. Similarly, Indonesia can build on its successful vaccine partnerships to spearhead South-South collaborations in enhancing health security across the Global South. In the realm of food security, agricultural technology transfers and knowledge sharing can bolster resilience against climate impacts and improve food production.

Indonesia's leadership role within ASEAN also provides a platform for advancing regional stability and inclusive growth. Strengthening ASEAN-led mechanisms such as the East Asia Summit and ASEAN Regional Forum ensures major powers engage constructively with the region. By promoting rules-based cooperation, Indonesia can uphold ASEAN's centrality, preventing the region from becoming a theater for major-power rivalry.

Balancing major-power competition is another critical aspect of Indonesia's strategy. Its "independent and active" foreign policy allows it to maintain strategic autonomy while fostering productive relationships with both the US and China. Additionally, enhancing ties with developed economies such as Japan, the ROK and the European Union further diversifies Indonesia's diplomatic and economic options, strengthening its position in an increasingly multipolar world.

Through these efforts, Indonesia can not only navigate the challenges of heightened major-power competition but also position itself as a resilient and influential player on the global stage. By leveraging opportunities in infrastructure, trade, technology and regional cooperation, Indonesia has the potential to achieve sustainable growth and stability while reinforcing its strategic importance in the "Indo-Pacific" region.

The Trump administration's "America First" policies could amplify global economic challenges, especially for emerging markets such as Indonesia. Nonetheless, these hurdles also provide opportunities for Indonesia to enhance its economic resilience, solidify ties with China and expand South-South partnerships. By leveraging regional mechanisms such as the RCEP, promoting technological cooperation, and upholding ASEAN centrality, Indonesia can adeptly navigate the shifting geopolitical landscape while fostering sustainable growth and stability.

Amid intensified major-power competition, Indonesia's capacity to maintain balanced relationships, diversify its economic partners and reinforce domestic capabilities will be vital for shaping its future. Strategic foresight, proactive diplomacy and inclusive development are key pillars that can position Indonesia as a robust and influential global player.

Sino-EU Economic Relations of Mutual Benefit*

By ZHANG ZHOUXIANG

The EU Chamber of Commerce in China and the China Chamber of Commerce to the EU have mentioned in their reports, respectively released in Brussels last December and in Beijing this January, the effect that politics has had on bilateral trade.

The annual report from EU states that political factors pose a challenge to Chinese enterprises operating in Europe, while calling for reducing the impact of politics on business. On Jan 9, the report from the China Chamber of Commerce to the EU noted that geopolitical factors and the tense trade situation between China and Europe have, to some extent, increased the economic costs for European companies in China.

China and the EU are each other's second-largest trading partners. The bilateral trade volume between China and Europe in 2023 was € 740 billion (\$756.88 billion), while the trade structure between China and Europe continues to optimize.

The largest increase in imports from China to the EU has been of motor vehicles, with an import value of € 12.9 billion, while the largest rise in exports from the EU to China is also of motor vehicles, with an import value of € 19.4 billion.

Chinese electric vehicle companies continue to rapidly expand their market share in Europe, with more than 20 Chinese brands having entered or planning to enter the European market. Some analysts predict that China will continue to be the world's largest automobile exporter this year.

On that basis, it is necessary to strengthen effective cooperation between China and the EU. It is essential for both parties to maintain further communication, eliminate unnecessary interference, and truly benefit consumers on both sides.

On the 50th anniversary of establishment of diplomatic relations between China and the EU in 2025, we look forward to both sides continuing to make steady progress on the broad road of economic and trade cooperation.

* This article first appeared at China Daily on 14 January 2025.

China-Latin America Trade Booms with Greater Prospects*

By CUI FAN*

In recent years, Chinese President Xi Jinping has charted a new blueprint for building a China-Latin America and the Caribbean (LAC) community with a shared future, ushering the China-LAC relationship into a new era defined by equality, mutual benefit, innovation, openness, and people-centered benefits. Guided by head-of-state diplomacy, China-LAC trade and economic cooperation has navigated numerous challenges, achieving remarkable results. China is now the region's second-largest trading partner, with bilateral trade maintaining rapid growth for seven consecutive years. Meanwhile, China's "circle of friends" in LAC continues to expand.

This year marks the 20th anniversary of the first free trade agreement signed between China and LAC countries. In the past 20 years, the progress made in free trade agreements between the two sides has expanded the scope, enhanced the quality, and increased the efficiency of China's network of high-standard free trade areas. Since 2005, China has successively signed and brought into force five free trade agreements in LAC with Chile, Peru, Costa Rica, Ecuador, and Nicaragua. Among these, the free trade agreements with Ecuador and Nicaragua were concluded during the 14th Five-Year Plan period (2021 - 2025). China is expediting free trade agreement negotiations with Honduras, and the two have reached an early harvest arrangement. Negotiations with Salvador are gathering pace, and active efforts are being made to negotiate and conclude free trade agreements with more LAC countries.

The free trade agreements between China and LAC countries reflect the standards required of high-level free trade agreements. The free trade agreements signed with Chile and Peru have both been upgraded in recent years. The China-Nicaragua free trade agreement, signed in August 2023, marks China's first instance of opening up cross-border trade in services and investment through a negative list approach.

In 2024, as the rotating chair of the Regional Comprehensive Economic Partnership (RCEP), China worked alongside other RCEP members to facilitate the procedures for new members joining the agreement. During the same year, Chile officially submitted its application to join the RCEP, promising a bright future for higher-level China-LAC free trade cooperation on broader platforms.

In the past 20 years, the free trade agreements between China and LAC countries have generated fruitful outcomes, boosting growth in trade and benefiting enterprises and people in China and the LAC.

Since the China-Chile free trade agreement came into force in 2006, bilateral trade has experienced rapid growth, reaching US\$61.66 billion in 2024, 8.6 times that of 2006. This growth significantly outpaced the 3.2-fold increase in China's foreign trade during the same period. In the decade following the agreement's implementation, China progressively eliminated tariffs on Chilean wine, leading to a 13-fold increase in wine imports from Chile. This not only met the diverse demands of Chinese consumers but also opened up numerous opportunities for Chilean enterprises. Additionally, Chilean cherries have benefited greatly from the tailwind of free trade, becoming a popular fruit among Chinese consumers.

The China-Peru free trade agreement, which came into force in 2010, has both promoted and witnessed the rapid growth in bilateral trade. In 2024, trade between China and Peru reached US\$43.36 billion, seven times the amount recorded in 2010, significantly outpacing the 1.7-fold increase in China's overall foreign trade during the same period. Peruvian products such as blueberries, grapes, avocados, and squid have successfully entered the Chinese market. Meanwhile, Chinese-made smartphones, toys, and passenger vehicles have gained widespread recognition and popularity in Peru.

* This article first appeared at China Daily on 2 February 2025.

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The China-Costa Rica free trade agreement took effect in 2011. In 2024, trade between the two countries increased to US\$7.76 billion, marking a 36.1 percent increase year on year. During this period, China's imports from Costa Rica grew by 50.1 percent, while exports to Costa Rica increased by 21.4 percent. These growth rates outpaced China's overall foreign trade growth, underlining the promising prospects for enhanced trade and economic cooperation between the two countries.

The three agreements that came into force in 2024 have also yielded remarkable results. The China-Nicaragua free trade agreement came into force on Jan 1, 2024. In 2024, bilateral trade grew by 46.8 percent year on year. Specifically, China's exports to Nicaragua rose by 40.8 percent year on year, and its imports from Nicaragua surged by 218.3 percent. Nicaraguan products such as sugar, frozen lobster, white shrimp, and cotton yarn have seen rapid growth in exports to China, starting from a zero base. Meanwhile, Chinese-made passenger vehicles, motorcycles, phones, knitwear, and rubber products have entered the Nicaraguan market at more competitive prices, greatly improving local communities' livelihoods.

The China-Ecuador free trade agreement came into force on May 1, 2024. In the first month of its implementation, China's imports from Ecuador saw both year-over-year and month-over-month growth. From May to December 2024, China's cumulative imports from Ecuador reached US\$5.78 billion, representing a 10.1 percent increase compared with the same period in 2023. Ecuador's signature export products such as frozen squid, frozen lobster, frozen fish, coffee, cocoa beans, pitaya (dragon fruit), and fishmeal all witnessed substantial growth in exports to China. Chinese-made smartphones, motorcycles, refrigerators, generators, and other cost-effective products have found their way into numerous households in Ecuador, bringing greater convenience to local people.

Less than half a year since the implementation of the early harvest arrangement of the China-Honduras free trade agreement, Honduran white shrimp has successfully entered the Chinese market. At the same time, people in Honduras can enjoy tilapia from China at more affordable prices, directly benefiting from the bilateral free trade cooperation.

Bound by a shared future, we need to work in unison on the path forward. The resolution adopted at the third plenum of the Communist Party of China 20th Central Committee in July 2024, stated that opening-up is a defining feature of Chinese modernization, and we must remain committed to the basic state policy of opening to the outside world and continue to promote reform through opening-up.

China's increasingly open market is bound to present more opportunities to LAC countries. Standing at a new historical starting point, China and LAC countries should fully exploit their respective strengths and continuously strengthen free trade cooperation to ensure that free trade agreements can deliver more benefits to the people. The two sides should strive for solid progress in building a China-LAC community with a shared future, and steer the ship of China-LAC friendship toward an even brighter future.

Crypto Assets

Trump Kicks Crypto Policy into Gear and Hammers Nail in US

CBDC Coffin^{*}

By LEWIS MCLELLAN^{*}

New executive order cites concerns that US CBDC threatens financial system stability

Just four days after his inauguration, US President Donald Trump is starting to make good on his promises to the crypto market.

After heading into office with a brazen husband-and-wife double act ‘memecoin’ issuance, there was little doubt that Trump would fervently back the crypto market. He followed through on that signal, with an executive order entitled ‘Strengthening American Leadership in Digital Financial Technology’ on Thursday.

As is the case with most executive orders, it is light on firm policy detail. However, it does make a number of important promises.

First, it promises to promote access to public blockchain networks. At present, many institutions, particularly banks, find it difficult to interact with public blockchains because their open nature make them hard to draw regulatory perimeters around. When anyone can participate in a network, know-your-customer checks becomes all but impossible to enforce.

This, combined with the Securities and Exchange Commission’s withdrawal of its controversial Staff Accounting Bulletin 121 (which made crypto a distinct asset class, requiring banks to treat cryptoassets held in custody as a liability and hold an asset against them) opens the door for traditional financial institutions to begin offering crypto services to their clients.

The SEC has also established a crypto taskforce, headed by the well-respected commissioner Hester Peirce. The Commodities and Futures Trading Commission has yet to establish its own cryptoasset regulatory body despite the fact that key legislation presently in Congress would place crypto markets under the CFTC’s supervision.

The convergence of cryptoassets and traditional finance – though contrary to crypto purists’ anti-bank ethos – is likely to provide the boost to crypto-markets that many predicted following Trump’s election victory in 2024.

Second, Trump’s executive order highlights ‘protecting and promoting fair and open access to banking services’, which is a veiled allusion to ending the practice of crypto debanking. Many in the crypto industry have found it difficult to secure banking relationships with reputable US institutions, typically due to banks’ risk management frameworks. How exactly the Trump administration intends to see these rewritten remains to be seen, but it is safe to assume that crypto and traditional banking’s relationship will grow closer.

Third, the executive order hammers a final nail into the coffin of a US central bank digital currency, citing concerns that it would ‘threaten the stability of the financial system’. This assertion has mostly been discarded by the central banks of the rest of the world, whether or not they intend to issue CBDCs. It is mostly asserted by banks that perceive themselves as at risk from disruption by CBDCs.

A likely future for CBDCs and stablecoins

^{*} Published on 24 January 2025.

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It is also interesting to note that the executive order's definition of CBDC ('a form of digital money or monetary value, denominated in the national unit of account, that is a direct liability of the central bank') is so broad as to include not only retail and wholesale CBDCs, but also FedWire, the Federal Reserve System's own wholesale payments service.

While this seems to preclude wholesale CBDC, the Fed may find a way to proceed with finding a means of representing central bank money digitally for use in financial markets or for interoperation with foreign central banks to improve cross-border payments. Such projects may find it beneficial to rid the label of 'CBDC' to ensure they are palatable to US authorities, but the legislative efforts so far (the CBDC Anti-Surveillance State Act) are primarily focused on retail CBDCs.

On the other hand, the executive order's mention of stablecoins as a means of promoting and protecting the dollar's sovereignty might suggest that the new administration will back private sector efforts to ensure that tokenised cash settlement and cross-border payments is carried out by stablecoins.

If so, that could result in a major divergence in the US from international efforts to bring central bank money onto unified ledgers. This risks seriously devaluing these projects since the dollar holds such an enormously important role in financial markets. For the Bank for International Settlements' Project Agorá and its ilk to proceed without the dollar would lessen their value. It would also require a major pivot in their design principles to incorporate stablecoins instead of US central bank money.

What Trump 2.0 means for crypto

Trump's pro-crypto stance will be divisive. Even among fans of the asset class, the issuance of the Trump memecoin (while retaining 80% of the supply) has drawn criticism as a brazen cash grab typifying the worst form of profiteering opportunism that has given the industry a bad name.

The executive order also revives Trump's campaign promise of a 'strategic bitcoin reserve', the main purpose of which appears to be the enrichment of bitcoin holders.

But the removal of the obstructive approach that characterised Joe Biden's administration (not to mention the much-criticised former SEC chair Gary Gensler's 'regulation by enforcement' attitude to crypto rule-making) creates an environment where cryptoassets and the businesses that serve them can thrive in the US. The EU enjoyed a brief period of relative appeal thanks to the clarity of its Markets in Crypto-Assets Regulation, but the US, already home to the lion's share of the industry's talent, is ready to kick into gear.

Tariffs Trigger for Sharp Decline in Crypto Assets^{*}

By CHINA DAILY EDITORIAL

On Friday, mainstream crypto assets experienced a significant drop, with the value of Bitcoin plummeting by 6.69 percent and the popular digital currency Dogecoin also seeing a substantial decline of 9.74 percent. The reasons for this can be attributed to several factors.

