Payment Firms, Cryptocurrencies, and CBDCs

Tobias Berg, Jan Keil, Felix Martini, Manju Puri

Outline & Preview

1. Documenting the rise of payment firms
   - 4-fold increase in market cap share
   - secular, broad rise

2. Innovation 1: Crypto & Stablecoin
   - not perceived as a threat

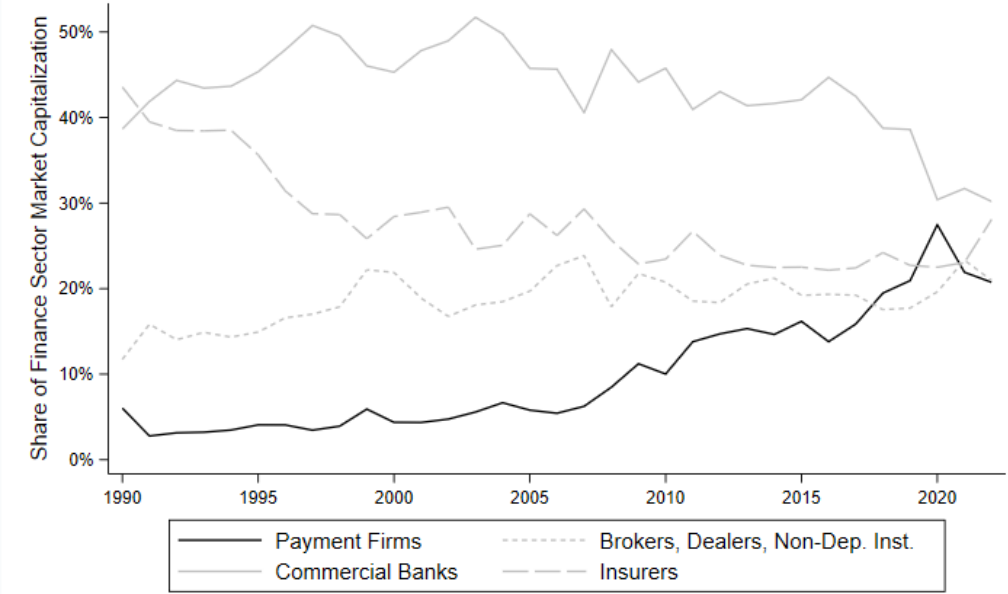
   $\rightarrow$ speculative asset class, no mean of payment

3. Innovation 2: CBDC
   - favorable communications $\rightarrow\downarrow$ 19% market cap

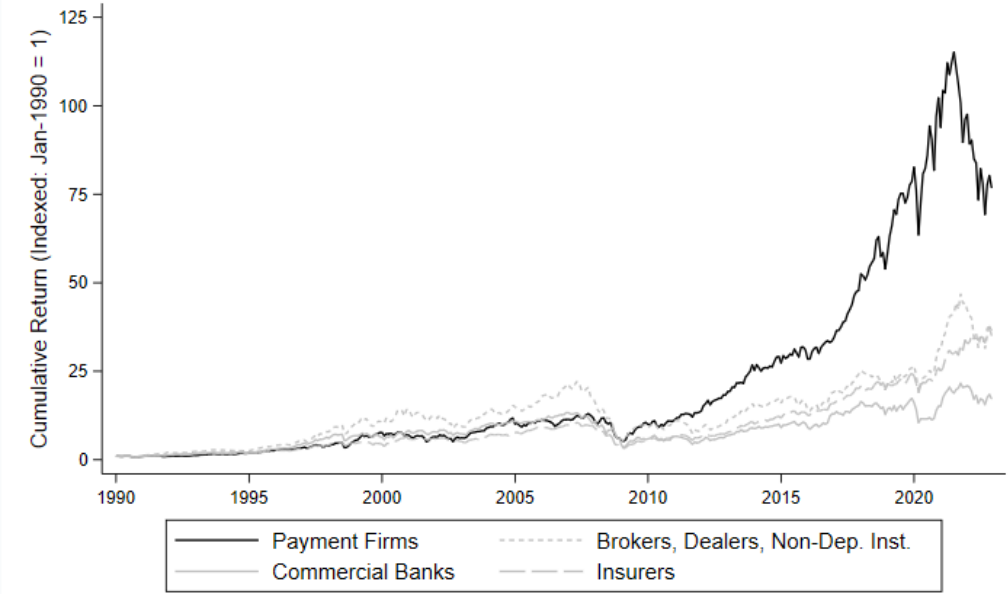
   $\rightarrow$ market fears CBDC dis-intermediates payment

