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Title

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Permalink

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Publication Date

2012-12-01

Copyright Information

Peer reviewed

Financial inclusion through m-banking systems: the case of Uruguay

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December 2012

1. Introduction

The low outreach of financial services in many developing countries is considered one major hindrance for growth. The inability to afford the high transaction costs involved is at the root of the self-exclusion of a large proportion of households and small firms. Their lack of collateral and of a credit history render them too risky for suppliers while the penetration of isolated areas without the necessary infrastructure poses additional costs (Beck *et al*., 2007).

Economic gains driven by the financial inclusion of these sub-populations would originate, for a start, in its associated increase in consumption levels (due to the access to credit of poor households members) and in investment rates (given the availability of additional funds and the improved framework for business). Furthermore, the access to credit of Micro, Small and Medium Enterprises (MSMEs), that are not only the largest proportion of firms but also one main source of employment for individuals at the bottom of the income distribution, would promote grassroots economic growth and equitable development and would result in social welfare benefits through the reduction of the informal economy.

Institutions aimed at attending low income individuals within emerging economies first appear in the 1970s. Mainly organized as saving and lending cooperatives, they are considered the origin of the modern microfinance industry. Although the industry has come a long way since the 1970s, it is still unable to reach most MSMEs as well as the poorest households, especially those living at isolated communities or rural areas. Its degree of development is far from being homogeneous among and within regions. In Latin America, for example, it was only a decade ago that banking institutions started a downscaling process in their loan portfolios redirecting their efforts towards providing microfinance services, so that there still is an untapped market for microcredit in most countries in the region (Navajas and Tejerina, 2007).

Latin American countries have a divergent performance with respect to other emerging economies that may be partially explained by some specificities of their markets, such as: (i) the high proportion of informal or semi-formal economic agents that interact, instead of operating in parallel, with formal agents; (ii) the low level of integration of informal firms in value chains; and (iii) the wide productivity gap observed between most MSMEs and the few firms that exhibit the largest market shares (Llisterri and García-Alba, 2009).

All three dimensions point at the lack of access to credit being the major restriction that prevents MSMEs from attaining the efficiency levels that would enable their full integration into the formal grid of the economy and their participation in networks with both public and private organizations. Since traditional financial agents cannot provide these groups with cheap and easy access to capital at the expected rate of profits, their financial inclusion may only be granted through the development of heterodox monetary systems that rely on distinct premises.

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One such innovative system is the so-called 'mobile-banking', due to its substantially reduced inherent costs and to the widespread use of mobile phones among the low-income population. The highly successful experiences of countries in Africa and Asia that followed the 2007pioneer introduction of mobile-money in Kenya, in turn, strongly support the argument.

Microfinance in Uruguay has not yet taken off as a way of really providing access to both the highly unbanked households within low income-strata and to MSMEs. Its development level is among the lowest in South America, ranked with a score that is only above those of Argentina and Venezuela (EIU Microscope 2011 Microfinance Ranking). The prevailing regulatory framework is generally blamed for such underperformance, despite there is no empirical evidence up to date that allows to discard other equally relevant sources linked to the behavior of individuals and economic agents.

We here start filling this gap by analyzing the decision process that underlies the demand of financial services of these sub-populations. We also explore the feasibility of introducing mobile-money systems in the country, both from the supply and demand sides, and thus identify some of the challenges that have to be foreseen and overcome.

We carry out a survey to collect the primary data that are necessary to perform the analysis, since no information exists to date on the subject. The target population is restricted to households at the capital city and its suburbs - the Great Montevideo - where around 50% of the country's total population is located (40% at Montevideo and 10% at its metropolitan area). The results obtained may be however considered as representative for households in urban centers with 10.000 or more inhabitants (including all capital cities of the remaining 18 'departments'), that account for approximately another 25% of the population.[1] In contrast, our findings should be taken only as indicative of actual patterns within rural areas and small villages, where the behavioral characteristics of individuals are not consistent with the specification of the model. Similarly, the representativeness of the sub-sample of MSMEs cannot be granted given the selection process of sample units. Nevertheless, in order to explore if there are behavioral differences depending on the respondent's occupation, self-employed workers are asked to answer to several questions as both family members and micro-entrepreneurs.

The next section is devoted to briefly summarize the current debate on m-banking systems and the main lessons set forth by the existing experiences. We afterwards describe some stylized facts for Uruguay that are relevant for the analysis of the feasibility of introducing m-money in the country. Based on such characterization, in Section 4 we specify a statistical model to reflect their eventual impact on the potential demand of m-money. We include a description of the methodological strategy used to gather the necessary data - the delimitation of the target population; the sample design; the questionnaire used; and the obstacles faced in collecting the data – and analyze the information in detail. The definition of the variables included in the model and the results obtained are summarized in Section 5 while conclusions are drawn in the final section.

2. Mobile-money: principles and experiences

No matter the degree of development or the size of an economy, there are always a proportion of individuals and productive units that are (self) excluded from the formal financial system. The most frequent reasons for self-exclusion are linked to the high transaction and operational costs and/or to the binding pre-requisites that have to be fulfilled. The enlarged risks faced and

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[1] According to preliminary data of the 2011-Census and to the toponimical work previously performed (INE, 2010a; 2012).

the lack of the necessary infrastructure is in turn the major deterrence for traditional suppliers. Consequently, households within the lowest income-strata and MSMEs constitute the bulk of the excluded population and the degree of exclusion is substantially higher among emerging relative to developed countries.

The role played by financial inclusion as a major driver of poverty reduction is currently not under debate (Mas, 2010; and the references therein). The lack of access to credit and the scarce, if not nil, saving possibilities of most individuals within the lowest income-strata, as well as for the majority of MSMEs, constitute insurmountable barriers to enter a virtuous circle of growth and development. While investment in workers' qualification and new technologies is one crucial requisite for MSMEs to successfully compete in global markets, human capital investment is a necessary condition for social mobility among members of the poorest households. Moreover, these groups are most vulnerable when faced with unexpected negative shocks of diverse nature – economic; environmental; health-related - due to their inability to keep a monetary fund to sort out contingent events.

Given that the financial inclusion of the low-income population would promote the substitution of informal by formal financial agents and hence attract investors in the medium-term, it is expected to act as an additional trigger of both local and countrywide growth. In offering access to credit and an easy means for saving, the system is expected to increase the efficiency of these sub-populations' economic activities and hence of the overall market (a discussion on the effects of social exclusion on growth can be found, e.g., in Jenkins, 2008; and in Bourdeau de Fontenay and Beltran, 2008). The enlarged availability of credit would create incentives for individuals towards formality (Catao *et al*., 2009) that, in turn, would allow for microcredit fostering policies to be coupled with an increase in loan conditionality.

Yet, a commercially feasible system would attain a universal character only if its costs are set at a minimum, a condition that branch-based banking does not fully accomplish. Hence, the identification of alternative mechanisms that may better suit the purpose has become the focus of a growing but still scant literature that has nevertheless brought forth relevant insights.

The provision of services on behalf of banks by local stores, such as deposits and withdrawals (generally known as a 'banking-beyond-branches' arrangement) has proven successful in enlarging the banking network by enabling the access of otherwise unreachable markets (Ivatury and Mas, 2008). The increased efficiency of cash-in/cash-out services; the substantial cost reductions of low-value transactions; and the nil physical rollout costs associated to branchless-banking are at the root of such improved performance.

The observed formalization driven by branchless-banking in Brazil along the last years is one example of these impacts (Mas, 2009). Still, the evidence also suggests that its ability to reach the unbanked is yet insufficient. For example, only 5% of all branchless-banking users in Brazil were previously unbanked, while in Colombia the outreach of the poor segments through bank-beyond-branches operators is also minor, as suggested by the substantially large-sized value of most transactions (Ivatury and Mas, 2008).

On the opposite, the reduced costs inherent to mobile banking systems and the extremely widespread and still increasing access to mobile telephones among these sub-populations render its introduction most attractive. Its likely social and economic benefits have been recently compared to those stemming from the access of low-income sub-populations to information and social networks through the use of mobile telephony and ICTs (Thompson and Garbacz, 2007; Paragas, 2005; Jensen, 2007; among others). The system has successfully served

to penetrate developing countries' markets in which other payment and cash-transfer possibilities did not exist, as shown by the results in Kenya through the system initially called M-PESA that reached over 8.5 million customers only after 2 years of its introduction, most of which were members of households within the lowest income-strata (Safaricom, 2009).[2]

The concept in a nutshell refers to the provision of/access to banking products and services through mobile tools – telephones and computers – and the association of mobile-phone numbers and/or electronic accounts to virtual personal accounts. Once the user physically deposits her/his money, payments and cash transfers may be materialized virtually through these devices without any additional transaction cost and irrespective of the location of the agents involved. Deposits made in person are done through pre-existent non-banking agents, so that the financial supplier does not need to invest in infrastructure to create a physical network. By offering all the products/services traditionally provided by banks at substantially lower costs and with minor eligibility conditions, the system is intended to penetrate markets that are neglected by traditional financial agents. Generally at a second stage, low-cost saving and lending services are also provided through the same mechanisms.

Although experiences in Asia and Africa seem to be taking off, the impact of the use of m-money among the Latin American population can still be considered as rather modest. One underlying reason for such meager diffusion relates to the boundaries set by regulations. Mobile operators in Brazil, for example, face special licensing provisions that oblige issuers to deposit the funds received from customers at banks and to physically provide the required documentation. Similarly, regulations in Peru prevent agents to process account opening requests electronically, forcing users to go to a bank branch. Restrictions in Brazil and Colombia also stem from the setting of a minimum number of monthly transactions (Heyer and Mas, 2009).

The accumulated empirical evidence brings forth several lessons. First, the feasibility of the system critically relies on the fulfillment of some key pre-requisites. One necessary condition for enabling m-banking to reach the poorest households refers to the existence of a widespread *adoption of mobile-phones* within the target sub-population. Nevertheless, the availability of high *quality wireless connections* as well as the homogeneous access to mobile technologies along a country is also of paramount importance. Further, the adoption of high-tech innovations should not be disregarded in a second stage if the system is expected to have a long-lasting success (Moore and McKenna, 1999).

Similarly, the pre-existence of a large network of non-banking agents who act as intermediaries is essential to reduce *infrastructure* investment levels. *The regulatory and institutional frame* of financial activities should be revised prior to the implementation of the system in order not to restrain the participation of non-banking actors in the market.

Another crucial aspect refers to the *market penetration strategy* adopted. The optimum approach suggested by the stylized facts is the sequential launching of the system, both with respect to the services supplied and to the reaching of new segments. The initial offer has generally provided only with some basic services - money deposits and withdrawals; payroll management; money transfers – shortly followed by the reception and sending of remittances or the payment of personal and household utilities. The next phase has involved the access to credit and/or the use of m-money as cash within a network of retailers. Due to its higher

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[2] Extensive reviews of country-specific experiences can be found in Flores-Roux and Mariscal (2010) or in Mas and Ng'weno (2010) and references therein.

associated risks, the supply of these services is envisaged only after the market has attained a certain scale. Regarding the target population, the Kenyan experience strongly suggests to initially set the focus just on a specific sub-population of early adopters. Once potential users within this group are almost fully captured, they would ease the penetration of other segments of society. Further, passing on knowledge on how the system works has also significantly served to include illiterate and semi-illiterate populations in Kenya.