First, US President Donald Trump's intensified tariff threats have led to a substantial retreat in global risk assets, including cryptocurrencies. On Thursday, Trump stated on his social media platform that the proposed tariffs on Mexico and Canada would still take effect on March 4, as would additional 10 percent tariffs on China. Coupled with previous measures, nearly all of US' trading partners, except for the United Kingdom, will face additional tariffs.

The escalating tariff threats from the Trump administration have dampened global appetite for risks. Both the US and Asian stock markets saw significant pullbacks, and cryptocurrencies, as risk assets, were not immune to these effects.

Second, the fluctuations in crypto assets are closely linked to global liquidity, and the expectation of a Federal Reserve rate cut in 2025 has narrowed under the pressure of rising inflation. On Jan 30, the Federal Reserve's interest rate meeting paused rate cuts, maintaining the federal funds target rate at 4.25 to 4.5 percent. On Feb 27, the hawkish president of the Federal Reserve Bank of Cleveland suggested that the current interest rate level had not yet reached a significantly restrictive point and should remain stable for some time.

Furthermore, although many members of Trump's Cabinet supported the idea of cryptocurrencies becoming a reserve currency, Federal Reserve Chair Jerome Powell has dismissed the possibility of this during his tenure. Additionally, numerous hacking incidents involving crypto assets indicate that the industry still has vulnerabilities in technology and risk management.

Moreover, leading US tech stocks have been reevaluated in the face of low-cost and more efficient artificial intelligence. Crypto assets, which are closely related to US tech companies, have indirectly accelerated their revaluation due to the rise of Chinese AI companies such as Deep-Seek.

Overall, during the second Trump presidency, despite the majority of Cabinet members supporting crypto assets, his policies are characterized by significant randomness and uncertainty. During this period, global macroeconomic conditions, liquidity environments, and foreign policy will have significant impacts or even disruptive changes, affecting the capital in the crypto market, the behavior of crypto asset investors, and the sentiment of cryptocurrency investors, leading to increased volatility in crypto assets.

^{*} This article first appeared on 3 March 2025.

Artificial Intelligence and Technologies

How Artificial Intelligence Will Affect Asia's Economies^{*}

By TRISTAN HENNIG, SHUJAAT KHAN

Asia-Pacific's economies are likely to experience labor market shifts because of artificial intelligence, with advanced economies being affected more. About half of all jobs in the region's advanced economies are exposed to AI, compared to only about a quarter in emerging market and developing economies.

However, as we show in our latest Asia-Pacific Regional Economic Outlook, there are also more jobs in the region's advanced economies that can be complemented by AI, meaning that the technology will likely enhance productivity rather than replace these roles altogether.

The concentration of such jobs in Asia's advanced economies could worsen inequality between countries over time. While about 40 percent of jobs in Singapore are rated as highly complementary to AI, the share is just 3 percent in Laos.

AI could also increase inequality within countries. Most workers at risk of displacement in the Asia-Pacific region work in service, sales, and clerical support roles. Meanwhile, workers who are more likely to benefit from AI typically work in managerial, professional, and technician roles that already tend to be among the better paid professions.

As the Chart of the Week shows, we also find that women are more likely to be at risk of disruption from AI because they are more often in service, sales, and clerical roles. Men, by contrast, are more represented in occupations that are unlikely to be impacted by AI at this stage, like farm workers, machine operators, and low-skill elementary workers.

How could policymakers address the threat of worsening inequality?

First, effective social safety nets combined with reskilling programs for affected workers will be critical to achieve an inclusive AI transition.

Second, education and training to help the workforce leverage what AI makes possible will be especially relevant in Asia's emerging economies, given that they have relatively few jobs in which AI could make workers more productive. It will also help displaced workers transition to new roles and support research and development that enhances innovation.

In addition, governments should set regulations that promote ethical AI use and data protection. Doing so can mitigate the risks of AI-induced disruptions and better capitalize on the opportunities for economic growth and improved productivity.

^{*} This article first appeared on 5 January, 2025, based on Box 1 of the analytical note included in the October 2024

New AI Models Risk Economic Amnesia*

By UDAIBIR DAS*

Will machines that think also forget?

Artificial intelligence is now irreversibly out of Pandora's box, as Martin Wolf of the Financial Times observed, and we must learn to live with machines that can think. The real concern, however, is not just the intelligence of these machines but what they might choose to forget.

For centuries, economic history has served as a foundation for policy-makers, investors and scholars to learn about financial cycles, crises and macroeconomic transformations. From the South Sea Bubble of 1720 to France's Mississippi Company collapse and the Panic of 1873, history has repeatedly warned of the dangers of speculation, leverage and financial excess.

Contemporary challenges, from inflationary spirals to financial bubbles, have even more recent historical parallels from the Great Depression to the 2008 financial crisis, which reaffirm how history provides insight. Even our understanding of the global South's economic trajectory today is incomplete without acknowledging the structural forces that shaped it over centuries.

As AI takes on a greater role in economic analysis and policy, an unsettling question arises: will its ability to recognise systemic risks with historical precedents weaken with a lack of immediate algorithmic reference? If AI models prioritise recent information, they may fail to detect the cyclical patterns that have long defined economic history.

The risk is not that AI will erase history, but that it will make historical knowledge seem less relevant and ultimately less studied. A world that sidelines history in favour of algorithmic optimisation risks repeating past mistakes under the illusion that AI-driven models are inherently forward-looking and rational.

Forgetting the past

Economic thought has never evolved in isolation. The Wealth of Nations by Adam Smith was shaped by the emergence of industrial capitalism, Keynesian economics was a response to the Great Depression and Milton Friedman's monetarist theories were a reaction to the inflationary crises of the 1970s. More recently, post-2008 financial regulations, including stress testing, capital buffers and macroprudential measures, were crafted with past financial crises in mind.

Yet as central banks, financial institutions and regulatory bodies turn to AI models for predictive accuracy, historical analysis risks becoming secondary. AI excels at identifying correlations within a defined dataset, but economic and financial cycles do not always conform to short-term trends or linear progressions. For instance, Mexico's vulnerability to short-term external debt before the 1994 peso crisis was crucially underestimated, as its immediate economic history had been one of high investor confidence. The failure of AI models to account for these deeper historical cycles could leave policy-makers unprepared for financial stress that follows long-established, often forgotten patterns.

Perils of financial amnesia

Financial markets, more than any other domain, have long suffered from a collective amnesia, repeatedly underestimating risks with clear historical precedents. AI-driven quantitative trading models, typically trained on just 10 to 20 years of data, could worsen this tendency by reinforcing short-termism. If AI-based trading strategies dominate decision-making, will human investors still be able to recognise these warning signs?

The 2008 financial crisis is a prime example: risk models failed to foresee a nationwide housing market collapse, largely because such an event had not occurred in modern financial history. If AI models trained primarily on post-2010 data reinforce similar blind spots, markets could once again be lulled into a false sense of security. The risk is not simply that financial crises will recur – that is inevitable – but that broader preparedness for systemic crises will erode as day-to-day algorithmic prediction becomes more precise.

* Published on 6 February 2025.

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Dangers of algorithmic curation

AI is not only transforming economic analysis, it is also shaping access to historical knowledge entirely. AI-powered search engines, large language models and financial news aggregators increasingly determine which historical narratives are visible and which fade from view. This algorithmic curation of history is not neutral; it reflects biases embedded in training data and prioritises dominant sources over others. Over time, this could narrow economic discourse, reinforcing widely accepted but potentially flawed interpretations, while marginalising alternative viewpoints.

This is particularly concerning in cases where economic history is complex and contested. There is continuous debate over whether the Great Depression was primarily a market failure or a policy failure, whether the collapse of the Bretton Woods system in the 1970s was inevitable or the result of avoidable policy missteps, and whether the 2008 financial crisis stemmed more from excessive leverage or from decades of financial deregulation. There are various interpretations of colonialism's economic consequences and the extent to which today's economic development problems go back to taxation and trade policies of those times.

These are not simple questions, nor do they have singular, prepackaged answers. Yet if AI-driven knowledge systems prioritise specific interpretations over others, they risk flattening historical complexity into deterministic narratives, narrowing the scope of economic debate.

AI's impact on policy-making

The most immediate danger of AI-driven historical amnesia lies in economic policy-making. Central banks and financial regulators have traditionally studied past crises to inform present decisions. Even post-pandemic monetary policies reflected a deep reading of past inflationary episodes. As AI-driven models take on a larger role in policy analysis, we will see historical case studies being supplanted by algorithmic forecasting and real-time risk modelling. While AI can improve short-term predictive accuracy, it remains unclear whether it will detect vulnerabilities rooted in past financial crises.

OMFIF's Future of payments notes that institutions such as Bank Indonesia and Banque de France are deploying AI to enhance predictive accuracy. Would AI models trained primarily on post-2010 data have flagged the structural weaknesses that led to the Asian financial crisis, the 1994 Mexican peso crisis or the 2008 collapse? The danger is not simply a failure to predict the next financial shock, but a weakening of institutional memory that makes crisis response less effective.

Despite these risks, AI could serve as a tool for historical preservation rather than amnesia, and, if used properly, could enhance economic history rather than erode it. AI has the potential to digitalise and reconstruct lost economic records, making archives more accessible as well as help identify long-term economic patterns that can span multiple centuries and improve our understanding of financial cycles. AI has the potential to democratise access to historical economic knowledge, ensuring that insights once buried in academic journals or central bank archives are available to a broader audience.

The challenge, then, is not merely to ensure AI's accuracy in short-term forecasting, but to guard against the erosion of historical context in its analysis. The machines are here, but whether they deepen our understanding of economic history or contribute to its gradual neglect remains a choice still within human hands.

Digital Wallet Dominance: A Competition Issue or An Innovation

Deficit?*

By LEWIS MCLELLAN*

Regulators are eyeing their dominance with concern

Digital wallets have already begun to take hold of our payments behaviour, accounting for 29% of card transactions in 2023, up from 8% in 2019. Their capabilities are only set to grow as identity solutions, new forms of money and other functions come online. But regulators are starting to become concerned that there are only really two games in town: Apple and Google. Their respective wallets, bundled with iOS and Android respectively, absolutely dominate the market.

From a Borkian perspective, as yet, there is little cause for worry. It is hard to argue that consumer welfare has been harmed by the growth in digital wallet use. For one thing, if people didn't want to use these wallets, they could still pay with cards or cash. It is only the convenience of wallets that has driven the immensely rapid growth of digital wallets in payments.

But the Financial Conduct Authority and the Payment Systems Regulator are concerned. A report published in February reveals several potential worries. Chief among these is the possibility that the control Apple and Google exert over their mobile ecosystem is anti-competitive.

'Digital markets are a challenging area in competition, because incumbents can have huge user bases and significant market positions,' said Dan Moore, head of strategy, analysis and engagement at the PSR. 'The risk is that, without other wallets that are able to compete, we could see quality of service reduced, opportunities for innovation missed and additional charges enter the system and eventually be passed onto consumers.'

What is the central issue?

Are Apple and Google to blame for their market dominance? Or is there a dearth of attractive alternatives?

Apple at least was ruled to be engaging in anti-competitive behaviour by restricting access to its iOS near field communication system to Apple Pay. The European Commission investigated this and, in July 2024, extracted legal commitments from Apple to open this functionality to third-party app developers. With the release of iOS 18.1 in October 2024, Apple complied with this both in the European Union and in the UK, although the details in the UK are slightly different. However, we have yet to see a third-party wallet app achieve traction even with access to NFC systems.

This has at least theoretically improved the competitive environment, but if NFC access were the only limiting factor, then we would surely have seen competitors to Google Pay arrive on the Android app store. The fact is that Google and Apple have enormous user bases already and therefore benefit tremendously from network effects and economies of scale that other potential wallet providers simply cannot match.

Again, we return to the question: is this a problem? If users still get access to digital wallets, does it matter if they are only provided by big tech companies?

Protecting consumer welfare

The fundamental question is: is healthy competition valuable for its own sake or is it only worth pursuing if its absence is harming consumer welfare?

When answering this, regulators need to consider not just present consumer welfare, but possibilities. Even if a small group of companies achieves a dominant market share through innovation and improvements to efficiency, if viable alternatives do not exist, over time this market share may create the opportunity for these companies to extract value and degrade the service they offer at the expense of consumers.

* Published on 19 March 2025.

* Lewis McLellan is Editor of the Digital Monetary Institute, OMFIF.

The extreme concentration of market power is visible already. Apple Pay and Google Pay do not rely on open banking application programming interfaces but are driven by bilaterally negotiated contracts with the underlying card providers. The growing importance of these wallets means that Apple and Google have an immensely advantageous position in these negotiations. It is possible that this could result in them pushing costs onto other elements of the ecosystem, i.e. card issuers and banks, and that these could be passed onto merchants and eventually consumers.

To some extent, this may already be happening in the case of fraud. Card issuers are ultimately liable for unauthorised transactions, even if these take place through digital wallets. Although wallets typically have good security standards like biometric authentication, they can still be a vector for fraudsters to attack. Card issuers and merchants will end up bearing the additional overheads and chargebacks without being able to address wallet providers' security standards themselves.

Open banking has not lived up to its promise

The FCA and PSR report highlights that digital wallets are entrenching card payments, and regulators would prefer account-to-account payments enabled by open banking to grow. But open banking has not yet lived up to its promise. Despite the support of regulators, successful, scalable business models built on making use of open banking APIs remain thin on the ground.

Does this suggest a lack of innovative spirit among payments fintechs? Open banking' s failure to take off reflects the challenge of encouraging grassroots innovation in payments. The industry runs on networks. Adoption, scaling and usability are everything. This gives incumbent payment system operators a huge advantage and means that only technology companies with their own adoption networks have managed to insert themselves into the industry.

Digital wallets are likely to form a core component of any solution that scales A2A payments. Moore said: 'If A2A is going to provide a real competitive alternative to other payments systems – which we very much hope to see – it will have to be available for a variety of types of payments, including in-hand at point of sale. That probably means we need digital wallet solutions which include A2A over time.'

