

Digital Innovation and Central Bank

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Ongoing digital innovation

- AI, big data, Fintech, distributed ledger technology, etc.
- How will the economy and financial system be affected in decades to come?
- What are policy challenges that digital innovation poses? My particular emphasis is on central bank.

Outline of my talk

1. Three phases of change triggered by technology advancement
2. Providing payment services
3. Achieving financial stability
4. Conducting monetary policy
5. Concluding remarks

Part 1: Three phases of change triggered by technology advancement

Rapid development of computer & information technology since 1980s

First stage

- Birth of derivative products
- Enormous benefit of risk management and its contribution to economic growth

Second stage

- Newly created risk
- Measures to tackle with various problems (Basel 1 and Basel 2, etc.)

Third stage

- Unintended consequences leading to Global financial crisis (GFC)

Distributed ledger technology (DLT)

- Official communities are now quite negative about crypto currency.
 - ---“It is a combination of a bubble, a Ponzi scheme and an environmental disaster” (Carstens (2018))
- DLT in general could have potentially useful applications in various areas of the economy and finance.

Part 2: Providing payment services

To whom should central bank open its account?

Bank of Japan

- It has a long tradition of allowing securities companies to have account with central bank.
- It opened account to exchanges and clearing house prior to GFC.

Bank of England

- Last April, it decided on allowing non-bank payment service provider direct access to UK RTGS system for the first time in its history

Should central bank issue digital cash?

- It seems natural, but there are many important issues to be considered.
- Central bank digital cash (or currency) could crowd out retail deposit of commercial banks. If it happens, who would lend money to households and corporates under reduced balance sheet of commercial banks?
- We also have to consider financial stability implications. In a crisis, depositors of commercial banks will rush for central bank digital cash. We observed a run on bank deposit in the past but potential scale of new bank run would be huge, given that commercial bank deposit can be moved to central bank digital cash by just a few mouse clicks.

Does digital cash avoid constraint of zero-lower bound of interest rate?

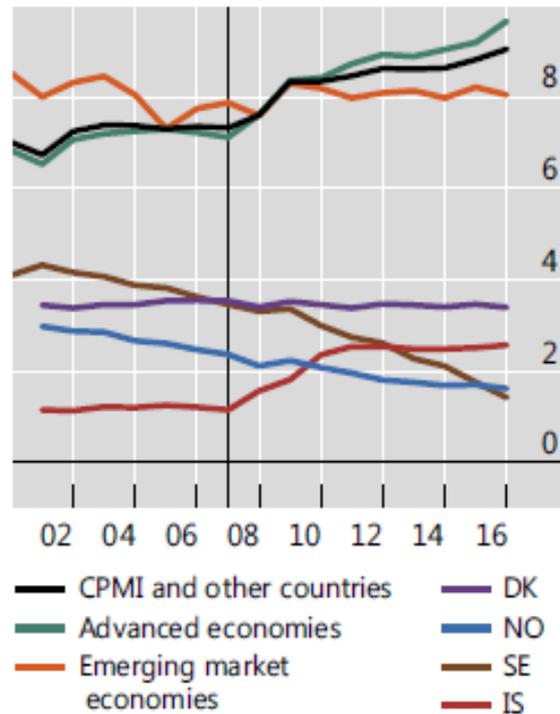
- I do not think an additional decline of interest rate, say 100 basis points or even more would have materially changed the situation. In a post-bubble period, unless excess of debt is eliminated, the economy will not return to sustainable growth path.
- Negative interest rate works when shock hitting the economy is purely temporal, but otherwise it does not.