Even if the above-stated pre-conditions were granted, an economically feasible m-banking system has to overcome other obstacles that, according to Mas and Ng'weno (2010), may be classified in three categories: trust, scale and the chicken-and-egg-trap.

The *'trust barrier'* involves security dimensions but it also encompasses the resistance to change that characterizes most populations. The use of technologies linked to pre-existent structures and social systems is strongly recommended to sort out the latter. The support of the banking regulator in Kenya increased the overall certainty level and it is thus considered as one essential source at the root of its success (Heyer and Mas, 2009). Other security aspects relate to physical access to mobile-phones and their content by third parties, known to the user or not (as would be the case of employees of mobile companies), as well as software-related risks such as viruses or the cracking of authentication and data encryption (State Bank of Pakistan, 2007). The use of passwords and sophisticated protocols and the registration of all mobile-phone numbers and their owners' particulars are facets of utmost relevance that have to be granted at early stages. However, since most networks allow just for unilateral authentication protocols, the design of mechanisms that enable the reimbursement of transfers and payments sent to erroneous recipients is yet one unsolved matter (Ngugi *et al.*, 2010).

The *'scale effect'* refers to the size of the potential market and is possibly the largest challenge faced by m-banking suppliers. One key factor that provided the necessary incentives for the introduction of m-banking in Kenya is the large share of its population, much of which is located at remote places but yet with access to mobile technology, that is in need of a low-cost access to financial markets (Jack and Suri, 2011). There are other characteristics that would grant the necessary scale and that are indeed observed in Kenya, such as its large informal sector and the high levels of demand for remittances among the low-income population. The success of SMART m-banking in Philippines is in turn partially explained by its large urban population and widespread mobile network, together with the overwhelming use of text-messaging among the young literate low-income sub-population (Flores-Roux and Mariscal, 2010). In contrast, m-banking in Brazil, launched in 2007 by Oi Paggo (a subsidiary of the mobile company Oi), has not yet reached a maturity stage. The previously mentioned regulatory restrictions are considered to be at the root of its still insufficient scale (Flores-Roux and Mariscal, 2010).

The *'chicken-and-egg trap'* of attracting both users and stores simultaneously is closely related to the reach of a critical mass of transactions. It is thus seen as an unavoidable, though largely arduous task to undertake in order to render m-banking operative. The creation of an attractive outlet network with merchants and other agents, among which financial entities may be included, is thus a key factor. The success attained in Kenya has been linked to the aggressive marketing strategy displayed by the mobile operator agent – Safaricom – from the very beginning. The retail network was built around a strong brand linked to M-PESA aimed at developing a sense of belonging among customers and stores (Safaricom invested in training resellers and in providing with identifiers for stores within the network). Network members

further enjoyed specific pricing benefits that in turn acted as additional incentives for outsiders to join the system (Mas and Ng'weno, 2010).

A last issue that is worth to take into account refers to the role that m-banking may play in enhancing the level of savings among members of the poorest households and the identification of the mechanisms that would be optimal for the purpose. One might expect that costs will not be the only relevant aspect in the decision-making process to join a micro-saving program, as opposed to the major role that trustworthiness would play. Not surprisingly, most international experiences up to date have yet to address the subject, although there are several ongoing initiatives.

Based on the above discussion, we analyze in the next section the characteristics of Uruguay that may pose substantial barriers or else facilitate the successful introduction of m-money systems.

3. Stylized facts for Uruguay

3.1 Overall characterization

Uruguay ranks among the top three Latin American countries in terms of GDP *per* capita since 1980 and has had the lowest poverty and indigence rates at least since 2002 (Bárcena, 2011; ECLAC, 2010). The country has always been at the top of the regional ranking in terms of income distribution; alphabetization rates; and formality degrees of both production and labour (ECLAC, 2010; ILO, 2011). Nonetheless, sustained growth and economic development are yet to be reached. Given the small size of its market (both in terms of area and population), the country is highly dependent on the external demand. Thus, the insufficient ability of agents to introduce the technologies and innovations required to compete in world markets is considered at the root of the lack of dynamism of the economy. A major deterrence for firms to engage in knowledge accumulation activities relates to the highly volatile business framework that results from the country's vulnerability to external shocks that is further magnified by its geographical location (in-between the two South American giants – Argentina and Brazil).

The high average degree of risk-aversion that characterizes most Uruguayan firms is also closely linked to their reduced size (around 96% of firms employ less than 20 workers) and to the low proportion of them (25%) that are integrated in higher value chains and/or economic networks. Since they provide jobs to around 65% of the working population, an increased dynamism of the sector is vital to improve the distribution of income and to alleviate poverty through raises in employment levels.

Traditionally perceived as firms that do not count with enough credit collateral or economic scale to be attractive borrowers for financial institutions, most of MSMEs lack the necessary financial backup to sort out contingent events. Consequently, minor proportions have historically gained access to credit (around 0.5% of formal micro-firms in the 1990s, according to Christen, 2000), a pattern that has not changed substantially during the first half of the last decade.[3] By 2008, the number of micro-firms that do not make any use of banks was still extremely high (around 33%, as reported by the 'MSMEs Survey' performed by the National Institute of Statistics - INE) while the demand level of certain products among those that are bank clients is insufficient (only 40% had a current account associated to their business and less than 3% got access to loans).

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[3] The supply of credit to small businesses was only between 3.5% and 10% of the estimated demand (SIC-*Desarrollo*, 2006).

In parallel, the lack of investment in human capital that characterizes individuals at the bottom of the income distribution is a major barrier for increasing social welfare levels. Moreover, even if disposing of a monetary capital of their own, their exclusion from the banking system prevents them to increase the size of savings through financial activities. In fact, according to a recent report on the unbanked (BROU, 2011), they do have savings stored somewhere for emergencies. However, not only the practice is inconvenient due to the risk of loss or theft but also because for several purposes it is required that cash is held in a bank account (e.g., when it acts as a rental guarantee). Still, the costs of opening and maintaining bank accounts are one important aspect blocking their use while savings-accounts are not necessarily operational enough.

Some progress has been achieved in terms of the inclusion of the unbanked along the past two decades through the introduction of banking-beyond-branches systems. Indeed, cashiers located at bank branches but also at stores; gas-stations; and other non-banking agents' networks, have increasingly been disposable for making withdrawals and deposits. They have successively been used to allow for payrolls management – both by public and private agents – and for accessing social security benefits through cards. This aspect has implied the opening of savings and/or current-accounts at banks by employers or state agencies and has therefore served to include some of the unbanked sub-populations, such as the construction industry's workers; the elderly that receive a pension; and young individuals employed in the public sector.[4] In contrast, those living in the smallest and most isolated communities and/or in rural areas is still a most unattended sub-population even by banking-beyond-branches systems, while informal workers are by definition non-eligible as users.

The previously discussed characteristics of mobile-money render the system as a most likely means to speed up the financial inclusion of these sub-populations. The hypothesis has been recently acknowledged by the Uruguayan government and materialized in 2009 in its launching a joint initiative with the Social Trade Organisation (STRO) to introduce C3 – Commercial Credit Circuit – in Uruguay (C3U).

C3U is thought as a network where participants would make payments in the form of digital claims among each other *via* the Internet or through mobile-phones. Most of these claims will be brought into circulation in the form of credits for MSMEs and may be spent by any participant, including all government-owned companies such as ANCAP (gasoline, oil), ANTEL (telephone), UTE (electricity), the Tax Office and the Pension Fund (BPS) as well as their corresponding suppliers. The system will provide an innovative approach for public e-procurement since the government will be able to forward immediate claims on future payments to their suppliers (instead of paying after 3 to 6 months, as is often the case) who, in turn, will be able to use these claims to pay their own suppliers. These mechanisms will also allow MSMEs to reinforce their commercial capital liquidity and will promote the generation of linkages with other economic agents by putting together large public institutions and private MSMEs within the same financial transaction network. Immediate advantages include cheap mutual credit, increased sales, conservation of cash and the usage of excess production capacity.

Yet, a more in-depth understanding of the role that m-money may play in the improvement of welfare standards is needed in order that the system becomes operational. The characterization of the Uruguayan low-income sub-population is one crucial pre-requisite to attain such goal while it would also serve to identify the best channels through which m-banking

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[4] Whenever payments are done by the public sector, the accounts are open at the *Banco de la República Oriental del Uruguay* – BROU.

may be introduced in the country. A thorough diagnosis along the lines discussed in the previous section is thus a most necessary task that we here start to undertake.

3.2 The target population

A first dimension of interest relates to the geographical distribution of the target population. The evidence in this respect for 2010 shows that the incidence of poverty is not fully homogeneous across the country – 21.6% in Montevideo, 16.4%/23.8% in communities in the Interior over/below 5.000 inhabitants; and only 6.2% in rural areas (INE, 2010b). Even though no significant differences exist in terms of labor market participation rates among household-heads within the poor and non-poor sub-populations at urban centers (2pp), the gaps in terms of employment and informality rates are indeed large (9pp and 40pp, respectively). Differences in participation and employment rates between sub-populations within rural areas are, in turn, the largest (over 13pp and 20pp, respectively).

Further, the informality rate among poor households' members in Montevideo in 2010 was the lowest (57.4%), 17pp and 24pp below those registered, respectively, in urban centers in the rest of the country and in rural areas. These gaps are mainly explained by the more stringent controls that exist in the capital city, a fact that also explains the homogeneity in the rates for poor and non-poor household members in the Interior, where the share of self-employed workers has been historically larger than that in Montevideo.

The above stylized facts show that the target population is not only of distinct size by region but also with a divergent profile in terms of financial needs. They therefore suggest that market penetration strategies should have a heterogeneous design depending on the geographical region, at least at the very launching stage. Further, the high informality rate that characterizes the target population implies that the system's design should also encompass specific facets to reach these potential customers that are unnecessary in the case of formal laborers, such as the highly irregular income flows perceived and the fear to become identifiable by the Tax Office and other public institutions.

The relative incidence of the system's diverse features would also depend on the demographic characterization of the target population (e.g., in terms of gender and age). In urban areas, 30% of household members are under 15 but the share rises to 50% within households in the lowest income-strata. Similarly, while 15% of the overall population is 65 years or older, the percentage goes down to 5% among poor household members (own calculations based on INE, 2010b; 2011). Therefore, the already small scale of the potential demand would be further reduced if the system were focused just on low income-strata sub-populations, at least in the short-run.

The divergent typology of poor households by gender of the household-head is partially responsible for the enlarged share of young individuals among the poorest households. While those led by men (60%) are mostly of nuclear character, the bulk of households headed by women are either of an extended or single-parent nature. Thus, female household-heads should be regarded as one potential market of non-negligible size that should be targeted in a differentiated way. The well-known increased difficulties they face in terms of daily routines suggest that the ease of handling and the enhanced security derived from not carrying any cash would stand as major attractors, especially if m-money can also be used to pay at local stores and/or to get easy access to loans.