Perhaps the problem of excessive dominance of Apple and Google in wallet provision and the problem of a lack of vehicles for A2A payments have the same answer: a digital wallet offering convenient A2A payment solutions. As yet though, none has emerged and, even if one does, gaining traction will be a struggle given Apple and Google's ability to steer users towards their own tools.

Encouraging innovation over regulation

So, what can regulators do? The PSR is certainly doing everything it can to encourage innovation from small players. Moore said: 'My preference is always to encourage competition and for good outcomes to arise through that, rather than detailed regulation, wherever possible. We should remember that these wallets are producing a lot of convenience and consumer benefit, and that maintaining a positive regulatory environment for innovation is important.'

But at some point, we may be forced to confront the possibility that good ideas are not enough to compete with the big players in payments. The Competition and Markets Authority is investigating this and will issue a decision on the wallets' 'strategic market status' by October 2025.

In an era where so much economic growth takes place in big tech companies, governments might be unwilling to apply too many brakes to their growth in order to create a generation of smaller fintech challengers. At that stage, we will have admitted that competition is no longer our main priority and we will have to hope that we have other levers to ensure that their market position does not compromise consumer welfare.

Opening Remarks - 4th Workshop on Data Science in Central Banking*

By ALBERTO NAUDON*

It is my great pleasure to welcome you all to the 4th Workshop on Data Science in Central Banking organized by the BIS Irving Fisher Committee on Central Bank Statistics (IFC) and hosted by the Bank of Italy.

As we gather today, we are reminded of the rapid advancements in data science and its profound impact on central banking. Indeed, the sheer volume and complexity of financial data now available call for more sophisticated techniques for data management and analysis. This trend is reinforced by the new opportunities opened up by artificial intelligence and machine learning. This workshop is a testimony to our collective commitment to harnessing innovation to enhance central bank' operations, policy-making, and overall effectiveness.

As emphasized in the last 2024 IFC's Annual Report just endorsed by the BIS All Governors a few weeks ago, the current focus on data science and AI supports the broader objective of improving statistical methods and fostering innovation in central banks. This IFC report underscores that leveraging new technologies can be instrumental to enhance data quality, improve analytical capabilities, and support evidence-based policymaking. The Report also calls for reviewing the related ongoing initiatives pursued by central banks and for providing a platform for sharing knowledge and best practices.

Let me recall that the three previous IFC data science workshops have been dealing with, respectively, (1) machine learning applications; (2) applications and tools in data science; and (3) data access and sharing. This time we will over the next three days delve into the various aspects related to the use of generative AI in central bank activities. We will hear from esteemed experts and practitioners who will share their insights and experiences, providing us with valuable knowledge and practical tools to navigate the evolving landscape of data science.

I would like first to extend a special welcome to our keynote speaker, Julien Simon, Chief Evangelist at Arcee.ai, who will be discussing the tailoring of small language models for enterprise use cases. His expertise and vision will undoubtedly set the tone for our discussions.

Then the sessions of the workshop will cover various critical areas, such as natural language processing tools, AI for summarization and information extraction, supervisory technology, text analysis for market monitoring and monetary policy purposes, and data privacy and anonymization.

Let me share with you a few thoughts on these issues:

First, the new techniques we will discuss are not only very timely, but they are also essential to leverage data science to address the complex challenges we face in modern central banking. In particular, the integration of generative AI and advanced data analytics into central banks' operations can significantly enhance their ability to make informed decisions, assess economic trends, and work to promote monetary and financial stability. More generally, IT innovation provides brand new perspectives. For instance, open-source software offer numerous benefits supporting official statistics and data analysis, including cost savings, flexibility, and the ability to customize solutions to meet specific needs. Another example is that modern data management approaches such as data lakes and data meshes architectures allow for new ways to store, organize, and access data. This calls for careful planning and for not blindly following the crowd and fashionable buzz words.

The main goal is to concretely help central banks to more effectively leverage their information assets, improve the integration and quality of their data, and support more sophisticated analytical techniques.

Second, your presence here today, coming from various jurisdictions all over the world and representing central banks, other public authorities, international organizations, academia and the private sector, underlines the importance of the goal of this workshop, which is to showcase concrete projects, share experiences, develop in-house knowledge and also reduce reliance on external service providers.

* Opening remarks by Mr Alberto Naudon at the 4th Workshop on Data Science in Central Banking, organised by the IFC, hosted by the Bank of Italy, Rome, 18 February 2025.

* Alberto Naudon, Board Member of the Central Bank of Chile and Chair of the Irving Fisher Committee on Central Bank Statistics (IFC).

Third, central banks, as producers of official data, have a key role to play to promote the access and dissemination of credible information to various external stakeholders, including other domestic authorities, international institutions, academia, and the general public. But better data is also key for supporting real-time, evidence-based policymaking in central banks, which increasingly rely on trustworthy data and sophisticated analytical and forecasting capacities to support their decisions.

Fourth, the relevance of artificial intelligence for central banks cannot be overstated, as it offers immense opportunities to enhance productivity, improve decision-making, and foster innovation. In particular, Generative AI has the potential to revolutionize data analysis and interpretation, offering deeper insights and more accurate predictions. For instance, the use of large language models can significantly enhance our ability to process and understand vast amounts of unstructured data, ranging from economic reports to news articles, thereby enabling us to make more informed policy decisions especially in the areas of monetary policy, financial stability, and regulatory oversight.

However, and this is my fifth point, GenAI also presents significant challenges and risks. Central banks must navigate issues such as data privacy, security, and ethical considerations. The potential for systemic risks, such as homogenization of information and procyclicality, requires careful management. As central banks increasingly rely on data-driven approaches, it is essential to ensure that sensitive information is protected, and that data is used ethically and responsibly.

And my last point is that addressing these challenges calls for developing robust governance frameworks. This is key so that we can harness the power of AI while mitigating its risks, ensuring that our financial systems remain stable and resilient. At the same time investing in advanced IT infrastructure and fostering collaboration and coordination as we do today can help to stay abreast of emerging threats and implement best practices.

To conclude, this workshop aims to gather a diverse audience of practitioners, specialists, and interested stakeholders from central banks, international organizations, national statistical offices, and beyond. Our primary objective is to highlight ongoing projects and exchange experiences that can help foster in-house expertise and lessen reliance on external service providers. For instance, a number of projects that will be presented in the next few days have replicable codes developed with open-source software and can be usefully shared among all interested stakeholders. Moreover, the presentations will enhance our understanding of the opportunities and risks associated with new Generative AI technologies. This is key for central banks willing to navigate the evolving financial landscape and ensure that they are well-positioned to meet future challenges.

I therefore encourage you all to actively participate in the sessions, engage with the speakers, and share your own experiences and perspectives. It is through this collaborative spirit that we can truly advance our understanding and application of data science in our field.

Climate Policy and Green Finance

Climate Initiatives Need A Heavy Push to Start*

By EMMA MCGARTHY*

There are positive signs for blended finance, but momentum must not be lost.

Mobilising sustainable investment in both emerging and developed markets has relied on a number of tools. However, one key instrument gaining traction is blended finance – an approach that strategically combines public and private capital to fund climate-focused initiatives. Yet questions and challenges remain regarding its practical application.

This edition of the Sustainable Policy Institute Journal examines the key role blended finance can and should play in scaling project development and capital flows into transition finance in emerging and developed economies. It features key insights from public investors, fund managers, multilateral institutions and central banks.

Vivian Guo, portfolio manager and co-head of ESG, Templeton Global Macro at Franklin Templeton, notes that blended finance has ‘mobilised only around \$230bn for sustainable development, compared to the \$4tn per year that the same countries need’ over the past decade. Guo suggests that to unlock blended finance, going above and beyond project-level de-risking to scalable solutions is vital. This strategy alone can leverage private investors to expand multilateral development banks’ balance sheets.

This is echoed by Nana Maidugu, head of sustainability and ESG at Nigeria Sovereign Investment Authority, who explains that the success of blended finance structures hinge on intentional design and execution as well as catalysing scale and solutions. Maidugu highlights blended finance’s potential in addressing ‘critical barriers to investment and development, including high transaction costs, currency risk and immature local capital markets.’ Aaron Vermeulen, finance practice lead at WWF International, enhances this arguing that more attention needs to be paid to ‘deal origination’.

The establishment of the New Collective Quantitative Goal at COP29, calling on ‘public and private sources to scale climate financing for developing countries to at least \$1.3tn per year by 2035’ also highlights this need. Marc-André Blanchard, head, executive vice-president and global head of sustainability and Erich Crompton, director of business relations at CDPQ Global, both underscore the critical importance of increasing finance mobilised from public sources and innovative instruments, such as first-loss instruments and guarantees.

Marcus Pratsch, head of sustainable bonds and finance at DZ Bank, goes on to suggest that bonds are well-suited for large-scale investments and a promising tool for blended finance. Issued in large volumes and allowing for significant capital mobilisation, ‘bonds can raise billions of dollars, providing the scale needed for large infrastructure projects’, he writes.

MDBs have the potential to play a huge role in providing technical assistance and risk mitigation for emerging market investment. Yet Vermeulen argues MDBs must embrace reform and ambitious target setting to scale funding, if they are to support blended finance. As Roberta Casali, vice-president for finance and risk management of the Asian Development Bank, says the ADB has made commitments worth ‘over \$800m, helping to catalyse projects worth nearly \$10bn’. The market is now willing to participate in green infrastructure projects and multilaterals must evolve to play the role of ‘ecosystem builders’ and ‘development partners’ to establish sustainable markets in their respective regions.

Nevertheless, as Isfandyar Zaman Khan, lead specialist for finance, competitiveness and innovation for East Africa and Rachel Mok, financial sector specialist, finance, competitiveness and innovation for East

* Published on 20 February 2025.

* Emma McGarthy is Head of the Sustainable Policy Institute at OMFIF.

Africa at the World Bank, write, blended finance alone is insufficient. A supportive policy environment that encourages private sector engagement is integral.

Policy-makers should clarify where blended finance is needed, according to Ekaterina Gratcheva, Fabio Natalucci and Cindy Van Oorschot from the Network for Greening the Financial System. In doing this, they should also clarify the right amount of concessional funding necessary to finalise a project, attract private capital and put in place the right climate policies, such as carbon pricing). In addition, they must strengthen the climate information architecture, engage with EMDE project sponsors from the early conceptualisation stage through financing to develop and bring to market a pipeline of viable projects.

Unlocking the potential of blended finance is vital. Innovative instruments, policy and new goals are being established to support capital mobilisation and de-risking of investments. Public investors, philanthropies along with the private sector are increasingly engaging in projects which will support sustainable infrastructure development. There are positive signs, but momentum must not be lost.

Financial Institutions Brought into Play in Carbon Market^{*}

By CHINA DAILY EDITORIAL

Eight securities companies have been granted approval to participate in the domestic carbon markets using their own funds, having received non-objection letters from the China Securities Regulatory Commission. The participation of securities firms in the carbon emission rights trading market is an important way for financial institutions to serve the real economy.

By the end of 2024, the cumulative trading volume in China's carbon market had reached 630 million tons, with a cumulative transaction amount of 43.03 billion yuan (\$5.91 billion). Carbon finance is a key part of the effort to address climate change. It is a way to fund projects that reduce or avoid greenhouse gas emissions. It places a financial value on carbon emissions and allows companies wishing to offset their own emissions to buy carbon credits earned from sustainable projects. The healthy and orderly development of carbon finance helps to improve the carbon pricing mechanism, and promote controlled-emission enterprises to achieve carbon reduction targets in a cost-effective manner.

As important intermediaries in the capital market, securities companies connect investment and financing. The entry of securities companies into the carbon market can increase capital liquidity. At the same time, they can also play the role of brokers by matching carbon asset transactions and reducing transaction costs.

Some institutions predict that the scale of China's carbon market transactions may reach 10 trillion yuan in the future, in which the market coverage of subjects, industries, product types and other elements will gradually be expanded. Against this background, it is necessary to allow financial institutions to play a greater role in the carbon trading market.

In recent years, China has actively carried out system and mechanism innovation in climate investment and financing, carbon market construction and other aspects, creating favorable conditions for financial institutions to participate in the carbon market. However, to truly make good use of finance in the carbon market, it is still necessary to improve the support provided.

Relevant authorities need to strengthen the system construction, establish corresponding macro-management policy frameworks, clear up the blockages and bottlenecks for financial institutions to enter the market and provide long-term policy signals and guidance for financial institutions. Meanwhile, the scope of trading subjects in the carbon market should be expanded in a timely manner, financial products and trading methods linked to carbon emission rights should be enriched, and finance guided to support the development of the carbon market.

^{*} Published on 6 February, 2025.

Climate Change and Supervision - Prioritise Action, Foster Collaboration*

By SABINE MAUDERER*

I would like to begin my speech with a quote by the Nobel Laureate Desmond Tutu, who said: Twenty-five years ago people could be excused for not knowing much, or doing much, about climate change. Today we have no excuse.

Who could disagree with the wisdom and moral clarity of Archbishop Tutu's words?

1 Advancements

Twenty-five years ago, the risks associated with climate change were not a major concern for central bankers and supervisors.

There were no climate hubs, no climate reporting and no climate stress tests.

A lot has changed since then.

In 2017, a handful of central banks – including the Bundesbank – founded the Network for Greening the Financial System. Surely, many of you are familiar with our network. The tremendous growth of the NGFS membership underlines our steadfast dedication to addressing climate-related risks.

Today we count over 140 central banks and supervisory authorities as members, alongside more than 20 observers globally. Recognizing that climate change is a major threat to our economies, we analyse its effects on key economic indicators, such as output, productivity and inflation.

Today, several central banks already incorporate climate-related risks into their analyses and decision-making processes. What is more, supervisory authorities are taking concrete steps to address the impacts of these risks on the financial institutions they oversee.

2 Capacity Building

In order to reap the full benefits of our work, we must ensure that all stakeholders are on board.

Building capacity is crucial in this process.

The NGFS actively promotes capacity building across its membership and we are eager to extend our partnerships. This is really a priority for me!

