

Blockchain & Money



Class 16

November 8, 2018

Class 16 Overview

- Readings and Study Questions
- Review of Central Banking & Approaches to Blockchain Technology
- Private Banknotes and Stable Value Tokens
- Central Bank Digital Currency
- Conclusions

Class 16 (11/8): Study Questions

- What lessons, if any, can be drawn from related experimentation – Ecuador, Senegal, Philippines - to date?
- Might stable value coins spur central banks into adopting CBDCs? What might Mastercard be considering with their patent for 'blockchain currency' fractional reserves?
- What recommendations would you have for Sweden's Riksbank (dating from 1668, the world's first central bank) for possible adoption of e-krona?

Class 16 (11/8): Readings

- *'The Riksbank e-krona project Action plan for 2018'* Sveriges Riksbank
- *'The World's first Central Bank Digital Currency Has Come – and Gone: Ecuador, 2014 - 2018'* Alt-M
- *'Stable Coins Analysis: Is there a Viable Vision for the Future?'* Coin Telegraph
- *'PH Moving to Test Digital Fiat Currencies with RCBC's e-Piso'* Entrepreneur
- *'eCurrency Mint Limited and Banque Regionale de Marches Launch New Digital Currency in Senegal'* Business Wire

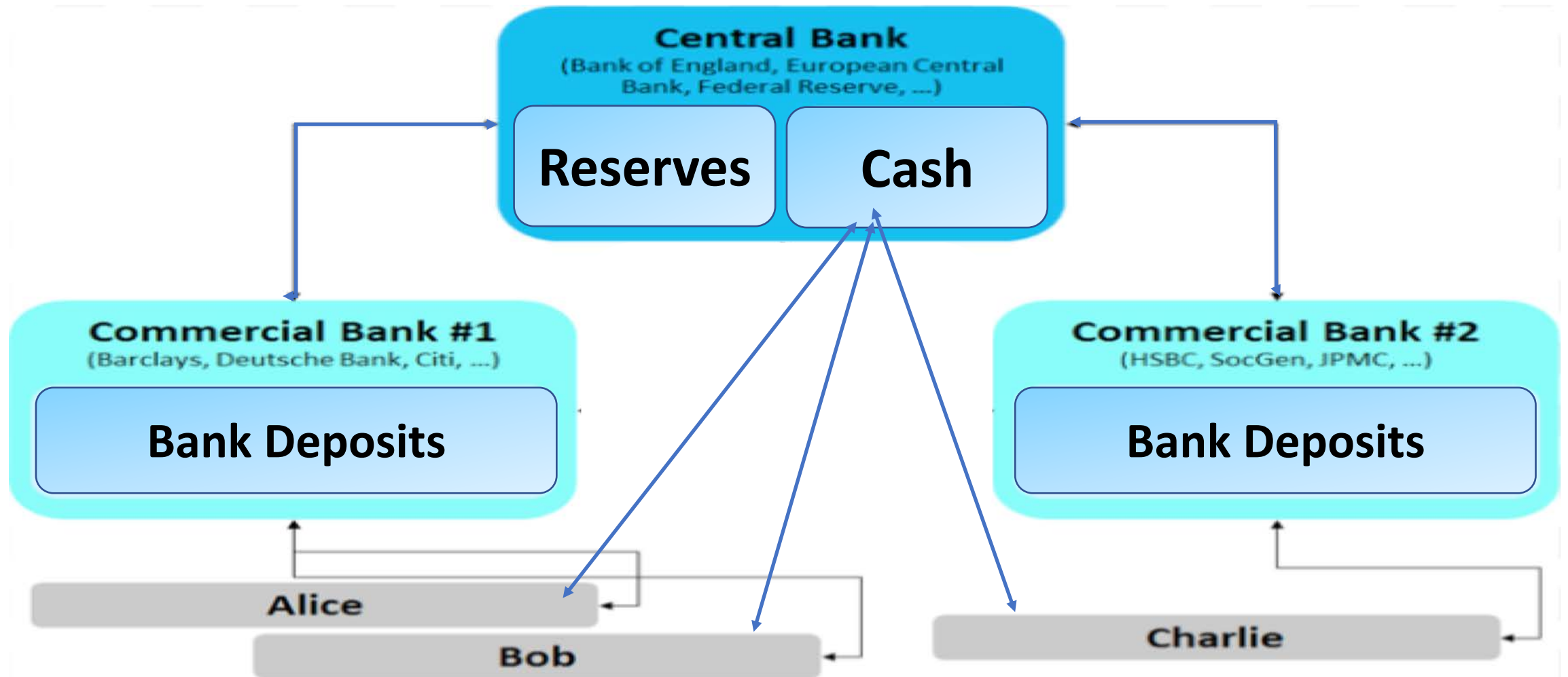
Central Banking Goals and Functions

- Manage the Nation's Fiat Money - Supply, Price and Payment Systems
- Oversee Fractional Banking System
- Banker to the Government
- Promote Price Stability and Economic Goals

Central Bank and Commercial Bank Money

(Reserves & Cash)

(Bank Deposits)



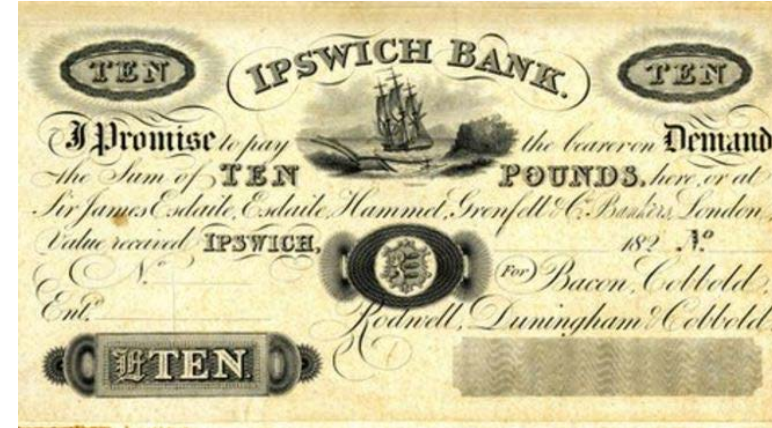
Fiat Currency

- Represented by Central Bank Notes & Reserves and Commercial Bank Deposits
- Relies upon System of Ledgers
- Accepted for Taxes
- Legal Tender for All Debts Public & Private

Commercial Bank Notes and 'Free Banking' era



Australia



United States



Canada



England

Hong Kong and Sterling Bank Notes



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Hong Kong

Bank of China

HSBC

Standard Chartered Bank



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United Kingdom

Bank of Ireland, Danske

Bank, First Trust Bank,

& Ulster Bank

Bank of Scotland,

Clydesdale Bank and

Royal Bank of Scotland

Private Sector Stable Value Tokens

- Fiat Collateralized: Tether, TrueUSD
