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# CBDCs, Payment Firms, and Geopolitics

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# Motivation & Research Question

## One of the First Empirical Studies on Central Bank Digital Currencies (CBDCs)

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- More than 100 countries representing 98% of global GDP are exploring CBDCs
- Central bank digital currency
  - Digital version of a jurisdiction's fiat currency
  - Direct liability of the central bank (unlike commercial bank deposits)
  - Functions:
    - 1) Store of value
    - 2) Medium of exchange

→ How would the introduction of CBDCs affect existing financial intermediaries?

# Classifying Payment Firms




































## No Established Definition in the Literature

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- Listed firms from the U.S. and the Eurozone:
  - 1) Commercial banks (SIC code 60)
  - 2) **Payment firms**
- Classification of payment firms:
  - 1) **Compustat business description** contains the words “payment” or “merchant solution”; AND
  - 2) **SIC code** 6099 (*functions related to depository banking*), or 6141 (*personal credit institutions*), or SIC code that does not start with 6
- Focus on **“pure players”**
  - Disregard e.g., payment business of banks, Apple Pay
- Payment firms are large: ~70% of market capitalization of commercial banks (U.S.)

# Largest Firms as of 2022

## Payment Firms Among the Most Valuable Companies in the Financial Sector

Rank	United States				Eurozone			
	Payment Firms		Commercial Banks		Payment Firms		Commercial Banks	
1.	Visa \$430bn		JPMorgan Chase \$393bn		Adyen \$43bn		BNP Paribas \$70bn	
2.	Mastercard \$332bn		Bank of America \$265bn		Edenred \$14bn		Banco Santander \$50bn	
3.	American Express \$110bn		Wells Fargo \$158bn		Worldline \$11bn		ING \$45bn	
4.	PayPal \$81bn		Citigroup \$88bn		Nexi \$10bn		Intesa Sanpaolo \$42bn	
5.	Fiserv \$64bn		U.S. Bancorp \$67bn		Easy2pay \$0bn		Nordea \$39bn	
6.	FIS \$40bn		PNC \$63bn		Wirecard \$0bn	wirecard	BBVA \$36bn	
7.	Block/Square \$38bn		Truist \$57bn				Credit Agricole \$32bn	
8.	Discover \$26bn		BNYM \$37bn				CaixaBank \$32bn	
9.	Global Payments \$26bn		State Street \$27bn				UniCredit \$27bn	
10.	Fleetcore \$13bn		M&T Bank \$25bn				KBC \$27bn	