As some of you may know, we successfully concluded our regional Outreach Meeting with African plenary members and observers here in Cape Town yesterday. We exchanged views on the best strategies to scale up financial flows for climate adaptation and mitigation measures in the region. We also discussed how to apply NGFS climate scenarios in the African context, among many other topics.

In my eyes, events like these are a great opportunity for mutual learning – to understand specific regional needs.

At the Bundesbank, we also have a long tradition of offering training courses to our international colleagues. In fact, we will offer several seminars around the topic of climate risks also this year. They are open to all our central bank colleagues¹.

In late February, we will start a preparatory course on climate risks, targeting those who are still finding their way into the topic. There will be advanced courses too, for examples on climate change and monetary policy and on supervising sustainability risks later in 2025. In addition, we offer tailored bilateral seminars.

So please do not hesitate to get in touch with me or my colleagues from the Bundesbank.

The integration of climate-related risk into financial supervision is an on-going effort which requires collaboration and knowledge sharing.

3 The Role of Supervision

* Speech by Dr Sabine Mauderer at the Basel Committee on Banking Supervision (BCBS) and Financial Stability Institute (FSI) high level meeting, Capetown, 16 January 2025.

* Sabine Mauderer, Vice-President of the Deutsche Bundesbank.

Now, let us delve deeper into the role of supervision.

It is a given that supervisory authorities are responsible for ensuring that financial institutions manage all material financial risks they encounter.

Climate change clearly constitutes such a risk. The risk can come through transition or physical impacts – or even both. Additionally, nature degradation – such as deforestation and the erosion of soil – is increasingly becoming a focal point.

It is crucial for the financial sector to capture, monitor and manage climate and nature-related risks. To give a practical example: As you know, land often serves as collateral for loans to small and medium-sized African businesses. The collateral-to-loan ratios can be quite high². Investment in land resilience, such as climate-adapted irrigation techniques, can increase its quality and, consequently, its asset value.

A bank that does not manage climate risk would fail to capture these effects. It would therefore be unable to adequately price the value of the collateral.

I consider it essential that the financial sector takes these aspects seriously and prepares accordingly.

In 2020, the central banks in the euro area published a guide outlining their expectations for prudent climate risk management. And several central banks, including the ECB and the Bundesbank, have conducted climate stress tests to assess climate risks in the financial sector.

4 Climate Scenarios

To conduct climate stress testing, climate scenarios are a fundamental tool. They explore a range of plausible futures, without assigning concrete probabilities, serving as the basis for stress assumptions.

In November of last year, the NGFS released an updated version of its long-term climate scenarios. The outcome of these scenarios is quite striking:

Potential losses in global GDP could reach almost 15 % by 2050 compared to a scenario without climate change. And even this may still be an underestimation, as we need to understand the causalities and tipping points even better.

The NGFS plans to launch a set of new short-term scenarios this quarter, covering a period of up to five years. They will help improve our understanding of the near-term financial and economic effects of transitioning to a net zero economy, also including the consequences of severe natural disasters.

5 Conclusion

In conclusion, the results of our numerous analyses strongly support Archbishop Tutu's perspective: We simply cannot ignore the profound and multifaceted implications of climate change to our economies and societies.

It is hence crucial that we collaborate, share best practices and address these challenges jointly.

Let us start now and continuously refine our approach as we learn from experience. Today's session on climate risk offers an excellent springboard for our efforts.

Working Paper

Bail-ins and market discipline: Evidence from China

By SHANSHAN LI, DI GONG AND LIPING LU*

Highlights

- bail-in event of the CoCo bond market plays a market discipline effect.
- Issuance spreads of CoCo bonds are higher for small banks after the bail-in event.
- Local fiscal deficits enhance the market discipline effect of the event.
- CoCo bond issuances lead to higher risk-taking by small banks.
- CoCo bond issuances lead to a lower spread of Negotiable Certificate of Deposits after the event.

Abstract: We examine the effect of bail-in event on the market discipline for Chinese banks, exploiting the bankruptcy of *Baoshang Bank* and subsequent write-down as a quasi-natural experiment. Using the bond data of banks from 2016 to 2021, we find that the bail-in event leads to higher issuance spreads for bonds with write-down clauses. This effect is more pronounced for bonds issued by small banks, and banks in regions with weaker local fiscal strength. A higher proportion of CoCo bond in the bank capital increase the risk-taking of small banks. CoCo bond issuance reduces the spread of Negotiable Certificates of Deposit (NCDs) after the event due to a stronger buffer effect. We underscore the role of bail-in event in imposing market discipline in an emerging economy like China.

Key words: Bail-in, Market discipline, CoCo bonds, Implicit guarantee

JEL classification: G21, G28

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1. Introduction

The bank failures during the global financial crisis stimulated regulators to reassess the bailout mechanism for systemically important banks (SIBs). Regulatory reforms mainly focus on alleviating the moral hazard problem and undermining the bailout expectations for SIBs (Avgouleas et al., 2013). The bail-in capability of financial institutions may play an essential role in curtailing bank risks, while the strengthening of bail-in rules has received substantial attention from the regulators after the global financial crisis (Lewrick et al., 2019). Bail-ins indicate that the losses must be absorbed by the unsecured creditors before the government bailout. On the one hand, the elevated capital requirements for SIBs under Basel III bolster the loss-absorbing capabilities of insolvent banks from an *ex-ante* regulatory perspective. On the other hand, the Financial Stability Forum proposed the Recovery and Resolution Plan (RRP) in 2009 from an *ex-post* risk management perspective, which outlines the bail-in responsibilities of SIBs. The European Parliament approved the Banking Recovery and Resolution Directive (BRRD) in May 2014, which established the bail-in rules for European banks.

The traditional supervisory framework is insufficient to guarantee the capital adequacy for large financial institutions (Flannery, 2014), while they need novel instruments to enhance their capacity of absorbing risks. Moreover, write-downs or conversion of senior debts into equities are questionable in practice. Thus, contingent capital with risk absorption capacity arises accordingly in the market, which has advantages over the equity capital. On the one hand, locking in the execution price of contingent capital leads to a lower cost of equity dilution in the context of proper flexibility (Bolton and Samama, 2011). Second, contingent capital helps mitigate the procyclical effect of the supervision on bank equity capital, which enables banks to issue capital on preferential terms during recessions as a countercyclical capital supervision (Bolton and Samama, 2012).

Market discipline is one of the three pillars of the new Basel Capital Accord, i.e., financial markets provide signals that guide borrowers' behavior in a manner in alignment with their solvency (Lane, 1993). Effective market discipline requires that investors' assessment on bank risk is promptly and accurately reflected in the debt pricing, which curbs potentially detrimental actions by bank owners and managers (Flannery and Sorescu, 1996). The global financial crisis underscored the role of market discipline, which stimulates regulators to strengthen the market discipline by bank debt.

Existing studies on the relationship between bail-in rules and market discipline mainly focus on developed markets, especially in the Europe. However, due to systematic differences in political and financial systems across countries, the impact of bail-in rules on market discipline may be different in emerging economies. China is the second largest economy all over the world with a bank dominated financial system, while it is similar with Europe in terms of total banking size, i.e., RMB 282 trillion (US \$44 trillion) at the end of 2021. Recently, China has emerged as the largest contingent convertible (CoCo) bond market all over the world. Regulatory authorities have refined the bail-in framework in a unique way, which permits the bail-in events in the country. Given the historically rigid redemption mechanisms of bank debts in China, the implementation of bail-in rules is likely to have a more far-reaching impact on the market discipline of banks than developed markets¹.

We employ the takeover of *Baoshang Bank* as a quasi-natural experiment, which provides a unique setting to investigate the role of bail-in for the market discipline in the CoCo bond market. We examine the issuance spreads of financial bonds with and without a write-down clause before and after the bail-in event. Risk premium of CoCo bonds increases substantially after the bail-in event, which suggests reinforced market discipline *ex post*. The estimated bail-in risk premium amounts to 23.2 basis points, i.e., 17.6 percent of the sample mean, which is economically significant. This effect is more pronounced among non-big 6 banks, which are small and medium-sized banks in the country (i.e., hereby small banks). We provide further supporting evidence from the trading of secondary bond markets.

The bail-in event increases the risk premium of CoCo bonds in regions with weaker fiscal strength, which casts light on the role of fiscal capacity on market discipline. We also assess the effect of CoCo bond issuance on bank risk-taking, and find that a higher proportion of CoCo

¹ A rigid redemption feature implies that the issuer has a strict schedule for repaying the principal amount (face value) of the bond at maturity. This is in contrast to more flexible arrangements where the issuer might have options to adjust or defer payments under certain conditions. In China, rigid redemption embedded in bonds is largely due to implicit government guarantee.

bonds in bank capital leads to higher credit risk and insolvency risk for small banks. We find that CoCo issuance leads to a reduction in the spreads of Negotiable Certificate of Deposit (NCD) after the bail-in event, which suggests a spillover effect to the NCD market.

Our paper contributes to the literature in various ways. First, most existing research examines bail-ins and market discipline in the deposit markets of developed countries, we explore the CoCo bonds in China to examine the role of bail-ins for the market discipline. Second, in contrast to the role of bail-ins for the SIBS in developed countries, we show that the bail-in event strengthens the market discipline mainly for small banks. Third, we demonstrate that weak fiscal capacity enhances the credibility of bail-ins and market discipline after the bail-in event, which suggests a significant nexus between local bank and local government. Finally, we highlight the spillover effect of the bail-in event in CoCo bond market to the NCDs market.

Our study has various policy implications. In contrast to the evidence in developed countries, the financial risk has been concentrated among small banks instead of the big 6 state-owned banks. Given stringent market discipline faced by non-big 6 banks, the bail-in framework seems to function effectively in the country. Financial authorities should enhance the bail-in framework and reinforce market discipline to better safeguard the financial stability in the country.

The remainder of the paper is organized as follows. Section 2 provides an overview of institutional background. Section 3 reviews the literature and develops the hypotheses. Section 4 introduces the data and method. Section 5 shows the results. Section 6 explores the role of fiscal capacity, the impact on bank risk-taking, and the effect on pricing of NCDs. Section 7 concludes the paper.

2. Institutional background

2.1 Bail-in event of *Baoshang Bank*

China has not witnessed any bank defaults except *Hainan Development Bank* in 1998, which has fostered widespread bailout expectations for bank debts. The financial authorities have been striving to establish a bail-in framework over the past few decades. Ever since 2013, big state-owned banks have successively formulated their recovery and resolution plans. China Banking and Insurance Regulatory Commission (CBIRC) issued the “*Interim Measures for the Implementation of Recovery and Resolution Plan for Banking and Insurance Institutions*” in Feb 2021, which underscores the bail-in rule for the recovery and resolution plan. It specifies that distressed financial institutions can only be addressed at the lowest cost if bail-ins proves to be ineffective, which has the potential to trigger systemic risks.

The bail-in event of *Baoshang Bank*, henceforth “the bail-in event”, is a milestone in the establishment of bail-in framework in China. The default of *Baoshang Bank* commenced with its delay in the release of 2017 annual report, which suggested a severe financial distress. The People’s Bank of China (PBoC) and CBIRC declared a one-year takeover of *Baoshang Bank* on May 24, 2019, which poses a surprise to the market with unexpected interventions. It led to a complete write-down of Tier 2 (T2) CoCo bonds of the bank on Nov 13, 2020, i.e., 6.5 billion RMB, while an interest payment of RMB 586 million would no longer be repaid. It marked a weakening of rigid redemption rule in the bond market in China. Table A1 in the Appendix shows the timeline of the event.

Bailout / no-bailout events are often treated as quasi-natural experiments as the uncertainty on the legislation and unexpected implementations (Roman, 2019). However, it may be difficult to specify a precise timing of these events, as certain information may come out before the official announcement. Although the write-down of the CoCo bonds of *Baoshang Bank* occurred in Nov 2020, the potential risks were foreshadowed much earlier in their issuance pricing. There were still two banks that had not released their annual reports by of the end of June in 2018, *Baoshang Bank* and *Hengfeng Bank*. As both banks were non-big 6 banks in the country, the market expressed concerns on the risks of small banks in the issuance spreads of CoCo bonds in July 2018. Figure 1 shows a small gap between the spread of CoCo bonds and non-contingent financial bonds before July 2018, while this gap widened substantially from July 2018 onward. However, it experienced a substantial contraction in the early months of 2019, which indicates a diminished bail-in expectations on these banks. Following the takeover on May 24, 2019, this gap widened again and maintained a relatively stable trend afterwards. Figure 2 shows that the gap between the annual

average issuance spreads of CoCo bonds and non-contingent financial bonds widened after the takeover.

The bail-in event can be treated as exogenous in the context of an absence of debt defaults in the Chinese banking sector. Despite investors' concerns about the bank risk during the period of delayed release of its annual report, the expectation of a bond default was not prevalent as it is a medium-sized local bank with perceived resilience. Therefore, the bail-in of *Baoshang Bank* was still unexpected to some extent. Figure 3 shows that the search index of *Baoshang Bank* in Baidu (a major search engine in China) witnessed an abrupt surge on the takeover date, which indicates a limited anticipation of the takeover of *Baoshang Bank ex ante* and the exogeneity of the bail-in event.

2.2 CoCo bond market in China

CoCo bond represents a form of contingent capital which can convert into equity or undergo a write-down under certain trigger conditions in case of bank failures (Flannery, 2005). CoCo bonds serve as Additional Tier 1 (AT1) or T2 capital in the context of Basel III framework. CoCo bonds must be perpetual with a minimum 5.125% of trigger threshold for the capital ratio in order to be qualified as AT1 capital. CoCo bonds with fixed maturities or lower trigger thresholds may be only eligible as T2 capital due to limited loss-absorbing capacity (Avdjiev et al., 2013). The trigger criterion for CoCo bonds can be either mechanical or discretionary. The mechanical criterion is activated by the banks' capital ratio, while the regulatory authorities can make trigger decisions at discretion based on distance to the point of non-viability (PONV).

