

**OPTIMAL PAYMENT PRACTICES:
A FRAMEWORK FOR ANALYSING
THE COLOMBIAN PAYMENTS ECOSYSTEM**

Jean Charles Rochet (University of Geneva)¹

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This report concludes my mission in the Banco de la República de Colombia (BR). This mission took place in Bogotá on December 9-13, 2019. It had three main objectives:

- Provide a conceptual framework for assessing the payments ecosystem of a modern country, in order to evaluate the pros and cons of different combinations of regulation and public provision of public services.
- Apply this conceptual framework to the Colombian case, taking into account the specific characteristics of the Colombian economy.
- Assist BR staff in preparing recommendations for the Colombian authorities in order to bring the Colombian payments ecosystem to its optimal levels of safety and efficiency.

The main message of this report is that the private sector is unable to generate on its own the efficient outcomes for the payment system. There is a need for defining a public policy for payments and for the Parliament to pass a law on payments, specifying in particular:

1. Why: what are the exact reasons for public intervention in the payments industry?
2. What: what are the precise objectives of intervention?
3. Who: which activities and which agents are going to be regulated?
4. By whom: which public authority will set the rules (regulation) and which ones will monitor their implementation (supervision)?

The report is organized as follows:

Section 1 characterizes payment systems and provides a taxonomy and an economic analysis. It reviews the main features of payment activities from an industrial organization

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perspective: economies of scale and scope, network and platform externalities, and the implications of technological development on the three functions of money.

Section 2 provides a conceptual framework for a public payment policy: the reasons for public intervention and the precise objectives for this intervention.

Section 3 reviews the possible options for Colombia: a completely public provision of electronic money, i.e. a Central Bank Digital Currency (CBDC), a simple regulation of completely private solutions, or a mixed duopoly.

Section 4 discusses implementation issues: the perimeter of payment policy and the ways to solve possible conflicts of interest between the Banco de la República and private institutions.

Section 5 concludes.

1. PAYMENT SYSTEMS: DEFINITION, TAXONOMY AND ECONOMIC ANALYSIS

1.1 A Definition

A payment system is a combination of arrangements for enabling trade². Its main role is to overcome two basic frictions:

- The time mismatch of trading demands.
- The limited enforcement of pledges.

The time mismatch occurs when trade cannot occur on the spot, in the Delivery Versus Payment mode. Money is useful to overcome the classical “double coincidence of wants” discussed by Jevons and others. A payment system goes further and guarantees the finality of payments by allowing the transfer of money between economic agents across time and space.

The limited enforcement of pledges can arise in many ways: geographic displacement of buyer and seller (like in e-commerce), legal system imperfections, or informational frictions.

Payment systems are vital for economic activities. They are the “plumbing” of the economy. As such, they need both “water” and “pipes”.

Monetary economics focuses on the quantity of different types of liquidity (the water): inside Vs outside money, monetary policy interventions by the central bank, credit regulation. These questions are outside the scope of this report.

Payment economics focuses on the architecture of the payment system (the pipes): how the different types of money circulate among economic agents, the safety and efficiency of the different payment technologies and what happens if there is a “leak” or a “gridlock”, i.e. how the continuity of operations of the payment systems is preserved in case of a crisis. These are the main topics of this report.

² Kahn, C. and W. Roberds (2006).

1.2 A Taxonomy

Payment systems can be classified along three dimensions:

- Are they token-based or account-based?
- Are they net or gross?
- Are they accessible to the public or only to financial institutions?

This section successively analyses these questions.

1.2.1 Token-based or Account-based?

Token-based systems rely on the transfer of “objects” such as commodity money, silver and gold coins, fiat money, or electronic tokens. Their crucial challenge is the verification of the authenticity and value of the payment object (how to avoid counterfeits). Their crucial advantage is the preservation of the anonymity of the traders. An ideal token-based system would be the spot exchange of safe securities.

