

What China's Digital Yuan Means for Renminbi Internationalization

Kashov Sharma

Research Seminar

Dr. Banks

April 10th, 2020

Abstract

For the past five years, the People's Bank of China (PBOC) has been researching the potential of a Digital Currency Electronic Payment (DCEP) to support their growing Financial Technology (fintech) sector. This paper will explore the potential impact the DCEP will have on the Renminbi (RMB) or Yuan in the context of global financial markets. First, I will explore the meaning of having an internationalized currency and its various benefits for the currency producing nation. I will then explore how China has pursued RMB Internationalization through traditional means such as through its Belt and Road Initiative (BRI), before finally analyzing the impact of the DCEP on its efforts.

To put the significance of Internationalization in context, currently, the U.S. dollar is the most internationalized currency in the world, serving as the basis of most of world trade. This regime began during the post-World War II Bretton Woods Conference where Western countries decided to treat the dollar as a safe asset and conduct trade through it. The Dollar's status as a reserve currency has allowed the U.S. economy to prosper beyond traditional expectations. In fact, some estimates state that the Dollar's status is directly or indirectly responsible for up to one-third of U.S. GDP.¹ With these high stakes established, this paper will analyze the Chinese efforts to supplant the Dollar with their own currency.

¹ Satyajit Das, "How the US Has Made a Weapon of the Dollar," The Economic Times, September 7, 2018

Literature Review

The interpretative discrepancies on the issue of the PBOC's motivation for launching the DCEP centers on whether it was done to support their burgeoning fintech industry or to expand the Yuan's reach. Experts such as Professor He Zhiguo argue PBOC's intentions are domestically focused, citing the DCEP's research starting five years ago. This was soon after the fintech apps AliPay and WeChat Pay took off and implies the DCEP was made to strictly support China's fintech industry.² Furthermore, they point to the need for the PBOC to exert greater control over lending practices and interest rates as another motivating factor, not a desire to take the RMB global and displace the dollar.³ Though there is little literature evaluating the direct impact of the DCEP on RMB Internationalization, many scholars have explored the possibility of RMB Internationalization and the motivations behind the creation of the DCEP.

Those more skeptical of the PBOC's intentions such as the Hudson Institute's Tim Morrison point to the fact that the DCEP was released around the same time Facebook's Libra was proposed, suggesting the PBOC did not want to allow a digital currency which is Dollar dominated to have a first mover advantage.⁴ They also argue that if BRI investments are forced to be denominated in DCEP or Renminbi, then the Yuan could rapidly cut into the dollar's international reach.⁵ Lastly, they point to the massive benefits the U.S. gets by the dollar being the international reserve currency. Thanks to the dollar's position, the American Federal Government is able to access near limitless, low yield loans, an option which has allowed it to

² Forkast.news, "WATCH: Why Is China's Central Bank Launching a Digital Currency? Chicago Booth Economist Explains the Impact - Forkast," *Forkast*, September 12, 2019,

³ *ibid.*

⁴ Tim Morrison, "The Greenback Needs a Digital Makeover," *Foreign Policy*, January 24, 2020,

⁵ Tim Morrison, "The Greenback Needs a Digital Makeover," *Foreign Policy*, January 24, 2020,

run high deficits for years on end.⁶ Furthermore, it has also allowed U.S. sanctions to shut down nearly any country's trade at will, giving it another tool to use in diplomatic negotiations.⁷ It is these benefits which Morrison and others argue the U.S. must defend by obstructing the DCEP.

Though Zhiguo makes a valid point that the DCEP was initiated well before China pushed RMB Internationalization and though it is likely true that the DCEP will provide a boost to Alipay and WeChat Pay, it also does not matter. I believe it is almost guaranteed that the Chinese Central Government will attempt to use the DCEP to expand the reach of the Yuan even if the primary motivation is domestic focused. Therefore, this paper will ignore the debate on the motivations behind the initial launch of the DCEP and assume the PBOC will try to leverage the DCEP to expand the Yuan's reach where it can.

Regarding RMB Internationalization, researchers disagree on whether the Yuan will supplant the Dollar after 10-15 years or at a more accelerated rate. If the threat of Internationalization is real, then the U.S. should naturally be more concerned about the DCEP, but if the Yuan does not have the fundamental prerequisite for an international currency, then the concern is overblown.

Advocates of RMB Internationalization such as Zhou Xiaochuan argue that due to China's growing economy and trade balances, the Yuan will naturally disperse throughout the world economy.⁸ Furthermore, they point out that as the Chinese financial judicial system institutionalized and becomes more reliable, countries will come to trust it.⁹ Xiaochuan also bets that political instability and high debt levels in the U.S. will simultaneously lead to a decline in

⁶ Satyajit Das, "How the US Has Made a Weapon of the Dollar," *The Economic Times*, September 7, 2018

⁷ *ibid.*

⁸ CHEN JIA, "World Awaits Digital Currency Breakthrough," global.chinadaily.com.cn, January 8, 2020.

