

Money, digital cash and cryptocurrencies: Privacy matters

Emanuele Borgonovo, Stefano Caselli, Alessandra Cillo, Donato Masciandaro, Giovanni Rabitti 12 March 2019

Alongside liquidity and store of value, is privacy an important attribute of money? Using laboratory experiments, the column shows that privacy matters, and increases the overall appeal of money. The experiments suggest that future competition between alternative currencies will depend on how the three properties are mixed.

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The protection of privacy is a crucial issue. In monetary economics, can privacy play a role in explaining demand? In other words, could privacy be a third attribute – with liquidity and store of value – that can explain demand for both traditional and new media of exchange? These media may already exist (cryptocurrencies, for example) or soon exist (central bank digital currencies).

For macroeconomists, there are three interesting trends:

- The resilience of state-issued paper currencies in the form of large-denomination banknotes (Rogoff 2014, Sands 2016), valued by holders for their anonymity.
- Innovation in private payment systems, characterised by the issuance of cryptocurrencies (Di Mauro 2018, Cong et al. 2018, Amihud and Cukierman 2018, Cecchetti and Schoenholtz 2018, Aizenman 2019). In this case cryptography is used to protect privacy, and many users like the property of anonymity (Bohme et al. 2015).
- The debate about central bank digital currencies (Bordo and Levin 2017, Niepelt 2018, Mancini-Griffoli et al. 2019, Eichengreen 2019), for which counterparty anonymity is a crucial issue.

Therefore, a natural question arises: does money demand depend on privacy? Recent research, working on the intuition that any kind of money can be considered a memory store (Kocherlakota 1998), has focused on the association between money and privacy of transactions (Athey et al. 2017, Fernandez- Villaverde 2018, Kahn 2018, Masciandaro 2018). But it is not clear that this relationship is so relevant and general that we should consider privacy as a third property of the demand for money.

Experiments about privacy and money

Borgonovo et al. (2019) propose a novel specification of the demand for money as a medium of payment with the following three properties:

- **Hedging against illiquidity risk.** This is associated with the probability that in any exchange a given medium of payment is accepted. This acceptability depends also on the property of being a unit of account (Borio 2019).
- **Hedging against depreciation risk.** This is associated with the probability that the value of a given medium of payment is stable in terms of goods and services.
- **A story of privacy.** This new idea depends on the probability that private information about the user is disseminated when a given medium of payment is used for exchanges (Masciandaro 2018).



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We tested the robustness of this new specification with laboratory experiments using the Prince method (Borgonovo et al. 2019).

The experiments used a three-stage procedure. First, the subjects stated their preference among alternative media of payment. In this first stage, the media of payment differ only in anonymity. This reveals the preference for privacy. The second stage tested the relative importance of privacy with respect to liquidity and store of value. Finally, in a context of complete anonymity, we measured the trade-offs between illiquidity risk and devaluation risks.

There were five main results:

- Privacy matters.
- Hedging against devaluation risk seems to be the most relevant property of money.
- Combining the three properties is likely to increase the overall interest in a given medium of payment.
- Risk-seeking individuals like privacy more than risk-averse People (this result is consistent with the assumption that agents involved in illegal activities seem to like anonymity and illegal activities).
- Given a level of privacy, the sacrifice ratio between illiquidity risks and devaluation risks is relatively high. In other words, individuals call for a more than proportional increase in the protections against devaluation in order to accept higher illiquidity risks.

Paper money abides, cryptocurrency has weaknesses, and digital cash has challenges

If privacy matters as a property of money – as the results suggest – then paper money can maintain its appeal as an anonymous medium of payment, but the more other media can be trusted to offer privacy while balancing illiquidity risk and devaluation risk, the more likely it is that paper money will be crowded out.

There are policy implications for medium of payment suppliers such as private and central banks, and non-banking firms. Banking monies could be challenged as media of payment by a lack of privacy, and if there is a high devaluation risk. In parallel, the success of a cryptocurrency will depend on its ability to overcome illiquidity and devaluation risks, while increasing the credibility of its claim to privacy.

Finally, regarding central bank digital cash – uniquely promising the potential to be both an electronic medium of payment and a public currency – the experiments suggest that its attractiveness will crucially depend on privacy design today, and later its interest-bearing mechanisms. In normal times the illiquidity risk of a central bank digital cash would be zero, but it seems unlikely that individuals will consider it anonymous in the same way as cash is already anonymous. Offering a yield could be a trigger to increase its competitive appeal.

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