- Crypto Collateralized: BitShare, Dai, Havven
- Commodity Collateralized: Digix, Ekon
- Not Collateralized 'Seigniorage based': Basis, Saga

Central Banks, Cryptocurrencies, and Blockchain Technology

- Monitor and Study
- Restrict Use
- Payment System Experimentation
- Central Bank Digital Currency Initiatives

Central Bank Blockchain Technology Real Time Gross Settlement Initiatives

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THE FIRST WAVE

Project Jasper 1  Canada  <ul style="list-style-type: none"> • RTGS PoC • Key issues: privacy & settlement finality 	Brazil 1  Brazil  <ul style="list-style-type: none"> • RTGS PoC • Key issue: privacy 	Project Ubin 1  Singapore  <ul style="list-style-type: none"> • RTGS PoC • Explored implications of production
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THE THIRD WAVE

Stella 2  Japan    <ul style="list-style-type: none"> • DvP PoCs 	Project Jasper 3*  Canada  <ul style="list-style-type: none"> • Will focus on the securities settlement process 	Project Ubin 3*  Singapore <div style="border: 1px solid black; padding: 2px;">Tech not announced</div> <ul style="list-style-type: none"> • Investing cross-border payments with DLT
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*Announced but not published



Brazil 2    <ul style="list-style-type: none"> • Compared technologies • Privacy still a main challenge 	Project Jasper 2   <ul style="list-style-type: none"> • Evaluated scalability & flexibility of DLT prototype • Implemented LSMs 	Stella 1    <ul style="list-style-type: none"> • RTGS with LSMs PoC • Performance testing done 	Project Ubin 2    <ul style="list-style-type: none"> • Compared technologies • Implemented LSMs 	Project Khokha   <ul style="list-style-type: none"> • RTGS PoC • Evaluated performance in realistic setting • Achieved privacy with scalability
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THE SECOND WAVE

Source: South Africa Project Khokha Report

Central Bank Digital Currency

- Central Banks Currently Already Issue Digital Reserves to Commercial banks
- Commercial Banks Provide Digital Currency (Deposits) to Public
- Private Sector is Experimenting with Stable Value Tokens
- Strategic question: Should Direct access to Digital Reserves be Expanded?