⁹ *ibid.*

trust of the U.S. economy, allowing for an alternative to take the place of the dollar.¹⁰ (A further analysis of China's RMB Internationalization efforts will be in the **Non-DCEP Policies**

Prompting RMB Internationalization section of my paper.)

Conservative economists such as the London Business School's Richard Portes, are more skeptical of RMB Internationalization, believing it will take significantly longer for the world economy to move away from Dollar dependence.¹¹ They argue that it will take years for the international financial community to gain sufficient trust in China's financial judicial system especially since there is a lack of judicial independence in China.¹² They also point out that in order for a country's currency to circulate internationally, it will need a substantial trade deficit, something the manufacturing powerhouse will have a hard time achieving.¹³ Furthermore, the Chinese reluctance to lift capital controls directly prevents the proliferation of the Yuan as investors are unable to take out their RMB denominated investments.¹⁴ Portes theorizes that it will take significant political effort and time for the Chinese Central Government to lift these restrictions as the real estate and banking sectors will lobby in support of them.¹⁵ Lastly, they point to the U.S.'s relationship with oil producing Gulf Countries and their support for the Petrodollar which helps to ensure a constant demand for Dollars.¹⁶

Though Portes and RMB skeptics do make good points, most of their arguments are only temporarily applicable. For instance, though the Chinese financial judiciary is not currently trusted by international investors to produce consistent, "reasonable" rulings, the legal

¹⁰ *ibid.*

¹¹ Richard Portes, "International Currencies and the Macroeconomy" (London School Business, 2009).

¹² *ibid*, pg 4.

¹³ *ibid*, pg 5.

¹⁴ *ibid*, pg. 4-5.

¹⁵ *ibid*, pg. 8.

¹⁶ *ibid*, pg. 10.

precedences which are being set likely will create a Common Law precedence which would lead to more consistent rulings. Furthermore, previous investments in China have already proven that international investors do not need to have complete trust in the Chinese political system to choose to invest and depend on it. Lastly, regarding China's trade surplus, its continuous lowering of tariffs on Asian countries will ultimately allow it to run the necessary deficit to circulate the Yuan. Due to these changes in Chinese Policy, this paper disagrees with Portes' critique of RMB Internationalization and agrees with Xiaochuan's stance, proceeding assuming the DCEP will impact RMB Internationalization does matter.

Why Does China Want the RMB to Internationalize?

In order to understand how the DCEP could be used to further RMB Internationalization, this paper will explore why China is pursuing Internationalization. China's push can be explained by three main advantages for a country's currency being the international reserve. First, Internationalization allows a country to access low interest loans. This is because, once a currency becomes internationalized, it serves as the basis of most international currency transactions, other countries denominate their own debt in that currency, and international trade becomes conducted through that currency as well.¹⁷ These new uses for a countries' currency leads to near limitless demand for a countries currency by international investors, and the currency can also come in the form of debt bonds its federal government distributes. This is because, in order for the international economy to conduct these three actions, there must be enough supply of a country's currency or debt.¹⁸ This near unlimited demand alleviates a country's constraints on federal debt. Normally, a country is constrained from running high deficits as outside investors may be reluctant to buy this debt if they believe the country will not be able to repay it. However, if a country creates the reserve currency of the world which is necessary for the aforementioned functions, there will be a near unlimited demand for the currency and therefore a limitless amount of debt which the country can create.¹⁹

The second benefit is that the country's foreign policy is given a tremendous tool in the form of an all-encompassing sanction. Because most trade and currency transfer occurs in the internationalized currency, if the currency-producing country cuts off the supply of its currency

¹⁷ Ben S Bernanke, "The Dollar's International Role: An 'Exorbitant Privilege'?", Brookings (Brookings, January 7, 2016).

¹⁸ *ibid.*

¹⁹ *ibid.*

to a sanctioned country, they could prevent all trade with that particular country not only blocking the sanctioned country's access to their own market but also to the world's market.²⁰

This power can be seen in the US tariffs against Iran. When the U.S. sanctioned Iran against the wishes of European countries, not only did it cut off Iran's access to American companies, but by threatening sanctions on any company or country which violated its own sanctions, it also prevented European firms from trading with Iran.²¹

Conversely, we can also see how the Europeans attempted to circumvent these tariffs as a parallel to what China will attempt if the RMB internationalizes. In response to unilateral American sanctions, European nations attempted to set up a direct currency transaction between the Euro and the Iranian Rial to circumvent the traditional dollar dominated exchanges.²² Though this particular scheme did not work due to a lack of trust by the European corporations, this did lay out a blueprint of how China could begin to eat away at the Dollar's dominance.

