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# Discussion

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“On the transmission of news and mining shocks in Bitcoin” by Karau et al.

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VIEWS EXPRESSED DO NOT NECESSARILY REFLECT THOSE OF THE  
BANK OF CANADA



# Summary

Adopt version of Lagos and Rochetau model to discuss theoretical impact of “news and mining shocks” on Bitcoin price and transaction volume

➤ Novelty: number of decentralized matches depends on mining power

Construct dataset with news and mining shocks and collect bitcoin data

Estimate impact of shocks using an SVAR with sign restrictions

Estimates *broadly* in line with theoretical framework (both shocks have a somewhat persistent positive impact on prices and on-chain transaction volumes)

# (1) Deeper analysis of block confirmation times and volumes

Figure 5: Impulse responses to a news ( $\epsilon$ ) shock in the model

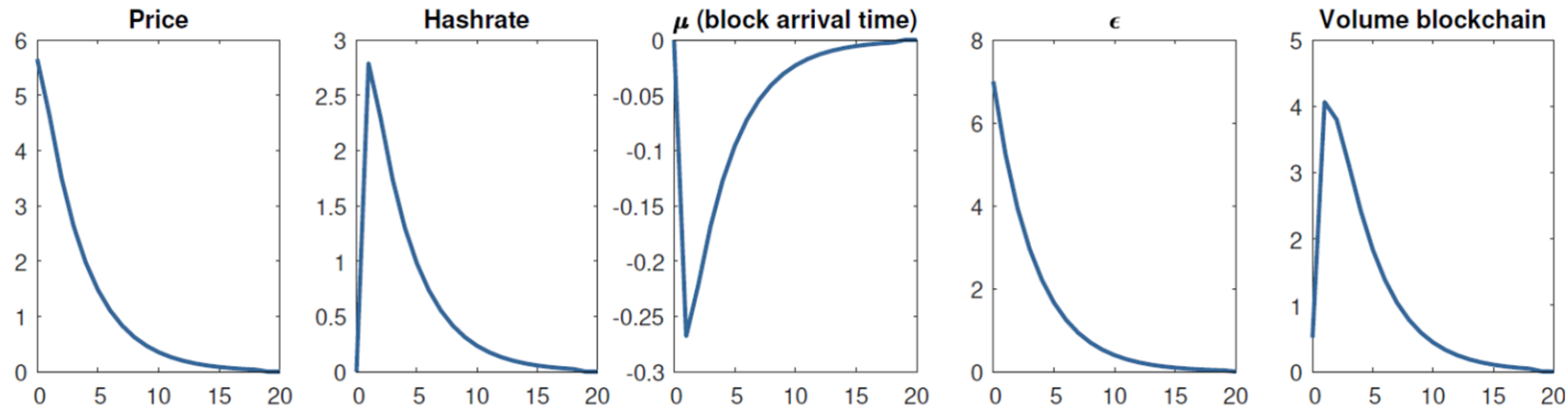
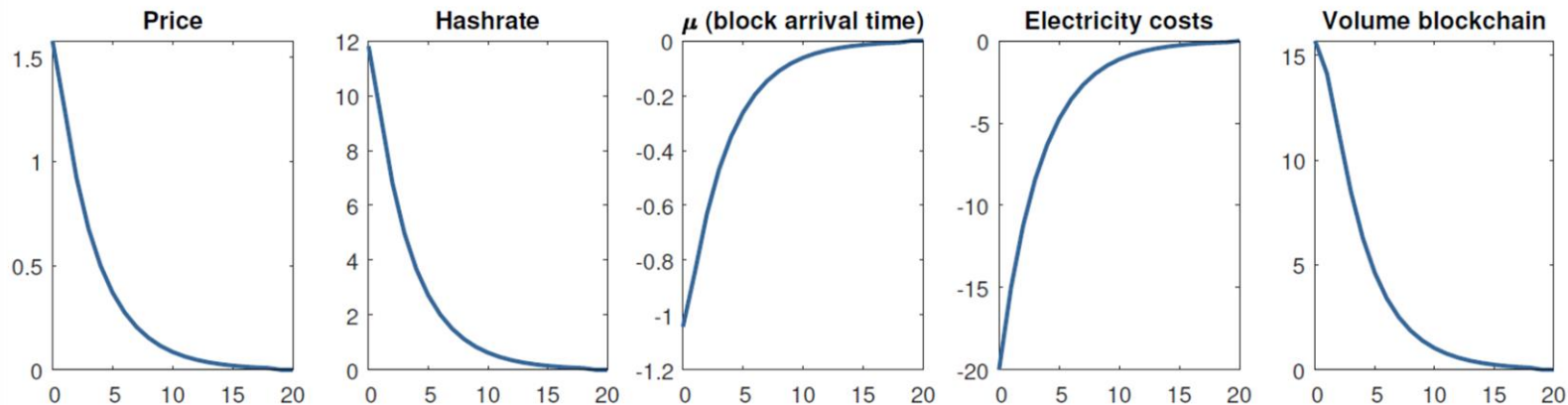