Huge variation of cash-to GDP ratio

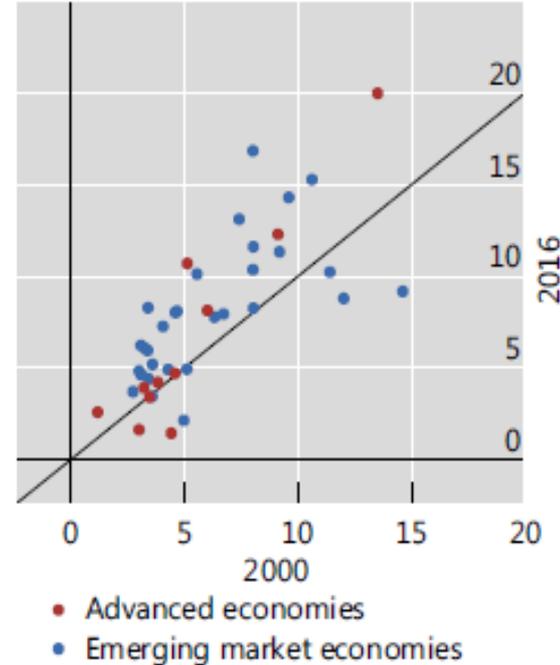
As a percentage of GDP

Graph 4

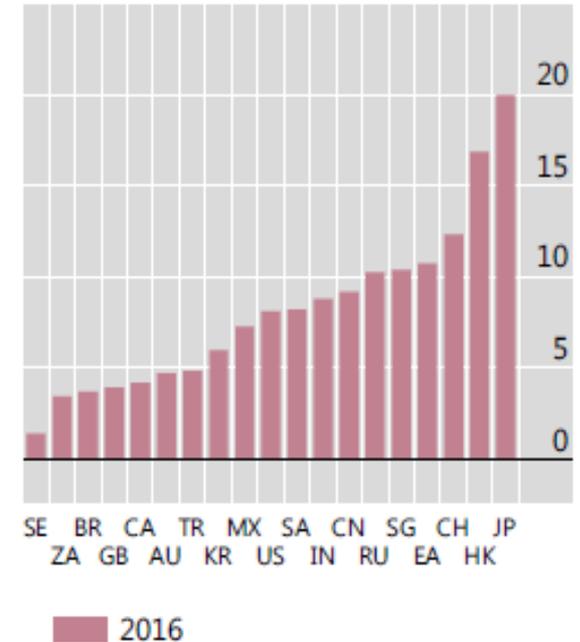
Selected groupings¹



Change from 2000 to 2016²



CPMI jurisdictions³



What explains Japan's high cash-to GDP ratio?

- Japan, Switzerland and Sweden are common in that they have adopted negative interest in recent years but quite different in term of cash to GDP ratio. It is as high as 20.1% in Japan and 11.0 % in Switzerland, while in Sweden it stands at 2.1 In Asia, its variation is also quite large.
- It seems difficult to explain fully these differences without invoking some cultural and social factors.
 - low crime rate and strong preference for privacy and anonymity.
 - In response to growing demand, infrastructure for cash payment has well developed, which in turn increases demand for cash.
- Since network economy works for the acceptance of payment medium, strong inertia kicks in.

Imposing a change in payment medium involves sensitive social value judgment

- What is a right response of government and central bank?
- Which is correct?
 - “Use of cash dictates society”
 - “Society dictates use of cash”

Part 3: Achieving financial stability

Need for holistic view

- How are economy and financial institutions affected by digital innovation? How are policies conducted?
- Many issues worthy of serious considerations.
 - How is industrial structure of financial service industry affected?
 - What is a mechanism for maintaining resiliency in a contingency?
 - How does monetary policy affect financial system in an environment characterized by ever-increasing digital innovation?

Industrial structure of financial service industry

- AI might make financial service industry more competitive by attracting new firms or unbundling services of incumbent firms.
- At the same time, giant IT firm might become dominant player because of strong network effect associated with AI and big data.
- If many financial institutions come to rely on a very few AI platformers, it could make financial system more fragile. The same is true for algorithm adopted. If the same algorithm is adopted by many financial institutions, it could become a source of financial instability through creating unintended herding behavior.

Maintaining resiliency is most crucial in a contingency

- In my 39-year life at Bank of Japan, I felt this most, when tragic earthquake, tsunami and an accident at nuclear power plant in Fukushima hit Japan in March 11, 2011.
- Relying only on single platform of payment is not prudent. We simply do not know which payment platform could continue to function without disruption. We also do not know what causes such disruption.

We need some duplicity and redundancy in basic financial infrastructure but... ..

- Non-financial platformers enter into market for payment services but these are not major source of their profit. They are tools for collecting “big data” which enables its effective use in other areas such as e-commerce.
- If this is a case, potential rent which would have accrued to commercial banks disappears and society might lose economic agents who commit to maintaining basic financial service by having some duplicity or redundancy.