Given the unbanked are at least 45% of the total population (BROU, 2011), the targeting of individuals within other socio-economic levels from the outset seems to be a most

convenient strategy. Moreover, under a strict definition of unbanked agents – those not owning a bank account (Flores-Roux and Mariscal, 2010) – Uruguay only displays a meager 30% of financial penetration (BROU, 2011), a value well below those reported for other countries, such as Chile, Guatemala or Brazil (Kendall *et al.*, 2010), although similar to that prevailing in Argentina, Mexico and Peru (Flores-Roux and Mariscal, 2010).

3.3 The feasibility of mobile banking

The successful introduction of mobile money in Uruguay and the likelihood that it effectively allows for the financial inclusion of the unbanked rely on the fulfillment of certain essential conditions and on the ability of suppliers to overcome several obstacles.

Following the discussion summarized in Section 2, a high degree of *penetration of mobile technologies* among specific sub-populations and a sufficient *technical quality of wireless connectivity* are two necessary conditions for m-banking systems to reach the unbanked. Both pre-requisites are non-binding for Uruguay. The country stands as the Latin American pioneer in introducing instantaneous messages in mobile-phones and also in developing inclusion plans for the poorest that involve ICTs tools (*Plan Ceibal*).[5] Further, the public phone company recently invested in optical fiber technologies that are already available for nearly 30% of households.[6] Uruguay also leads the regional ranking of Internet users *per* inhabitant (0.48) followed by Chile (0.45), Panama (0.43) and Brazil (0.41), although it is still far below the international maximum (0.95) exhibited by Iceland (Ursec, 2011; UIT, 2011).

Three companies provide mobile-telephony in Uruguay. The public company –ANTEL – has the largest market share (45%), closely followed by *Movistar* (39%), as opposed to significantly smaller penetration of *Claro* (16%). The two private companies also operate in other countries in the region. Given that in some countries they are further involved in mobile-banking systems (e.g., Movistar in Argentina, Claro in Peru), Uruguay can benefit from their current accumulated experience (Mas and Ng'weno, 2010).

The country has surpassed the 100% mobile-phone penetration mark in 2008 according to the Global System for Mobile Communications Association, a remarkable fact for Uruguay given its small size and its rather reluctant start into mobile-phones more than a decade ago. Such increased growth has been partially driven by price competition but it is mostly the consequence of the ability of local mobile-phone companies, and in particular, of the public operator, to reach the poorest segments of the population, among which the use of mobile-phones has rocketed upwards in the past 5 years. Indeed, according to preliminary data from a survey on the usage of ICTs performed by the NIS in 2011, the penetration rate of mobile phones among members of the poorest households in Montevideo is 70%.

By 2011, Uruguay had 1.36 mobile-phones *per* inhabitant, 75% of which are pre-paid services. The country is third in the Latin American teledensity ranking, below Argentina (1.42) and Panama (1.85) and far above Brazil (1.04), although it is more than half-way compared to the world's leader Macao China (2.06). Services with access to Internet, in turn, have climbed up to near 587.131 if with a speed larger than 256 Kb/s and to 2.428.977 for those under that speed. The rate of usage during the first semester of 2011 measured in minutes reached the

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[5] The goal of the program is to grant the access to information and social networks to children from the poorest households through the provision of free basic notebooks furnished with an Internet wireless connection to students of public schools.

[6] The historical path followed by the public enterprise – ANTEL – can be found at its webpage - http://www.antel.com.uy/antel/institucional/nuestra-empresa/Resena-historica.

2.628 millions (a monthly average of 96 minutes *per* service) while text messages sent were 2.769 million (Ursec, 2011).

Regarding *infrastructure needs*, the solid payment retailer's network that involves two agents – *Abitab* and *RedPagos* – largely satisfies the already discussed necessary conditions for the system to become operational at a minimum cost. These agents have acted as reception points of payments of public and private services for more than a decade (*Abitab* since 1993 and *RedPagos* since 2005) and as reception and sending agents for remittances. Social security benefits and other payments from private providers are also part of the services supplied. They are further allowed to keep deposits from individuals for specific purposes, such as gathering money-donations for social and humanitarian events. These two networks are spread all around the country, reaching more than 700 spots. Their by now long-dated good reputation and trustworthiness thus render them a most convenient partner.

The current *legal framework* of financial activities does not foresee the participation of non-banking agents and it should hence be modified to incorporate some specific regulations prior to the launching of the system. The task is largely complex and lengthy given it encompasses multiple bargaining stances between policy-makers, political leaders, financial agents, bank-regulators and other economic agents that may eventually become network participants. The government's involvement in the design of C3U from the outset should ease and accelerate the process while several negotiations would be settled in advance due to the participation of the Planning and Budget Bureau (OPP), the National Bureau of Development (CND), the telephone public company and the Tax Office, among other key public actors.

The government's active role in the C3U-initiative further serves to readily overcome some major *trust barriers* given its explicit interest in granting money-traceability (to prevent money laundering), full transparency (for tax supervision) and purchasing power security (to avoid robbery). Regarding the eventual loss or theft of devices, a preventive rule put in practice on December 1st, 2011 allows for the automatic disabling of a physical device immediately after reporting its disappearance. Given the initiative was launched by the three mobile-phone operators, its effectiveness in terms of enhanced security is expected to be most adequate. On the other hand, tools that are more sophisticated need to be used in order to overcome the privacy and software-related dimensions of security.

The last two key aspects highlighted by Mas and Ng'weno (2010), *scale effect* and the *chicken-and-egg trap*, need to be jointly analyzed in the Uruguayan case since the economic feasibility of the system is largely jeopardized by the small-sized potential market inherent to a country with 3.3 million inhabitants. One means to grant a minimum amount of transactions that would avoid the collapse of the system would be to build an outlet network at the initial stage.

Although the accumulated evidence suggests that these networks are not to be created soon after the launching of the system, the barriers faced to accomplish the goal may be less restrictive in Uruguay due to the extensive linkages that MSMEs have with low-income strata households. Furthermore, the large concentration of poor households in specific neighborhoods of urban centers would also facilitate the early inclusion of a large subset of MSMEs and individuals in the same network.

The challenge posed by the insufficient scale of the potential demand may be alternatively addressed by displaying a *market penetration strategy* that partially postpones in time the full financial inclusion of some of the most vulnerable segments of the population. Young urban individuals within all income-strata are suggested as a convenient set of early

adopters. The country's large degree of urbanization, the high level of self-exclusion that characterizes youngsters and their extensive use of text-messaging would serve to maximize the number of initial users. Given the age-composition of the lower income-strata sub-population, the strategy would allow for reaching a non-negligible subset of the originally targeted population while younger users may act as most effective promoters of the system among low-income adults and MSMEs.

4. Empirical analysis

The decision to become an m-money user is here rationalized as dependent on the relative relevance that individuals assign to each of the above-discussed barriers and attractors, her/his eligibility status, the goals sought by getting access to financial services, her/his subjective views on the performance of banks and her/his attitude towards savings.

The overall level of potential demand is further allowed to differ across sub-populations of distinct characteristics associated to both the individual, the household and the environment. We therefore explore the role played by the individual's gender, age, education level, position at the household, frequency of income flows, labor market status and occupation. The household's profile is in turn accounted for by acknowledging for the number of members, the proportion of income-earners, the presence of children, the quality standard of the house and the availability of a set of utilitarian devices. Neighborhoods are classified according to the prevailing average typology of households there located.

Since no information on these features is available, we carried out a survey to collect the necessary primary data following the methodological steps below summarized.

4.1. The Survey: methodology and goals

The survey is aimed at gathering relevant information on the financial needs and eventual motivations and fears that money-holders from the poorest Uruguayan households would experience if faced with a mobile-money system. Therefore, we define the target population as that within the three lowest income-strata.

We set the focus on the poorest households at the capital city and its metropolitan area - the Great Montevideo. The analysis of the behavioral patterns that prevail in the rest of the country would imply the specification of a different statistical model in order to account for its demographic and economic specificities, a task that surpasses the scope of the current study. Nevertheless, the insights provided may be taken as quite indicative of the behavior to be expected in urban centers in the Interior with more than 10.000 inhabitants (the remaining departments' capital cities and 16 other urban communities). It is worth to note that, under the assumption that a sequential market-penetration strategy is indeed optimal as suggested by the accumulated evidence, our choice is in line with the Great Montevideo being the most sensible initial locus to penetrate the overall Uruguayan market.

The target population is further narrowed to that of households living in 28 of the 62 neighborhoods in the Great Montevideo that concentrate around 50% of the total population (of which 70% are older than 18 years) and 42% of all households (around 194.000) according to 2008 data (Llambí and Piñeyro, 2012).

The decision stems from the fact that the incidence of poverty is the highest within this sub-universe (30%) given that 85% of the households below the poverty line are there located (55.000, approximately that correspond to around 115.000 individuals over 18 years old) while less than 5% of households in each neighborhood belong to the highest income-stratum. Further

still, while the share of the sub-population of interest in the Great Montevideo is 68%, the incidence of the three lowest income strata within these neighborhoods raises to 95%. Therefore, although the inference in *strictu sensus* refers only to the 28 neighborhoods sub-population, the results can be taken as a most accurate reflection of the behavior of all low-income households at the capital city and its suburbs.

A two stages stratified sampling model is used to define a representative 400 units sample. At a first stage, a certain number of blocks are randomly chosen within each neighborhood to obtain at most five sample units by block. The quota of blocks is determined by the relative weight of each neighborhood in the total number of households within the 28-subset, as reported by the INE (2004 Census).

Since the sample units are individuals, a second stage of the sampling model involves the choice of one respondent among members of the selected household. In order to also grant individual-level representativeness, the sample distribution is defined so as to reflect the actual composition of the total sub-population by gender and three age-strata – 18 to 29; 30 to 64; and 65 and older – as reported in the 2004 Census. Consequently, the suitable expansors to be used afterwards to estimate the model controlling for sample design (Fazio *et al.*, 2008) are those defined by the INE.

The questionnaire includes a module that serves to characterize the individuals, their households and neighborhood. Some of these questions are aimed at evaluating the odds that the household itself acts as the first step of the contagion-process that is necessary for the system to be economically feasible. We also explore the eventual difficulties linked to the comprehension of these technologies by potential users and to the financial culture of respondents.

The financial behavior of individuals is accounted for by means of including variables that state if she/he has been a customer of banks and/or other financial agents in the past; if he/she has a credit card, differentiating among issuers; if he/she has a banking card to withdraw wages, social benefits and/or other payments; if he/she has (has had) access to loans from financial agents; if he/she knows how to open and handle a bank account; if he/she has (has had) a bank account and of what type – current/savings -; and his/her behavior related to savings (amount, frequency and where are savings kept).

Other hypothesized relevant factors for the financial (self) exclusion/inclusion of respondents refer to their lack of interest and/or willingness of becoming a bank client; the existence of barriers stemming from the type and/or level of their income; the role played by physical security-related features; the respondent's objective non-eligibility (he/she has been rejected by financial agents); the respondent's subjective non-eligibility (based on the personal belief or on non-financial agents' opinion); the costs of current/saving bank accounts and loans; and the degree of complexity of operating with banks.