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# Empirical Findings

# Empirical Strategy

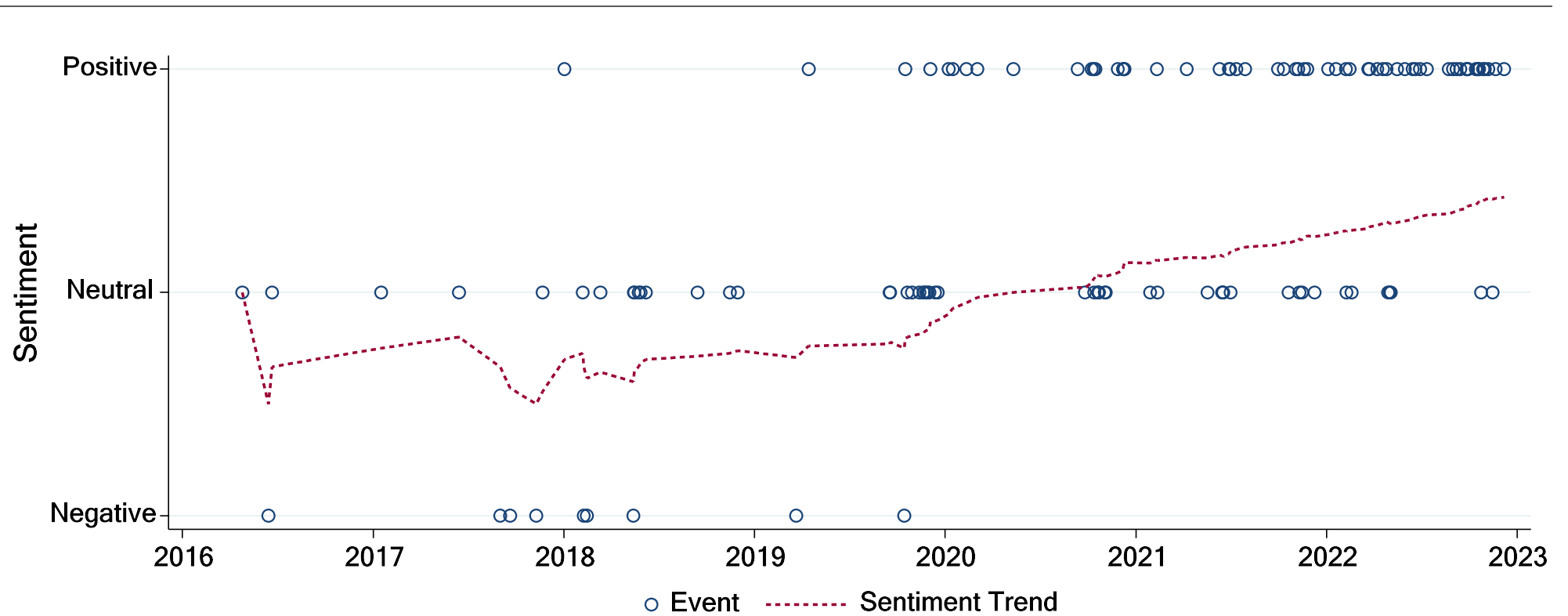
## Event Study Design

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- Challenge: no advanced economy has introduced a CBDC so far
- Idea: analyze stock price reactions to **news on the potential future introduction** of a CBDC
- Focus: **digital euro** (= leading advanced-economy CBDC project)
- Data:
  - BIS database on **central bank speeches** (Auer et al., 2020)
  - **Sentiment indicator** for each speech
  - Sample period: Jan-2016 to Dec-2022

# Speeches on the Digital Euro Over Time

Sentiment Gradually Becoming More Positive



# Empirical Strategy (Cont.)

## Event Study Design

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- Regress market cap-weighted daily stock returns on speech dummy:

$$Ret_{i,t} = \beta_0 + \beta_1 PositiveSpeech_t + \beta_2 Mkt_t + \beta_3 Controls + \varepsilon_{i,t}$$

- Four separate regressions for four types of firms

- 1) U.S. payment firms
- 2) Eurozone payment firms
- 3) U.S. banks
- 4) Eurozone banks



# CBDC Event Studies

Positive Communication → Negative U.S. Payment Firm Returns

	(1) Baseline	(2) Factors	(3) Industry Controls	(4) Fixed Effects	(5) Placebo
Positive Sentiment	-0.0019* (-1.84)	-0.0018* (-1.78)	-0.0020** (-2.10)	-0.0019** (-2.03)	
Neutral Sentiment					0.0011 (0.93)
Market	1.1774*** (43.62)	1.1575*** (38.54)	1.1545*** (43.95)	1.1560*** (43.21)	1.1552*** (43.13)
Constant	0.0002 (0.95)	0.0002 (1.30)	0.0002 (1.41)	-0.0001 (-0.06)	-0.0001 (-0.06)
Observations	62,049	62,049	62,049	62,049	62,049
Adjusted R-squared	0.5004	0.5058	0.5149	0.5160	0.5158
Stock Return Factors	No	Yes	Yes	Yes	Yes
Industry Controls	No	No	Yes	Yes	Yes
Year x Quarter FE	No	No	No	Yes	Yes
# Positive Speeches	69	69	69	69	-
# Neutral Speeches	-	-	-	-	58