The regulation on bank capital in China resembles the general trend of the rest of the world since the global financial crisis. China Banking Regulatory Commission (CBRC)² issued the “*Capital Management Measures for Commercial Banks*” in June 2012, which mandated the inclusion of “write-down or conversion-to-equity” for T2 capital instruments. Traditional subordinated bonds without loss absorption clauses have rarely been issued by commercial banks since 2013. CoCo bonds issued by banks have predominantly been the discretionary and write-down category. The directive specifies the triggering events for qualified T2 capital instruments: (1) the CBIRC determines that the bank would be non-viable without a write-down; (2) the bank faces non-viability without capital injection by the public sector or equivalent support.

Table 1 shows the distribution of financial bond issuances. Panel A shows that CoCo bond issuances experienced a notable acceleration from 2019. The annual issuance volume surged over 1.1 trillion RMB during 2019-2021 in contrast to around 400 billion RMB during 2017-2018. The annual issuances of perpetual CoCo bonds amounted to around 600 billion RMB since 2019, while non-contingent financial bond issuances remained stable. The issuance of non-contingent subordinated bonds has been negligible since 2013. Panel B shows a consistently upward trend in the number of CoCo bond issuances recently, which is mainly driven by a rapid growth of perpetual bonds since 2019. As of the end of 2021, the face value of CoCo bonds reached 5.3 trillion RMB, i.e., 3.5 trillion RMB in T2 CoCo bonds and 1.8 trillion RMB in perpetual bonds, which constitutes over 20% of the total bank equity.

Table 2 shows the data on 1,467 financial bonds issued by Chinese banks from 2010 to 2021, i.e., 644 ordinary financial bonds and 823 subordinated bonds. The subordinated bonds consist of 92 non-contingent subordinated bonds, 605 T2 CoCo bonds and 126 AT1 perpetual bonds. The maturities of T2 CoCo bonds vary between 10 to 20 years with a concentration around 10 years. Only 5 out of 128 lack write-down clauses as of the end of 2021 for the AT1 perpetual bonds.

3. Literature and hypothesis

There are two strands of literature related with our research. One strand of the literature examines the market discipline of subordinated debts with a focus on CoCo bonds, while the other strand of the literature explores the market discipline of bail-ins. We formulate testable hypotheses subsequently based on the literature.

Market discipline serves dual roles: market monitoring and market influence (Bliss and Flannery, 2002). Market monitoring entails the timely incorporation of bank risk into the security price by market participants. Market influence involves translating market information such as

² The CBRC and the China Insurance Regulatory Commission (CIRC) were merged in April 2018 into the CBIRC as a regulator of banks and insurance companies.

securities prices, into incentives for managers or shareholders to curtail risk-taking behaviors, which ultimately constitutes the objective of market discipline (Scott, 2004; Ashcraft, 2008). While numerous studies substantiate the effectiveness of market monitoring, the impact of market influence remains relatively limited (Bliss and Flannery, 2002).

There are three approaches to assess the market monitoring effect: price-based approach, quantity-based approach, and combined price and quantity-based approach (Ghosh and Das, 2003). Existing studies on market discipline in subordinated debts mainly concentrate on price-based approach due to limited withdrawal risk of these debts with longer maturities (Bennett et al., 2015).

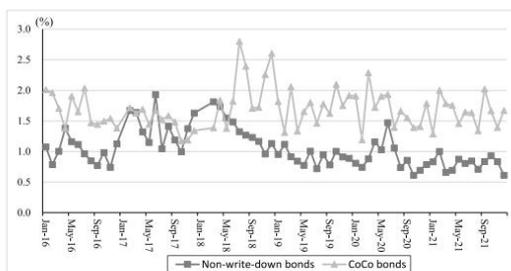


Fig. 1. Monthly average issuance spread. In Figs. 1 and 2, (1) refers to the event on May 24, 2019 in Table 3; (2) refers to the event in June 2019; (3) refers to the event in January 2020; (4) refers to the event on November 13, 2020.

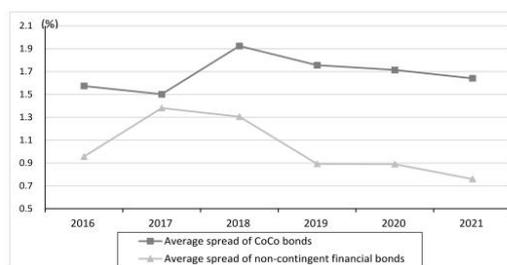


Fig. 2. Annual average issuance spread. Data Source: WIND Database.

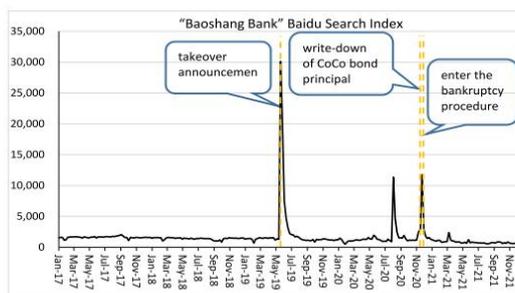


Fig. 3. Baidu search index of "Baoshang Bank". Data source: Index Baidu website.

3.1 Subordinated bonds and CoCo bonds and market discipline

We review the literature on subordinated debts without contingent clauses, and then CoCo bonds as a unique type of subordinated bonds. Bank creditors exhibit market discipline incentives in general. For example, Hassan et al. (2002) document quantity-based market discipline effect in the letters of credit in Canada. Subordinated bondholders as the first to bear potential losses, are more incentivized for risk monitoring than shareholders or higher-priority creditors (Blum, 2002; Karacadag and Shrivastava, 2000). However, most existing studies indicate limited market monitoring in subordinated bond markets (Krishnan et al., 2005; Evanoff et al., 2011).

As the efficiency of financial market improves and the government guarantee weakens, the market discipline effect of subordinated bonds becomes evident in both market monitoring and market influence. From the market monitoring perspective, Flannery and Sorescu (1996) link weaker government guarantees to the pricing of subordinated bonds. Covitz et al. (2004) find increased risk sensitivity of interest margin, which reflects worsened creditor protection. From the market influence perspective, the high sensitivity of subordinated bonds helps regulators assess

bank risk in a timely manner (Karacadag and Shrivastava, 2000; Bliss, 2001). In turn, the prompt corrective action will enhance market discipline and lower subordinated debt spreads (Lee et al., 2017). Establishing a bail-in framework creates a clean environment for the risk pricing of subordinated bonds after the global financial crisis, which weakens the implicit guarantees of SIBs and fosters market discipline of their subordinated bonds (Zhang et al., 2014).

CoCo bonds are different from traditional subordinated debts in terms of the wealth transfer effect from bondholders to shareholders under trigger conditions, which enhances market monitoring incentives of bond holders. Chang and Yu (2018) show that contingent capital notes (CCN) are more effective than subordinated debts in enhancing market discipline. With a credible bail-in mechanism, CoCo bond investors have a strong incentive to monitor the bank and price its bail-in risk through issuance costs by demanding a bail-in risk premium (Crespi et al., 2019). Recent studies show that the bail-in clause increases the risk premium of bail-inable bonds, which widens the interest rate gap between bail-inable bonds and non-bail-inable counterparts (Chan-Lau and Oura, 2016; Crespi et al., 2019). Le Lesle (2012) and Cutura (2021) estimate the bail-in premium, which varies from 13 to 300 basis points. Giuliana (2019) finds higher risk premium of unsecured bonds associated with higher bail-in commitment in the secondary market. While most studies explore developed countries, there is little research on the market discipline in the world's largest CoCo bond market.

Table 1: Distribution of issuance of financial bonds over time.

Panel A: Issuance amount (billion RMB)	All financial bonds	CoCo bonds		Non-contingent financial bonds	
		(Tier 2) CoCo bonds	(AT1) Perpetual bonds	Non-contingent subordinated bonds	Ordinary financial bonds
	(1)	(2)	(3)	(4)	(5)
2010	92	0	0	92	0
2011	346.9	0	0	313.2	33.7
2012	391.2	0	0	224	167.2
2013	106.7	1.5	0	0.2	105
2014	427.3	344.9	0	0	82.4
2015	468.8	267.9	0	0	200.9
2016	586.4	225.4	0	0	359
2017	857.6	480.4	0	0	377.2
2018	891	398.5	0	0	492.5
2019	1577.1	582	569.6	10	415.5
2020	1924.2	611.3	648.4	0	664.5
2021	1962.7	615.1	580.7	4.8	762.1

Panel B: Number of issuances	All financial bonds	CoCo bonds		Non-contingent financial bonds	
		(Tier 2) CoCo bonds	(AT1) Perpetual bonds	Non-contingent subordinated bonds	Ordinary financial bonds
2010	21	.	.	21	.
2011	32	.	.	30	2
2012	54	.	.	33	21
2013	33	1	.	1	31
2014	87	42	.	.	45
2015	116	61	.	.	55
2016	151	90	.	1	60
2017	195	126	.	.	69
2018	160	65	.	.	95
2019	176	68	16	1	91

2020	202	71	53	.	78
2021	240	81	57	5	97

Note: This table shows issuance amount (Panel A) and number of issuances (Panel B) of financial bonds. We decompose the sample into CoCo bonds and non-contingent financial bonds. CoCo bonds consist of (Tier 2) CoCo bonds and (AT1) Perpetual bonds. Non-contingent financial bonds consist of non-contingent subordinated bonds and ordinary financial bonds. Data is from the Wind database

Table 2: Characteristics of financial bonds issued during 2010-2021 in China.

	N	Mean of coupon rate	Mean of issuance rate spread (%)	Mean of maturity (years)	Mean of issuance amount (billion RMB)
All financial bonds	146	4.659	1.512	7.986	6.563
	7				
Ordinary financial bonds	644	4.143	1.167	3.398	5.683
Subordinated bonds	823	5.062	1.782	11.577	7.251
Non contingent subordinated bonds	92	5.818	2.163	12.228	7.023
CoCo bonds	731	4.967	1.734	11.495	7.280
CoCo bonds of non-big 6 banks	655	5.051	1.816	11.318	4.125
CoCo bonds of big 6 banks	76	4.246	1.026	13.026	34.467
Tier 2 CoCo bonds	605	5.035	1.725	10.145	5.830
AT1 perpetual bonds	126	4.642	1.781	-	14.244

Note: The table reports the mean of coupon rates, issuance rate spread (%), maturity (years), and issuance amount (billion RMB).

3.2 Bail-ins and market discipline

Bailouts can enhance banks' franchise value, reduce risk-taking incentives and weaken market discipline (Cordella and Yeyati, 2003; Schenck, 2013). Balasubramnian and Cyree (2011) show that subordinated bond spreads are less sensitive to default risk after the bailout of Long-term Capital Management Corporation. Recent studies consistently show that no-bailout events promote market discipline in contrast to bailouts (Schäfer et al., 2016; Tölö et al., 2021; Mo et al., 2021).

The occurrence of bail-in events can affect bank risk and financial stability (Crespi et al., 2019). Imai (2007) and Tölö et al. (2021) examine the impact of bail-in events on the spreads and market dynamics. Hahn et al. (2023) show that the two cornerstones of the European bail-in regime, the BRRD and the Single Resolution Mechanism (SRM), do not effectively reduce the implicit government guarantees in the European banking sector especially for the SIBs. Bail-in events can increase risk premia of bail-inable bonds and improve market discipline (Lewrick et al., 2019; Chan-Lau and Oura, 2016; Crespi et al., 2019). Keister and Mitkov (2023) emphasize the importance of setting a minimum bail-in, which considers the potential inefficiency of initial bail-ins being too small and bailouts being excessively large.

There is limited research on the appropriateness or efficiency of bail-in regulation in developing countries. Velliscig et al. (2022b) find a higher yield spread for banks in emerging countries within a bail-in framework. Although there is a dearth of studies on the market discipline effect of bail-in events in emerging markets, insights from existing studies suggest that the landmark write-down of CoCo bonds of *Baoshang Bank* may affect the market discipline of banks in China.

3.4 Hypotheses

The bail-in event of Baoshang Bank may improve the price-based market discipline of CoCo bonds in China, which makes the issuance spreads a more accurate measure of the bonds' bail-in risk after the event. We propose Hypothesis 1:

Hypothesis 1: *Bond issuance spreads, especially for financial bonds with write-down clauses by banks, are higher after the bail-in event of Baoshang Bank.*

The effect of a bail-in event on market discipline may vary across bank characteristics, while the bail-in rule was initially targeted towards the SIBs. Studies on developed countries show that bail-in expectations erode the financing advantages for SIBs. After the implementation of bail-in rules, SIBs may suffer greater stress in financing costs (Acharya et al., 2016). Announcements of bail-ins can affect credit default swap (CDS) spreads for SIBs and bond financing costs of big banks in Europe (Schäfer et al., 2016; Giuliana, 2019; Crespi et al., 2019). Existing studies also show that the bail-in framework weakens the financing cost advantage of SIBs (Pablos Nuevo, 2020; Lindstrom and Osborne, 2020; Cutura, 2021). The amended Banking Recovery and Resolution Directive (BRRD) in 2017 increases the yields of subordinated bonds issued by EU G-SIBs versus smaller banks, which suggests higher bail-in expectations afterwards (Velliscig et al., 2022a). These findings align with the regulatory intent in developed countries. However, the effectiveness of compulsory subordinated bonds in enhancing market discipline is limited in the context of reinforced implicit government guarantees (Sironi, 2003). Market discipline in the uninsured debt market may be weaker for banks with high implicit government guarantees (Nier and Baumann, 2006).

Generally speaking, Chinese banks fall into various categories: state-owned banks, joint-stock banks, city commercial banks, and rural commercial banks, etc. The Big 6 state-owned banks (ICBC; CCB; BOC; ABC; Bocom; PSBC) account for 47% of the total banking assets in 2021. The Big 4 banks (ICBC, CCB, BOC, ABC) are G-SIBs, while PSBC and Bocom, though not G-SIBs, have systemic importance and national government shareholders, which resemble the Big 4 banks more than other banks.

Implicit guarantees, especially for state-owned banks (SOBs), are deeply rooted in the Chinese banking system. The 4-trillion government stimulus plan in 2009 further strengthened the link between state-owned enterprises (SOEs) and SOBs. This institutional setting complicates the effect of bail-in reform on bank market discipline.