Account-based systems rely on record keeping. They correspond to the bulk of exchanges in modern economies. They consist in transfers between inside money (typically bank deposits) through checks, credit and debit cards, direct debits, etc. Their crucial challenges are verifying the identities of the traders and keeping track of their positions. Their crucial advantage is that there is no physical constraint on the creation of inside money. An ideal account-based system would entirely rely on credit.³

1.2.2 Net or Gross?

Deferred Net Systems (DNS) allow banks to save on liquidity by using bilateral or multilateral compensation (netting) of payments. Payments are only final after this compensation takes place (oftentimes, at the end of the day) which implies some credit risk for the banks if they decide to provide immediate finality to their customers during the day, DNS work well when all parties are solvent, in which case the credit risk is tiny.

Real Time Gross Systems (RTGS) allow protection against intraday default risk of participants. However, they consume a lot of liquidity and often have to be accompanied with overdraft facilities.

1.2.3 Accessible to all or only to financial institutions?

Finally, an important distinction is between (large value) interbank payment systems that allow financial institutions to transfer reserves between their accounts at the Central Bank and retail payment systems that allow individuals and businesses to transfer electronic money (deposits) between their accounts at commercial banks. The two types of systems are interconnected: indeed, except “on-us” payments that take place between customers of the same commercial bank, most retail payments imply a transfer between the bank of the payor and the bank of the payee.

³ Kocherlakota, N. (1996).

Some countries are considering the possibility of creating a Central Bank Digital Currency, which would essentially amount to allowing individual and businesses to open accounts with the Central Bank. An alternative is a Fast Payment Platform that would allow these individual and businesses to transfer electronic money between their existing bank accounts at high speed and low cost.

1.3 Economic analysis of payment services

The industry for payment services differs from standard industries in which free competition brings efficiency. This is because the payment industry exhibits economies of scale, economies of scope, network externalities, platform externalities, and has an impact on important public policy dimensions such as financial inclusion.

1.3.1 Economies of Scale and Scope

Payment systems exhibit strong economies of scale. Indeed, they are characterized by very high fixed costs (infrastructure) and very low marginal costs (operation)⁴.

They also exhibit economies of scope: the same infrastructure can be used to provide different services associated with payments, such as clearing, settlement and ancillary functions. The multiproduct cost function of these different activities is sub-additive, implying that a single provider of all these services is more efficient than separate providers.

For all these reasons, the payment industry is to a large extent a natural monopoly or oligopoly, implying that competition forces cannot work properly. Economies of scale and scope imply the existence of barriers to entry for new providers. Incumbent providers may be tempted to excessive pricing, insufficient quality of service and insufficient innovation.

Two (not mutually exclusive) possible solutions: regulation and /or public provision, could be implemented in order to have an efficient, accessible and safe retail payment systems. We examine below the pros and cons of these solutions.

1.3.2 Network externalities

Networks are characterized by membership and usage externalities, which may go in opposite directions.

Membership or club externalities are present when the value of accessing a service (here a payment service) depends on the number of other members, i.e. the agents that also have access to the same service. These externalities are typically positive.

Usage externalities are present when the value of the service depends on the volume of usage by other members. They are typically negative (congestion).

⁴ See for example Beijnen and Bolt (2007).

1.3.3 Platform externalities

Platforms allow interactions between two or more categories of users. They generate indirect network externalities. A canonical example are payment cards.

In a platform industry the same service (allowing interactions) is provided jointly to two or more users. The cost of the service (together with the profit margin of the provider) has to be shared between the different users. The price structure matters, not only the total price level. The competitive price structure is typically not socially optimal: there is a market failure that comes from platform externalities.⁵

For example, once a merchant decides to accept payment cards of some type, all his customers that own this card have the choice between using it or another payment method. This has an impact on the costs and benefits incurred by the merchant, generating an externality. Interchange fees between the merchant's bank and the cardholder's bank maybe a way to internalize this externality.

Indirect network externalities are particularly sizable if the value of complementary services (such as software and ancillary services) increases when the platform has more users. These complementary services may in turn boost the use of the platform.

