

Financial Inclusion

Peru Model for Financial Inclusion: E-Money Potential Adopters

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Abstract

This paper presents a quantitative approach to the potential demand of formal financial services offered from the unique platform launched under the name of Peru Model (Modelo Perú) for financial inclusion. It is based on the creation of an ecosystem for mobile financial services that rely on electronic money. The aim is twofold. First, to extend access to formal financial system to most of the population. Second, to minimize the perceived barriers to financial inclusion: distance, fees, documents required, security and trust. We quantify the number of potential customers of electronic money and divide them into three categories: Early Adopters, Majority Adopters and Late Adopters.

1. Introduction

Financial inclusion is a topic of great concern in developing countries. The low usage rates of formal financial services generates inefficiencies in the way individuals manage their finance such as high interest rates from informal lenders, high risk and insecurity of saving at home and the long distances and extended waiting time when it comes to making payments. This situation makes people vulnerable to shocks and also reduces labour productivity since, the time required and the costs involved in dealing with simple financial transactions are both very demanding.

This paper aims to assess the joint impact of three factors: technology, regulation and bank accounts, to promote financial inclusion. Using the Bayes' methodology, we calculate the potential demand for the basic digital financial services provided by the financial industry through a unique platform.

In the last few years, technology and regulation have made possible to create new and more efficient means of interaction between formal financial systems and their customers, which are both economically viable for the suppliers and accessible for the customers (i.e. affordable prices and more convenient in terms of proximity). These advances play a central role in bridging the financial inclusion gap because they not only extend access but also incorporate new services in order to eliminate involuntary barriers, such as cost of formal financial services, lack of documentation, distance and trust. On the one hand, regulatory process has been adapted to accounts for risk-proportionality while keeping risk-prevention compliant with the AML (Anti-Money Laundering) and KYC (Know Your Customer) principles. It enables financial industry to create basic services which are suitable for the needs of low income people. On the other hand, technological innovation makes real digital delivery of financial services to reach a mass of population in an efficient manner.

In 2012 Peru approved the Electronic Money law that regulates the electronic-money (e-money) market in many the aspects¹. E-money is typically defined as a type of 'stored value' instrument or product that is issued on receipt of funds and consists of electronically recorded value stored on a device (i.e., a computer system, mobile phone, prepaid card, or chip). E-money is convertible into cash and is accepted as a means of payment by parties other than the issuer.

This new way of operating digitally is considered to be one of the cornerstones of what we know as the Peru Model. The Peru Model, jointly created by the finance industry (ASBANC, the Peruvian Bank Association),

1: See Sánchez and Tuesta (2013) for an analysis of Peru's Electronic Money law.

microfinance institutions and credit cooperatives), the government and telecommunications firms, is an ecosystem of mobile payments based on electronic money, which aims to convert this means of payment into a mainstream option in Peru. Financial institutions and telecommunications firms create the infrastructure and above them is the government, in a regulatory and supervisory capacity. On the other side, there are consumers who need to use not only a mobile phone but also a bank account. A basic mobile phone, with no need for a mobile data tariff, is the new entry point for Peruvians into the formal financial system. Simply by keying in a code, the consumer will be able to access a wide range of financial services, such as cash-in/cash-out, paying for purchases, making transfers, taking out micro-insurance policies, making deposits, paying invoices, etc. According to GSMA 80% of Peruvian adults have a mobile phone² and yet only 29% have an account in the formal financial system (Global Findex, 2015, World Bank). The Peru Model project endeavours to promote the use of this new channel for using formal financial services by making financial services more accessible and attractive, particularly for vulnerable demographic groups. The innovation is twofold: in the access channel and in the product's quality. Its success depends to a large degree on the positive network externalities that are generated.

The rest of the document is organized as follows. Section 2 describes network externalities of the unique platform. Section 3 analyses the potential demand (adoption) of the formal financial services under the Peru Model implementation. Section 4 concludes.