The Rise of Payment Firms

Market Cap Shares – Finance Subsectors



Cumulative Stock Returns – Finance Subsectors



Financial Statistics

	Payment Firms			Commercial Banks		
	2000s	**2010s**	**2020/21**	**2000s**	**2010s**	**2020/21**
Firms (#)	46	41	41	479	589	480
Size						
Market Cap ($m)	145,957	598,772	1,606,677	1,210,550	1,500,518	1,959,797
Assets ($m)	249,362	508,335	829,639	8,497,946	12,992,766	18,198,884
Equity ($m)	37,925	110,937	225,631	688,649	1,298,929	1,579,632
Revenue ($m)	62,337	133,310	200,744	604,403	643,196	677,937
Profitability						
Net Income ($m)	6,019	23,237	36,960	69,626	113,979	164,112
ROA (%)	2.38	4.54	4.44	0.90	0.86	0.89
ROE (%)	15.99	21.10	16.32	10.93	8.58	10.37
Growth						
Revenue Growth (%)	4.94	8.84	8.87	8.51	1.63	-5.11

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Largest Firms by Sector

Rank	Payment Firms	Banks	Brokers, Dealers, Non-Dep. Institutions	Insurance
1	Visa	JP Morgan	Morgan Stanley	United Health
	(465bn)	(387bn)	(124bn)	(332bn)
2	Mastercard	Bank of America	Blackrock	Anthem
	(355bn)	(262bn)	(110bn)	(79bn)
3	PayPal	Citigroup	Charles Schwab	Cigna
	(275bn)	(128bn)	(100bn)	(74bn)
4	Square	Wells Fargo	Goldman	Marsh & McLennan
	(99bn)	(125bn)	(95bn)	(59bn)
5	American Express	US Bancorp	CME	Progressive Corp
	(97bn)	(70bn)	(65bn)	(58bn)
6	FIS	Truist	ICE	Humana
	(88bn)	(65bn)	(65bn)	(53bn)
7	Fiserv	PNC	Capital One	Metlife
	(76bn)	(63bn)	(45bn)	(42bn)
8	Global Payments	BNYM	Blackstone	Travelers
	(64bn)	(38bn)	(44bn)	(35bn)
9	Discover	State Street	MSCI	Centene
	(28bn)	(26bn)	(37bn)	(35bn)
10	Fleetcor	First Republic	T. Rowe Price	Verisk
	(23bn)	(26bn)	(35bn)	(34bn)

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8	Global Payments (64bn)	BNYM (38bn)	Blackstone (44bn)	Travelers (35bn)
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10	Fleetcor (23bn)	First Republic (26bn)	T. Rowe Price (35bn)	Verisk (34bn)

Cryptocurrency

- Hypotheses
  - payment narrative: system that will handle payments without an intermediary

  vs investment narrative: speculative asset class

- Operationalization
  - crypto returns = expected adoption of cryptocurrencies
  - $R_t - R_{Ft} = \alpha + \gamma(B_t - R_{Mt}) + b(R_{Mt} - R_{Ft}) + sSMB_t + hHML_t + e_t$
    - R_t payment firms return
    - B_t cryptocurrency returns (ex. stablecoins)
    - Farma-French 3-Factor: $b(R_{Mt} - R_{Ft}) + sSMB_t + hHML_t$
    - can replace $(B_t - R_{Mt})$ with log stable coin transaction $Volume_t$

Crypto Index Returns

	(1) S&P BTC	(2) S&P BTC (2014-2017)	(3) S&P BTC (2018-2021)	(4) S&P CBDM
Crypto	-0.004	0.003	-0.011	-0.013
	(-0.57)	(0.37)	(-0.96)	(-1.43)
Market	1.145***	1.052***	1.171***	1.170***
	(36.70)	(22.33)	(27.08)	(29.40)
SMB	-0.068	-0.046	-0.064	-0.065
	(-1.27)	(-0.70)	(-0.77)	(-0.89)
HML	-0.026	-0.094	-0.013	-0.029
	(-0.71)	(-1.54)	(-0.27)	(-0.63)
Constant	0.000	0.001	-0.000	0.000
	(0.25)	(0.69)	(-0.06)	(0.41)
Observations	418	209	209	253
Adjusted R^2	0.776	0.722	0.792	0.785