Digital Currency Initiatives

- Dubai – emCash project
- Ecuador - Dinero Electrónico - U.S. \$ electronic currency
- Iran – Indigenous Cryptocurrency backed by Iranian Rials
- Philippines- ePiso
- Senegal - eCFA
- Sweden - E-Krona initiative
- Tunisia – e-Dinar
- U.K. – Royal Mint Gold
- Uruguay – 6 Month Pilot for Digital Uruguayan Peso
- Venezuela - Petro Oil backed Initial Coin Offering

CBDC – Opportunities

- Continue Government Provision of a Means of Payment
- Promote Competition in Banking System
- Promote Financial Inclusion
- Address Payment System ‘Pain Points’
- For Some Nations, Avert Sanctions

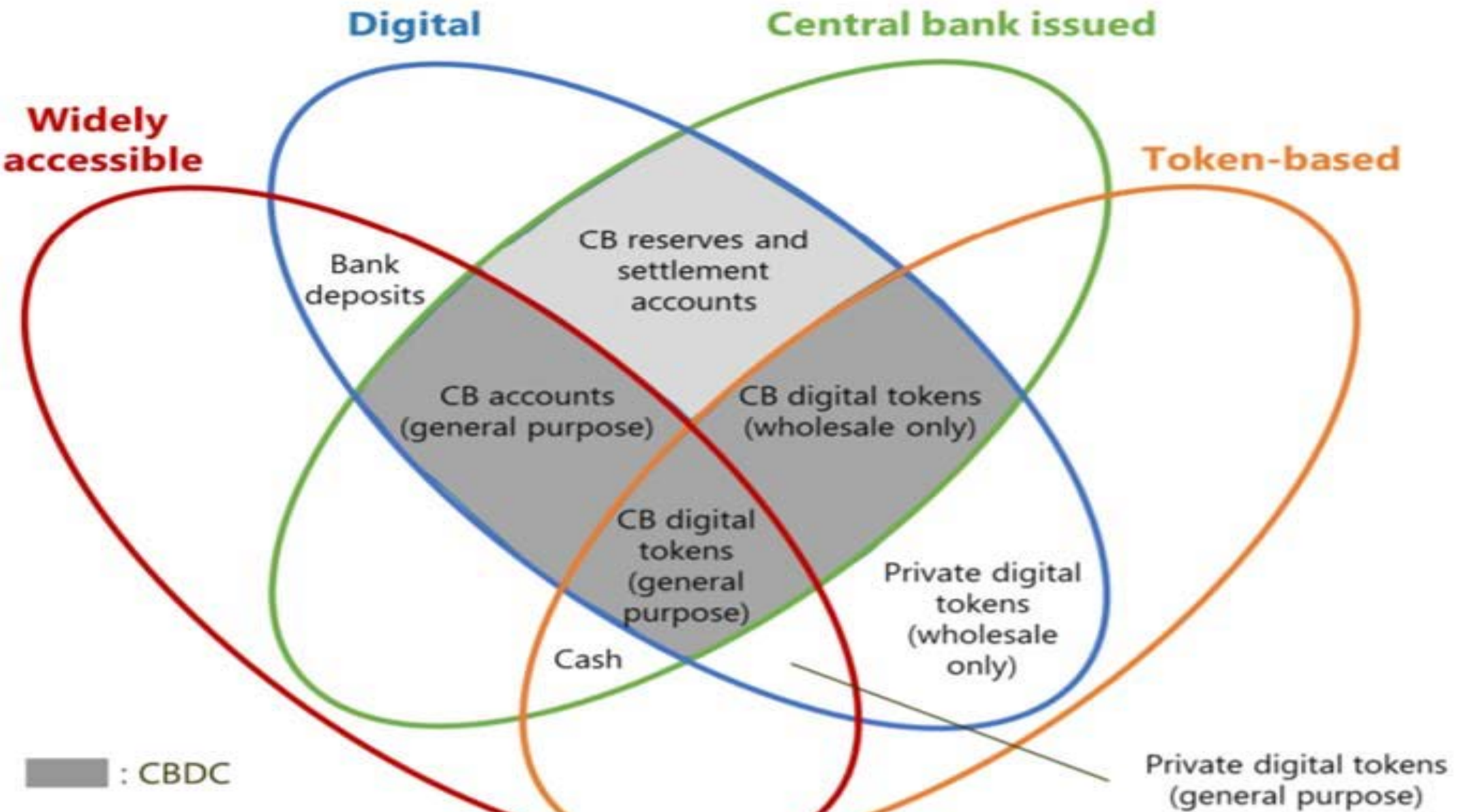
CBDC - Challenges & Uncertainties

- Financial Stability and Potential to Increase Ease of Bank Runs
- Changes to Commercial Banks' Deposits and Funding Models
- Effects on Credit Allocation and Economy
- Monetary Policy Implementation & Transmission
- Resilience of Open Payment Infrastructures

CBDC – Design Considerations

- Widely Accessible vs. Wholesale
- Token (e-Money) or Account (e-Deposit) based
- Issuer – Central Bank, Commercial Bank or Others
- Degree of Anonymity
- Transfer Mechanism
- Limits or Caps
- Interest Bearing and Level of Account Services

The Money Flower



Digital Currency Initiatives

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Ecuador - Dinero Electrónico

- U.S. \$ Electronic Currency
- Direct Liability of Ecuadorian Central Bank
- Operational - 2015
- Decommissioned - 2018
- Mobile Phone Payment Alternatives Authorized - 2018

Philippines- ePiso

Philippines- ePiso

- Digital Currency, ePiso
- Announced - 2018
- Issued by a Commercial Bank, Rizal Commercial Banking Corp.
- Released along with Mobile Wallet not requiring a bank account
- Platform is Operating under Central Bank, Bangko Sentral ng Pilipinas' 'test and learn or regulatory sandbox'
- Software supported by eCurrency Mint Limited of Ireland