The third benefit of having an internationalized currency is the simple soft power the country receives. Having a country's currency be internationalized is an implicit stamp of approval by the international community for the currency and the country's economy, indicating that the country is one of the stablest in the world and that its word on transactions can be relied upon.²³

²⁰ Kathy Gilsinan, "Why the United States Uses Sanctions So Much," *The Atlantic* (The Atlantic, May 3, 2019).

²¹ *ibid.*

²² Tom McTague, "What the Iran Crisis Reveals About European Power," *The Atlantic*, June 25, 2019.

²³ Ben S Bernanke, "The Dollar's International Role: An 'Exorbitant Privilege'?", *Brookings* (Brookings, January 7, 2016).

Non-DCEP Policies Prompting RMB Internationalization

China's current efforts to internationalize the RMB independent of the DCEP can be categorized into six main strategies. The first strategy China is using to proliferate the Yuan is the BRI, its trillion dollar scheme to invest in the infrastructure for Asian and African countries. By investing billions into Asian and African countries in Yuan denominated debt, China is able to make these countries take on loans in RMB, thus increasing the international supply of the currency.²⁴ This mirrors the U.S. strategy in the post-World War II period when it invested in Europe and Japan through the Marshall Plan, which solidified the Dollar as the international currency at the time.²⁵

China's second strategy is to create an alliance of anti-U.S. oil producing states in order to establish a competing Petroyuan against the Petrodollar. Seeing an opening in the countries America had isolated including Russia, Angola, and Venezuela, China was able to have them agree to trade their oil to China in RMB, creating a minor market for the Yuan.²⁶ In order to comfort oil investors, however, China agreed to back the Petroyuan in gold, assuaging worries that the volatility in the value of the Yuan might reduce the value of the oil which was traded for.²⁷ Lastly, China is able to use the fact that it is the second largest consumer of oil to force countries to trade in the Petroyuan by threatening to cut off their purchase of a particular country's oil. Not only does this create a market for the Yuan but it also incentivizes these countries to buy Chinese products in Yuan, increasing demand for Chinese technologies.²⁸

²⁴ Benn Steil, "Central Bank Currency Swaps Tracker," Council on Foreign Relations (Council on Foreign Relations, November 19, 2019).

²⁵ *ibid*, pg 5-6.

²⁶ DAMON EVANS, "Shanghai Shakes up Global Oil Trading," *Nikkei Asian Review*, October 17, 2018.

²⁷ *ibid*, 3-4.

²⁸ *ibid*, pg 1.

Though the Petroyuan's trading volumes would be relatively insignificant, the fact China was able to establish the market in the first place is significant as it creates a precedent for future expansion of the Yuan.²⁹

A major obstacle for Yuan Internationalization is China's trade surplus which results in other countries using their RMB reserves to buy Chinese goods, leading to a net in-flow of RMB out of international markets and into China instead of Yuan being pumping out into the global economy as China desires for RMB Internationalization.³⁰ In fact, this is the inverse problem the U.S. has. Because the Dollar is in such high demand, it makes U.S. exports uncompetitive and leads to the U.S. running a trade deficit.³¹ Thus, though a trade surplus may seem like a benefit for China, it actually hinders them from promoting the RMB internationally. In order to overcome this structural disadvantage, China is trying to transform its economy away from being export driven to consumer driven.³² Thus, it is trying to expand its service sector while steadily lowering tariffs in order to create an influx of goods and an outflow of RMB currency.³³

The fourth strategy China is pursuing is agreeing to currency swaps with other nations. Through the Chiang Mai Initiative, China was able to transfer its RMB into other countries' financial systems, most prominently during the Asian Financial Crisis.³⁴ In the Crisis, the PBOC was able to step in with more stable RMB and provide it to other Asian central banks who in-turn loaned them out to their own institutional banks which were running dry of foreign currencies.³⁵

²⁹ *ibid*, pg 2-3.

³⁰ Felix K. Chang, "Foreign Policy Research Institute," Foreign Policy Research Institute, August 6, 2019.

³¹ *ibid*.

³² *ibid*.

³³ *ibid*.

³⁴ Mie Oba, "Reforming the Chiang Mai Initiative," *thediplomat.com*, May 21, 2019.

³⁵ Zero One Think Tank, "央行数字货币Q&A手册:一文带你看懂CBDC与Libra-零壹财经," *www.01caijing.com* (Zero One Think Tank, August 5, 2019).