In order to understand how far trust needs to be built for the system to work in Uruguay, a subset of questions is posed to capture how comfortable potential users will feel about doing cash deposits at non-banking institutions; about using their mobile-phone as the main instrument for their money transactions; and about having mobile-phone operators managing the system and hence as "trusted partners" for their savings. General trust-related barriers are proxied by the degree of confidence on financial agents (through direct and indirect questions) and on the existent payment-retailer networks (*Abitab* and *RedPagos*).

Another set of questions is used to explore the likelihood of observing herding effects that would boost the mobile-money phenomenon in Uruguay (and hence serve to reduce scale

effects). The identification of attractors and deterrents is done by means of inquiring about the reasons for self-exclusion; the attractiveness of the system in terms of costs and easiness; and the eventual use of m-banking to more safely save/handle cash.

Questions on the actual use of a payment-retailer spot serve to account for infrastructure needs while those on the respondent's and/or other family members ownership of a mobile phone are intended to capture the degree of mobile-telephony penetration. The degree of technology literacy is in turn proxied by the respondent and other family members' knowledge of text-messaging.

Obstacles linked to the *chicken-and-egg trap* are in turn identified by the degree of acceptance of the system; its ease of operation; and the trustworthiness of m-money. When the respondent owns a MSME, she/he is asked to answer both as a customer and as a micro-entrepreneur. Questions on how reluctant interviewees would be to make mobile-money a viable payment option for their shopping and own business are also included.

The survey was carried out through face-to-face interviews of 20 to 30 minutes duration, using a structured questionnaire with around 30 closed and eight open questions.[7] The adequacy of the questionnaire was tested for by means of performing a pilot survey or pre-test and some minor modifications were introduced regarding the grammatical structure of questions, particularly those for which scaled answers are required. A first quality check of the information gathered was done by supervising 10% of all the filled-in questionnaires.

The field work was most successful, as revealed by its rapid completion, the high standard attained in terms of response rate (97% out of 415 attempts) and the quality of answers. The final sample-size is 401. Female interviewees are 48% of sample units while the composition by age is such that 28% of respondents are under 30, 55% are between 30 and 64 years while the remaining 17% correspond to individuals over 65 years. The average frequency by neighborhood is, in turn, 3.5%.

As expected, the percentage of micro-entrepreneurs surveyed - 17% - is lower than their share in the overall population according to the INE (23%), which is in turn below that observed among poor households members. Therefore, the inference for this particular sub-group cannot be taken as fully representative of the patterns that prevail among poor micro-entrepreneurs in Montevideo.

4.2. Data description
We summarize the composition of the sample in terms of several relevant individual and household dimensions in Table 1 below.

In line with the already mentioned high education levels observed in Uruguay, even among those within the lowest income-strata, around 70% of respondents as well as of household-heads have completed secondary-level education or have incomplete college studies. There are no illiterates in the sample.

The informality rate, assimilated to the percentage of respondents that receive public health care, is 33%, a figure quite below the 57% incidence reported in 2010 for members of the poorest households (INE, 2010b). However, the bias is likely to be only apparent once noted that informality among household-heads has gone down 20% in 2011 according to official statistics while the lack of representativeness of the sample in terms of occupation-types may

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[7] The questionnaire is included in Appendix A.

also distort the calculations. In particular, even though 60% of self-employed respondents are not members of a Health Maintenance Organization (HMO) as granted by law, their under-representativeness in the sample is one major cause at the root of the result.

Table 1. Sample composition by individual and household characteristics

Characteristic	Number of cases	Percent
Education level		
Up to Primary School	102	28
Up to incomplete College education	243	68
College education	14	4
Health care coverage		
Public Hospital	134	33
Military/Police Hospital	25	6
HMO	241	60
Private Hospital	1	0
Main source of income		
Salary	168	42
Self-employed w/establishment	19	5
Self-employed w/o establishment	45	11
Retirement Social Security benefits	94	23
Family-aid	59	15
Unemployment benefits	5	1
Government-aid	6	2
Other	5	1
Household-head's education level		
Up to Primary School	110	28
Up to incomplete College education	264	65
College education	27	7
Household-head's health-care coverage		
Public Hospital	92	23
Military/Police Hospital	27	7
HMO	282	70
Total number of household members		
1	39	10
2 or 3	171	43
4	86	21
More than 4	105	26
Number of household members receiving an income		
1	118	30
2	180	45
3	59	14
More than 3	44	11
Children under 10 years		
None	60	15
1	282	70
2	34	8
More than 2	25	7
Share of household members receiving an income		
Up to 33%	64	16
40% to 65%	119	31
66% to 74%	134	33
75% to 100%	81	20

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

The household typology varies considerably. One-person households are 10% of the sample. The share of those with two or more children under 10 years is 15% while the proportion of households with four or more members is 25%. On the other hand, the proportion of households in which at least two out of three family-members receive an income is around 50% while in 20% of the cases the ratio increases to 3 out of 4 members. Comparing the share of the largest-sized households with that corresponding to families with two or more children under 10 years and with three or more members receiving an income, it is apparent that there are at least 10% of extended families within the sample. Consistent with the hypothesis, a large proportion of respondents (15%) receive some sort of monetary-aid from their family while almost a fourth receives retirement pensions.

In order to distinguish among households of distinct socio-economic characteristics we define a categorical variable that differentiates four strata – Low-low; Low; Medium-low/Medium; and Medium-high/High. The strata are delimited using the results obtained from a factor analysis performed over a set of environmental, household and individual features. The variables included in the analysis refer to the average socio-economic level of the neighborhood; the number of household members; the ratio of adults *per* children under 10; the percentage members that receive an income; household comfort-related factors (type of roof; number of members *per* bathroom; paid domestic-aid; fixed phone; washing machine; fridge; microwave; dishwasher; DVD; number of cars; number of personal computers; number of TV sets; TV subscription; and air-conditioner); the household-head's education level and health coverage; and some characteristics of the respondent (gender, age, education, health coverage and occupation).

We identify three significant factors that may be associated to: (i) degree of formality of the household-head and degree of comfort of the household (measured by a subset of the above items); (ii) demographic characteristics of the respondent and the availability of DVDs and PCs at home, two devices that might be linked to her/his age; and (iii) crowding degree of the household (as reflected in the number of household members, the incidence of children under 10 and of income-earners years, and the ratio of members *per* bathroom).[8]

As shown in Figure 1, the distribution of the sample according to these three principal components suggests that the higher levels of wages and the sustained economic prosperity experienced along the last years have been reflected in an increased consumption of non-basic goods (Factor 1) to a larger extent than in improved household conditions and living-standards (Factor 3).[9]

Figure 1. Distribution of the sample by three principal components
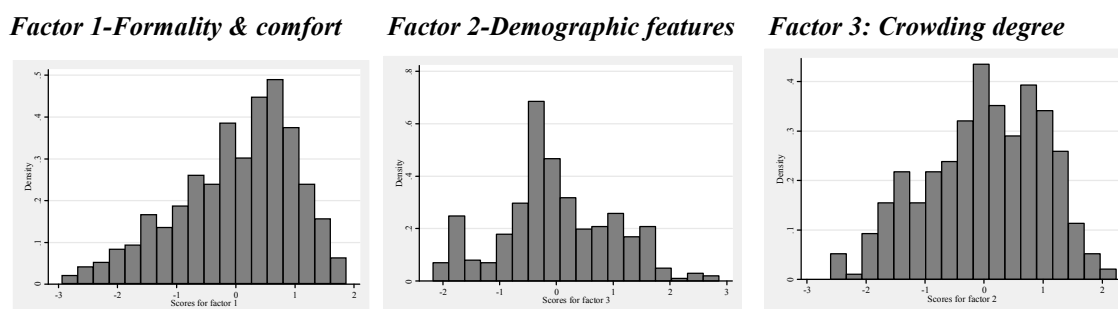
Factor 1-Formality & comfort   *Factor 2-Demographic features*   *Factor 3: Crowding degree*

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

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[8] See Appendix B.
[9] Indeed, the frequency of cases associated to a positive Factor 1 and a negative Factor 3 are 50% larger than that found for the inverse case, while the median values are 0.20 and 0.11 for Factors 1 and 3 respectively.

The four categories of the proposed socio-economic level indicator are defined in terms of the positive/negative values of the three factors (Table 2). The lowest/highest stratum gathers all cases for which the three factors are negative/positive. As a result, households at the top/bottom of the ranking are those for which formality levels are the lowest/highest and that exhibit a relatively better/worse standard in terms of comfort and living conditions. The bottom category further groups those cases for which education levels of both the respondent and the household-head are the lowest. The two categories in-between are differentiated by Factor 3, cases with a positive value being classified in the second highest stratum. It is worth to note that given the above-mentioned patterns of consumption and the consequent oversized weight of Factor 1, the top stratum is likely to include households of at least the three highest socio-economic levels.[10] Besides this fact, the distribution of households along the four categories (Table 2) is quite in line with the reported evidence (Llambí and Piñeyro, 2012).

Table 2. Sample composition by socio-economic level of the household

Stratum	Number of cases	Percentage
Low-low	91	22
Low	194	49
Medium-low	52	13
Medium-to- High	64	16

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/ IMTFI, 2012.

Actual users of financial services are defined as those that have a bank account, a banking or credit card issued by a formal financial agent and/or that have taken a loan from a formal financial agent (bank, cooperative of savings and lending services, etc.) in the last 2 years. Under such definition, the financial market participation rate of individuals living in the 28-neighborhoods area is 61% (see Table 3).

The rate is homogeneous by gender but it does vary according to age, the lowest proportion corresponding to those under 30 years. The large rate found for the elderly is in line with the fact that those receiving retirement pensions generally get access to it through banking cards. Similarly, the participation rate of salaried workers is twice that of self-employed laborers, no matter they have an establishment or not, while it increases with education levels and with the socio-economic ranking of the household (except in the case of the top category, scarcely below that of the precedent stratum).

Differences by individual and household characteristics are significantly reduced, and they at times vanish, when considering the potential demand of financial services instead. The overall gap between actual inclusion and potential demand for financial services (the excess demand) is 23 %. The largest excess demand corresponds to self-employed workers (37pp) for whom the potential demand is twice their actual inclusion rate; to members of the poorest households (35pp) and to the youngest individuals (33pp).

Compared to the 84% of individuals declaring their need and willingness of financial inclusion, the degree of acceptance of heterodox banking systems is low - 44% and 38% for branchless and m-banking, respectively. Further, the homogeneity observed among the diverse categories of individuals generally disappears when it comes to branchless and mobile banking potential users.

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[10] Indeed, if differentiating among cases associated to values smaller/larger than 1 for this factor, the top category would gather 8% of the sample units. Therefore, households within the highest stratum would actually belong to medium-high and high-low socio-economic strata.