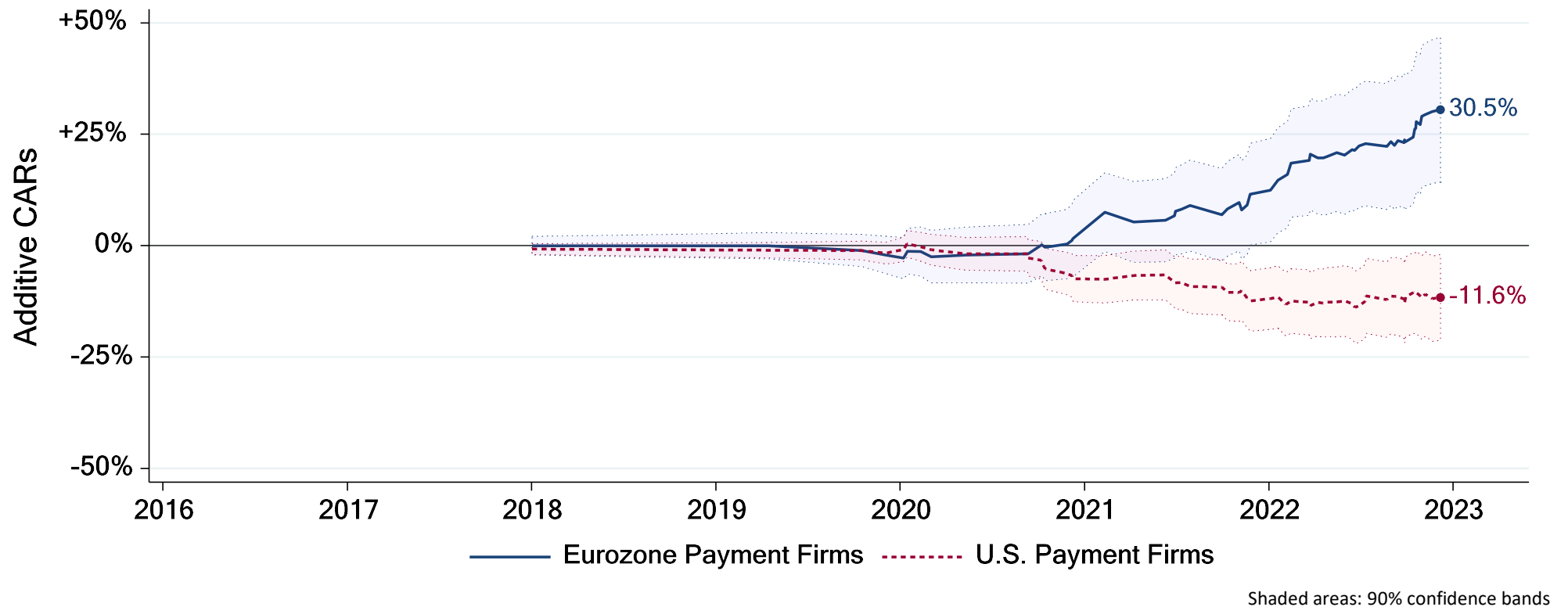
# CBDC Event Studies

Positive Communication → Positive Eurozone Payment Firm Returns

	(1) Baseline	(2) Factors	(3) Industry Controls	(4) Fixed Effects	(5) Placebo
Positive Sentiment	0.0043** (2.28)	0.0044** (2.41)	0.0047*** (2.90)	0.0052*** (2.99)	
Neutral Sentiment					0.0007 (0.57)
Market	1.0420*** (24.67)	1.0044*** (23.90)	0.9565*** (28.05)	0.9661*** (28.23)	0.9689*** (28.28)
Constant	0.0002 (0.53)	0.0002 (0.57)	0.0004 (1.37)	-0.0002 (-0.14)	-0.0002 (-0.13)
Observations	11,004	11,004	10,895	10,895	10,895
Adjusted R-squared	0.2111	0.2721	0.3304	0.3320	0.3308
Stock Return Factors	No	Yes	Yes	Yes	Yes
Industry Controls	No	No	Yes	Yes	Yes
Year x Quarter FE	No	No	No	Yes	Yes
# Positive Speeches	69	69	69	69	-
# Neutral Speeches	-	-	-	-	58