2. The Peru Model

Network Externalities and the Single Platform

The success of the unique platform, Peru Model, depends to a large extent on large-scale use of electronic money and thus being able to maximize the resulting economies of scale. We refer to these as network externalities. Positive network externalities exist when the utility resulting from using a product increases with the number of people who use it. In other words, each additional user confers an extra benefit to the existing ones. The theory of network externalities has been used to explain value creation in the network economy (Economides, 1996; Shapiro and Varian, 1999; Liebowitz, 2002; among others). The direct benefits derive from interaction between users, while the indirect ones derive from the producers, who are motivated by economies of scale to develop new goods and services that are compatible with this technology.

In the financial context, the theory of network externalities has been applied in the study of mobile banking (Gowrisankaran and Stavins, 2004), ATM networks (Kauffman and Wang, 2002) and clearing and settlement houses (Ackerberg and Gowrisankaran, 2003). The results obtained by Kauffman and Wang (2002) show that banks which share their ATM networks enjoy additional benefits from the growth of their own individual networks. As such, the benefit of sharing a single platform, as in the case of the Peru Model, will enable both financial and telecoms firms to obtain further gains as a result of this larger network that guarantees interoperability. For instance, in the case of electronic payments, as more consumers use the same payment system, more merchants will accept it, and viceversa. In turn, the utility for consumers grows, since the payment system will become more practical.

The Peru Model includes three characteristics such as standardization, interoperability and compatibility which are essential for the generation of network externalities. There is interaction between these three characteristics in the sense that standardization increases compatibility and this in turn increases network externalities, creating greater value for users, which leads to the network growing through combining preexisting networks. An other advantage of standardization is the reduction in the costs of coordination and search to the users. Finally, Tirole (1988) argues that standardization prevents what is known as excess

2: This figure is corrected for people owning several SIM cards. The number of SIMs per subscriber is 1.9. The 2014 National Household Survey show that 84.9% of the households have a mobile phone.

inertia, which occurs when users have to choose between several technologies, thus delaying the adoption of any one.

Expectations for Financial Inclusion

The initiative tries to palliate many of perceived obstacles to financial inclusion³. First, although considerable progress has been made in terms of distance to avoid people making long journeys to cash their wages, send remittances or make a deposit, there are still many people without access to formal financial system. The Global Findex database (2015) shows that for 24% of the non-banked the distance is a problem and 36% of these unbanked who perceive distance as a barrier for financial inclusion are concentrated in the lowest income quintile. Also, the percentage of women giving this reason is higher than in the case of men, 28%, compared to 18.7%. Access to formal financial services through mobile phone aims to complement the actual network of banking agents throughout the country and then, to include rural and remote areas and vulnerable groups with more restricted mobility. Second, over 55% of the total number who are excluded state that they do not have an account because fees are too high⁴. This is most likely to be the reason for the appearance of another figure, that of the indirect user (someone using a family member's account); this is the route taken by 11% of the total excluded. However, the banking service fees paid by users, under the Peru Model implementation, are likely to be minimal or even nil. The pricing policy will be decided by banks depending on their own strategies.

Competition between banks to win this new customer base as it joins the electronic payment systems market could drive down prices for the consumer. Thirdly, the paperwork necessary to operate the Peru Model will also be very limited. Electronic money operations can be carried out with a personal identification number and a telephone number; with these it will be possible to open one of these simplified accounts which will permit operations with limited sums of money (a maximum of PEN2,000 a year, equivalent to approximately USD700). The latest estimates, for 2015, show that 16% of the adult population without a bank account say that lack of necessary documents is the reason for being financially excluded. Finally, in terms of security, this system has major advantages over cash. It eliminates the risk of theft, since the money is in an account which is accessed via a personal operations key, and not in the mobile handset. Furthermore, none of the operations carried out leaves a trace in the telephone. Closely-related to concept of security is lack of trust in the financial system. 37% of excluded individuals, a percentage which grows as the income level rises, state that lack of trust prevents them from using formal financial services. The underlying causes for this are related to the Peruvian historical background that includes episodes of hyperinflation and recent banking crisis together with a weak financial consumer protection. In the new scenario, customers do not necessarily need to visit a bank branch to deal with their finances because it is possible to conduct basic financial operations in establishments that they already use on a regular basis (supermarkets, gas stations, pharmacies, etc.). This may be beneficial for customers who are not confident at dealing with banks.