The market discipline effect of the bail-in event on the Big 6 banks may be weaker than the non-Big 6 banks, which can be attributed to their implicit government guarantees and lower bail-in credibility. We propose Hypothesis 2:

Hypothesis 2: *The impact of the bail-in event on the price-based market discipline of CoCo bonds may be less pronounced for the Big 6 banks versus non-Big 6 banks.*

4. Data and method

4.1 Data

We retrieve the data on financial bonds from the Wind database. We match banks with annual financial data from the China Stock Market & Accounting Research (CSMAR) and Chinese Research Data Services (CNRDS) by the issuer name and issuance year. We also obtain fiscal data from the Wind database. We limit the sample period of financial bonds to 2016-2021, as China introduced deposit insurance in 2015.³

In line with Avdjiev et al. (2020), our sample includes T2 and perpetual CoCo bonds, but excludes preferred shares due to their stronger equity attribute. In order to examine the effect of bail-in event on the relationship between write-down clause and bond issuance spreads, both non-contingent financial bonds and CoCo bonds are included in the sample. We exclude financial bonds issued by *Baoshang Bank*.

4.2 Method

We examine the impact of the bail-in event on the price-based market discipline of CoCo bonds through a pooled OLS cross-section regression (Cucinelli et al., 2021). Our regression model is:

³ On March 31, 2015, the PBoC issued the Regulations on Deposit Insurance effective from May 1 of 2015. Market discipline is determined by explicit insurance as well as non-insurance credibility of uninsured debts (Angkinand and Wihlborg, 2010). The establishment of deposit insurance system helps enhance the perception that uninsured creditors do not enjoy implicit guarantees (Prabhavivadhana and Wihlborg, 2012) and strengthen market discipline (Distinguin et al., 2013).

$$\begin{aligned}
 \text{spread}_{i,j,t} = & \alpha_0 + \alpha_1 \text{post}_t + \alpha_2 \text{writedown}_{i,j} + \alpha_3 \text{post}_t \\
 & * \text{writedown}_{i,j} + \alpha_4 \text{post}_t * \text{nonbig6}_i + \alpha_5 \text{nonbig6}_i * \text{writedown}_{i,j} + \alpha_6 \text{post}_t * \text{nonbig6}_i * \text{writedown}_{i,j} + \alpha_7 \text{bank}X_{i,y-1} + \alpha_8 \text{bond}X_{i,j} + \theta_i \\
 & + \theta_y + \varepsilon_{i,j,t}
 \end{aligned}
 \tag{2}$$

nonbig6 is a dummy indicating non-big 6 banks, which equals one for bonds issued by non-big 6 banks, and zero otherwise. We extend our model by introducing pairwise and triple interaction terms involving *post*, *nonbig6*, and *writedown*. The control variables and fixed effects are the same as the baseline Model (1). The triple interaction term captures the heterogenous effect of market discipline on the big 6 banks versus non-big 6 banks.

4.3 Descriptive statistics

Table 3 shows the descriptive statistics for our sample, which includes a total of 1,121 financial bonds issued by banks from 2016 to 2021. About 55.8% are CoCo bonds, and 48.4% were issued after the bail-in event. The average issuance spread for the financial bonds are 137.8 basis points with an average maturity of 8.27 years. We winsorize the variables at the 1st and 99th percentiles to deal with outliers.

Table 4 shows the Pearson pairwise correlations among variables. The majority of variables exhibit low correlation, which mitigates the concerns on multicollinearity. There is a negative correlation between *spread* and *post* mainly driven by the lower spread of non-write-down financial bonds ex post the event. Additionally, the positive correlation between *spread* and *writedown* indicates an increased required risk premium due to the write-down clause. A positive correlation between *spread* and *nonbig6* reflects investors' demand for a risk premium on the bonds by *non-big 6* banks.

Table 3: Descriptive statistics.

	N	Min	P 25	Media n	Mean	P 75	St. Dev.	Max
Spread	1,121	-0.1 80	0.880	1.320	1.378	1.800	0.600	3.370
Post	1,121	0.00 0	0.000	0.000	0.484	1.000	0.500	1.000
Writedo wn	1,121	0.00 0	0.000	1.000	0.558	1.000	0.497	1.000
Nonbig6	1,121	0.00 0	1.000	1.000	0.920	1.000	0.272	1.000
Bond rating	1,121	2.00 0	5.000	7.000	6.372	8.000	1.615	8.000
Perpetual	1,121	0.00 0	0.000	0.000	0.115	0.000	0.319	1.000
Maturity	1,121	2.00 0	3.000	10.000	8.271	10.000	5.409	20.000
Ln maturity	1,121	0.69 3	1.099	2.303	1.865	2.303	0.675	2.996
Ln amount	1,121	3.68 9	6.551	7.601	7.616	8.517	1.583	11.350
BankSize	1,098	1.55 3	1.912	2.048	2.057	2.224	0.246	2.530
NPL	904	0.35 0	1.250	1.510	1.542	1.770	0.485	4.310
z-score	1,121	2.20 7	3.844	4.537	4.595	5.256	1.019	11.198
ROA	1,092	0.19 0	0.680	0.860	0.869	1.020	0.320	2.110
CAR	1,069	8.56 0	12.060	13.070	13.340	14.390	1.644	17.760
Deficit	893	0.00 0	0.000	0.000	0.498	1.000	0.500	1.000

Financial Sufficiency	908	0.115	0.514	0.694	0.665	0.823	0.209	1.086
Tradespread	213,458	-1.334	1.140	1.769	1.674	2.182	0.926	14.635
Capitalmix	1,543	0.000	0.000	0.088	0.095	0.175	0.101	0.589

Table 4: Pearson pairwise correlation matrix.

Variables	Spread	Post	Writedown	Nonbig6	Bond Rating	Perpetual	Lnmatu rity	Lnamou nt
Spread	1.000							
Post	-0.079*	1.000						
Writedown	0.532*	0.044	1.000					
Nonbig6	0.247*	-0.134*	-0.124*	1.000				
Bond Rating	-0.732*	0.238*	-0.462*	-0.298*	1.000			
Perpetual	0.246*	0.361*	0.293*	-0.099*	0.083*	1.000		
Lnmatu rity	0.513*	0.116*	0.913*	-0.152*	-0.365*	0.501*	1.000	
Lnamou nt	-0.581*	0.186*	-0.108*	-0.482*	0.788*	0.176*	-0.049*	1.000
BankSize	-0.630*	0.266*	-0.164*	-0.537*	0.881*	0.147*	-0.085*	0.910**
NPL	0.222*	-0.026	0.091*	0.052	-0.227*	0.018	0.070**	-0.086**
Z-score	-0.192*	0.388*	0.015	-0.217*	0.303*	0.126*	0.036	0.302**
ROA	-0.005	-0.241*	0.004	-0.055*	-0.126*	-0.155*	-0.021	-0.093**
CAR	-0.201*	0.296*	-0.154*	-0.380*	0.197*	0.033	-0.115*	0.093**
Deficit	0.267*	-0.017	0.089*		-0.241*	0.020	0.074**	-0.190**
Financial Sufficiency	-0.327*	-0.035	-0.145*		0.333*	-0.037	-0.117*	0.277**

Variables	BankSize	NPL	Z-score	ROA	CAR	Deficit
BankSize	1.000					
NPL	-0.137*	1.000				
Z-score	0.314*	-0.230*	1.000			
ROA	-0.109*	-0.409*	0.075*	1.000		
CAR	0.176*	-0.192*	0.250*	0.301*	1.000	
Deficit	-0.213*	0.273*	-0.191*	0.009	-0.202*	1.000
Financial Sufficiency	0.308*	-0.305*	0.219*	0.059*	0.173*	-0.791*

5. Results

5.1 Baseline results

Table 5 shows the regression results of Model (1). In column (1), we control for bank and year fixed effects only. The coefficient of *writedown* is positive and significant at the 1% level, which

suggests that CoCo bonds with write-down clause have higher issuance spread. In addition, the coefficient of the interaction term is also positive and significant at the 1% level, which suggests that the premium is higher after the bail-in event. The effect is also economically significant, i.e., the issuance spread is 41 basis points higher for CoCo bonds with write-down clause after the bail-in event. In column (2), we find qualitatively similar results when controlling for bank characteristics. In column (3), our interaction term remains positive and significant at the 1% level when the bond-level controls are included, while the coefficient of *writedown* is no longer significant. The bail-in risk premium are 23.2 basis points, which is about 17.6 percent of the sample mean (the average issuance spread is 1.32%).

Table 5: Baseline regressions: bail-in event and price-based market discipline.

Spread	(1)	(2)	(3)
Post	-0.036 (0.057)	-0.016 (0.058)	-0.007 (0.056)
Writedown	0.330*** (0.037)	0.330*** (0.038)	0.040 (0.059)
Writedown*Post	0.410*** (0.050)	0.386*** (0.053)	0.242*** (0.053)
Banksize		0.324 (0.824)	0.851 (1.120)
Npl		0.052 (0.056)	0.080 (0.049)
ROA		-0.071 (0.120)	0.038 (0.118)
CAR		-0.024 (0.017)	-0.023 (0.015)
Bond Rating			-0.203*** (0.030)
Perpetual			0.380*** (0.043)
Lnaturity			0.108*** (0.041)
Lnamount			-0.012 (0.016)
Constant	1.025*** (0.031)	0.565 (1.861)	0.741 (2.338)
Year FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Observations	985	857	857
Adjusted R-squared	0.716	0.707	0.779
Number of banks	187	187	140

Notes: This table reports baseline regressions on the issuance spreads before and after the bail-in event for bonds with and without write-down clauses from 2016 to 2021. The dependent variable is the issuance spread in percentage points. We run pooled OLS estimation with bank and year fixed effects in all specifications. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * significance at the 1%, 5%, and 10% levels, respectively.

In sum, we find that the market discipline effect manifests only after the bail-in event through a higher requirement on the bail-in risk premium of CoCo bonds, which is consistent with existing studies (e.g., Lewrick et al., 2019; Chan-Lau and Oura, 2016; Crespi et al., 2019). In addition, the bail-in risk premium of CoCo bonds exhibits significant market discipline effect in the economic sense in China, which is even higher than the 14 and 2 basis points in the US and Japan estimated by Lewrick et al. (2019). While bail-in risk premium may vary among countries with different

levels of implicit guarantee, it turns sizable after the milestone bail-in event in a country with strong implicit guarantee up until now.

5.2 Bank heterogeneity

Table 6 shows the regression results in Model (2) on bank heterogeneity. We include double and triple interaction terms of *post*, *writedown*, and *nonbig6*, which can identify the heterogenous effect of market discipline across bank types. In column (1), we control for bank and year fixed effects only. The double interaction term between *post* and *writedown* remains positive, but is statistically significant at the 10% level. The coefficient of the triple interaction term is significant and positive at the 1% level, which suggests a stronger market discipline effect of the bail-in event on small banks. Our main results are corroborated by the results in columns (2) and (3) where bank and bond controls are included. In column (3), the *post*writedown* is not significant and the triple interaction term is positive, which implies that the divergence between big 6 banks and non-big 6 banks is mainly driven by the changes of financing cost of the latter, which is consistent with Pablos Nuevo (2020).

Table 6: Bank heterogeneity.

Spread	(1)	(2)	(3)
Post	0.047 (0.070)	0.066 (0.075)	0.040 (0.070)
Writedown	0.396*** (0.038)	0.382*** (0.043)	0.225*** (0.072)
Writedown*Post	0.137* (0.078)	0.153* (0.082)	0.009 (0.063)
Nonbig6*Post	-0.082 (0.051)	-0.084 (0.056)	-0.035 (0.054)
Nonbig6*Writedown	-0.083 (0.057)	-0.067 (0.060)	-0.219*** (0.064)
Writedown*Post*Nonbig6	0.328*** (0.093)	0.285*** (0.099)	0.287*** (0.083)
BankSize		-0.034 (0.845)	0.467 (1.117)
NPL		0.054 (0.056)	0.079 (0.049)
ROA		-0.063 (0.119)	0.043 (0.117)
CAR		-0.021 (0.017)	-0.021 (0.015)
Bond Rating			-0.217*** (0.032)
Perpetual			0.378*** (0.042)
Lnmaternity			0.103** (0.040)
Lnamount			-0.014 (0.016)
Constant	1.022*** (0.030)	1.277 (1.911)	1.635 (2.353)
Year FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Observations	985	857	857
Adjusted R-squared	0.719	0.710	0.782
Number of banks	187	140	140

Notes: This table reports baseline regressions on the heterogenous effect of bank type (or size) on issuance spreads before and after the bail-in event for bonds with and without write-down clauses from 2016 to 2021. The dependent variable is the issuance spread in percentage points. We run pooled OLS estimation with bank and year fixed effects in all specifications. See the appendix

for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

Notably, the coefficient of the double interaction term is no longer significant in column (3), which suggests that the market discipline effect is not significant for large banks but for small banks only. Our findings diverge from the pattern in developed countries where bail-ins weaken the financing cost advantage of G-SIBs (Giuliana, 2019; Crespi et al., 2019; Pablos Nuevo, 2020; Lindstrom and Osborne, 2020). A potential explanation is that implicit government guarantee weakens the credibility of bail-in (Distinguin et al., 2013), in particular for the Big 6 banks in China. It also suggests that the driving force of the bail-in premium is related to the risk of bank failure rather than its G-SIB status (Cutura, 2021).

5.3 Robustness checks

We provide some robustness checks through examining the market discipline effect in the secondary market, the impact of Covid-19 pandemic, and the exogeneity of write-down clause.