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Crypto Index Returns

	(1) S&P BTC (Payee-Facing)	(2) S&P BTC (Networks)	(3) S&P BTC (Ex. PayPal, Block/Square)	(4) S&P BTC (PayPal, Block/Square)
Crypto	0.003	-0.011	-0.010	0.023
	(0.39)	(-1.27)	(-1.33)	(1.42)
Market	1.182***	1.113***	1.098***	1.364***
	(35.08)	(29.18)	(32.40)	(19.00)
SMB	0.023	-0.129**	-0.101*	-0.000
	(0.39)	(-1.97)	(-1.73)	(-0.00)
HML	-0.264***	0.149***	0.130***	-0.675***
	(-6.59)	(3.29)	(3.23)	(-8.12)
Constant	-0.000	0.001	0.000	0.001
	(-0.22)	(0.69)	(0.34)	(0.71)
Observations	418	418	418	337
Adjusted R^2	0.760	0.695	0.737	0.550

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Fama-French Three-Factor Model

	(1) Stablecoins	(2) Tether	(3) USD Coin	(4) Terra	(5) Binance
Ln (Trading Volume) – Detrended and Standardized	-0.0004 (-0.45)	-0.0004 (-0.49)	-0.0014 (-0.91)	0.0016 (0.55)	0.0007 (0.36)
Market	1.1375*** (33.51)	1.1376*** (33.52)	1.1626*** (21.98)	1.0709*** (8.49)	1.1888*** (18.94)
SMB	-0.0795 (-1.28)	-0.0795 (-1.28)	-0.0709 (-0.71)	0.1147 (0.59)	-0.0120 (-0.10)
HML	-0.0340 (-0.87)	-0.0340 (-0.87)	0.0018 (0.03)	-0.0165 (-0.14)	0.0345 (0.54)
Constant	0.0004 (0.52)	0.0004 (0.52)	-0.0008 (-0.52)	-0.0019 (-0.61)	-0.0018 (-0.94)
Observations	373	373	184	73	135
Adjusted R-squared	0.7583	0.7583	0.7516	0.5339	0.7534

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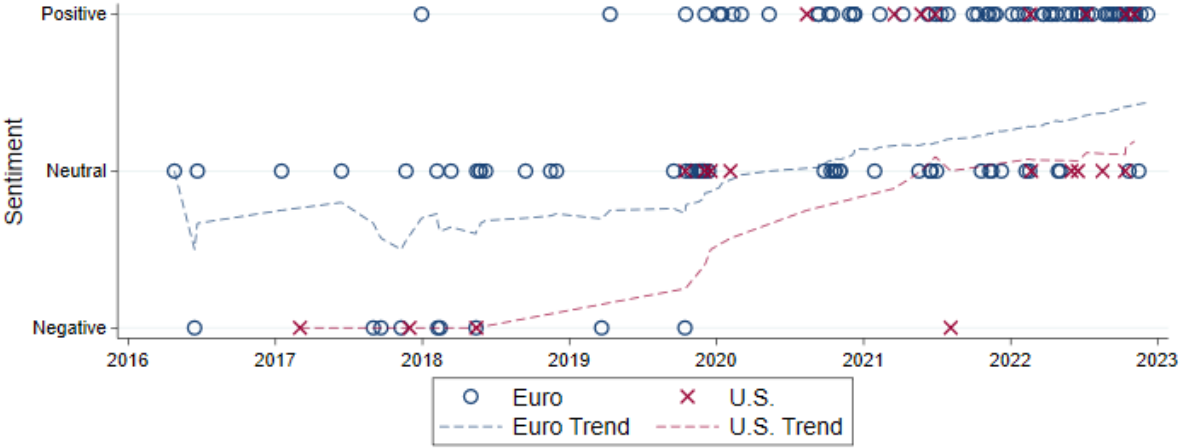
CBDC

- CBDC discussion:
  - (too?) broad adoption
  - (more) cost efficient payment
  - might even fully eliminate intermediaries
- Empirical strategy:
  - CBs communicate stances via speeches → contain information
  - Do valuations react to changes in the likelihood of CBDC introduction?