3: While lack of participation in the system could be due to voluntary exclusion, we are interested in the involuntary reasons that point to market failures as the main reason for not using formal financial services. Asbanc estimates that by 2019 at least 5 million Peruvians who are currently excluded from the formal banking system will be using this mobile banking system.

4 It is interesting to note that most of the individuals who perceive the high cost of services as a barrier (59%) are in the fourth income quintile.

3. Adoption of Formal Financial Services: a Quantitative Approach

This section carries out an empirical approach to the potential demand. Given the behavioural evidence, we try to analyse the expected adoption path of the new formal financial services by quantifying the number of potential adopters. A simple way of calculating the approximate number of potential users of electronic money, and classify them, is to apply the Bayes' Theorem. This is a simple mathematical formula used for calculating conditional probabilities and according to these conditional probabilities, we classify the adults in three groups: Early Adopters, Majority Adopters and Late Adopters. We can quantify the number of people in each group and compare their evolution over time by calculating the conditional probabilities.

The probability of a hypothesis H conditional on a given body of data D is the ratio of the unconditional probability of the conjunction of the hypothesis with the data to the unconditional probability of the data alone and it can be expressed as follows:

$$P(H|D) = \frac{P(D \cap H)P(H)}{P(D)} \quad (1)$$

Equation (1) shows clearly that the chance of having a bank account, (H), given that the individual has a mobile phone, (D), can be expressed as a function of the probability of the individual having a mobile phone given that he/she has a bank account. The left hand side of equation (1) is called the posterior probability, $P(H)$ is called the prior probability, and $P(D)$ is the probability of D whether H is true or not.

This first conditional probability $P(H|D)$, (Eq. (1)), is associated with the group of Early Adopters. Since we have no joint information referring to mobile phones and bank accounts for the same individual, we assume that individuals who have a bank account also have a mobile phone. According to GSMA (Groupe Speciale Mobile Association) the mobile phone penetration in Peru is high and most of the phones (92% in 2014) are active. This number of people who have a mobile phone have increased in the last few years, from 72% in 2011 to 78% in 2014. However, the Global Findex show that percentage of people using formal financial services, although increasing (8 percentage points in the last three years) is much lower, at 29% in 2014. Early Adopters are individuals with both a bank account and a mobile phone. The characteristics of this group mean that its members are the most likely to become e-money users from the outset. Figure 1 shows that the potential users and their distribution across the three groups. The group of Early Adopters, which are that which starts building the network, has increased dramatically, from 3.9 million people in 2011 to 5.7 million in 2014.

The second group, Majority Adopters, is extremely interesting in terms of financial inclusion because it includes individuals who have a mobile phone but do not have a bank account. It can be represented by Equation (2):

$$P(\bar{H}|D) = 1 - \frac{P(D \cap H)P(H)}{P(D)} \quad (2)$$

Figure 1 illustrates that the target group in terms of financial inclusion is the most numerous and has remains relatively steady in the last three years, around 10 million people. What is particularly interesting about this group is that as individuals they are accustomed to using a mobile handset and, thus, accessing formal financial services using this new channel can bring them out of their present state of financial exclusion. We would expect this group to start using electronic money very shortly after the first group.

Finally, the third group, Late Adopters, includes adults who have neither a mobile phone nor a bank account. These individuals probably have the least likelihood of using the new financial services. In terms of conditional probability, they are represented as follow:

$$P(\bar{H}\bar{D}) = Total\ Adults - (P(H\setminus D) + P(\bar{H}\setminus D)) \quad (3)$$

The number of Late Adopters decreased by around 1 million during 2011-2014, to 4.2 million (Figure 1). Setting up the mobile banking system could increase this group's interest in acquiring a mobile phone and thus being able to access the formal financial system easily and cheaply, using network externalities. This group would begin to sign up as increasing numbers of the second group did, and this would be expected to take place at a later stage, as a consequence of the increasing use of e-money.