This not only stabilized China's trading partners but it also gave it the opportunity to serve the same role the Fed (U.S. Federal Reserve Bank) played during the 2008 Financial Crisis, introducing the notion that the RMB is a trustworthy, stable currency.³⁶

China's fifth action is opening up their banking sector to foreign banks. They hope that by allowing financial institutions such as J.P. Morgan Chase and Goldman Sachs to invest in domestic corporations, it will open the door for these companies to trade in RMB, as Chinese investments will naturally be denominated in Yuan.³⁷ If they can introduce such international investors to the RMB markets, the Chinese hope it will allow for a swifter Internationalization effort.³⁸

The sixth and final strategy China is pursuing is a gradual lifting of long standing capital controls. China first established strict capital controls as it feared investors would take money made in China and invest it abroad, leaving China "high and dry." Thus, Beijing enforced strict controls which, though succeeded in keeping investment in, also prevented the spread of the RMB.³⁹ However, in recent years as the Central Government's priorities have shifted and confidence in the domestic economy has increased allowing for these controls to be relaxed.⁴⁰

³⁶ *ibid*, pg 6-7.

³⁷ Biz Analysis, 2019 in Review: China Accelerates Opening-up of Financial Sector, CGTN, December 27, 2019.

³⁸ *ibid*.

³⁹ IMFBlog, "Central Bank Digital Currencies: 4 Questions and Answers," IMF Blog, December 12, 2019.

⁴⁰ *Ibid*, pg 10.

The DCEP's Impact

The DCEP's launch may be the final push the RMB needed to become international, proliferating into BRI countries. Since the launch of the BRI, China has been frustrated by the stubborn resilience of the Dollar in Asian markets. Initially, when it began investing, it expected other countries to adopt the RMB just as Europe had done pre-Brenton Woods with the German Mark.⁴¹ However, the risk averse Asian economies tried to avoid taking on debt in RMB, in fact demanding loans be denominated in the Dollar.⁴²

This reluctance had become a serious problem for Beijing as it had hoped that the capture of Asian and African economies in the RMB currency umbrella would allow it to not only begin the process of Internationalization but also bypass West regulations and sanctions in regions which are projected to dominate the future world economy.⁴³

Simultaneous to the Asian countries were a resistance to Chinese fintech companies such as Ant Financial's Alipay and Tencent's WeChat Pay.⁴⁴ This was largely due to those markets already being dominated by Facebook's products. Facebook's presence blocked these companies' social media products from spreading, social media apps being the product which they relied on to bring in users to their ecosystems.⁴⁵

However, the launch of the DCEP and the Digital Silk Road is Beijing's attempt to eliminate two problems at once. Currently, these East Asian countries are attempting to digitize their financial markets which are currently mainly cash based and they are looking to the

⁴¹ Benn Steil, "Central Bank Currency Swaps Tracker," Council on Foreign Relations (Council on Foreign Relations, November 19, 2019).

⁴² *ibid.*

⁴³ Nathaniel Taplin, "China's Blockchain Revolution Won't Set Investors Free," *Wall Street Journal*, October 29, 2019, sec. Markets.

⁴⁴ Orla Ward and Sabrina Rochemont, "Understanding Central Bank Digital Currencies (CBDC)," 2019.

⁴⁵ *ibid.*

Chinese model. During China's transition away from cash, it leapfrogged the Western credit card model by going straight from cash to digital fintech app transactions.⁴⁶ Thus, the BRI's digital component will fund the digital infrastructure (e.g. fiber optics and database infrastructure) of these countries in order to facilitate their adoption of financial apps.⁴⁷

While China is building these East Asian countries' digital infrastructure it is also integrating the DCEP into their fintech giants. Evidence of this can be seen by the Central Government pushing Alipay to partner with Unionpay, a financial company with close links to the government.⁴⁸ By linking Alipay's financial services to Unionpay, China created a network through which it could distribute their DCEP.⁴⁹

This follows up Unionpay's aggressive expansion abroad in recent years where it has entered over 173 countries and has gotten Walmart and French supermarket company Carrefour to accept its credit cards.⁵⁰ Even I have seen ads for its credit cards scattered throughout malls in the California Bay Area. By leveraging loan negotiations in East Asian nations and their desire to adopt a more sophisticated payment system, China is attempting to expand their fintech services into these nations.⁵¹ Furthermore, by expanding their fintech companies' footprint into these countries, it will create a network through which it can proliferate the DCEP and, by extension, the Yuan.⁵²

⁴⁶ Net Politics, "China's Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism," Council on Foreign Relations, September 26, 2019.

⁴⁷ *ibid.*

⁴⁸ Miranda Wood, "Raw Seafoods and Partners Join IBM's Food Trust Blockchain," Ledger Insights - enterprise blockchain, October 17, 2019.

⁴⁹ *ibid* pg 4-5.

⁵⁰ *ibid*, pg 2.

⁵¹ Net Politics, "China's Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism," Council on Foreign Relations, September 26, 2019.

⁵² *ibid.*

Lastly, if China is able to expand its fintech apps into East Asian countries, their expansion would give the Central Government the room to suppress manufacturing due to jobs created in the financial sector.⁵³ By facilitating this shift away from manufacturing exports, China would be able to both reduce its trade surplus while also maintaining domestic wealth and growth, side stepping major political consequences.