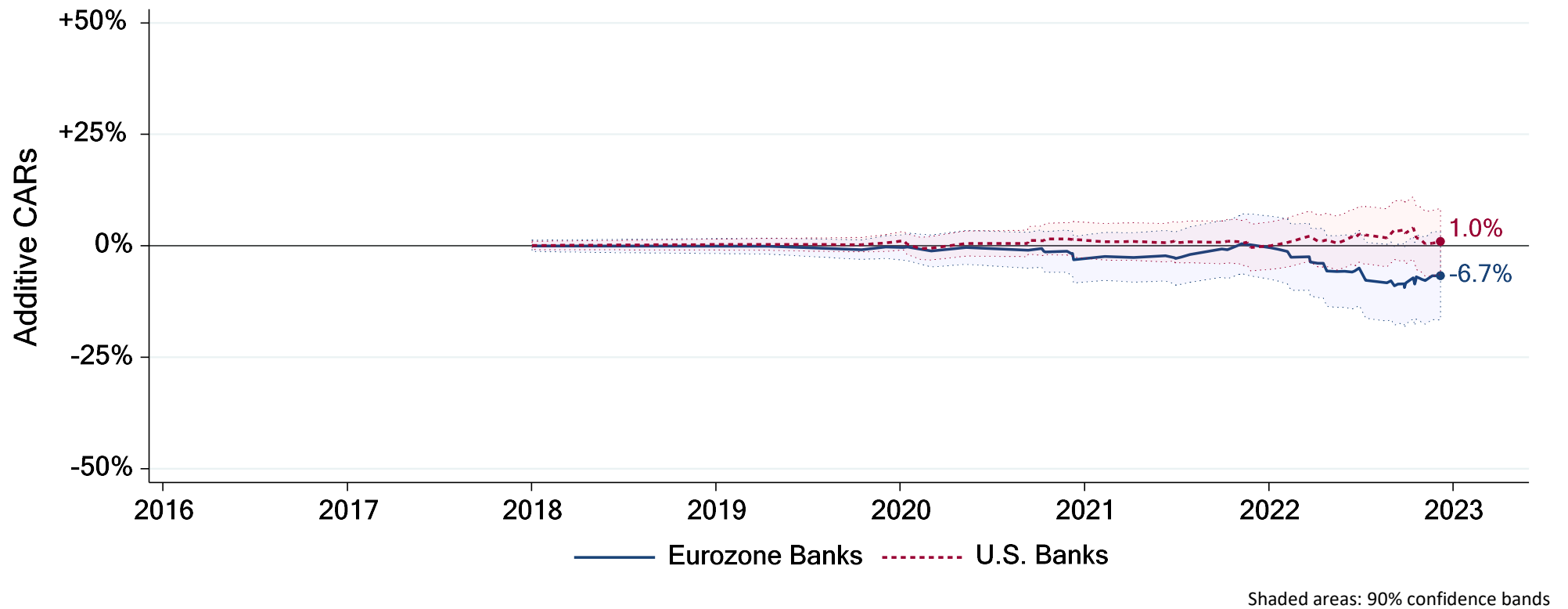
# CBDC Event Studies – Cumulative Effects for Payment Firms

U.S. pymt firms lose USD 127 billion in market cap, European pymt firms gain USD 23 billion



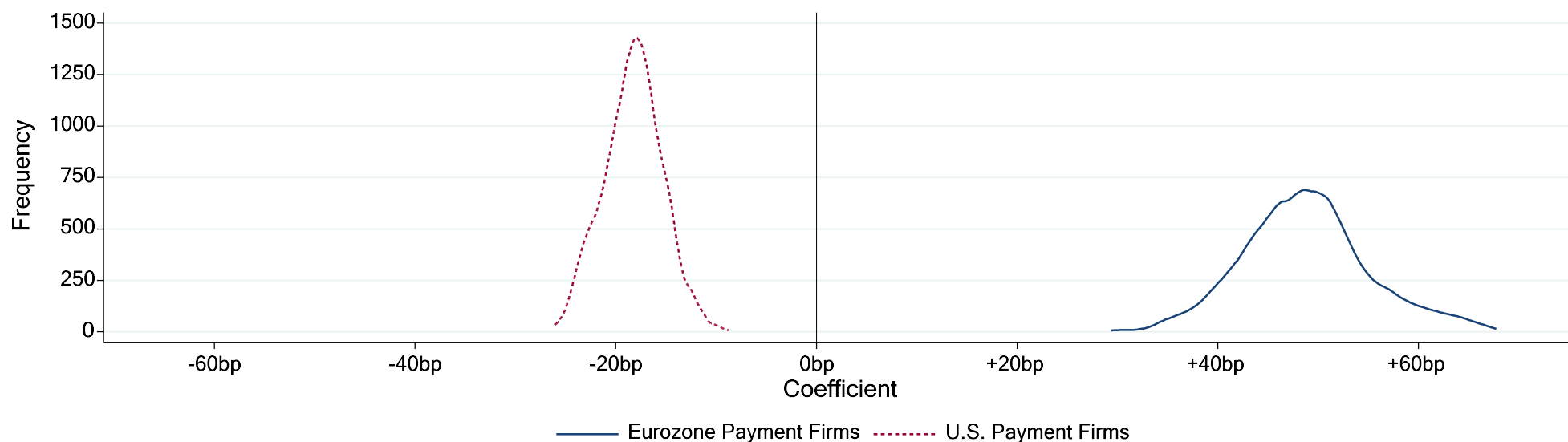
# CBDC Event Studies – Cumulative Effects