4. Conclusions

The Peru Model is a single platform where financial institutions, telecommunications companies and customers interact, in an innovative fashion. It aims to make a meaningful contribution to expanding financial inclusion, with several million Peruvians, who as of today are excluded from the formal financial system because of market failures, starting to use the formal system. Financial exclusion, understood as a problem of social exclusion, affects a very high percentage of the population of Peru (more than 70% of the adult population) and of the developing world in general.

Using the Bayes' Theorem, we calculate the potential demand for the basic digital financial services provided by the financial industry through a unique platform. We identify three groups of individuals by the ease with which they can be expected to start using the new banking services and the moment at which they can be expected to do so: Early Adopters, Majority Adopters and Late Adopters. The target group in terms of financial inclusion, Majority Adopters, is the most numerous and has remained relatively steady in the last three years, around 10 million people in 2014. However, the group of Early Adopters, which is going to start building the network, has increased dramatically, from 3.9 million people in 2011 to 5.7 million in 2014. Finally the number of Late Adopters decreases by around 1 million in the same period, to 4.2 million. These figures try to map an idea of what impact the mobile payment system could have. An analysis of other scenarios could be considered if the assumption that everyone with a bank account has a mobile phone were relaxed. The interaction between standardization, interoperability and compatibility is crucial for the success of the Peru Model, as it is for any network. However, along with the potential benefits (i.e. easier access, lower costs, product diversification beyond simple money transfer and payment services) may appear some risks such as opaque terms and conditions, agent misconduct or fraud that can harm customers and reduce their trust and usage of the new services. Better understanding and managing these risks can help to promote customer well-being through progressive financial inclusion.

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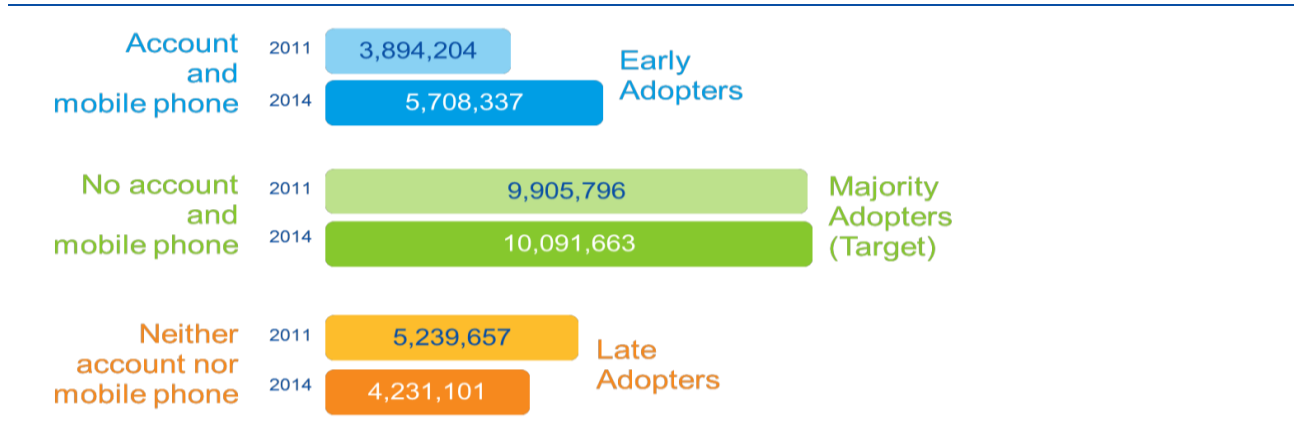
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Figure 1
Potential users of Peru Model. Number of adults (+15 years)



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