Table 3. Financial services: demand by system and individual characteristics

Financial sector	Actual demand		Potential demand	
Total	61%	(2%)	84%	(2%)
Gender: M	60%	(4%)	84%	(3%)
Gender: F	62%	(3%)	84%	(3%)
Age: 18 to 29	48%	(5%)	81%	(4%)
Age: 30 to 64	68%	(3%)	85%	(2%)
Age: 65 & older	59%	(6%)	85%	(4%)
Up to Primary School	54%	(5%)	78%	(4%)
Up to incomplete College education	60%	(3%)	84%	(2%)
College education	93%	(7%)	100%	----
Self-employed with establishment	37%	(3%)	73%	(10%)
Self-employed w/o establishment	37%	(6%)	75%	(6%)
Salaried	76%	(3%)	90%	(2%)
Family assistance	44%	(6%)	69%	(6%)
Social Security retirement pension	67%	(5%)	89%	(3%)
Income Strata: Low-low	44%	(5%)	79%	(4%)
Income Strata: Low	58%	(4%)	83%	(3%)
Income Strata: Medium-low	82%	(5%)	90%	(4%)
Income Strata: Medium to High	77%	(5%)	86%	(4%)

Potential demand	Branchless banking		M- banking		M-banking & Retailer-network	
Total	44%	(3%)	38%	(2%)	33%	(2%)
Gender: M	42%	(4%)	34%	(3%)	30%	(3%)
Gender: F	46%	(4%)	42%	(3%)	35%	(3%)
Age: 18 to 29	48%	(5%)	41%	(5%)	40%	(5%)
Age: 30 to 64	46%	(3%)	42%	(3%)	33%	(3%)
Age: 65 & older	30%	(6%)	19%	(5%)	17%	(5%)
Up to Primary School	30%	(5%)	26%	(4%)	20%	(4%)
Up to incomplete College education	49%	(3%)	42%	(3%)	37%	(3%)
College education	63%	(13%)	63%	(13%)	35%	(13%)
Self-employed with establishment	43%	(11%)	58%	(11%)	48%	(11%)
Self-employed w/o establishment	32%	(7%)	22%	(6%)	28%	(7%)
Salaried	50%	(4%)	43%	(4%)	38%	(4%)
Family assistance	49%	(7%)	45%	(6%)	34%	(6%)
Social Security retirement pension	36%	(5%)	26%	(5%)	18%	(4%)
Income Strata: Low-low	47%	(5%)	40%	(5%)	26%	(5%)
Income Strata: Low	39%	(4%)	36%	(3%)	31%	(3%)
Income Strata: Medium-low	37%	(7%)	35%	(7%)	30%	(7%)
Income Strata: Medium to High	59%	(6%)	46%	(6%)	47%	(6%)

Note: Percentages are calculated using the expansors that stem from the '2004 Population and Household Census' (INE). Standard errors reported in parenthesis.

Source: Own calculations based on data from 'Survey on financial behavior', Grupo Radar/STRO/IMTFI, 2012.

Young/middle-aged individuals and self-employed workers with a fixed location are more prone to participate in bank-beyond-branches systems than the elderly and the self-employed workers without an establishment. The two latter groupings are also those that experience the most substantial decrease in potential demand levels – a reduction of 55pp (65%) in the case of the elderly and of 43pp (60%) for micro-entrepreneurs without an establishment.

The share of potential users is further reduced when it comes to m–banking arrangements, especially in the case of men, those older than 64 years/receiving Social Security retirement payments, self-employed without an establishment and individuals from households at the top of the socio-economic ranking. In contrast, established micro-entrepreneurs are more attracted to mobile than to branchless-banking (43% *versus* 58%).

The most noteworthy finding is, however, that one third of respondents that declare to be uninterested to participate in financial markets state that they are likely to demand m-banking services.

The potential demand of m-banking services is not fully homogeneous across individuals of distinct financial status, the highest odds (43%) being found among current/past bank clients and branchless-banking users (Table 4). Individuals that are either unbanked but willing to become financially included, or else that have received loans from other financial agents exhibit a scarcely lower likelihood (38% to 40%).

Table 4. Potential users of m-banking by financial market status

Sub-populations	Proportion	SE	[95% Conf. Interval]	
Unwilling to participate of Fin.Mkt.	32%	4%	23%	40%
Willing to participate of Fin.Mkt.	38%	6%	25%	50%
Current/past bank clients	43%	5%	34%	52%
Other financial agents clients	40%	11%	18%	62%
Branchless-banking clients	44%	12%	20%	67%

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

The possibility to pay at local stores with m-money acts, on average, as an additional deterrence for potential users, particularly among women; middle-aged and most educated individuals; those receiving Social Security retirement payments; and members of the poorest households. The smallest gaps are in turn associated to the youngest respondents and members of households at the top of the socio-economic ranking.

The trends exhibited by micro-entrepreneurs are quite distinct. Those that have a fixed location are more attracted to the use of branchless-banking than to mobile systems, as opposed to the increased interest shown by self-employed without an establishment. However, the gaps are quite smaller when bank-beyond-branches is compared to mobile money systems that allows for the use of m-money at stores.

The underlying source of such behavior is linked to the dual positioning of respondents within this particular sub-population depending on them answering as a household member or as a micro-entrepreneur, even with respect to the use of payments retailers' networks to pay their bills (Table 5).

Their comparatively larger reluctance to join any of the two heterodox systems for their business and household may be explained by the greater share of informal workers among micro-entrepreneurs relative to that in the total population.

Table 5. Micro-entrepreneurs: potential demand

	Payments retailer networks user	Branchless-banking potential user	Mobile-banking potential user
Business			
Yes	76%	19%	17%
Maybe	---	16%	16%
No	14%	24%	67%
Unsure	---	41%	---
Home			
Yes	94%	39%	32%
Maybe	---	24%	17%
No	6%	33%	51%
Unsure	---	4%	---

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

The behavioral patterns depicted by the above comparisons are better understood when jointly analyzed with the respondents' opinions with respect to the advantages and disadvantages of the system, as summarized in Tables 6 and 7.

A first worth noting finding refers to the large proportion of individuals that, when asked to spontaneously evaluate the systems, state they find no associated disadvantage (43% and 36% for branchless and mobile banking, respectively) while those that do not see any specific weakness are 16% to 25% of cases. The fact that no other feature is signaled at by a significant number of respondents in the case of bank-beyond-branches further points at the system being already accepted by the Uruguayan population (Table 6).

Table 6. Advantages and disadvantages of branchless and mobile banking systems

Advantages			Disadvantages		
	Branchless Banking	Mobile Banking		Branchless Banking	Mobile Banking
Trust	3%	1%	Distrust	7%	33%
Eligibility	2%	---	Cash preference	1%	1%
To keep savings	16%	---	Inability to save	6%	5%
Ease	40%	71%	Cumbersome	3%	1%
Security	10%	9%	No m-phone/Insecurity	4%	5%
Low cost	4%	1%	No interests paid/Cost	11%	3%
Doesn't know	13%	9%	Doesn't know	25%	16%
No advantage	12%	9%	No disadvantage	43%	36%
Reasons not to be willing to join m-banking					
	M-banking		M-banking + retailer network		
Distrust	58%		31%		
Cash preference	8%		43%		
Inability to save	7%		3%		
Cumbersome	10%		6%		
No m-phone	6%		3%		
Not interested/Other	7%		5%		
Doesn't know	4%		9%		

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

Indeed, the distributions of individuals sharing this view by gender, age, education, source of income and socio-economic level of the household generally mirror that of the whole sample. Relatively larger shares are associated to those under 30 years; with an intermediate education level; receiving a regular monetary income; and that are members of households within the lowest two socio-economic strata (compare Table 1 and Table 6).

M-banking poses trust-related limitations for one third of interviewees, particularly among the youngest; most educated individuals that are members of the best ranked households in terms of their socio-economic level (Table 7).

Table 7. Advantages and disadvantages of branchless and mobile banking systems *(%)*

	Gender		Age-strata			Education level			Source of Income			Socio-economic level			
	M	F	Y	MA	E	P	S	C	W	SE	R	L-l	L	M-l	M-H
Branchless Banking															
Advantages															
No disadvantage	48	52	31	56	13	22	76	2	39	16	23	28	44	12	16
Ease	50	50	34	55	11	20	74	6	50	17	16	23	50	11	16
Security	40	60	22	63	15	11	83	6	42	12	18	10	48	20	22
To save	44	56	26	54	20	32	66	2	36	11	27	29	47	10	14
Disadvantages															
No advantage	52	48	15	54	30	51	49	0	30	22	37	26	35	28	11
Distrust	62	38	24	66	10	23	73	4	45	24	21	17	48	14	21
Cost/No interest	61	39	27	50	23	18	73	9	32	23	23	23	48	16	13
Mobile Banking															
Advantages															
No disadvantage	45	55	26	59	15	26	72	2	43	15	24	24	46	14	16
Ease	48	52	34	52	14	26	71	3	42	18	20	22	47	13	18
Security	39	61	19	67	14	19	74	7	42	11	33	30	36	17	17
Disadvantages															
No advantage	53	47	12	62	26	39	61	0	41	15	29	29	50	9	12
Distrust	47	53	34	56	10	20	73	7	46	14	16	25	46	10	19
Reasons not to be willing to join m-banking															
Mobile Banking															
Distrust	45	55	20	57	23	37	62	1	43	19	27	25	48	12	15
Cumbersome	54	46	8	46	46	30	60	10	38	8	54	8	31	38	23
Mobile Banking+Store-Network															
Distrust	56	44	28	59	13	29	67	4	50	20	22	37	39	9	15
Cumbersome	100	0	0	100	0	100	0	0	0	100	0	0	50	0	50
Cash preference	43	57	20	53	27	44	55	1	32	19	35	19	53	16	12

Notes: 'M'/'F' refer to male/female. Age-strata are: 'Y' –under 30 years; 'MA' – 30 to 64 years old; 'E' – over 64 years. Education levels - 'P'/'S'/'C'- refer to Primary school/Secondary school/College. Sources of income considered are: 'W'/'SE'/ 'R', corresponding to wages/self-employment/retirement pensions. Socio-economic levels are: 'L-' Low-low; 'L' – Low; 'M' – Medium-low and Medium ; and 'H'; Medium-high to High.
Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

Moreover, distrust is also a major barrier for those that state they would not join the system, especially when faced with the possibility of substituting cash payments at local stores. The eldest and the least educated are relatively less confident while the use of m-money within a

network of retailers is most rejected by those from the poorest households and wage-earners. Although rejection due to distrust is a scarcely more frequent reason among women, it is substantially more widespread among men when it comes to its use within a retailers' network.

The operational complexity of the system is also a cause of rejection for 6% to 10% of non-potential users, particularly among men, and it further increases with age and household socio-economic status. On the other hand, self-employed and young members of the poorest households are the least frequent categories found among self-excluded individuals (Table 6). The evidence is consistent with the fact that the use of mobile phones is relatively more widespread among these sub-groups, in contrast to their narrow knowledge on the dynamics and underlying rationale of financial markets. Both branchless and mobile banking are regarded as interesting means to ease money-handling and to a lesser extent as a more secure way of keeping cash (Table 7). Ease is a relatively stronger attractor for young and salaried individuals while security-related advantages are highlighted comparatively more frequently by women with secondary education-level.