## Commercial Banks



# CBDC Event Studies – Robustness

## Return Pattern Confirmed in 2,592 Alternative Regression Specifications



### Robustness Test Dimensions:

#### 1) Events:

All | Main CB Speeches

#### 5) Factor Models:

Market | 3-F | 6-F

#### 2) Winsorized Returns:

No | Within Firms | Across Firms

#### 6) Industry Index Controls:

No | Local | Global

#### 3) Event Sentiment Controls:

Positive | Positive/Negative/Neutral

#### 7) Time Fixed Effects:

No | Year | Y-Quarter | Y-Month

#### 4) Firm Definitions:

SIC + Business Description | GICS

#### 8) Earnings Announcement Controls:

No | Yes

## CBDC Event Studies – Heterogeneity

Cross-section of firms, cross-section of speeches support results

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### Cross-section of payment firms

- Results are non-existent for **U.S. payment firms with a pure domestic focus**
- Results are stronger for pure-play payment firms (such as Visa, Mastercard, Paypal, Fiserv) than for **diversified payment firms** (such as Discover, American Express)
- Results are weaker for **Ingenico** (producer of hardware terminals) and **Wirecard** (accounting scandal)

### Cross-section of speeches

- Results become stronger if we remove **generic-title speeches**
- Results become stronger if we focus on speeches with **significant positive news content**

Overall: Results are stronger when one would reasonably expect them to be stronger

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## Supporting Evidence

# Strategic Autonomy Hypothesis

Results Consistent with “Words and Actions” from Policymakers

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- European payment landscape dominated by U.S. firms
  - Payment systems = critical infrastructure
- Enhanced political autonomy as a key motive for the digital euro



# Strategic Autonomy Hypothesis

## Results Consistent with “Words and Actions” from Policymakers

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- European payment landscape dominated by U.S. firms
  - Payment systems = critical infrastructure
- Enhanced political autonomy as a key motive for the digital euro

*“A digital euro would increase the efficiency of European payments and contribute to **Europe’s strategic autonomy.**”*

– Fabio Panetta (former ECB board member)

# Strategic Autonomy Hypothesis

## Results Consistent with “Words and Actions” from Policymakers

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- European payment landscape dominated by U.S. firms
  - Payment systems = critical infrastructure
- Enhanced political autonomy as a key motive for the digital euro

*“Europe’s current payment systems are national or international – we don’t have truly European options, and are **overly reliant on companies such as Visa, Mastercard, or PayPal.**”*

– Mairead McGuinness (EU Commissioner)

# Strategic Autonomy Hypothesis

## Results Consistent with “Words and Actions” from Policymakers

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- European payment landscape dominated by U.S. firms
  - Payment systems = critical infrastructure
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### ECB Shuns Visa, Mastercard, PayPal for Digital Euro Advisory Panel

BY PYMNTS | OCTOBER 25, 2021



The European Central Bank (ECB) has announced the 30 people to be on its Market Advisory Group for its digital euro project, according to a [press release](#).

The group will advise the ECB on the design and distribution of a possible digital euro, the release stated. It will also consider how a digital euro could add value to the eurozone's payments ecosystem.

## Strategic Autonomy Hypothesis

### Results Consistent with “Words and Actions” from Payment Firms and Merchant Associations

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*“We are particularly concerned that the proposal to establish the digital euro has gone beyond its stated objective of providing individuals and businesses with a digital form of central bank money. Instead, **the proposal seeks to create a duplicative, non-market led payment system** that calls into question the European Union’s (EU) established approach to an open market economy with free competition.”*

– Mastercard (2023)

*““As a recognised payment leader, we are committed to playing an increasingly visible role at the pan-European level as **we support** at different levels major developments, such as **the European Payments Initiative or the Digital Euro.**”*

– Worldline (2022)

## Strategic Autonomy Hypothesis

Results Consistent with “Words and Actions” from Payment Firms and Merchant Associations