1.3.4 Fintech and Bigtech

Technological innovation has allowed the developments of new solutions (called Fintech) for the provision of financial services, and payments are no exception. Moreover, Bigtech companies such as e-commerce platforms, social networks or mobile operators have entered (or are seriously considering entering) the payment industry. For example, they can already offer cost-efficient transfer methods between existing bank accounts.

2. A CONCEPTUAL FRAMEWORK FOR A PUBLIC POLICY FOR PAYMENTS

This section sets a conceptual framework for analyzing the reasons why there is a need for a public policy for payments, and for a cost benefit analysis of different possible implementation modes.

2.1 Payments are an essential service

An inclusive, safe and efficient payment system is essential for a modern economy to function properly. The payment system is operated in part by private businesses (banks or Payment Service Providers). These providers can be viewed as agents of the government. This is similar to the organization of the health system in many countries, where doctors and private clinics are independent agents that are directly or indirectly remunerated by the government for providing public goods.

⁵ Rochet, J.C. and J. Tirole (2003).

Because of the specificities of payment services such as economies of scale, scope and network externalities, the private sector is unable to provide on its own the efficient outcomes for the payment system.

2.2 Technology and the three functions of money

In classical economics, money has three functions:

- Unit of account
- Store of value
- Means of payments.

Central Bank money, and to a large extent bank deposits, provide these three functions simultaneously but information technologies and financial innovation have created alternative solutions that have contributed to unbundle these three functions. For example, cryptocurrencies provide alternative means of payments but are not a very good store of value (because of large fluctuations in their value). Similarly, AAA tranches of Asset Backed Securities provide a (quasi) safe investment, and thus a good store of value but they cannot be used as a means of payments.

More importantly, some big players envisage the creation of new electronic monies (stable coins) that could compete with central bank monies. This could pose a threat to sovereignty and could lead to some kind of digital dollarization⁶. This threat has encouraged several central banks to envisage offering central bank digital currencies (CBDCs), i.e. providing access to central bank reserves to the public.

In other countries, public authorities are planning instead to offer efficient fast payment solutions to the public without creating CBDCs. For example, in the US the Federal Reserve announced in November 2018 that it would develop FedNow, essentially a new payment system that provides real time gross settlement of retail payments, in response to RTP, the fast payment retail system that was launched one year before by the Clearing House, an association of US commercial banks.

2.3 Privacy control

Another important aspect is the control of private data. The traditional business model of commercial banks relies on “relationship” banking: by managing the deposit accounts of their customers, commercial banks accumulate soft information about these customers, which they use to make their “relationship” more profitable. This may be a source of inefficiency, related to the classical “hold-up” problem about personal data. If they have a monopoly on these personal data, banks are able to extract ex post monopoly rents from their customers who face important informational switching costs. To overcome these difficulties, several regulators (such as the UK Competition and Markets Authority, or the EU Commission with PSD2, its new directive on payments) have introduced the notion of “open banking” that requires banks to grant third party (typically payment service providers) access to the account

⁶ Brunnermeier et al (2019).

data of their customers, upon their consent. This introduces important changes in the competitive positions of commercial banks and may have unintended consequences⁷. Moreover, it seems that Big Tech companies who exploit their knowledge of private data about their customers are not subject to the same constraints than commercial banks, which makes the playing field uneven.

2.4 Payment aspects of financial inclusion

Efficient, accessible and safe retail payment systems and services are critical for encouraging greater financial inclusion (CPMI 2015). A transaction account is an essential financial service in its own right and can also give access to other financial services such as credit.

In a modern economy, it is crucial that individuals and small businesses have access to transaction accounts allowing them to meet their payment needs, safely store value and access complementary financial services.

A possible way to improve financial inclusion is to encourage banks or the post office to provide free basic account services (payments, savings) to any customer that applies to it. In some countries, banks are subject to universal service obligations.

2.5. What are the precise objectives of public intervention in the payment industry?

To wrap up, there are basically two reasons for public intervention on payments:

- Payments services are a network good that is vital for a proper functioning of a modern economy.
- The Banco de la República is effectively a monopoly⁸ for the issuance and management of the Colombian peso, the sole legal tender in Colombia.