Figure 6: Impulse responses to a mining ( $\nu_2$ ) shock in the model



Model:

- News shocks have large impact on price and small impact on volume
- Mining shocks have large impact on volume and small impact on price



# (1) Deeper analysis of block confirmation times and volumes

Figure 7: Impulse responses to a news shock in the VAR

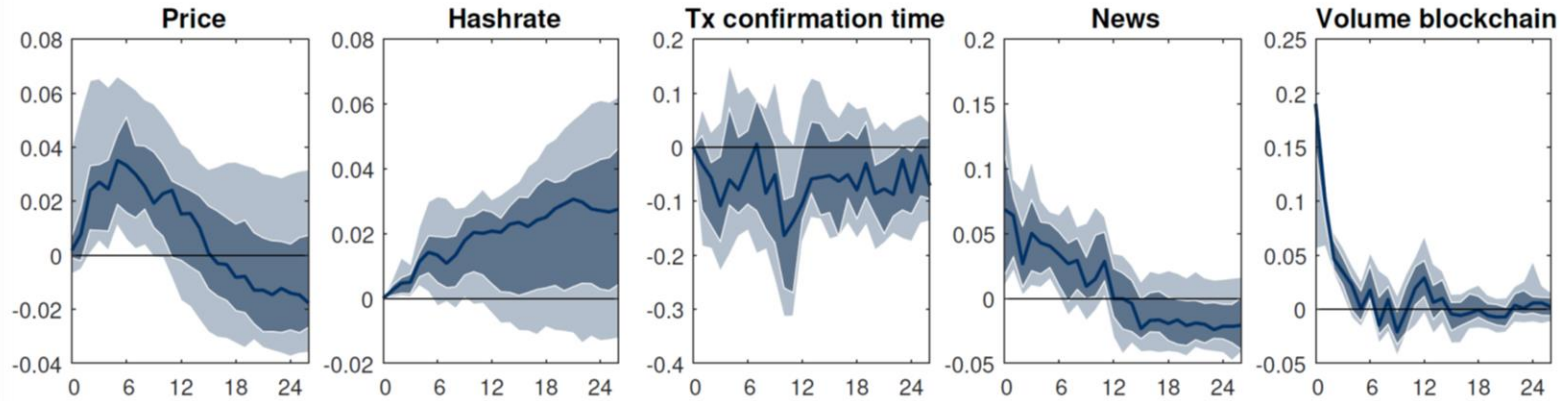
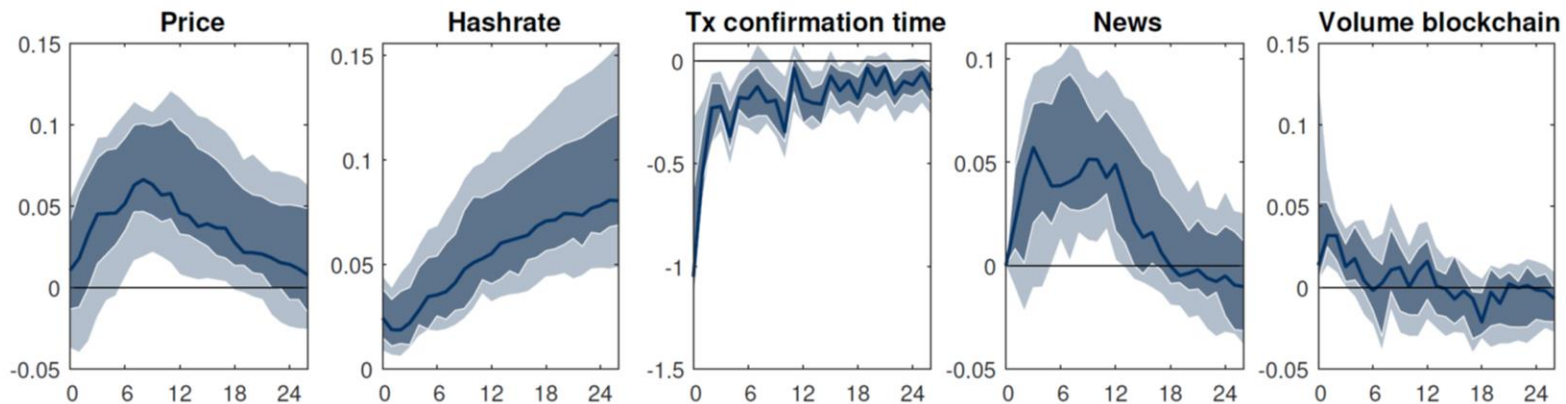