  → Event study: announcement returns of payment firms around CB speeches
  - $R_t = \alpha + bR_{Mt} + \tau_+ D_t^+ + \tau_- D_t^- + \tau_0 D_t^0 + e_t$
- BIS database (Auer et al. (2020)) on CB speeches on CBDCs
  - Jan-2016 to Mar-2022
  - Eurozone & U.S.
  - Indicator of speech sentiment towards CBDCs

CBDC – Event Study



	(1) Positive	(2) Negative	(3) Neutral	(4) All	(5) Euro Only	(6) US Only
Sentiment_Positive	-0.0022**			-0.0022**	-0.0021**	-0.0034
	(-2.47)			(-2.44)	(-2.29)	(-1.19)
Sentiment_Negative		0.0013		0.0012	0.0008	0.0026
		(1.48)		(1.34)	(0.86)	(1.47)
Sentiment_Neutral			-0.0001	-0.0001	0.0001	-0.0015
			(-0.18)	(-0.14)	(0.16)	(-0.78)
Market	1.1851***	1.1858***	1.1856***	1.1854***	1.1856***	1.1852***
	(41.08)	(40.98)	(40.98)	(41.04)	(41.03)	(40.94)
Constant	0.0001	-0.0000	0.0000	0.0001	0.0001	0.0000
	(0.77)	(-0.00)	(0.15)	(0.66)	(0.58)	(0.22)
Observations	1,635	1,635	1,635	1,635	1,635	1,635
Adjusted R-squared	0.7881	0.7873	0.7872	0.7880	0.7878	0.7874
# Positive Events	48			48	44	5
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# Neutral Events			52	52	46	7
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	(1) Payee-Facing	(2) Networks	(3) Speeches Only	(4) Senior CB Representative	(5) Non-Senior CB Representative
Positive Sentiment	-0.0028**	-0.0019*	-0.0025**	-0.0032***	-0.0013
	(-2.45)	(-1.71)	(-2.47)	(-2.63)	(-1.10)
Negative Sentiment	0.0024**	0.0005	0.0008	0.0009	0.0014
	(2.10)	(0.48)	(0.69)	(0.41)	(1.39)
Neutral Sentiment	-0.0001	-0.0002	0.0007	0.0008	-0.0005
	(-0.07)	(-0.27)	(0.61)	(0.66)	(-0.51)
Market	1.2286***	1.1605***	1.1845***	1.1843***	1.1858***
	(42.13)	(34.11)	(41.00)	(41.00)	(40.99)
Constant	-0.0001	0.0003	0.0001	0.0001	0.0001
	(-0.24)	(1.13)	(0.35)	(0.41)	(0.34)
Observations	1,635	1,635	1,635	1,635	1,635
Adjusted R^2	0.7322	0.7012	0.7876	0.7878	0.7872
# Positive Events	48	48	44	36	12
# Negative Events	13	13	13	5	8
# Neutral Events	52	52	49	29	23

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# Positive Events	48	48	44	36	12
# Negative Events	13	13	13	5	8
# Neutral Events	52	52	49	29	23