The objectives of the public policy on payments should therefore be:

- Guarantee the access of all potential users (households and businesses) to an efficient, safe and cost-effective payment system;
- Guarantee the continuity of the payment services to the users;
- Protect users against fraud, counterfeit and unapproved use of their private data;
- Stimulate innovation and encourage the development of complementary services.

⁷ Zachariadis and Oscan (2017).

⁸ The bulk of money is in the form of deposits, which are issued by commercial banks. However, these deposits are (almost) perfect substitutes to currency, and their volume is indirectly controlled by the BR through monetary policy and prudential regulation.

3. POSSIBLE SOLUTIONS FOR COLOMBIA

The Colombian peso is the sole legal tender in Colombia, and the Banco de la República is the only institution that has received the mandate to ensure the stability of the Colombian peso, as well as the efficiency and safety of the Colombian payment system.

The Banco de la República relies on commercial banks for issuing deposits in peso (inside money) through the provision of credit to the private sector, and for managing payments, thus serving the needs of households and businesses. Commercial banks are thus private agents that provide a public good on behalf of the Banco de la República.

It would be inappropriate to think of bank deposits as private money, since they are (almost) a perfect substitute for currency, and the Banco de la República is the only institution in charge of overseeing the payment system. The correct interpretation is that the Banco de la República has delegated the issuance of electronic (public) money to private agents (the banks) because it is a natural side-product of their (private) credit activities.

A crucial part of the mandate of the central bank is to print the currency (bank notes) and make it accessible to the public in a safe and efficient way. Although cross-country differences are important, there is a worldwide tendency for promoting the replacement of cash payments by electronic payments. As for Colombia, one driver is the desire to increase financial inclusion and decrease the relative size of the informal economy. Given its mandate, the BR has a central role to play in promoting universal access to fast, efficient and safe electronic payment systems.

The essential question is the optimal balance between public provision and regulation. We first examine CBDC, which corresponds to one extreme: full public provision. Then we examine the other extreme, namely regulation but not operation. Then we describe what we consider the best compromise, namely a mixed duopoly where the BR would play a dual role: regulator and operator. Finally, we examine the ways to avoid conflicts of interest in the mixed duopoly solution.

3.1 Full public provision: CBDC

The first solution is providing access of the general public to central bank reserves, i.e. a universally accessible Central Bank Digital Currency. The arguments in favor of CBDC differ across countries. In some countries like Sweden, cash has virtually disappeared and a CBDC is viewed by the Riksbank as a way to fulfill its mandate of providing currency to the public. In other countries, it results from the desire by public authorities to protect monetary sovereignty under the threat of entry by Bigtech companies offering private currencies. Finally, some view a CBDC as a way to make monetary policy more efficient by allowing “Quantitative Easing for the people” i.e. helicopter money.

There exist private sector alternatives to CBDC, such as stored value facilities or the “wrapper” technology. Stored value facilities such as AliPay and WePay in China, or M-Pesa in Kenya, provide private e-money to users against funds received and placed in custodian accounts.

Transactions occur between e-wallets installed on mobile phones or tablets. However, they are typically restricted to participants in the same network. The wrapper technology is similar to credit or debit card transactions, but it is less costly, as it allows to bypass the expensive EFTPOS terminals managed by the card networks.

More importantly, there also exist public sector alternatives to CBDC. The objectives of CBDC could also be reached by encouraging (and possibly subsidizing) access of all the population to bank accounts and providing a public platform for fast and efficient transfers between these bank accounts. There are many projects of such central-bank provided fast payment solutions: NPP in Australia, TIPS in the EU, SPEI in Mexico, FAST in Singapore, FPS in the UK, and FedNow in the US.

A CBDC would require the central bank to keep a running record of all payment data, which would be far more costly than the management of physical cash. Moreover, it may pose significant legal questions, such as privacy. In particular, would the anonymity of transactions be preserved? This is the case currently with cash, but seems incompatible with other public policy objectives, such as the fight against terrorism, money laundering and tax evasion.