The launch of the DCEP also comes at a time of heightened Dollar skepticism as articulated by, of all people, the Governor of the Bank of England, Mark Carney. Though the U.S. and the U.K. tend to have close relations, Carney spoke out against the world relying on the Dollar as the reserve currency.⁵⁴ He argued that because the U.S.'s economy is not growing as fast as strong developing countries such as Vietnam and India but is growing faster than Europe, its monetary policy tends to be out of sync with other central banks.⁵⁵ For instance, when the U.S. economy was booming between 2017 and 2019, the Fed took to tightening monetary policy, sucking investment away from both developing and developed nations. Carney goes as far as to propose the RMB would be a superior alternative to the Dollar if China could create a more open financial system.⁵⁶ With criticism coming from both allies and adversaries, if the PBOC is seen as more innovative and better equipped for future financial systems, countries may choose to switch to the RMB.

⁵³ *ibid.*

⁵⁴ Mark Carney, "The Growing Challenges for Monetary Policy in the Current International Monetary and Financial System," (August 23, 2019).

⁵⁵ *ibid*, pg 3.

⁵⁶ *ibid*, pg 7.

The COVID-19 Financial Crisis' Implications on RMB Internationalization And The DCEP

The current COVID-19 Crisis has led to unprecedented actions from the various Central Banks including the U.S. Fed, actions likely to impact the Internationalization of the RMB along with the strength of the Dollar.

Firstly, the Fed's decision to buy up trillions of dollars of assets, injecting money into the markets, though a necessary action, has weakened the Dollar's international position.⁵⁷ During the crisis, it not only bought relatively reliable U.S. Federal Bonds, but also took the unprecedented step of buying U.S. Corporate Bonds as well, some of which may not be paid back by the institution which produced it.⁵⁸ Though it did not exactly print money, the Fed's actions did create a certain level of uneasiness for international investors, calling into question whether the Dollar can remain the world's reserve currency.⁵⁹

The second major event which occurred during the crisis was the PBOC's decision to not drop its interest rates down to the levels of most Western and developed Eastern countries.⁶⁰ This put the RMB in an impressively stable, strong position relative to most other currencies. Due to the high interest rates, international investors have begun looking to China for investment opportunities, buying RMB denominated bonds, exactly what the PBOC desires for RMB Internationalization.⁶¹

⁵⁷ Matthieu Favas, "Geopolitics and Technology Threaten America's Financial Dominance," *The Economist*, May 7, 2020.

⁵⁸ *ibid.*

⁵⁹ *ibid.*

⁶⁰ Bloomberg Markets and Finance, "China Acting Like Emerging Developed Market: BNP Paribas's Sun," YouTube Video, YouTube, May 28, 2020.

⁶¹ *ibid.*

Thirdly, during the crisis, the PBOC took the impressive step of expanding trial runs of the DCEP to a new economic zone south of Beijing, and they agreed to work with SenseTime, a Chinese AI company, to integrate Machine Learning into the roll out of the digital currency.^{62 63} By taking advantage of the explosion of digital payments during the crisis, China seems to be looking to integrate AI into their payment platform in order to take advantage of the high levels of digital transitions which will likely continue to occur after social distancing is over.

Due to these three major events, RMB Internationalization, backed by the DCEP, seems like it could gain momentum during this crisis and even if it does not, the current strong position of the Yuan does set a precedence of Chinese bond investments being equally as competitive and reliable as U.S. assets.

⁶² Frank Tang, “McDonald’s, Starbucks, Subway to Join China’s Digital Currency Test,” South China Morning Post, April 23, 2020.

⁶³ Ding Yi, “SenseTime Announces AI Tie-Up With Central Bank Amid Digital Currency Rumors - Caixin Global,” Caixin Global, April 29, 2020.

Conclusion

As the Chinese economy continues to grow at a relatively high rate, its government will look to take advantage of its projected position as the largest economy by displacing the U.S. Dollar as the world's reserve currency. They are making their push, through the DCEP, by building on nearly a decade of fiscal reforms which positioned the RMB for Internationalization. By leveraging a strategically built digital payment transfer network including AliPay and UnionPay, they will attempt, and likely will succeed, in proliferating the DCEP and the Yuan, using their economic size and their advanced technological sector to achieve RMB Internationalization.