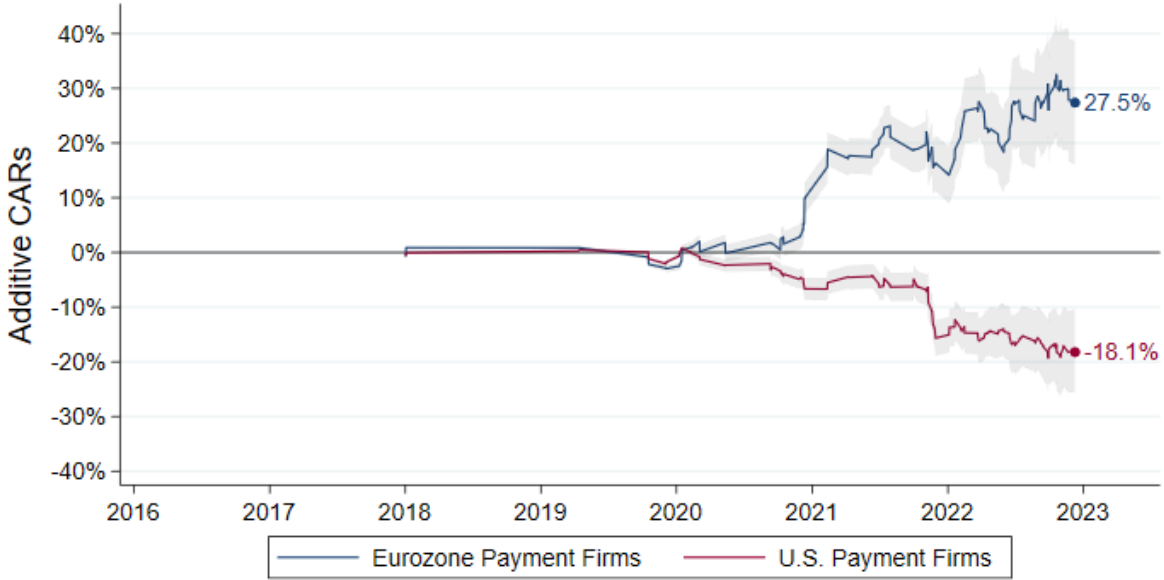
	(1) Payee-Facing	(2) Networks	(3) Speeches Only	(4) Senior CB Representative	(5) Non-Senior CB Representative
Positive Sentiment	-0.0028**	-0.0019*	-0.0025**	-0.0032***	-0.0013
	(-2.45)	(-1.71)	(-2.47)	(-2.63)	(-1.10)
Negative Sentiment	0.0024**	0.0005	0.0008	0.0009	0.0014
	(2.10)	(0.48)	(0.69)	(0.41)	(1.39)
Neutral Sentiment	-0.0001	-0.0002	0.0007	0.0008	-0.0005
	(-0.07)	(-0.27)	(0.61)	(0.66)	(-0.51)
Market	1.2286***	1.1605***	1.1845***	1.1843***	1.1858***
	(42.13)	(34.11)	(41.00)	(41.00)	(40.99)
Constant	-0.0001	0.0003	0.0001	0.0001	0.0001
	(-0.24)	(1.13)	(0.35)	(0.41)	(0.34)
Observations	1,635	1,635	1,635	1,635	1,635
Adjusted R^2	0.7322	0.7012	0.7876	0.7878	0.7872
# Positive Events	48	48	44	36	12
# Negative Events	13	13	13	5	8
# Neutral Events	52	52	49	29	23

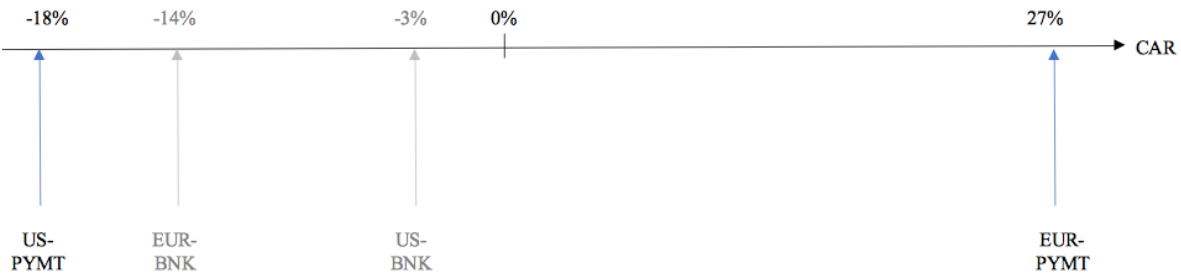
Outlook

- Focus on CBDCs & the digital Euro
  - crypto part $\rightarrow$ spin-off paper

1. ECB advocates it as an alternative payment infrastructure
2. To reduce costs of payments
2. To improve strategic autonomy
   A) implied by communication
   B) in ECB prototyping
   C) what the market believes (speech case study)