It is worth to note that security is not seen as an advantage of branchless-banking by the least educated individuals of the poorest households and by those receiving Social Security retirement payments, the fear of robbery being at the root of the perception. The hypothesis is further supported by the full/partial reversion of the pattern in the case of m-banking (Table 7).

Banking-beyond-branches is further seen as a means to keep savings, a preference that is more frequent among women; elder respondents, especially if receiving a pension; the least educated; and poorest households' members. Except for women, these sub-groups are also those that more recurrently consider that there are no advantages associated to the systems.

5. Econometric analysis

The odds that an individual would join the m-money system are modeled as a logistic function controlling for sample design. The model is hence estimated by Full-Information Maximum-Likelihood methods.

5.1. Definition of variables

The odds that an individual joins an m-banking system are defined as a binary variable that assigns the value '1' to respondents that declare to most surely become users of the system. Similarly, binary variables are created based on the features reported in Section 4.2 in order to allow for differentiated marginal effects by category. The proportions of cases in the population that correspond to each of the diverse categories of individual, household and environment characteristics are reported in Table 8.

The financial status of the individual is proxied by a categorical variable that takes the value '0' for voluntary non-participants of financial markets; '1' for those excluded but that do want to get access to financial services; '2' for former and current bank clients; '3' for those that are customers of a cooperative or other non-bank financial agent; and '4' in the case of individuals that are users of branchless-banking (assimilated to those that own a card only to withdraw cash deposited by their employers or by the Social Security institution).

Given the public character of the *Banco de la República Oriental del Uruguay* (BROU) and its largely more widespread geographical presence compared to that of private banks, we further include a binary variable to differentiate current bank clients and branchless-banking users that operate through the BROU.

Table 8. Descriptive statistics of selected variables

	Proportion	Std.Error	[95% Conf. Interval]	
Branchless banking clients				
0	81%	2%	77%	85%
1	19%	2%	15%	23%
BROU clients				
0	86%	2%	82%	89%
1	14%	2%	11%	18%
Current bank clients				
0	58%	2%	53%	63%
1	42%	2%	37%	47%
Cooperatives clients				
0	96%	1%	95%	98%
1	4%	1%	2%	5%
Former bank clients				
00	82%	2%	78%	86%
1	18%	2%	14%	22%
Current participant of financial market				
0	39%	2%	34%	44%
1	61%	2%	56%	66%
Current non-participant of financial market that wants to participate				
0	72%	2%	68%	77%
1	28%	2%	23%	32%
Trust-barriers				
0	67%	2%	63%	71%
1	33%	2%	29%	37%
Technological-barriers				
0	92%	1%	89%	94%
1	8%	1%	6%	11%
Infrastructure-barriers				
0	60%	3%	54%	65%
1	40%	3%	35%	46%
Cost-attractor				
0	59%	2%	54%	63%
1	41%	2%	37%	46%
Ease-attractor				
0	12%	2%	9%	16%
1	88%	2%	84%	91%
Eligibility-attractor				
0	86%	2%	83%	89%
1	14%	2%	11%	17%
Financial market status				
0	30%	2%	26%	35%
1	19%	2%	15%	23%
2	37%	2%	32%	41%
3	7%	1%	5%	10%
4	7%	1%	4%	9%

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

The subjective views of respondents on banks are proxied by binary variables that take the value '1' when they declare to strongly agree (assigning a value of 8 or more in a 0-to-10 scale) with several propositions related to trust, operational complexity, costs and eligibility.

In order to capture the ultimate goal that those excluded would seek if they participated in financial markets, we define three bank-attractors, depending on banks being seen as a means to keep savings that would be increased by earning interests; as a secure manner of holding cash; or as an option to get access to loans.

Trust barriers are accounted for by a binary variable taking the value '1' if distrust is one main declared hindering factor not to join the system or else if the valuation of the system is low in terms of its degree of reliability (values between 0 and 3 in a scale that goes up to 7).

Technological barriers are in turn assumed to be inexistent (the variable takes the value '0') if at least one household member has a mobile-phone and knows how to text-message. Infrastructure barriers are accounted for by means of the respondent not using a payments-retailer network (*Abitab*/*RedPagos*) to pay for the household/business bills, assuming that a spot should be located nearby whenever they do; or else if, even being a user, she/he would not trust the network to keep her/his money. Attractors in turn refer to its low costs; minimum eligibility conditions and operational ease (answers valued as 6/7 in a 0-to-7 scale).

We further account for differences stemming from m-banking with and without the possibility to shop at a network of stores by defining a categorical variable that differentiates among non-potential users (assigned a '0' value) and three types of potential clients. The variable equals '3' when the respondent is a potential user of m-banking under both types of arrangements. If she/he is instead attracted to the system only if m-money may be used to pay at local stores, the variable takes the value '2' while in the opposite circumstance it is equal to '1'. As shown in Table 9, only 50% of the potential demand of m-banking involves users of all services. The large proportion of individuals that would be customers only if m-money can be used to pay at local stores is due to its increased acceptance among the youngest, in line with their behavioral patterns with respect to the use of cash.

Table 9. Percentage m-banking users   by type of arrangement

	Proportion	Std. Err.	[95% Conf. Interval]	
M-banking users-no network	27%	0.063	21%	34%
M-banking users-only if network	17%	0.051	11%	22%
M-banking users-both	45%	0.074	37%	53%

Source: Own calculations based on data from "Survey on financial behavior", Grupo Radar/STRO/IMTFI, 2012.

5.2. Results

The statistical performance of the model is validated by its overall explanatory power and its ability to correctly predict 89% of the observed cases in the sample.[11]

Significant estimated differences are found in the demand of m-banking services associated to several of the financial market-related dimensions included in the model. Contrarily, the share of potential users of the system is homogeneous across sub-populations defined in terms of most individual, household and environmental features (Table 10).

The degree of acceptance of m-money among unbanked individuals that would like to become bank clients is almost six times higher than that associated to those uninterested in

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[11] The percentage is calculated assuming that predicted probabilities that are equal or greater than 0.5 may be assimilated to self-declared potential users while they correspond to non-users whenever below that threshold.

getting access to financial services of any sort. However, it is only twice that found among actual participants of financial markets, among which no differences are captured linked to the type of inclusion – through traditional and branchless banks or through other financial agents.

Individuals that regularly save a portion of their income flows are six times more likely to join the system than those that rarely keep savings. Nonetheless, the estimated odds associated to those that are mainly attracted to traditional banks as a means to save money are one fourth the level found for individuals that believe advantages of banks are mostly related to other facets.

Table 10. The potential demand of m-banking: estimated results

Variable	Odds Ratio	S.E.	t	P>|t|	[95% Confidence Interval]	
Neighborhood socio-economic level	1.311	0.317	1.120	0.264	0.814	2.112
Household socio-ec. level: Low-low	**3.754**	**2.877**	**1.730**	**0.086**	**0.830**	**16.99**
Household socio-ec. level: Low	1.759	1.274	0.780	0.436	0.422	7.332
Household socio-ec. level: Medium	1.309	1.244	0.280	0.777	0.201	8.518
Gender: 1 = male	0.587	0.313	-1.000	0.318	0.205	1.678
Age-stratum: 1 = below 30 years	0.591	0.401	-0.780	0.439	0.155	2.251
Age-stratum: 1 = over 64 years	**0.317**	**0.154**	**-2.360**	**0.019**	**0.121**	**0.828**
Education: 1 = Primary school	1.826	1.475	0.750	0.457	0.372	8.972
Education: 1 = Secondary school	0.955	0.751	-0.060	0.954	0.203	4.492
Salaried worker	1.156	1.338	0.130	0.900	0.118	11.29
Self employed worker	1.161	1.403	0.120	0.902	0.107	12.56
Informal worker	0.902	0.453	-0.210	0.837	0.335	2.428
Labor market non-participant	1.831	0.500	0.619	0.167	20.07	2.225
Retired worker	1.738	1.351	0.710	0.477	0.376	8.037
Household head	1.580	0.855	0.840	0.399	0.544	4.587
Regular income flows	0.692	0.466	-0.550	0.585	0.184	2.605
Saving culture	6.271	2.880	0.004	1.788	21.99	3.994
Opinion on banks: trustworthy	1.883	1.060	0.291	0.579	6.120	1.126
Opinion on banks: operational ease	**0.420**	**-1.250**	**0.212**	**0.107**	**1.649**	**0.291**
Opinion on banks: low costs	1.195	0.300	0.761	0.377	3.788	0.700
Bank attractor: saving	**0.250**	**0.191**	**-1.810**	**0.072**	**0.055**	**1.130**
Bank attractor: loans	2.583	2.683	0.910	0.362	0.334	19.99
Bank attractor: security	0.335	0.390	-0.940	0.348	0.034	3.313
M-banking attractor: ease	**21.57**	**14.65**	**4.520**	**0.000**	**5.658**	**82.23**
M-banking attractor: trust	**3.328**	**1.672**	**2.390**	**0.018**	**1.237**	**8.958**
M-banking barrier: infrastructure	0.477	0.283	-1.250	0.214	0.148	1.538
M-banking barrier: technology	2.436	2.348	0.920	0.357	0.364	16.28
M-banking barrier: trust	1.264	0.782	0.380	0.705	0.374	4.278
M-banking + Retailers network	**9.978**	**2.309**	**9.940**	**0.000**	**6.324**	**15.74**
Financial market participant	**2.503**	**1.392**	**1.650**	**0.100**	**0.837**	**7.488**
Bank client	1.165	1.042	0.170	0.865	0.200	6.793
Client of BROU	1.031	0.676	0.050	0.962	0.283	3.754
Branchless-banking client	1.434	1.392	0.370	0.711	0.212	9.714
Unbanked willing to get access	**5.714**	**4.468**	**2.230**	**0.027**	**1.224**	**26.67**
Constant	**0.000**	**0.000**	**-4.630**	**0.000**	**0.000**	**0.005**
Sample/population size: 391/430.119			Units/Strata: 391/164			
F(34,194) = 5.96 Prob > F = 0.000			Hosmer-Lemeshow test = 0.23 Prob>F = 0.79			

The irrelevant role played by technology and infrastructure-related barriers comes as no surprise given the almost universal access to mobile-phones among individuals within low income-strata and the existing widespread network of payments-retailers. In contrast, the nil estimated impact of trust barriers is quite unexpected, at least at first sight, given the stylized facts previously discussed. The result turns into a fully consistent finding, however, once noted that most individuals sharing this view have access to financial services and hence the effect of trust is already captured by their status with respect to the financial market. Further still, the relative importance of the trust dimension is not at all lost within the model but assimilated instead to the substantially higher share of potential users found among individuals that consider the system is trustworthy with respect to that associated to other sub-populations.

The dimension that is suggested to be the by far most powerful differentiating factor is the degree of difficulty that m-banking poses to users. Indeed, potential users are 21 times more likely to be found among individuals that consider the system is easy to handle (which are almost 90% of the sample) than among those that evaluate it as too cumbersome.