5.3.1 Evidence from the secondary market

Existing studies mainly focus on the primary market of bond issuance. Investors in the secondary market are sensitive to the changes in bank risk from the bail-in event. Therefore, we analyze the pricing and trading in the secondary market. We collect the trading data on banks' financial bonds, i.e., both non-contingent financial bonds and CoCo bonds in the secondary market from 2017 to 2021. We estimate the following model:

$$\begin{aligned} TradeSpread_{i,j,t} = & \alpha_0 + \alpha_1 post_t + \alpha_2 post_t * writedown_{i,j} + \alpha_3 post_t * nonbig6_i + \alpha_4 post_t * nonbig6_i * writedown_{i,j} \\ & + \alpha_5 residual\ maturity_{i,j,t} + \alpha_6 bankX_{i,y-1} + \theta_j + \theta_i + \theta_y + \varepsilon_{i,j,t} \end{aligned} \quad (3)$$

where *TradeSpread* is the difference between the daily annualized yield of the bond and the daily YTM of treasury bonds of the same maturity on the same date⁴. We include *post*, *writedown*, *nonbig6*, and their double and triple interaction terms. Note that some terms are picked up by bond fixed effect θ_j , bank fixed effect θ_i , and year fixed effect θ_y . The bank-level control variables (*bankX_{i,y}*) are the same as those in Model (2). We use the remaining maturity of the bond as a control variable (Balasubramnian & Cyree, 2011).

Table 7 shows the results using the secondary market data. Column (1) shows results for the baseline regression. The positive and significant coefficient for the double interaction term of *post* and *writedown* confirms the rising spreads of CoCo bonds after the bail-in event, which is in line with the market discipline. Column (2) shows the results for Model (3) without controlling for bank or bond covariates. We find that the triple interaction term is positive and significant, which confirms that small banks witness more stringent market discipline. Column (3) includes bond covariates and column (4) includes the full set of controls. The double and triple interaction terms are positive and significant, which suggests that the bail-in event increases the risk premium for CoCo bonds with write-down clause for both Big 6 and non-Big 6 banks in the secondary market. However, the effect is stronger for small banks.

Table 7: Robust test: Evidence from secondary markets.

TradeSpread	(1)	(2)	(3)	(4)
Post	-0.774*** (0.066)	-0.874*** (0.052)	-0.805*** (0.066)	-0.483*** (0.063)
Writedown*Post	0.830*** (0.074)	0.128*** (0.039)	0.121*** (0.039)	0.123*** (0.036)
Nonbig6*Post		0.127** (0.061)	0.123** (0.060)	0.093* (0.053)
Nonbig6*Writedown*Pos t		0.715*** (0.091)	0.721*** (0.090)	0.415*** (0.083)
Constant	1.717*** (0.017)	1.717*** (0.020)	0.766*** (0.236)	3.413 (2.872)
Bank-level controls	No	No	No	Yes

⁴ We conduct a panel unit root test for the dependent variable *TradeSpread*, and the p-value indicates significant at the 1% level, which supports the stationarity of the variable.

Bond-level controls	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Bond FE	Yes	Yes	Yes	Yes
Observations	213,458	213,458	213,458	132,674
Adjusted R-squared	0.700	0.708	0.709	0.804
Number of bonds	146	146	146	146

Notes: This table reports analogous regressions to the baseline specification using trading data from secondary markets of financial bonds issued by banks from 2017 to 2021. The dependent variable is the issuance spread measured in percentage points. We run pooled OLS estimation with bank, bond, and year fixed effects in all specifications. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

5.3.2 Alternative sample period

Our results might be disturbed by the Covid-19 pandemic. We employ a sample period over 2017 to 2019 and re-estimate Models (1) and (2). Table 8 shows the estimation of Model (1) in the first two columns and Model (2) in the last two columns. The regressions in odd columns do not control for bank or bond level variables, while regressions in even columns have a full set of controls. The coefficients of the double interaction term in columns (1)-(2) are positive and significant at the 1% level, which confirms the market discipline effect in the full sample. In addition, the triple interaction term in columns (3)-(4) also remain positive and significant, which confirms the robustness of our results.

5.3.3 Propensity score matching (PSM)

Our results may be prone to the selection bias. We use propensity score matching to better control for the selection bias. We set the triple interaction term of *writedown*, *post*, and *nonbig6* as the treatment variable, and *spread* as the outcome variable. We analyze the treatment effect of the interaction term on the issuance spread. Table 9 shows the results of the PSM estimation. We apply six matching methods with replacement. As the sample size of the control group is three times more than that of the treatment group, we adopt both one-to-one matching in column (1) and one-to-four matching in column (2). In addition, we apply four other matching methods, namely, spline matching, radius matching, local linear regression matching, and Mahalanobis matching in columns (3) to (6). Table 9 shows the matching results of the participating group, ATT, the matching result of the non-participating group, ATU, and the matching result of all banks, ATE. The PSM results in columns (1)-(6) show that all of the ATT matching results are significantly positive at the 1% level, which confirms that the bail-in event significantly improves market discipline of non-Big 6 banks.

6. Extensions

6.1 Bail-in event and bank-government nexus

We investigate the effect of fiscal strength on the market discipline effect of the bail-in event. As a market-preserving federal system (Weingast, 2009), the bailout responsibility sharing model for local banks among various hierarchical levels of governments is similar to that of the EU to a certain extent in China. Local banks, such as city and rural commercial banks, fall under the supervision of local offices of CBIRC in the country. Local governments bear a main responsibility for bail-out interventions in cases of financial distress for these local banks, despite with the central government as a rescuer of the last resort. In contrast, national banks are supervised by the CBIRC headquarter office in Beijing, and the central government is accountable for their bail-out measures. In addition, it is noteworthy that the primary shareholders of China's local banks are either the local governments or state-owned enterprises owned by local governments. As a result, the fiscal weakness of sub-sovereign or local governments acts as a constraint on the capability to conduct bailouts and enhances the credibility of bail-in.⁵ Therefore, our focus lies in understanding the influence of local fiscal strength on the bail-in credibility of local banks. The bail-in event serves as an indicator of the central government's commitment to

⁵ Schäfer et al. (2016) exploit bail-in events in the EU and find that bail-ins in PIIGS countries (Portugal, Italy, Ireland, Greece, and Spain) have a much greater impact on CDS spreads than in other EU countries, as weaker fiscal strength leads to lower bailout capability and stronger bail-in expectations.

bolster the credibility of a no-bailout policy. Nevertheless, given the nexus between local governments and local banks, this event may concurrently foster a stronger connection between the issuance cost of CoCo bonds and the fiscal strength of local governments.

Table 8: Robustness checks: Shortened sample period (2017-2019).

Spread	(1)	(2)	(3)	(4)
Post	-0.049 (0.054)	-0.058 (0.049)	0.133 (0.104)	0.065 (0.098)
Writedown	0.312*** (0.050)	-0.078 (0.121)	0.356*** (0.069)	0.208 (0.135)
Post*Writedown	0.442*** (0.084)	0.313*** (0.088)	0.146 (0.176)	-0.041 (0.117)
Post*Nonbig6			-0.200** (0.100)	-0.113 (0.092)
Nonbig6*Writedown			-0.051 (0.091)	-0.332*** (0.082)
Post*Nonbig6*Writedown			0.364* (0.196)	0.417*** (0.134)
Constant	1.164*** (0.023)	5.533 (6.340)	1.162*** (0.021)	6.884 (6.465)
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Bank-level controls	No	Yes	No	Yes
Bond-level controls	No	Yes	No	Yes
Observations	439	382	439	382
Adjusted R-squared	0.623	0.637	0.622	0.639

Notes: This table reports baseline regressions on the issuance spreads before and after the bail-in event for bonds with and without write-down clauses from 2017 to 2019. The dependent variable is the issuance spread in percentage points. We run pooled OLS estimation with bank and year fixed effects in all specifications. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Robustness checks: Propensity Score Matching (PSM).

	(1)	(2)	(3)	(4)	(5)	(6)
Spread	One-to-one matching	One-to-four matching	Spline matching	Radius matching	Local linear regression matching	Mahalanois matching
ATT	0.234*** (0.067)	0.206*** (0.056)	0.195*** (0.046)	0.235*** (0.048)	0.220*** (0.045)	0.145*** (0.051)
ATU	0.086 (0.115)	0.209** (0.107)	0.223*** (0.074)	0.209*** (0.084)	0.207** (0.097)	0.590*** (0.045)
ATE	0.134 (0.082)	0.208*** (0.071)	0.213*** (0.053)	0.217*** (0.062)	0.212*** (0.068)	0.491*** (0.040)
Observations	1,061	1,061	1,061	1,061	1,061	1,061

Notes: This table reports estimation of Average Treatment Effect on the Treated (ATT), Average Treatment Effect on the Untreated (ATU), and Average Treatment Effect (ATE) using six matching methods, i.e., one-to-one matching, one-to-four matching, spline matching, radius matching, local linear regression matching, and Mahalanois matching. Each cell reports the estimation of each regression. Observations are financial bonds from 2016 to 2021. The dependent variable is the issuance spread in percentage points. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

To identify the impact of local fiscal capacity on market discipline effect of the bail-in event, we restrict our sample to city and rural commercial banks. In addition, we exclude local banks located in municipalities directly under the central government and those with cross-province branches operating in multiple regions. Inspired by Jenkner and Lu (2014), we estimate the following specification:

$$Spread_{i,j,t} = \alpha_0 + \alpha_1 deficit_{i,c,y-1} + \alpha_2 post_t + \alpha_3 post_t * deficit_{i,c,y-1} + \alpha_4 bankX_{i,c,y-1} + \alpha_5 bondX_{i,j} + \theta_i + \theta_y + \varepsilon_{i,j,t} \quad (4)$$

We include a dummy for fiscal deficit of prefecture government, *deficit*, which equals one for cities with deficit ratio above the sample median in a year and zero otherwise. The local government fiscal deficit is fiscal deficit / local GDP at the prefecture level. The bank-level controls (*bankX_{i,c,y}*) and bond-level controls (*bondX_{i,j}*) are the same as in Model (1). We include bank fixed effects θ_i and year fixed effects θ_y .

Table 10 reports the regression results for the effect of local fiscal strength on bond issuance spreads. In the first two columns, we proxy local fiscal strength with a *deficit* dummy. The interaction term of *post* and *deficit* yields a positive and significant coefficient in column (1) when bank or bond characteristics are not included. It suggests that CoCo bonds from local banks with higher fiscal deficit exhibit an elevated issuance spread after the bail-in event. Column (2) further confirms the results, which reinforces that the bail-in event increases the risk premium of CoCo bonds issued by banks in regions with weaker fiscal strength. It aligns with the pattern observed in Europe (Schäfer et al., 2016).

Table 10: Bail-in event and the local bank-government nexus.

Spread	(1)	(2)	(3)	(4)
Post	-0.097 (0.157)	-0.137 (0.147)	0.288** (0.121)	0.167 (0.138)
Deficit	-0.260** (0.113)	-0.305* (0.165)		
Post*Deficit	0.406*** (0.096)	0.317*** (0.099)		
Financial Sufficiency			0.196 (0.166)	0.225 (0.193)
Post* Financial Sufficiency			-0.352*** (0.097)	-0.283*** (0.103)
Constant	1.825*** (0.095)	3.562 (5.827)	1.606*** (0.100)	2.026 (5.812)
Bank-level controls	No	Yes	No	Yes
Bond-level controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	290	210	294	214
Adjusted R-squared	0.196	0.323	0.212	0.348

Notes: This table reports regressions examining the effect of local fiscal strength on issuance spreads before and after the bail-in event. Observations are financial bonds from 2016 to 2021. The dependent variable is the issuance spread in percentage points. We run pooled OLS estimation with bank and year fixed effects in all specifications. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

Alternatively, we substitute the *deficit* dummy with a *financial sufficiency* dummy variable, which equals one for cities with a financial sufficiency ratio above the sample median for a given year, and zero otherwise. Financial sufficiency is fiscal revenue over fiscal expenditure. Unlike the *deficit* dummy, a higher *financial sufficiency* ratio denotes higher fiscal strength. The interaction term of *post* and *financial sufficiency* has a negative coefficient in columns (3) and (4), which provides additional support for the effect of financial strength on bond spreads.

6.2 CoCo bonds and bank risk-taking

We examine whether the market discipline effect of CoCo bonds curbs banks' risk-taking. The impact of subordinated debt on bank risk taking mainly covers two channels, i.e., charter value and moral hazard, while the literature is mixed on the channels.

On the one hand, empirical studies show that there is a negative relationship between charter value and bank risk taking (e.g., Konishi and Yasuda, 2004; González, 2005; Agoraki et al., 2011). The higher cost of subordinated debts lowers interest margin, which therefore weakens the charter value of banks. Consequently, it increases banks' risk-taking incentives to compensate for this effect (Blum, 2002). On the other hand, subordinated debts may reduce banks' moral hazard through curtailing value-destroying actions by managers of distressed banks (Chen and Hasan, 2011). Most studies confirm that subordinated debts reduce banks' risk-taking only under specific conditions, such as credible commitment of banks to a given level of risk (Blum, 2002), the conversion-to-equity clause (Chen and Hasan, 2011), or the level of bank supervision and economic development reaching a certain threshold (Nguyen, 2013).

The wealth transfer effect from creditors to shareholders under trigger conditions by CoCo bonds amplifies the incentives for banks to transfer risk. Additionally, this dynamic may elevate the moral hazard for both bank managers and shareholders (Berg and Kaserer, 2015; Hori and Cerón, 2016). The potential consequence is an increase in the instability and vulnerability of the banking system (Koziol and Lawrenz, 2012; Chan and Van Wijnbergen, 2016). In elucidating the impact on shareholders' risk incentives, Fatouh and McCunn (2022) underscore that the direction of wealth transfer during the bond conversion plays a pivotal role. In addition, the impact of Total Loss-Absorbing Capability (TLAC) bonds on management's risk behavior hinges on their proportion in total liabilities and the sensitivity of their yield to the issuers' risk exposure (Flannery and Bliss, 2019). The appropriate selection of CoCo bond parameters is imperative for mitigating banks' incentives for excessive risk-taking (Hilscher and Raviv, 2014). The type of trigger employed in CoCo bonds is also a pivotal factor. Mechanical-type CoCo bond exhibits a greater propensity to curtail risk-taking when juxtaposed with the discretionary type (Avdjiev et al., 2020). This disparity arises from the lower triggering probability and bail-in credibility associated with the discretionary type, which leads to lower financing cost and reduced sensitivity to risk.