Outlook – Cumulative Payment Returns & Positive Speeches on the Digital Euro




-18%
-14%
-3%
0%
27%
CAR
US-PYMT
EUR-BNK
US-BNK
EUR-PYMT

		Medium of Exchange			*Unit of Account*		*Store of Value*				*Other*	
	Total	**Instant Payment Settlement**	**Cost Efficiency**	**Strategic Autonomy**	**Monetary Sovereignty**	**Monetary Anchor**	**Transmission of Monetary Policy**	**Safety of Deposits**	**Financial Remuneration**	**Deposit Market Power**	**Preserving Privacy**	**Financial Inclusion**
All Speeches (#)	157	87	68	30	46	9	71	32	28	9	54	50
Location (% of Total)												
U.S. Speeches	21	71%	48%	0%	0%	0%	33%	24%	0%	5%	52%	48%
Eurozone Speeches	136	53%	43%	22%	34%	7%	47%	20%	21%	6%	32%	29%
Year (% of Total)												
2016	3	100%	67%	0%	0%	0%	100%	0%	0%	0%	33%	0%
2017	8	63%	50%	0%	0%	0%	63%	50%	38%	0%	38%	25%
2018	15	47%	40%	0%	0%	0%	53%	33%	27%	20%	33%	27%
2019	20	65%	45%	10%	15%	5%	50%	10%	10%	0%	35%	50%
2020	26	81%	42%	19%	58%	0%	46%	27%	31%	4%	46%	42%
2021	31	48%	48%	13%	29%	3%	42%	16%	16%	6%	26%	32%
2022	54	43%	39%	35%	35%	13%	37%	17%	11%	6%	33%	24%
Speech Stance (% of Total)												
Positive Stance	75	53%	45%	32%	48%	9%	48%	20%	19%	5%	37%	29%
Negative Stance	14	64%	36%	0%	0%	0%	43%	29%	21%	14%	36%	36%
Neutral Stance	68	56%	43%	9%	15%	3%	43%	19%	16%	4%	31%	34%
Speaker Seniority (% of Total)												
Senior	93	52%	41%	22%	29%	3%	43%	16%	15%	4%	24%	29%
Non-Senior	64	61%	47%	16%	30%	9%	48%	27%	22%	8%	50%	36%

		Medium of Exchange			*Unit of Account*		*Store of Value*				*Other*	
	Total	**Instant Payment Settlement**	**Cost Efficiency**	**Strategic Autonomy**	**Monetary Sovereignty**	**Monetary Anchor**	**Transmission of Monetary Policy**	**Safety of Deposits**	**Financial Remuneration**	**Deposit Market Power**	**Preserving Privacy**	**Financial Inclusion**
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Eurozone Speeches	136	53%	43%	22%	34%	7%	47%	20%	21%	6%	32%	29%
Year (% of Total)												
2016	3	100%	67%	0%	0%	0%	100%	0%	0%	0%	33%	0%
2017	8	63%	50%	0%	0%	0%	63%	50%	38%	0%	38%	25%
2018	15	47%	40%	0%	0%	0%	53%	33%	27%	20%	33%	27%
2019	20	65%	45%	10%	15%	5%	50%	10%	10%	0%	35%	50%
2020	26	81%	42%	19%	58%	0%	46%	27%	31%	4%	46%	42%
2021	31	48%	48%	13%	29%	3%	42%	16%	16%	6%	26%	32%
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Outlook – Text Analysis of Speeches

		Medium of Exchange			*Unit of Account*		*Store of Value*				*Other*	
	Total	**Instant Payment Settlement**	**Cost Efficiency**	**Strategic Autonomy**	**Monetary Sovereignty**	**Monetary Anchor**	**Transmission of Monetary Policy**	**Safety of Deposits**	**Financial Remuneration**	**Deposit Market Power**	**Preserving Privacy**	**Financial Inclusion**
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Year (% of Total)												
2016	3	100%	67%	0%	0%	0%	100%	0%	0%	0%	33%	0%
2017	8	63%	50%	0%	0%	0%	63%	50%	38%	0%	38%	25%
2018	15	47%	40%	0%	0%	0%	53%	33%	27%	20%	33%	27%
2019	20	65%	45%	10%	15%	5%	50%	10%	10%	0%	35%	50%
2020	26	81%	42%	19%	58%	0%	46%	27%	31%	4%	46%	42%
2021	31	48%	48%	13%	29%	3%	42%	16%	16%	6%	26%	32%
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		Medium of Exchange			*Unit of Account*		*Store of Value*				*Other*	
	Total	**Instant Payment Settlement**	**Cost Efficiency**	**Strategic Autonomy**	**Monetary Sovereignty**	**Monetary Anchor**	**Transmission of Monetary Policy**	**Safety of Deposits**	**Financial Remuneration**	**Deposit Market Power**	**Preserving Privacy**	**Financial Inclusion**
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2019	20	65%	45%	10%	15%	5%	50%	10%	10%	0%	35%	50%
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Thank you!