Bibliography

- Amadeo, Kimberly. "How the Yuan Could Become a Global Currency." The Balance. The Balance, May 10, 2013.
<https://www.thebalance.com/yuan-reserve-currency-to-global-currency-3970465>.
- Anzalone, Robert. "Details Of China's Digital Currency Are Scarce. What Are The Implications?" Forbes, February 7, 2020.
<https://www.forbes.com/sites/robertanzalone/2020/02/07/details-of-chinas-digital-currency-are-scarce-what-are-the-implications/#b1ea71f323e9>.
- Bernanke, Ben S. "The Dollar's International Role: An 'Exorbitant Privilege'?" Brookings. Brookings, January 7, 2016.
<https://www.brookings.edu/blog/ben-bernanke/2016/01/07/the-dollars-international-role-an-exorbitant-privilege-2/>.
- Biz Analysis. "2019 in Review: China Accelerates Opening-up of Financial Sector." news.cgtn.com, December 27, 2019.
<https://news.cgtn.com/news/2019-12-27/2019-in-Review-China-accelerates-opening-up-of-financial-sector-MJRyahurvO/index.html>.
- Bloomberg Markets and Finance. "China Acting Like Emerging Developed Market: BNP Paribas's Sun." YouTube Video. *YouTube*, May 28, 2020.
<https://www.youtube.com/watch?v=plIJ-2IaEOc>.
- Boring, Perianne, and Marc Kaufman. "Blockchain: The Breakthrough Technology of the Decade and How China Is Leading the Way -An Industry White Paper," April 12, 2020.
<https://digitalchamber.org/wp-content/uploads/2020/02/Blockchain-The-Breakthrough-Technology-of-the-Decade-and-How-china-is-Leading-the-Way.pdf>.
- Bram, Barclay. "Inside China's Mission to Create an All-Powerful Cryptocurrency." Wired UK, February 4, 2020.
<https://www.wired.co.uk/article/china-digital-currency-crypto>.
- Carney, Mark. "The Growing Challenges for Monetary Policy in the Current International Monetary and Financial System." presented at the Jackson Hole

Symposium 2019, August 23, 2019.

<https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/the-growing-challenges-for-monetary-policy-speech-by-mark-carney.pdf?la=en&hash=01A18270247C456901D4043F59D4B79F09B6BFBC>.

Changchun, Mu. “Design and Architecture of Central Bank’s Digital Currency Mu Changchun CF40 Invited Guest Deputy Director of the Payment and Settlement Department of the PboC.” Chinese Development of Digital Currency and Global Outlook, August 10, 2019.

<http://www.cf40.org.cn/uploads/newsletter/20190803.pdf>.

CHEN JIA. “World Awaits Digital Currency Breakthrough.” global.chinadaily.com.cn, January 8, 2020.

<https://global.chinadaily.com.cn/a/202001/08/WS5e150960a310cf3e3558310b.html>.

Chorzempa, Martin, and Dovey Wan. Why China Aims to Replace Cash With the Digital Yuan. Interview by Laura Shin. *Unchained*, November 19, 2019.

Cote-Munoz, Natalia, and Sean Silbert. “Blockchain in China: A Solution in Need of a Problem.” thediplomat.com. The Diplomat, January 11, 2020.

<https://thediplomat.com/2020/01/blockchain-in-china-a-solution-in-need-of-a-problem/>.

Das, Satyajit. “How the US Has Made a Weapon of the Dollar.” *The Economic Times*, September 7, 2018.

<https://economictimes.indiatimes.com/news/international/business/how-the-us-has-made-a-weapon-of-the-dollar/articleshow/65715068.cms?from=mdr>.

Dell’Ariccia, Giovanni, Itai Agur, and Anil Ari. “Designing Central Bank Digital Currencies.” IMF, November 18, 2019.

<https://www.imf.org/en/Publications/WP/Issues/2019/11/18/Designing-Central-Bank-Digital-Currencies-48739>.

- “Digital Yuan Patent Strategy: A Collection of Patents Filed by the People’s Bank of China.” CHAMBER OF DIGITAL COMMERCE, February 2020.
<https://digitalchamber.org/wp-content/uploads/2020/02/PBOC-Patents.pdf>.
- Dobiexchange. “The Digital Currency of the Central Bank Design Concept and Technical Architecture Full Text of Mu Changchun’s Speech.” ChainNews, August 12, 2019. <https://www.chainnews.com/articles/761536251153.htm>.
- EVANS, DAMON. “Shanghai Shakes up Global Oil Trading.” Nikkei Asian Review, October 17, 2018.
<https://asia.nikkei.com/Business/Markets/Commodities/Shanghai-shakes-up-global-oil-trading>.
- Ezrati, Milton. “China’s Digital Hype.” City Journal. City Journal, November 6, 2019.
<https://www.city-journal.org/china-digital-currency>.
- Favas, Matthieu. “Geopolitics and Technology Threaten America’s Financial Dominance.” The Economist, May 7, 2020.
https://www.economist.com/special-report/2020/05/07/geopolitics-and-technology-threaten-americas-financial-dominance?utm_source=YouTube&utm_medium=Economist_Films&utm_campaign=Link_Description&utm_term=Business_and_Finance&utm_content=Correspondent&linkId=100000012284457.
- forkast.news. “WATCH: Why Is China’s Central Bank Launching a Digital Currency? Chicago Booth Economist Explains the Impact - Forkast.” *Forkast*, September 12, 2019.
<https://forkast.news/watch-why-is-chinas-central-bank-launching-a-digital-currency-chicago-booth-economist-explains-the-impact/>.
- Foxley, William. “President Xi Says China Should ‘Seize Opportunity’ to Adopt Blockchain.” CoinDesk, October 25, 2019.
<https://www.coindesk.com/president-xi-says-china-should-seize-opportunity-to-adapt-blockchain>.
- Gang, Di. “Di Gang: Digital Currency Discrimination.” ChainNews, April 19, 2019.
<https://www.chainnews.com/articles/176343895374.htm>.