3.2 Full private provision

The other extreme would be to restrict the role of the BR to the regulation of a purely private provision of retail electronic payments. Given the importance of scale economies and network externalities in this domain, it is very likely that the private incumbent (ACH Colombia) would remain the sole provider of interbank settlements.

History shows that the regulation of private monopolies is very difficult, because of asymmetries of information and lobbying power. There is an additional difficulty in the case of payments, given the unique ability of the central bank to provide interbank settlements without introducing liquidity or credit risks.

3.3 Mixed Duopoly: a balance between public provision and regulation

In economic sectors confronted with economies of scale, scope or network externalities, public provision is a standard practice, as a complement to public regulation and supervision. For example, in the health sector, private clinics compete with public hospitals. In the education sector, private schools compete with public schools.

This is also true in the payment industry. In many countries, Large Value Interbank Payments are provided by a mixed duopoly, involving a public firm and a private firm. This is the case in Colombia with CENIT and its private counterpart ACH Colombia. This is also true in many other countries. In the Eurozone for example, TARGET (run by the ECB) competes with EURO1 (run by the Euro Banking Association). In the US, Fedwire is run by the New York Fed, whereas CHIPS is run by private banks. The Fed announced in 2018 that it would develop a future fast payment platform, FedNow, as a competitor to RTP, the private RTGS launched by the Clearing House.

As we already discussed, any payment system is characterized by a large fixed cost and a small marginal cost. This cost structure could justify a public monopoly, managed according to the principles of second best economics, essentially Ramsey pricing. However, a monopoly, even public, does not have the correct dynamic incentives for innovating and improving the quality and scope of services offered to the users. The presence of a private competitor is a way to stimulate innovation and maintain an appropriate quality and scope of services at minimum cost.

Cremer et al. (1989) show that a (second best) optimal situation can be implemented by a mixed duopoly where the private firm maximizes its profit and the public firm is instructed to maximize social surplus. Holthausen and Rochet (2002) characterize the efficient pricing rule for a public payment system confronted with a private competitor. Socially efficient pricing is characterized by a fixed fee and a marginal fee involving quantity discounts.

4. IMPLEMENTATION OF A PUBLIC PAYMENT POLICY IN COLOMBIA

4.1. The perimeter of payment policy

A fundamental question is which firms have to be subject to the public policy for payments. My answer is simple: all the institutions that participate in the payment system should be regulated. This includes:

- Commercial banks, who are already subject to prudential regulation for their credit and deposit activities.
- Payment service providers, who should be more lightly regulated than banks, because they do not create money.
- Infrastructures, including the ones managed by the Central Bank.

There could be a tension here since the Banco de la República is both an agent and a principal. We show below how to solve this potential tension.

What to do with non-banks if they start issuing private monies? My view is very simple: there is only one legal tender in Colombia, namely the Colombian peso. Other forms of money such as foreign currency or private monies are unlawful. Some private sector agents, such as banks and Payment Service Providers, receive a license for issuing pesos and or managing deposits in pesos but they have to be authorized and supervised⁹.

4.2 Who should implement the payment policy?

We suggest the following guidelines:

- There is a need for a clear legal framework (a law on payments) that unambiguously defines the roles of the different public institutions in the regulation and supervision of payment activities.

⁹ Banks are also regulated and supervised for prudential reasons.

- It seems natural to give all regulatory powers to the BR bank, who has the exclusive control of the legal tender in Colombia.
- Supervision should be performed by existing supervisory authorities. Given that the legal frontier between banks and non-banks is complex and moving, the BR should be given the possibility to assign new players or issues to one supervisor or the other.
- A Consultative Committee on Payments should be created, comprising representatives from the BR and other relevant parties. The role of the Consultative Committee on Payments would be to coordinate decisions made by the different institutions and resolve potential conflicts of interest.
- The BR would be in charge of producing all the data and the models that are needed for assessing the fulfillment of the objectives of Payment Policy. The BR would also have to produce the cost and benefit analyses needed by the Consultative Committee on Payments.

