

Digital Currencies and Cryptocurrencies

Taught by Branislav Saxa, PhD as
part of the program
International Economics and Finance (IEF)

Course outline

This course will consider the new phenomenon of digital currencies from a monetary and financial stability angle. We will first look at functions of money and history of private and public money. We will continue with technological foundations of cryptocurrencies and we will discuss existing and potential use of blockchain in finance. Consequently, we will cover stablecoins, discuss the differences *via-a-vis* cryptocurrencies and discuss why they have the potential to change the global financial system. We will discuss private efforts to issue stablecoins (e.g. Libra/Diem) and discuss why they raise concerns of regulators. Finally, we will introduce central bank digital currencies, discuss challenges and risks related to their issuance as well as reasons why central banks around the world experiment with them. We will study central bank digital currencies that are in advanced stages and we will learn about their potential impact on payment systems, financial stability and monetary policy.

Pre-requisites: One introductory-level economics course

Lecturer

Branislav Saxa, PhD, is principal economist at the monetary department at the Czech National Bank. He has studied at Comenius University Bratislava (Mgr) and at CERGE-EI (MA and PhD) and has also spent time at the University of Pennsylvania and the European Central Bank.

Grading

Grades are based on the following components:

- (1) Take-home assignments during the course 50%
- (2) Midterm exam 25%
- (3) Final exam 25%

At the end of the term, cumulative points will be converted into grades by the following scheme:

Letter Grade	Percentage	Description
A	93-100	Outstanding work
A-	90-92	
B+	87-89	Good work
B	83-86	
B-	80-82	

C+	77-79	Acceptable Work
C	73-76	
C-	70-72	
D+	67-69	Work that is significantly below average
D	63-66	
D-	60-62	
F	0-59	Work that does not meet the minimum standards for passing the course

Academic Integrity Policy

Plagiarism and other forms of academic dishonesty are not tolerated.

UPCES/IEF Non-Discrimination/Harassment Policy

The UPCES/IEF program in Prague promotes a diverse learning environment where the dignity, worth, and differences of each individual are valued and respected. Discrimination and harassment, whether based on a person's race, gender, sexual orientation, color, religion, national origin, age, disability, or other legally protected characteristic, are repugnant and completely inconsistent with our objectives. Retaliation against individuals for raising good faith claims of harassment and/or discrimination is prohibited.

UPCES/IEF Diversity Policy

UPCES/IEF fully embraces diversity and strives to create a safe and welcoming environment for students from all backgrounds. Prague is a wonderfully diverse community and UPCES/IEF is no different. All students should feel at home while studying abroad and UPCES/IEF will do its utmost to make sure that becomes a reality. Although unique challenges may arise, we believe that students from all walks of life will encounter wonderful opportunities for enrichment as they explore a new culture while studying abroad.

Schedule of classes

The course will consist of the following topics:

- Changes in money and payments (2 weeks)
 - Functions of money
 - History of money, how did we end up with central banks issuing public money
 - Revolution in money: Real time settlements, credit card schemes, declining use of cash
- Cryptocurrencies and blockchain (3 weeks):
 - What is blockchain and how it works, the process of currency issuance and mining, public and private keys, transactions
 - Examples of existing and possible use of blockchain in finance
- Bitcoin (1 week):
 - History of the Bitcoin as the most popular cryptocurrency

- Limits of bitcoin, energy consumption needed for bitcoin transactions
- Stablecoins (1 week):
 - What is the idea behind stablecoins, how do they differ from cryptocurrencies
 - Project of Libra/Diem, its history and potential future
 - How can stablecoins change the financial system worldwide and why regulators care
- Central Bank Digital Currencies (CBDC, 4 weeks):
 - How does CBDC differ from cash
 - Potential forms of CBDC: Token based/account based, interest bearing or not, anonymity, limits&caps
 - Examples of pilot CBDC projects in the world, Bank for International Settlements CBDC initiatives
 - Opportunities: Faster and cheaper payments, especially if implemented internationally. Inclusion of unbanked.
 - Concerns: Why CBDC can be a threat to financial stability? Anti-money laundering, decline of liquidity
 - Possible effects of CBDC on monetary policy

Literature

- McLeay, Michael and Radia, Amar and Thomas, Ryland, Money Creation in the Modern Economy (March 14, 2014). Bank of England Quarterly Bulletin 2014 Q1, Available at SSRN: <https://ssrn.com/abstract=2416234>
- Nofer, M., Gomber, P., Hinz, O. et al. Blockchain. Bus Inf Syst Eng 59, 183–187 (2017). <https://doi.org/10.1007/s12599-017-0467-3>
- A Peer-to-Peer Electronic Cash System, Bitcoin whitepaper, <https://bitcoin.org/bitcoin.pdf>
- Linda Schilling, Harald Uhlig, Some simple bitcoin economics, Journal of Monetary Economics, Volume 106, 2019, Pages 16-26, ISSN 0304-3932, <https://doi.org/10.1016/j.jmoneco.2019.07.002>.
- Harald Vranken, Sustainability of bitcoin and blockchains, Current Opinion in Environmental Sustainability, Volume 28, 2017, Pages 1-9, <https://www.sciencedirect.com/science/article/pii/S1877343517300015>
- Bullmann, Dirk and Klemm, Jonas and Pinna, Andrea, In Search for Stability in Crypto-Assets: Are Stablecoins the Solution? (August, 2019). ECB Occasional Paper No. 230, Available at SSRN: <https://ssrn.com/abstract=3444847>
- CBDCs: an opportunity for the monetary system, BIS Annual Economic Report 2021, <https://www.bis.org/publ/arpdf/ar2021e3.htm>
- Sarah Allen & Srdjan Capkun & Ittay Eyal & Giulia Fanti & Bryan A. Ford & James Grimmelmann & Ari Juels & Kari Kostianen & Sarah Meiklejohn & Andrew Miller & Eswar Prasad & Karl Wüst & Fan Zhang, 2020. "Design Choices for Central Bank Digital Currency: Policy and Technical Considerations," NBER Working Papers 27634, National Bureau of Economic Research, Inc.

- Bordo, Michael and Levin, Andrew, (2017), Central Bank Digital Currency and the Future of Monetary Policy, No 23711, NBER Working Papers, National Bureau of Economic Research, Inc, <https://EconPapers.repec.org/RePEc:nbr:nberwo:23711>.
- Report on a digital euro, 2020, European Central Bank, https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf

(Further readings will be made available on the course website.)