- Gilsinan, Kathy. "Why the United States Uses Sanctions So Much." *The Atlantic*. The Atlantic, May 3, 2019.
<https://www.theatlantic.com/politics/archive/2019/05/why-united-states-uses-sanctions-so-much/588625/>.
- Greenwald, Michael B. "What a Chinese Digital Currency Means for the Dollar's Future." Belfer Center for Science and International Affairs, September 17, 2020.
<https://www.belfercenter.org/publication/what-chinese-digital-currency-means-dollars-future>.
- Guillén, Mauro F. *The Architecture of Collapse : The Global System in the 21st Century*. Oxford Scholarship Online, 2015.
- IMFBlog. "Central Bank Digital Currencies: 4 Questions and Answers." IMF Blog, December 12, 2019.
<https://blogs.imf.org/2019/12/12/central-bank-digital-currencies-4-questions-and-answers/>.
- Jinze, Etienne. "First Look: China's Central Bank Digital Currency." Binance Research, August 19, 2019. <https://research.binance.com/analysis/china-cbdc>.
- K. Chang, Felix. "Foreign Policy Research Institute." Foreign Policy Research Institute, August 6, 2019.
<https://www.fpri.org/article/2019/08/unequal-sequel-chinas-belt-and-road-initiative/>.
- . "Unequal Sequel: China's Belt and Road Initiative." Foreign Policy Research Institute, August 6, 2019.
<https://www.fpri.org/article/2019/08/unequal-sequel-chinas-belt-and-road-initiative/>.
- King, James. "CHINA'S PAYTECH GIANTS GO GLOBAL Fintech." login.stanford.idm.oclc.org, January 1, 2020.
<https://search-proquest-com.stanford.idm.oclc.org/docview/2331527161?accountid=14026>.

- Koumbarakis, Antonios, and Guenther Dobrauz-Saldapenna. "Central Bank Digital Currency: Benefits and Drawbacks." *SSRN Electronic Journal*, 2019.
<https://doi.org/10.2139/ssrn.3429037>.
- Kshetri, Nir. "China's Emergence as the Global Fintech Capital and Implications for Southeast Asia." *Asia Policy* 27, no. 1 (February 21, 2020): 61–81.
<https://doi.org/10.1353/asp.2020.0004>.
- Libra Corp. "Libra White Paper | Blockchain, Association, Reserve." *Libra.org*, 2019.
<https://libra.org/en-US/white-paper/#introduction>.
- Liu, Sue. "Fortune Telling." *Fortune. International Financial Law Review*, February 13, 2017.
- McTague, Tom. "What the Iran Crisis Reveals About European Power." *The Atlantic*, June 25, 2019.
<https://www.theatlantic.com/international/archive/2019/06/us-iran-sanctions-eu/592489/>.
- Miranda Wood. "How China's Central Bank Digital Currency Will Help Renminbi to Challenge Dollar." *Ledger Insights - enterprise blockchain*, October 18, 2019.
<https://www.ledgerinsights.com/china-central-bank-digital-currency-cbdc-renminbi-dollar/>.
- . "Raw Seafoods and Partners Join IBM's Food Trust Blockchain." *Ledger Insights - enterprise blockchain*, October 17, 2019.
<https://www.ledgerinsights.com/raw-seafoods-ibm-food-trust/>.
- Morrison, Tim. "The Greenback Needs a Digital Makeover." *Foreign Policy*, January 24, 2020.
<https://foreignpolicy.com/2020/01/24/dollar-reserve-currency-united-states-china-crypto-digital-currency/>.
- Muir, Paul. "Inside China's Mission to Create Digital Yuan." *Asia Times*, February 5, 2020.
<https://asiatimes.com/2020/02/inside-chinas-mission-to-create-digital-yuan/>.