Part 4: Conducting monetary policy

Prolonged monetary easing was one of factors leading to the GFC

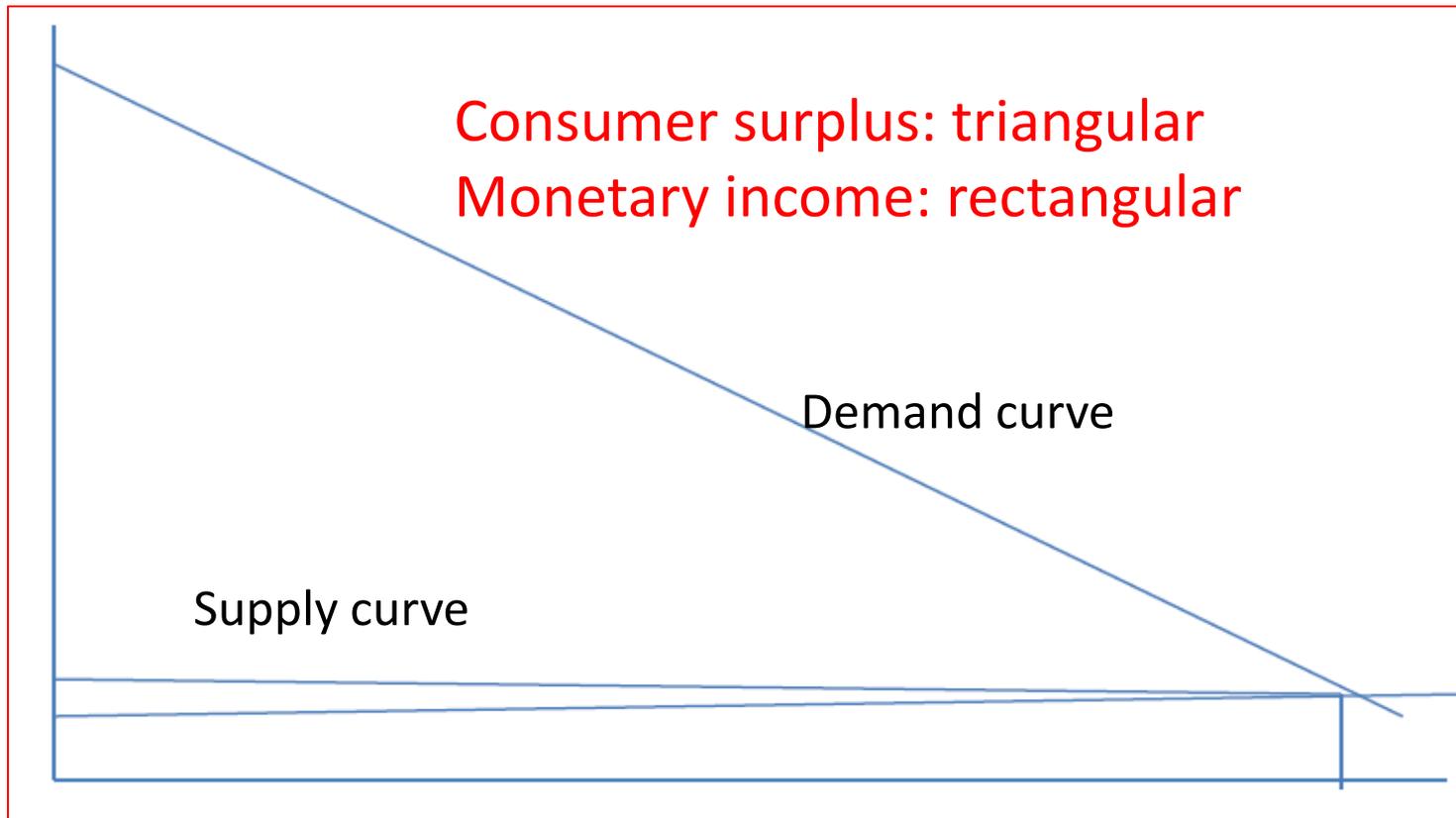
- Financial imbalances created under prolonged monetary easing—combination of excessive leverage and elevated asset prices—were often neglected or treated as a problem that should be better addressed by financial supervision and regulation.
- How does digital innovation come in the debate on the best conduct of monetary policy and for that matter, financial stability?

Monetary policy makers will be faced with many challenges

- How can we be confident about measuring prices of goods and services reasonably correctly, or decompose nominal expenditure into P and Q?
- Can GDP continue to serve as a reasonable measure of social welfare in a economy where marginal cost of digital services becomes negligible?
 - Consumer surplus might become larger relative to producers surplus or monetary income.

Consumer surplus and monetary income in case marginal cost becomes negligible

price



quantity

Part 5: Concluding remarks

Innovation always brings about many positives as well as many challenges

- Central bank has to be agile in recognizing what is ongoing on technology front and think deeply of its implications for the economy and financial system, and has to be open-minded about new technology.
- Traditionally, most common professionals within central bank was economists and lawyers. Now, we need technology people as well. But what is need more is collaboration among these professionals and various departments within central bank and a sort of joint partnership of central banks and private IT firms. We have to avoid silo culture.

Prediction by Herbert Simon in 1978

- *“What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention.”*
- Big data is important, but big picture is also important!

Thank you for your kind attention.