We evaluate whether CoCo bond issuance increases banks' risk-taking. Following Ashcraft (2008), we employ Model (5) to examine the impact of capital structure changes on risk-taking of non-Big 6 banks from 2016 to 2021:

$$risk_{i,t} = \alpha_0 + \alpha_1 capitalmix_{i,t-1} + \alpha_2 car_{i,t-1} + \alpha_3 bankX_{i,t-1} + u_i + v_i + \varepsilon_{i,t} \quad (5)$$

where we consider two proxies for the dependent variable, the banks' risk ($risk_{i,t}$), i.e., z -score for banks' insolvency risk and NPL for credit risk, respectively. Z -score is the sum of ROA and equity-to-asset ratio over the standard deviation of ROA (std (ROA)) estimated using three-year rolling window. We take the natural logarithm of z -score, while a higher z -score indicates lower insolvency risk.

The core variable is $capitalmix$, i.e., CoCo bond balance over the sum of CoCo bond balance and total equity. Due to the missing data issue, we use total equity to proxy for banks' capital. We extend the set of bank controls to include $liquid\ assets$, i.e., the proportion of liquid assets in total assets (Acharya and Naqvi, 2012; Nguyen, 2013; Khan et al., 2017), and the proportion of long-term funding in total liabilities ($long-term\ funding$), besides capital adequacy ratio (CAR), bank assets ($BankSize$), and profitability (ROA).

Table 11 shows the results with NPL as the dependent variable in the first two columns and z -score in the last two columns. Notably, the coefficient of $capitalmix$ is significantly positive at the 1% level in columns (1) and (2). It implies that a higher proportion of CoCo bonds in total capital increases the risk-taking behaviors of small banks, which aligns with the channel of charter value. Beyond the wealth transfer effect, the discretionary trigger type of CoCo bonds emerges as an important determinant. As the financing cost of discretionary CoCo bonds and its sensitivity to risk are lower than those of mechanical CoCo bonds, the charter value effect imposes a relatively weak constraint on banks' risk-taking, which leads to a dominance of moral hazard effect.

In columns (3) and (4), the coefficient of $capitalmix$ is significantly negative at the 5% and 10% levels respectively when the dependent variable is z -score. It implies that the impact on credit risk outweighs that on insolvency risk. As the mean of $capitalmix$ is only 9.5% in our sample, its impact on risk-taking is constrained and localized.

6.3 CoCo bond and NCD

We examine the effect of the bail-in event on the NCD market to identify a market spillover effect. There is some literature on the ripple effect of subordinated debt issuances on the senior debt market. Linn and Stock (2005) show that the issuance of new subordinated debts is accompanied by a change in the risk premiums of senior unsecured debts. Gimber and Rajan (2019) stress that under the credible bail-in assumption, the spread of senior unsecured bonds could be reduced as more subordinated creditors take risks. Flannery and Bliss (2019) also find that bail-in bonds increase protection for short-term debt holders. Pablos Nuevo (2020) shows that the yields on banks' senior bonds decreased in 2016, i.e., the year when the BRRD came into effect in the EU.

The priority of NCDs is higher than the non-contingent financial bond. Therefore, we expect that the improvement in the market discipline of CoCo bonds induced by the bail-in event provides a stronger buffer against the NCD market, and may henceforth reduce the issuance spreads of NCDs. Following Linn and Stock (2005), we employ Model (6) to test this conjecture:

$$NCDspread_{i,j,t} = \beta_0 + \beta_1 post_t + \beta_2 issue\ coco_{i,t} + \beta_3 post_t * issue\ coco_{i,t} + \beta_4 shibor_t + \beta_5 bankX_{i,y-1} + \beta_6 NCDX_{i,j} + u_i + v_y + \epsilon_{i,j,t} \quad (6)$$

where $NCDspread_{i,j,t}$, is the difference between the coupon rate of NCD_j issued by bank i on date t and the daily YTM of treasury bonds with the same maturity on the same date. Issue $coco_{i,t}$ is a CoCo bond issuance dummy which equals one for banks that have issued at least one CoCo bond before the date, and zero otherwise. Interbank market liquidity can affect the interest rates in the NCD market, so we introduce the 1-month SHIBOR rate ($shibor_t$) as a proxy for interbank market liquidity. Scarcer liquidity tends to elevate issuance spreads. Bank-level control variables are the same with Model (1). NCD-level control variables ($NCDX_{i,j}$) include the natural logarithm of maturity ($lnmaturity_{i,j}$) and issuance amount ($lnamount_{i,j}$). Furthermore, we incorporate bank fixed effects u_i , and year fixed effects v_y . Notably, monthly shibor indices are not absorbed by year fixed effects.

Table 11: Proportion of CoCo bonds in bank capital and risk-taking.

	(1)	(2)	(3)	(4)
	NPL		Z-score	
Capitalmix	0.024*** (0.008)	0.021*** (0.008)	-1.311** (0.601)	-1.085* (0.603)
CAR	-0.099*** (0.028)	-0.058** (0.023)	0.831 (2.154)	0.372 (2.312)
Constant	0.030*** (0.004)	0.046** (0.019)	4.563*** (0.281)	9.351*** (2.266)
Bank-level controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	1,122	1,052	1,120	1,115
Adjusted R-squared	0.618	0.653	0.360	0.365
Number of banks	266	249	254	254

Notes: This table reports regressions on the effect of the proportion of CoCo in bank capital on banks' risk taking. Observations are bank-years of non-big 6 banks. Dependent variables are NPL in the first two columns and Z-score in the last two columns, respectively. Capitalmix is the proportion of CoCo bonds in a bank's capital structure, defined as CoCo bond balance divided by the sum of total equity and CoCo bond balance. Odd-numbered columns exclude while even-numbered columns include bank level controls. We run pooled OLS estimation with bank and year fixed effects. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12: Descriptive statistics of NCD issuances (2016-2021).

	N	Min	p25	Median	Mean	p75	SD	Max
NCDspread	153,173	-1.960	0.624	0.882	0.980	1.316	0.452	3.047
Post	153,17	0.000	0.000	0.000	0.495	1.000	0.500	1.000

Shibor	3 153,17	1.300	2.500	2.725	2.956	3.712	0.741	4.935
Maturity (Days)	3 153,17	28.000	91.000	182.000	188.181	365.000	128.326	1096.000
Ln maturity	3 153,17	3.332	4.511	5.204	4.925	5.900	0.874	6.999
Amount (RMB 100 million)	3 153,17	0.100	1.000	2.500	7.327	6.500	16.841	482.900
Ln amount	3 153,17	0.095	0.693	1.253	1.466	2.015	0.984	6.182

Table 13: CoCo bond issuance, bail-in event and pricing of NCDs.

NCD spread	(1)	(2)	(3)	(4)
	2016-2021		2017-2019	
Post	0.162*** (0.034)	0.146*** (0.036)	0.199*** (0.029)	0.150*** (0.028)
Issue Coco	0.038 (0.038)	0.049 (0.035)	-0.039 (0.054)	-0.012 (0.041)
Post*Issue Coco	-0.082** (0.035)	-0.080** (0.038)	-0.118*** (0.033)	-0.087*** (0.031)
Constant	3.121*** (0.647)	2.173*** (0.651)	2.355*** (0.773)	0.799 (0.744)
Bank-level controls	Yes	Yes	Yes	Yes
Shibor	No	Yes	No	Yes
NCD-level controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	130,738	130,738	67,052	67,052
Adjusted R-squared	0.653	0.705	0.602	0.726

Note: This table reports regressions on the effect of CoCo bond issuances on NCD spreads before and after the bail-in event. Observations are NCDs in 2016-2021 in the first two columns and 2017-2019 in last two columns. The dependent variable is the NCD spread in percentage points. Odd-numbered columns exclude *Shibor* and NCD-level controls, while even-numbered columns include the full set of controls. We run pooled OLS estimation with bank and year fixed effects in all specifications. See the appendix for variable definitions. Robust standard errors are clustered by bank in brackets. ***, **, and * statistical significance at the 1%, 5%, and 10% levels, respectively.

We extract the NCD issuance data from the Wind database, and Table 12 shows the descriptive statistics. The NCD sample includes 153,173 issuances from 2016 to 2021, which is a large number due to its higher issuance frequency, shorter maturity and smaller issuance size than CoCo bonds. Its average maturity is about six months, while its average issuance amount is about 732 million RMB.

Table 13 shows a full sample period during 2016-2021 in the first two columns, while a narrower sample period during 2017-2019 in the last two columns. In odd columns, we omit *shibor* and NCD level controls, whereas in even columns we incorporate the full set of controls. The coefficient of *post* is significantly positive at the 1% level across the specifications, which suggests an increase in NCD issuance spreads after the bail-in event due to diminishing expectations of implicit government guarantees. The coefficient of *post* suggests that the bail-in event leads to an increase in NCD spreads by about 14.6 basis points in column (2). At the same time, the coefficient of the interaction term in column (2) is significantly negative at the 5% level. It suggests that CoCo bond issuance reduces NCD spreads after the bail-in event, while a higher bail-in expectation of CoCo bonds provide a stronger buffer against NCDs.

7. Conclusion

We examine the market discipline effect of bail-ins in the Chinese bond market. We find that the bail-in event of Baoshang Bank improves the price-based market discipline, while bonds with write-down clause are issued with higher spreads ex post the event. The effect is stronger for non-Big 6 banks versus Big 6 banks. Our results are robust to the secondary market, various sample periods and propensity score matching method.

Moreover, the bail-in event leads to a closer nexus between risk premiums of CoCo bonds and the fiscal strength of local governments. In addition, the proportion of CoCo bonds in total capital increases the risk-taking of non-Big 6 banks, which may be related with the discretionary trigger type. After the bail-in event, CoCo bond issuance tends to reduce NCD spreads, while stronger bail-in expectations provide a stronger buffer against NCDs.

The infrequent but crucial occurrence of bail-in events plays a pivotal role in enhancing the bail-in credibility. Our work underscores the significance of bail-in events in enforcing market discipline, i.e., a key element of the Basel regulatory framework, which offers policy implications for financial regulators in other emerging markets. The effect of bail-ins is more pronounced for small banks instead of G-SIBs, which highlights systematic differences in financial risk profiles and supervisory regime between China and the developed countries.

Data availability statement

Data are available from the authors upon request.

Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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Declaration of competing interest

All authors declare that they have no conflict of interest.

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Appendix

Table A1: Timeline of the bail-in event.

Time	Event
April 28, 2018	Baoshang Bank announced that the 2017 annual report could not be disclosed before April 30.
June 28, 2018	Baoshang Bank issued another announcement, further delaying the disclosure of the 2017 annual report.
May 24, 2019	In response to the “significant credit risk” at Baoshang Bank, the PBoC and CBIRC jointly declared a one-year takeover of the bank.
June 2019	The takeover team employed an intermediary agency to verify assets and operations in a market-oriented manner, revealing a significant insolvency gap. A theoretical projection indicates that, the repayment rate for general creditors would be below 60% without public fund intervention.
October 2019	Formal reform and restructuring were initiated. To ensure uninterrupted financial services, the PBoC and CBIRC opted to establish Mengshang Bank, which would acquire and manage the assets, liabilities, employees, and businesses of the Baoshang Bank.
April 30, 2020	Mengshang Bank was officially established and opened.
November 13, 2020	The principal of Tier 2 CoCo bonds (RMB 6.5 billion) of Baoshang Bank was written down in full, which ended up in 100% loss of principal and unpaid interest for investors.
November 23, 2020	The CBIRC issued a document indicating its preliminary agreement for Baoshang Bank to enter the bankruptcy procedure.
February 7, 2021	Baoshang Bank was declared bankruptcy by the court, which was the first bank to experience bankruptcy since the introduction of deposit insurance in China.

Table A2: Variables definition and data sources.

Variable	Definition	Data sources
Spread	Issuance spread (%). The issuance rate of financial bonds minus yield to maturity (YTM) of treasury bonds with the same maturity on the issuance date.	Wind database
TradeSpread	Trade spread (%). The difference between daily annualized yield of the bond and daily YTM of treasury bonds of the same maturity on the same date.	Wind database
NCDSpread	NCD spread (%). The difference between coupon rate of NCD and daily YTM of treasury bonds with the same maturity on the same date.	Wind database
Post	The bail-in event dummy, which equals 1 for bonds issued after the bail-in event, and 0 otherwise.	Wind database
Writedown	Write-down clause dummy, which equals 1 for bonds with write-down clauses, and 0 otherwise.	Wind database
Non-Big 6	Non-big 6 dummy, which equals 1 is for bonds issued by non-big 6 banks, and 0 otherwise.	CSMAR and CNRDS
Bond Rating	Bond rating with a value from 1 to 8. A higher value indicates a higher rating.	Wind database
Perpetual	Perpetual bond dummy, which equals 1 for perpetual bonds, and 0 otherwise.	Wind database
Maturity	Maturity of a bond in years.	Wind database
Lnaturity	Natural logarithm of the maturity (years).	Wind database
Lnamount	Natural logarithm of the bond's issuance amount.	Wind database
BankSize	Natural logarithm of bank total assets.	CSMAR and CNRDS
NPL	NPL ratio of an issuing bank (%) = non-performing loans / total loans.	CSMAR and CNRDS
ROA	Return on assets of an issuing bank (%) = net profit / (total assets at year beginning + total asset at year end)*2.	CSMAR and CNRDS
CAR	Capital adequacy ratio of an issuing banks (%) = net capital / risk-adjusted assets.	CSMAR and CNRDS
Z-Score	A bank's insolvency risk = log of (ROA+equity-to-asset ratio) / three-year std(ROA).	CSMAR and CNRDS
Deficit	Prefecture-level fiscal deficit level dummy, which equals 1 if the deficit ratio is above the median in the year and 0 otherwise.	Wind database
Financial Sufficiency	Prefecture-level financial sufficiency level dummy = Fiscal revenue / fiscal expenditure.	Wind database
Capitalmix	Proportion of CoCo bonds in a bank's capital structure = CoCo bond balance over the sum of total equity and CoCo bond balance.	CSMAR and CNRDS

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