- Net Politics. “China’s Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism.” Council on Foreign Relations, September 26, 2019.
<https://www.cfr.org/blog/chinas-digital-silk-road-strategic-technological-competition-and-exporting-political>.
- . “China’s Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism.” Council on Foreign Relations, September 26, 2019.
<https://www.cfr.org/blog/chinas-digital-silk-road-strategic-technological-competition-and-exporting-political>.
- Oba, Mie. “Reforming the Chiang Mai Initiative.” thediplomat.com, May 21, 2019.
<https://thediplomat.com/2019/05/reforming-the-chiang-mai-initiative/>.
- Pan, David. “China’s Congress Passes Cryptography Law, Effective Jan. 1, 2020.” CoinDesk, October 26, 2019.
<https://www.coindesk.com/chinas-congress-passes-cryptography-law-effective-jan-1-2020>.
- Portes, Richard. “International Currencies and the Macroeconomy.” London School Business, 2009.
http://www.dt.mef.gov.it/export/sites/sitodt/modules/documenti_it/eventi/eventi/Portes.pdf.
- Prasad, Eswar. “Central Banking in a Digital Age: Stock-Taking and Preliminary Thoughts.” Brookings Institution, April 2018.
https://www.brookings.edu/wp-content/uploads/2018/03/es_20180416_digitalcurrencies_final.pdf.
- PYMNTS. “PBOC Patents Show China’s Push For Digital Cash.” PYMNTS.com, February 13, 2020.
<https://www.pymnts.com/news/international/2020/pboc-patents-show-chinas-push-for-digital-money/>.

- Qian, Yao. "Central Bank Digital Currency: Optimization of the Currency System and Its Issuance Design." *China Economic Journal* 12, no. 1 (January 2, 2019): 1–15.
<https://doi.org/10.1080/17538963.2018.1560526>.
- Rao, K. Venkateshwar. "US Dollar Faces the Threat of Being Displaced by China's Digital Currency." *InsideOver*, November 5, 2019.
<https://www.insideover.com/economy/u-s-dollar-faces-the-threat-of-being-displaced-by-chinas-digital-currency.html>.
- Rogoff, Kenneth. "Digital Currency Headache." *International Economy*, October 1, 2019.
<http://content.ebscohost.com/ContentServer.asp?EbscoContent=dGJyMNxb4kSep684y9fwOLCmsEieqLBSsaq4TLCWxWXS&ContentCustomer=dGJyMPGqsVGwrbdQuerwgd%2FiuX3i6d%2BI5wAA&T=P&P=AN&S=R&D=bth&K=141301577>.
- Shirai, Sayuri. "China's Digital Currency Could Threaten Dollar's Dominance." *The Japan Times*, November 20, 2019.
<https://www.japantimes.co.jp/opinion/2019/11/20/commentary/world-commentary/chinas-digital-currency-threaten-dollars-dominance/#.XmlwJZNKj6Z>.
- Silva, Matthew De. "China's Digital Currency Is All about Control." *Quartz*, November 14, 2019.
<https://qz.com/1747988/pbocs-digital-currency-has-yet-to-launch-bank-warns-of-frauds/>.
- Steil, Benn. "Central Bank Currency Swaps Tracker." *Council on Foreign Relations*. Council on Foreign Relations, November 19, 2019.
<https://www.cfr.org/article/central-bank-currency-swaps-tracker>.
- Tang, Frank. "McDonald's, Starbucks, Subway to Join China's Digital Currency Test." *South China Morning Post*, April 23, 2020.
<https://www.scmp.com/economy/china-economy/article/3081291/mcdonalds-starbucks-subway-among-foreign-firms-set-test>.
- Taplin, Nathaniel. "China's Blockchain Revolution Won't Set Investors Free." *Wall Street Journal*, October 29, 2019, sec. Markets.

<https://www.wsj.com/articles/chinas-blockchain-revolution-wont-set-investors-free-11572349325>.

Vigna, Paul. “Brace for the Digital-Money Wars.” *Wall Street Journal*, December 7, 2019, sec. Tech.

<https://www.wsj.com/articles/brace-for-the-digital-money-wars-11575694806>.

Ward, Orla, and Sabrina Rochemont. “Understanding Central Bank Digital Currencies (CBDC),” 2019.

<https://www.actuaries.org.uk/system/files/field/document/Understanding%20CBDCs%20Final%20-%20disc.pdf>.

Werbach, Kevin. “Opinion: China Is Pushing Toward Global Blockchain Dominance.” *Wired*, November 12, 2019.

<https://www.wired.com/story/opinion-china-is-pushing-toward-global-blockchain-dominance/>.

Yi, Ding. “SenseTime Announces AI Tie-Up With Central Bank Amid Digital Currency Rumors - Caixin Global.” *Caixin Global*, April 29, 2020.

<https://www.caixinglobal.com/2020-04-29/sensetime-announces-ai-tie-up-with-central-bank-amid-digital-currency-rumors-101548510.html>.

Zero One Think Tank. “央行数字货币Q&A手册：一文带你看懂CBDC与Libra-零壹财经.” *www.01caijing.com*. Zero One Think Tank, August 5, 2019.

<http://www.01caijing.com/article/43310.htm>.