Figure 8: Impulse responses to a mining shock in the VAR

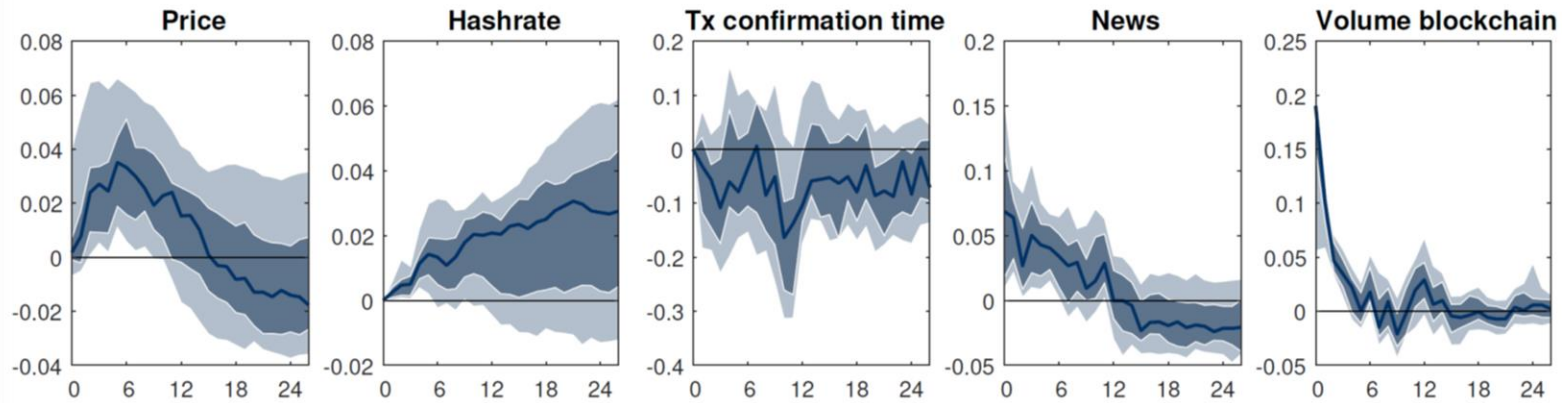


Contrary to model:

News shocks appear to have a larger impact on volume (given a similar or smaller impact on price)

# (1) Deeper analysis of block confirmation times and volumes

Figure 7: Impulse responses to a news shock in the VAR



Sample until 2019M5:

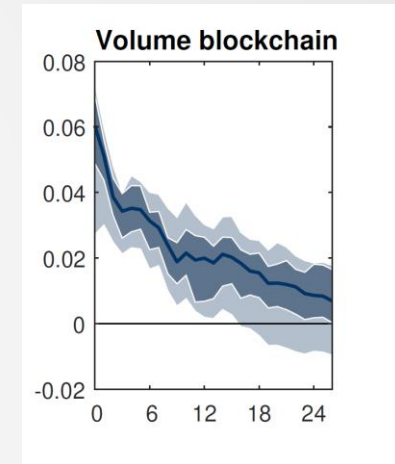
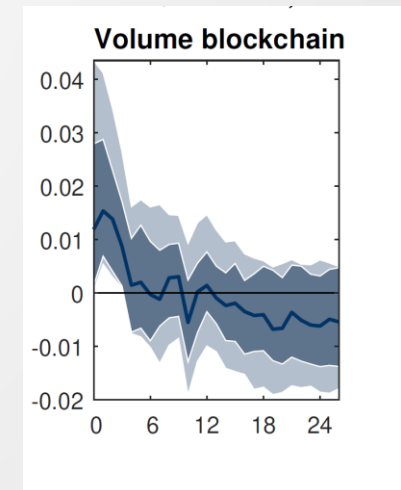
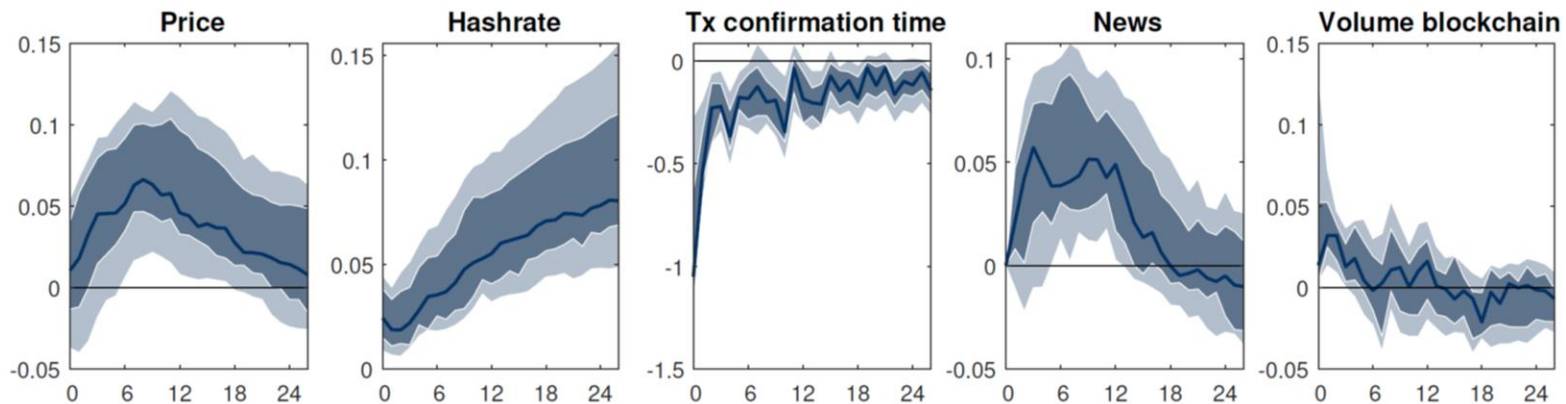