4.3 Public Provision and Regulation

We have already mentioned the benefits of public provision of fast payments. ACH CENIT could be opened to retail payments, allowing individuals and businesses to transfer payment almost instantly at minimum cost. We also argued in favor of allowing the private sector to compete with the public sector by offering similar services, because this would stimulate innovation and the supply of better and broader services. The difficulty is the possibility of conflicts of interest for the BR, who would be simultaneously in a position of regulator and regulated provider of payment services. This risk could be eliminated as follows:

- The law on payments should specifically prevent the BR from any predatory behavior against its private competitor(s). This could be obtained in particular by requiring full cost recovery for CENIT, and complete interoperability between CENIT and its private competitor(s)¹⁰.
- The law on payments should enable the BR to establish independent institutions so that it can define the most transparent governance schemes for the public provision of payment services. Public providers would be overseen by the Board of the BR (JDDBR) who would be specifically in charge of guaranteeing a level playing field between such providers and their private competitor(s).
- Finally, the Consultative Committee on Payments would have the possibility of making recommendations in order to resolve potential conflicts between private and public providers.

¹⁰ In the US, there has been a vivid debate after the FED decided to offer its FEDNOW solution. Three important criteria have been used to justify the public provision of a service that was already offered by RTP, a private operator. These criteria are: other providers cannot offer the same quality of service as the FED; clear social benefits can be obtained by public provision; finally, full cost recovery of FEDNOW will be guaranteed.

5. CONCLUSION

This report provides a conceptual framework for assessing the payments ecosystem of Colombia. The objective is to evaluate the pros and cons of different combinations of regulation and public provision of payment services.

The industry for payment services exhibits economies of scale, economies of scope, network externalities, platform externalities, and has an impact on important public policy considerations such as financial inclusion. For all these reasons, free market competition does not spontaneously bring social efficiency and some form of public intervention is warranted.

The objectives of the public policy on payments should be:

- Guarantee the access of all potential users (households and businesses) to an efficient, safe and cost-effective payment system.
- Guarantee the continuity of the payment services to the users.
- Protect users against fraud, counterfeit and unapproved use of their private data.
- Stimulate innovation and encourage the development of complementary services.

Some Bigtech companies have entered (or are seriously considering entering) the payment industry. This poses a potential threat to sovereignty and has encouraged several central banks to envisage offering central bank digital currencies (CBDCs), i.e. providing access to central bank reserves to the public.

But a CBDC would have important drawbacks. It would require the central bank to keep a running record of all payment data, which would be far more costly than the management of physical cash. Moreover, it would pose significant legal questions, such as privacy. Would the anonymity of transactions be preserved, as it is the case currently with cash? This seems incompatible with other public policy objectives, such as the fight against terrorism, money laundering and tax evasion.

There exist public sector alternatives to CBDC, such as encouraging (and possibly subsidizing) access of all the population to bank accounts and providing a public platform for fast and efficient transfers between these bank accounts. There are many projects of such central-banks providing fast payment solutions: NPP in Australia, TIPS in the EU, SPEI in Mexico, FAST in Singapore, FPS in the UK, and FedNow in the US.

A mixed duopoly (or oligopoly) seems to be the most efficient industry structure for fast payments. A monopoly, even public, does not have the correct dynamic incentives for innovating and improving the quality and scope of services offered to the users. The presence of one or several private competitors is a way to stimulate innovation, maintain an appropriate quality and scope of services at minimum cost.

The two main reasons for public intervention on payments in Colombia are the following:

- Payments services are a network good that is vital for a proper functioning of a modern economy.

- The BR is effectively a monopoly for the issuance and management of the Colombian peso, the sole legal tender in Colombia.

There is a need for a clear legal framework (a law on payments) that unambiguously defines the roles of the different public institutions in the regulation and supervision of payment activities. The BR should receive all regulatory powers, because it has the exclusive control of the legal tender in Colombia. Supervision should be performed by existing supervisory authorities. A Consultative Committee on Payments should be created, comprising representatives from the BR and other relevant parties. The role of the Consultative Committee on Payments would be to coordinate decisions made by the different institutions and resolve potential conflicts of interest.

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