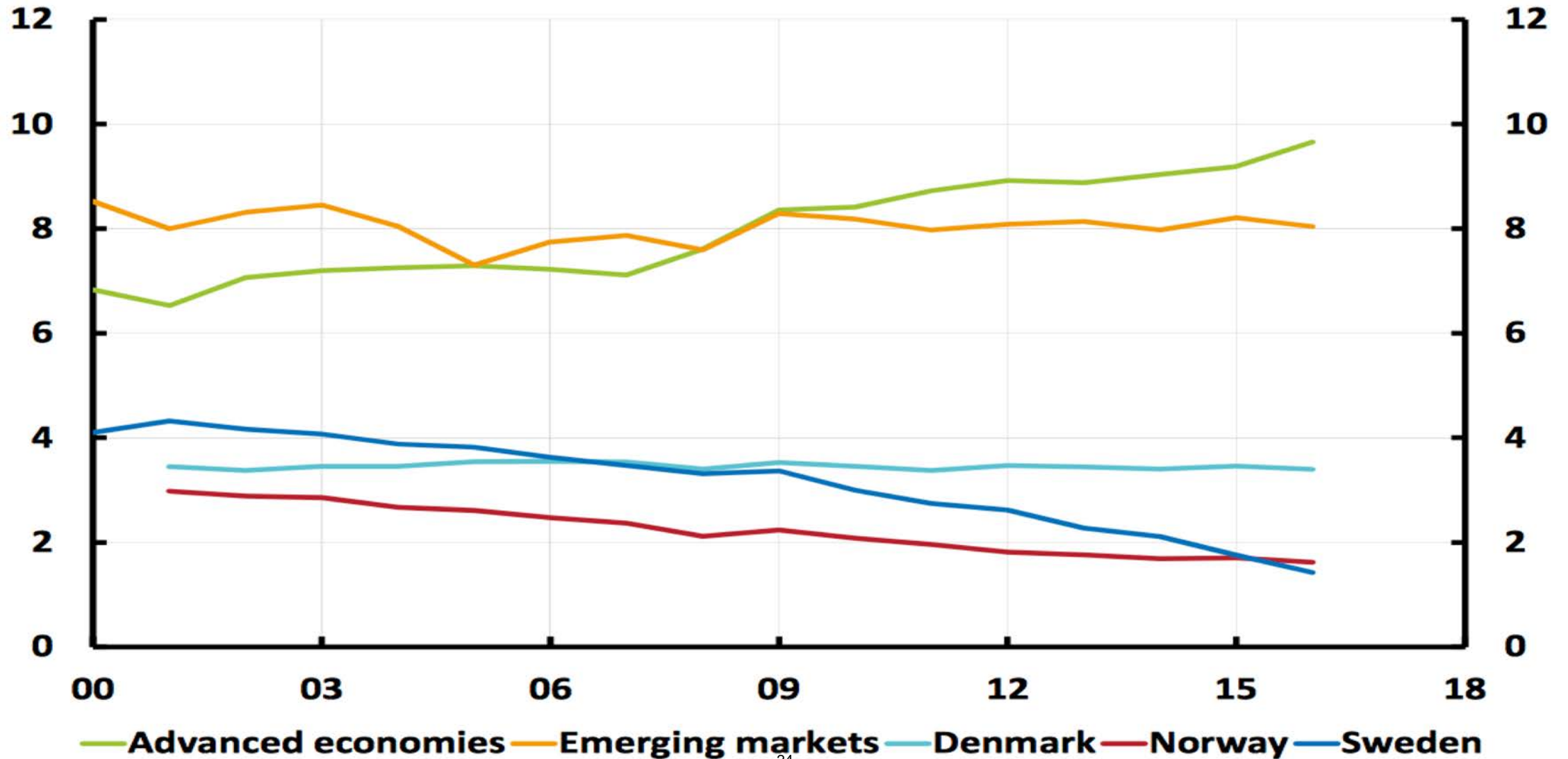
Senegal - eCFA

- Digital Currency, eCFA, in West African Economic and Monetary Union
- Announced - 2016
- Complies with e-money Regulations of Central Bank of WAEMU
- Issued by a Commercial Bank, Banque Régionale de Marchés
- Software supported by eCurrency Mint Limited of Ireland

Sweden E-Krona

- Benefits
 - Continue Public Access to Risk-free Guaranteed Means of Payment
 - Increase Resilience of Payment System
 - Increase Competition of Payment Market
 - Make Digital Payment Services More Broadly Available
- Properties
 - Comprehensive Range of Services
 - Widely Available
 - Robust Transaction Capacity, Performance, Security & Reliability
 - Several e-Identification Solutions
 - User Integrity – though - Traceability

Cash as Percent of GDP



Source: Sveriges Riksbank E-Krona Report (October, 2018)

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Class 17 (11/13): Study Questions

- How have crypto-exchanges become a critical gateway for the vast majority of crypto secondary market trading?
- How does the business model of crypto-exchanges compare to traditional securities and derivatives exchanges? How do centralized crypto-exchanges compare to decentralized crypto-exchanges?
- What do all of the hacks, reports of manipulation and failures tell us about the current state of security and investor protection of crypto-exchanges?

Class 17 (11/13): Readings

- *'Move deliberately, fix things: How Coinbase is building a cryptocurrency empire'* Washington Post
- *'Robinhood rolls out zero-fee crypto trading as it hits 4M users'* TechCrunch
- *'After Nasdaq CEO Blesses Cryptocurrency, Investors See Bigger Future for Bitcoin, Others'* Forbes
- *'Bitcoin Sees Wall Street Warm to Trading Virtual Currency'* New York Times
- *'Cryptocurrency Exchanges Are Getting Hacked Because It's Easy'* Wall Street Journal
- *'The sad state of crypto custody'* TechCrunch

Conclusions

- Central Banks Play an Important Role in Economy
- We Already Live in an Electronic Currency Age
- Payment Systems and Fiat Currency have had Challenges
- Blockchain Technology can be a Catalyst for Change
- Central Banks Monitoring Crypto Finance & Exploring Payment System Uses
- Central Bank Digital Currency debate focused on Opportunities & Challenges
- Central Bank Digital Currency, though, likely will be seen in Adoption



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