Figure 8: Impulse responses to a mining shock in the VAR



## (2) If Lagos and Rocheteau were a hammer, would bitcoin be a nail or a screw?

- Model for asset trading to describe impact of shocks on bitcoin *price* and *volume*
- Model assumes real flow utility of holding a bitcoin (“fruit from a bitcoin tree”)
- What is the utility derived from holding bitcoin?
  - You can live in a house, enjoy dividends from stocks and interest payments from bonds
  - Thinking of utility from holding bitcoins because of liquidity or hedging purposes is not very credible
    - Model assumes that holding 1 bitcoin priced at \$1,000 provides more utility than holding 0.1 bitcoin priced at \$10,000
- Is it possible to tell a story about transmission of news and mining shocks on bitcoin prices and transaction volumes without explicitly modelling potential source of utility?
  - Model does not describe, for example,
    - investment/hedging motives based on expected future prices (“store of value”)
    - motives to hold bitcoin as a medium of exchange
      - merchant acceptance and user adoption
- Instead, the model tells a story along the lines of
  - a) Positive news shock means the level of flow utility from owning bitcoin is higher
  - b) Positive mining shock means bitcoin can be moved quicker to agents deriving more utility from it



## (2) Bitcoin as a medium of exchange and/or store of value

**Equilibrium level of the bitcoin exchange rate: quantity equation plus two assumptions** (Bolt and Van Oordt, *forthcoming*)

$$S^{\$/B} = \frac{T^*/V^*}{M - Z}$$

- $S^{\$/B}$  is the bitcoin exchange rate
- $T^*/V^*$  is ratio dollar value of payments with bitcoin and velocity (“dollar amount of bitcoins needed to process payments”)
- $M$  is the total number of bitcoins
- $Z$  is the number of bitcoins **not used** to make purchases (“store of value/investment motive”)

### **Assumptions:**

- Prices when paying with bitcoin are adjusted based on the latest available exchange rate:  $P^B = P^{\$/S^{\$/B}}$
- Numerator is in equilibrium determined by technology and preferences

## (2) What happens if news shocks occur?

### Model story:

Positive news shock means more utility from bitcoin fruit → higher price

### Alternative story:

- Positive news shock (about adoption or acceptance) → more payments with bitcoin → higher volumes → higher bitcoin price
- Positive news shock → higher expectations → more speculative demand → higher bitcoin price and temporarily higher volume

$$S^{\$/B} = \frac{T^*/V^*}{M - Z}$$



## (2) What happens if mining shocks occur?

### Model story:

More mining power allows for more transactions → easier to sell/buy whenever you like → bitcoins can easier be sold to someone who derives more utility from it → higher price

➤ Consistent with updating the difficulty of mining every two weeks?

### Alternative story

- More mining power → more secure blockchain (higher cost of double-spending attack) → enables larger transactions\* → total dollar value payments increases → higher price (and perhaps volume).

(\* E.g., as in Chiu and Koepl (2018), Auer (2019).

- More mining power → more secure blockchain → higher probability bitcoin used in the future\* → more speculative demand → higher price and temporarily higher volume.

(\* E.g., as in Garratt and Wallace (2018), Bolt and Van Oordt (*forthcoming*).

$$S^{\$/B} = \frac{T^* / V^*}{M - Z}$$

# Concluding remarks

Interesting study, pleasure to read

Interesting empirical patterns in the data...

...but those patterns also suggest something is missing in the theoretical model

Would be great if the theoretical framework would be extended with explicit motivation to hold bitcoin as a *medium of exchange* or *store of value*

Thank you