The odds that an individual becomes a potential m-banking client among those that would use m-money as a substitute for cash at local stores are substantially greater (10 times) than those unattracted by its use within a network of stores. The creation of a retailers network is thus suggested to exert a most significant effect on potential demand, supporting the hypothesized key role that it might play in attaining the necessary scale for the system to be economically feasible. Moreover, the model unravels that the creation of a retailers' network would also serve to enlarge the potential demand by attracting individuals that would otherwise be uninterested to join the system.

Individuals over 64 years are the least prone to become m-money users, in line with the comparatively increased difficulties that innovative systems pose to the elderly, that in this case is further magnified by their less frequent use of mobile-phones. The potential demand of m-banking services is found to be 4 times larger among members of households within the lowest socio-economic stratum, no differences being identified among those within the other three categories. The result is in line with individuals at the bottom of the income distribution being those that exhibit the largest level of unsatisfied demand.

Besides the above-summarized marginal effects of each individual dimension, the estimated model also serves to evaluate diverse scenarios involving distinct profiles. A first exercise is designed to explore the role that the creation of a retailers network may play to overcome the elderly larger rejection of the system further assuming that they do face trust and ease-related barriers. The estimated effects show that a correct design of a network of stores may indeed succeed to attract this particular sub-population regardless of whether or not they are currently unbanked (Table 11, upper files in columns 1 and 2).

If further accounting for the role of savings, the model predicts that the largest impact would be observed among those that are unable to save regularly, especially if members of the poorest households (Table 11, upper files in columns 3 and 4).

Although still significant, the network effects are much weaker among middle-aged and young individuals that are frequently able to save a portion of their income (Table 11, bottom files in columns 1 and 2), while the opposite trend is predicted among non-regular savers.

These results thus reveal the differing outcomes that are to be expected by the interaction of trust and ease within the diverse age-strata, while brings forth the role played by the saving patterns observed in both subsets.

Table 11. M-banking potential users of specific profiles: : estimated odds

Sub-populations	(1)	(2)	(3)	(4)
M-money users over 64 years				
Without network	2%	3%	28%	35%
Only with network	10%	14%	64%	73%
Both	69%	74%	97%	98%
M-money users under 65 years				
Without network	7%	9%	1%	2%
Only with network	25%	34%	5%	8%
Both	87%	90%	52%	59%

Note: (1)/(2) refer to participants of financial markets/unbanked willing to participate with a saving culture while (3)/(4) refer to participants of financial markets/unbanked willing to participate that do not save regularly.

6. Conclusions

The research here summarized strongly suggests that the introduction of mobile-banking systems in Uruguay is a feasible means for the financial inclusion of micro-entrepreneurs and of members of the poorest households, especially the youngest. The widespread use of branchless-banking, both through cashiers and in partnership with the existing network of payment retailers, appears as a key smoothing factor facilitating the introduction of mobile systems. This behavioral pattern implies that it is most relevant that m-money systems are able to offer services that outperform branchless-banking 's, particularly for those that are scarcely attached to mobile-phones.

The existing payments retailer networks stand as a most recommended partner for m-money operators, due not only to their extensive national-level presence but also because they are trustworthy enough for most individuals. Furthermore, when put together with the high standards of wireless connections that prevail all along the country, the evidence suggests that infrastructure barriers are not relevant for Uruguay. Analogously, the generalized use of mobile-phones and text-messaging, in particular among members of the poorest households, imply that technological barriers are also negligible.

The generalized opinion of respondents, regardless of whether they are potential users or not is that the system is easy to handle. MSMEs with a fixed location are particularly attracted by the ease of handling inherent to m-banking, at the extent to prefer the system to branchless-banking. The relatively minor interest shown by self-employed without a fixed location, in turn, suggests that informality is one deterrent factor to join the system, so that the design of specific incentives headed towards informal micro-entrepreneurs should not be disregarded.

The potential demand is quite homogeneous across individuals with distinct personal, household and environmental characterizations, with two exceptions. First, those that are members of households within the lowest socio-economic stratum are more prone to participate, in line with them exhibiting the lowest inclusion rate. The behavioral profile of the elderly and their comparatively larger financial inclusion driven by the withdrawal of pensions through cashiers, are less likely to join the system than those under 65 years. Yet, the provision of saving-related services may act as a powerful attractor for this sub-group. This particular dimension of m-banking is also suggested as most relevant to attract the large-sized potential market found among those with a saving-culture.

In line with the international evidence, trust barriers are identified as the demand-side dimension that poses the most stringent obstacles for a successful acceptance of m-money in Uruguay. The involvement of public actors, particularly the BROU and the public telephone company, is thus highlighted as a most convenient strategy to undertake.

Nonetheless, since distrust is rooted on distinct dimensions depending on certain individual characteristics, it should be counteracted with the use of a variety of market penetration strategies. In the particular case of the elderly, e.g., to whom technological barriers are also a major hindrance, one feature that may counteract these disadvantages is the provision of enhanced security mechanisms to deposit their money. Similarly, in the case of self-employed workers, the low cost associated to transfers and loans may act as a successful attractor that may outweigh the deterrent role played by the irregular amount and frequency of their income flows. An additional trust-related obstacle is suggested to arise from the informal character of economic activities that may even be magnified by the government's involvement.

The major challenge faced by m-banking operators is however related to the economic feasibility of the business given the limited scale attainable in a small-sized market like the Uruguayan. Consequently, a thorough design of market penetration strategies is an unavoidable task to be undertaken from the outset.

The sequential launching of the system, e.g., may need to involve several sub-populations instead of one. Analogously, the apparent advantages of initially focusing in the Great Montevideo may not be such. Since urban centers in the rest of the country and rural areas are characterized by a more meager development of financial activities and a larger presence of MSMEs, the expected excess demand may be larger within these locations than at Montevideo.

The narrow gap found between the potential demand of m-banking with and without considering the use of m-money at local stores suggests that creating a retailers network may play a most crucial role in attaining the necessary scale. This hypothesized view is consistent with the fact that the system's operational ease is a major attractor for young and middle-aged respondents, who in turn put a secondary emphasis on barriers that stem form trust-related facets. The creation of a retailers' network at the initial stage is also supported by the fact that one third of individuals that are uninterested to join the system would however become potential users if allowed to use m-money to shop at local stores

Despite such strategy contradicts the evidence reported for other countries, it may be most feasible in the case of Uruguay due to the small size of the market and the relatively meager share of potential users that would not trust in such arrangement.

Its success would however rely on a yet internationally unsolved key aspect related to the design of a mechanism that grants the recovery of erroneous money transfers. As before, the Uruguayan small-sized market and population and the ability with which the three mobile-phone companies have undertaken coordinated policies suggest that a solution to the issue may be more easily encountered locally than elsewhere.

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Appendix A - Questionnaire

A - Nr. Interview _____

B – First name of respondent _____

C – Gender   Male   1   Female   2

D – Age _____

Address _____

Telephone/mobile _____

Neighborhood *(ACCORDING TO INE)* _____   *Census tract* _____   Segment _____   Block _____

Name of Pollster _____   Date _____

'Good morning / afternoon / evening. My name is ...... and I work for the RADAR Group, an Uruguayan consulting firm dedicated to conducting surveys. We are conducting a survey in the Great Montevideo on the issues of savings and loans, with the support of California University in the United States. Adriana Cassoni is the person in charge of the project. The interview will not last more than 30 and you can end it at will. Your responses will be treated with absolute confidentiality, following the International Code of Ethics. We can guarantee that no one will contact you with the purpose of selling you products/services after this survey. The sole risk of completing this questionnaire would be that someone receives a copy and therefore becomes aware of your and use of financial services. In order to minimize this risk we will not collect any information that allows for your identification and we will grant that no one apart from me and the researchers involved in the project has access to the questionnaire. Could I interview you for this purpose now?'

1. I will list some possible sources of revenue and I ask you to please indicate which ones are relevant for you. You may provide more than one answer **(READ ALL, MULTIPLE)**

Salary	1
Self-employed, with an own physical location	2
Self-employed, without an own physical location	3
Retirement or pension	4
Independent professional with a university degree	5
Family assistance	6
Unemployment insurance	7
Other state subsidies (MIDES, allowances, etc.)	8
Other _____	9
No answer	99

2. *(IF THE ANSWER WAS "self-employed" – 2 or 3)* What do you do? _____

3. Is your income regular, i.e. do you earn more or less the same amount every month, or are there significant variations from one month to another?

   Always earns the same   1   There are significant variations 2   Doesn't know / no answer   9

4. Are you a customer of a bank, even if only for a credit card or a savings account to withdraw your salary via an ATM? We are referring only to banks, not cooperatives or other financial firms. *(SPONTANEOUS, MULTIPLE ANSWERS POSSIBLE, LIST ALL BANKS)*

Bandes	BROU	BBVA	City	Comercial	Discount	HSBC	Itaú	Lloyds	Santander	None
1	2	3	4	5	6	7	8	9	10	98

5. Reflecting on the past two years, (i.e. in 2010 and in 2011), have you taken on a loan of any kind with a bank or a cooperative, or financial institution?

Bank	1
Cooperative ☐ which one(s)? _____	
Financial Institution ☐ which one(s)? _____	
Did not get a loan	98
No answer	99

6. Do you own (a) credit card(s)?

(ENSURE THEY LIST ALL THE CARDS THEY OWN, INSIST IN THAT RESPONDANTS DOESNT FORGET TO MENTION ANY. IF RESPONDANT MENTION A BANK, ASK IF IT IS VISA OR MASTER)

OCA	1
VISA	2
Master	3
American Express	4
Anda	5
Cabal	6
Creditel	7
Diners	8
Italcred	9
Oca-Visa	10
Pronto Visa	11
Passcard	12
Tarjeta D / Créditos Directos	13
Other_____	14
Does not own any	99

ONLY FOR INTERVIEWEES THAT ARE NOT BANK CLIENTS, ACCORDING TO Q4 OR Q5

7. Have you ever been customer of a bank?

Yes   1   No   2   → *GO TO Q9*   Does not know   9 → *GO TO Q9*

8. Why did you close your account? *(SPONTANEOUS, DO NOT READ OPTIONS OUT LOUD)*

It was too expensive	1
I never/barely used it, it was useless	2
I do not have savings capacity; I had nothing to deposit	3
I had very irregular incomes	4
I became unemployed and the account was a "salary account"	5
Other _____	
Does not know	9

GO TO Q12

9. Has a Bank ever offered to open you an account before?

Yes   1 → *GO TO Q8*   No   2   Doesn´t know   9

10. Have you ever tried to open a bank account?

Yes   1   No   2   → *GO TO Q9*   Doesn't know *GO TO Q9*

11.   Why did you not follow through? I will list you some possible reasons, you can choose many.

You did not meet the requirements, solicitation rejected	2
The process was too complicated, too many procedures	3
The costs resulted being too high	4
You did not like the manner in which you were treated, You felt uncomfortable	5
They did not offer you any service to your interest	6
Other reason _____	
Doesn´t know	9