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**Digital Euro: Merchants support a fast, innovative, and low-cost pan-European payment method**

*“The digital euro has the potential to transform European payments – **increasing efficiency, promoting innovation**, and placing Europe at the forefront of payment technology.”*

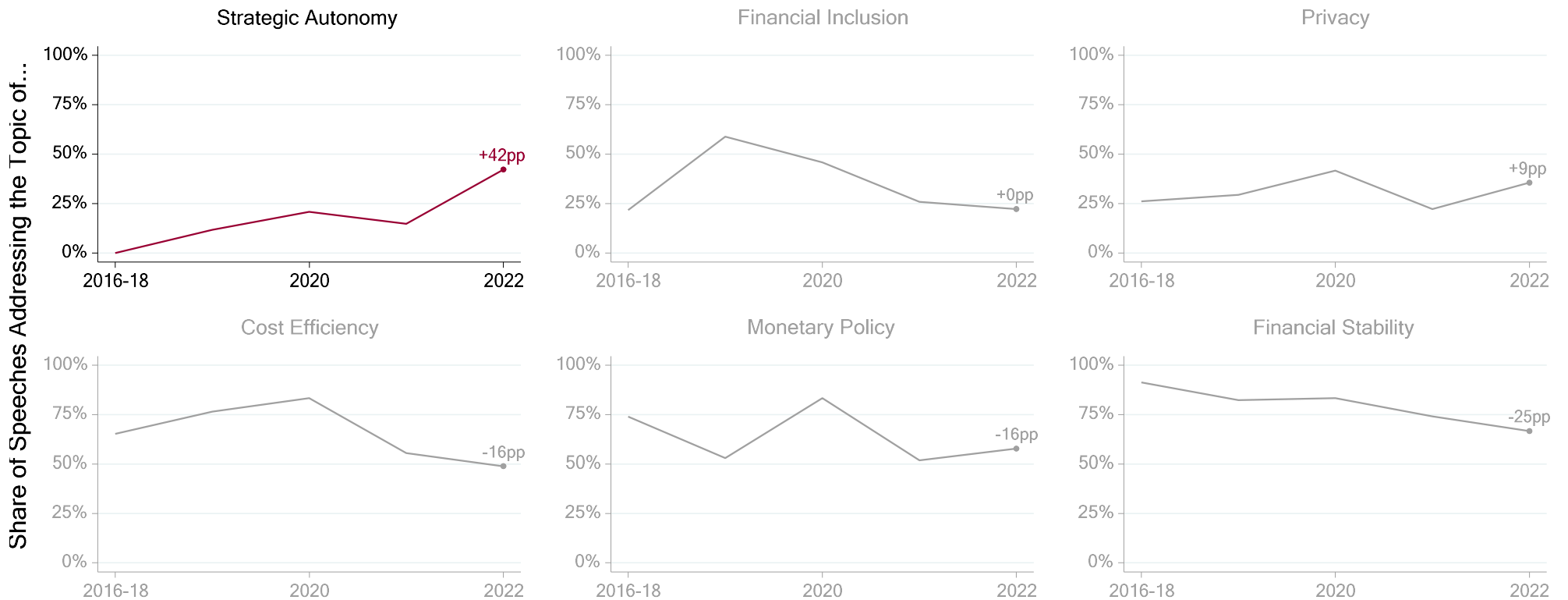
*“Merchants are the business end-users of the EU payment ecosystem and **are currently limited in their ability to negotiate fair terms.**”*

*“Merchants stand to benefit from **lower costs.**”*

*- E-Commerce Europe (industry association representing more than 150,000 merchants)*

# Strategic Autonomy Hypothesis

## Textual Analysis Reveals Sharp Increase in 'Strategic Autonomy'-Speeches



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# Conclusion

## Key Takeaways

### CBDCs Could Reshape the Financial System With Very Different Implications for Existing Financial Intermediaries

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- For positive speeches on the digital euro, we find that stock prices of...
  - U.S. payment firms **decrease**
  - Eurozone payment firms **increase**
  - Banks **do not react**
- Our findings...
  - Emphasize the **medium-of-exchange function** of CBDCs
  - Highlight a novel **geopolitical dimension** of CBDCs: enhanced autonomy in payments



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Thank you!

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