GO TO Q10

12. Why would you say you are not a client of any bank? I will list some reasons, you can indicate multiple answers:

Never felt the need	1
Doesn't know how to, or where to go to	2
You believe you do not meet the requirements asked by the banks	3
An acquaintance, friend or family member said you do not meet the requirements	4
It is too complicated, too many procedures	5
There is no bank near to where you live or work	6
You do not trust the banks	7
The costs are too high	8

Other reason _____
Doesn´t know   99

13. Would you like to be a client of a bank?
(IF YES) What is the main reason for which you would like to be a client of a bank? *(SPONTANEOUS, DO NOT MAKE SUGGESTIONS)*
       Yes, because _____

 (IF NO) What is the main reason for you not to want to be a client of a bank?
      No, because _____
Doesn´t know   99

ONLY IF RESPONDANT IS CLIENT OF A BANK ACCORDING TO Q4 OR Q5

14. *(IF RESPONDANT RECEIVES A SALARY ACCORDING TO Q1)* Do you cash your salary via an ATM?   Yes 1   No 2   does not know/does not answer 9

15. Do you have a savings account? *(IF APPLICABLE, ADD: "besides the account where you currently receive your salary?")*   Yes 1   No 2   Does not know/does not answer 9

16. Do you have a current account   Yes 1   No 2   Does not know/does not answer 9

17. *(IF RESPONDANT CHARGES SALARY VIA ATM AND/OR OWNS A SAVINGS ACCOUNT AND/OR CURRENT ACCOUNT)* Have you ever used your ATM card to pay in commerce/shops?
      Yes 1   No 2   does not know/does not answer 9

FOR ALL RESPONDANTS

 (FOR ALL RESPONDANTS) I will list you a number of phrases reflecting the opinion of other people, and I will ask you to say in how far you agree with each one of these using a scale from 0 – 10 in which 0 signifies you "do not agree at all" and 10 means you "totally agree".

18. Banks are reliable companies that comply with all their promises	0	1	2	3	4	5	6	7	8	9	10	NA
19. Banks offer services for people like myself	0	1	2	3	4	5	6	7	8	9	10	NA
20. Banks are only for people with high economic resources	0	1	2	3	4	5	6	7	8	9	10	NA
21. Most Uruguayans have the possibility to open a bank account	0	1	2	3	4	5	6	7	8	9	10	NA
22. The requirements to open a bank account are complicated	0	1	2	3	4	5	6	7	8	9	10	NA
23. The services which banks offer are expensive	0	1	2	3	4	5	6	7	8	9	10	NA
24. If banks had more branches located in the proximity of where people live, they would have more clients.	0	1	2	3	4	5	6	7	8	9	10	NA

25. Do you customary save a part of your income?
      Yes 1 No 2 ➔ *GO TO Q26*   No answer 9 ➔ *GO TO Q26*

26. *(YES, RESPONDANT SAVES)* With which frequency do you tend to save? *(READ OPTIONS)*
Every month 1 Every 2/3 months 2 Every 4/6 months 3 Less frequently 4 Doesn't know 9

27. *(YES, RESPONDANT SAVES)* Where do you customary save? *(READ OPTIONS)*
      AT a bank or at another financial institution   1
      Saves it in cash somewhere else   2
      Other (specify) _____

28. Does he/she own a mobile phone for personal use?   Yes 1   No 2

29. Does someone else in their house own a mobile phone? Yes 1   No 2   There is no one else 3

30. *(YES OWNS A MOBILE PHONE)* Do you know how to send a text message? *(YES, KNOWS)* Do you send a text message at least once a day?
      Knows how to send and sends at least one a day   1
      Knows how to send but doesn't send   2

Does not know how to send   3

31. *(ONLY IF SOMEONE ELSE IN THE HOUSEHOLD OWNS A MOBILE PHONE Q29=1)* Does any other member of your family know how to send text messages via mobile phones?

Yes   1   No   2   Not sure   9

32. Is it customary for your household to pay its bills at ABITAB or REDPAGOS?
(IF RESPONDANT IS SELF-EMPLOYED ACCORDING TO Q1) And the bills of your self-owned business?

	Yes	No	No answer	Not self-employed
30.1 - Household	1	2	98	
30.2 - Business	1	2	98	99

I am going to tell you about a new service which will be launched soon: it will allow you to deposit money in a bank account, under your personal name, at Abitab and Redpagos. You will consequently be able to cash it in completely or partially when you need it, at any branch of Abitab or Redpagos, at a very accessible cost. Do you understand the new service described here? *(MAKE SURE THE REPONDANT HAS UNDERSTOOD. IF HE/SHE HAS NOT UNDERSTOOD, REPEAT THE EXPLANATION WITHOUT MODIFYING THIS TEXT).*

Understood   1   → *CONTINUE*
Did not understand   2   → *CONTINUE TO LIST OF "CLASSIFICATION" QUESTIONS*

33. Does this new service seem interesting, somewhat interesting or not interesting at all?
Very interesting   1   Somewhat interesting   2   Barely or very Little interesting   3   Doesn´t know   9

34. Which advantages do you foresee this new service could give you? *(SPONTANEOUS, DO NOT MAKE ANY SUGGESTIONS)*_____

35. What disadvantages do you foresee?*(SPONTANEAOUS, DO NOT MAKE ANY SUGGESTIONS)*
_____

36. Would you trust Abitab or Redpagos to deposit your money? Please respond on a scale of 1 – 7, where 1 means you "do not trust at all" and 7 means you "trust completely". Remember you can use any number between 1 and 7.

1   2   3   4   5   6   7   Does not know   9

37. Do you think you would make use of this service for your home? *(READ OPTIONS)*
(IF RESPONDANT IS SELF-EMPLOYED ACCORDING TO Q1) and for your business?

	Yes, for sure	Maybe	No wouldn't use it	Doesn´t know	Does not have a business
30.1 – House	1	2	3	98	
30.2 – Business	1	2	3	98	99

38. Additionally, being able to deposit money on an account in Abitab or RedPagos, will also allow you to pay your monthly bills such as UTE, ANTEL, OSE and others, without needing cash, by simply sending a text message from your mobile phone. Every time you pay via mobile phone, this money will be discounted automatically from your Abitab or RedPagos account. The only cost is that of sending the message. Do you understand how this would work?

Understood   1   → *CONTINUE*
Did not understand   2   → *CONTINUE TO "CLASSIFICATION" QUESTIONS*

39. Does this payment system seem very interesting, somewhat interesting or not interesting at all?
Very interesting   1   somewhat interesting   2   Barely or not interesting at all   3   Does not know   9

40. What advantages do you foresee of this payment system? Any other? *(SPONTANEOUS, DO NOT MAKE ANY SUGGESTIONS)*_____

41. What disadvantages do you foresee of this payment system? Any other? *(SPONTANEOUS, DO NOT MAKE ANY SUGGESTIONS*_____

42. What do you think about this method of payment? Please indicate using a scale from 1 – 7, where 1 means you find it "very complicated to use" and 7 means you find it "very simple to use". Remember you can indicate any number between 1 and 7.

   1   2   3   4   5   6   7   Does not know   9

43. How would you rate this method of payment, using the same scale, where 1 means it is "not trustworthy at all" and 7 means it is "totally trustworthy".

   1   2   3   4   5   6   7   Does not know   9

44. How would you rate this method of payment, on a scale from 1 to 7 where 1 means it is "very inconvenient" and 7 means it is "very convenient"? Remember you can indicate any number between 1 and 7.

   1   2   3   4   5   6   7   Doesn´t know 9

45. Do you think you would use this method of payment to pay your bills? *(READ OPTIONS, IF NECESSARY, REMIND THEM THAT THE ONLY COST INVOLVED IS THAT OF THE TEXT MESSEGE)*

Yes, for sure	1
Maybe	2
No, would not use it	3
Doesn´t know	9

46. *(IF ANSWERED "NO" IN Q45)* Why do you not think you would use it? *(SPONTANEOUS, DO NOT MAKE SUGGESTIONS)* _____

47. And if you could also pay your purchases in your neighborhood stores where you accustom to buy, do you think you would use it? *(READ THE OPTIONS)*

Yes, for sure	1
Maybe	2
No, would not use it	3
Doesn't know	9

48. *(IF ANSWERED "NO" IN Q47)* Why do you not think you would use it? *(SPONTANEOUS, DO NOT MAKE SUGGESTIONS)* _____

49. *IF YOU ARE SELF-EMPLOYED, ACCORDING TO Q1, WITH OR WITHOUT OWN PHYSICAL LOCATION:* Would you accept your clients paying you through this payment system, via mobile phone?

   Yes, for sure   1   Maybe   2   No   3   Doesn't know

To conclude, I will ask you some questions which serve to classify the households we are surveying.

A. How many people in your household have some sort of income?							
One	0	Two	5	Three	9	More than three	11

B. How many people does your household consist of?							
1 person	0	2 or 3 people	3	4 people	4	5 or more	6

C. Are there minors (up to 10 years) in your household?						
1 minor or none	2	2 minors	1	More than 2 minors	0

D. How many years of study has the person who receives the highest income in your household, completed?			
Primary school completed or less	0	College education incomplete	1
Secondary school complete or incomplete	1	College education completed	3
		Post Graduate	6

D1. (ONLY IF THERE IS MORE THAN ONE PEROSN IN THE HOUSEHOLD) How Many years of study have you yourself completed?				
Primary school completed or less	0	College education incomplete		1
Secondary school complete or incomplete	1	College education completed		3
		Post Graduate		6

E. Is there at least one person with a university degree in the household?				
There is none	0	1 person or more	3	

F. What kind of health coverage does the highest income earning individual of the household have?						
Public Hospital	0	Police or Military Hospital	5	HMO	7	Private Insurance	8

F1. (ONLY IF THERE IS MORE THAN ONE PRSON IN THE HOUSEHOLD) What health coverage do you have yourself?							
Public Hospital	1	Police or Military Hospital	2	HMO	3	Private Insurance	4

G. Does the household have (a) car(s)? How many?					
None	0	One	4	More than one	7

H. How any color televisions are there in your household?					
None	0	One	4	Two or more	4

I. Is there a refrigerator/freezer?		J. Is there air conditioner?		K. Do you have a television subscription?		L. Is there a DVD?	
Yes	No	Yes	No	Yes	No	Yes	No
4	0	2	0	2	0	1	0

M. Computer				N. Washing machine		O. Dishwasher		P. Microwave		Q. Fixed phone	
One	Two	More than two	None	Yes	No	Yes	No	Yes	No	Yes	No
2	3	4	0	2	0	2	0	2	0	3	0

S. (BY OBSERVATION) House has a tin roof or is made from another precarious material		T. How many bathrooms does this house have?		
Yes	No	1 or none	Two	More than two
1	0	0	3	7

Appendix B. Results of Factor Analysis – Factor loadings

Variable	Factor1	Factor2	Factor3	Uniqueness
Age-strata	0.1662	**-0.7896**	-0.1871	0.3140
Age	0.1360	**-0.8146**	-0.2369	0.2618
Education level	0.3220	**0.6690**-	0.4331	0.1248
Health-care	**0.6967**	-0.1097	-0.0158	0.5023
Self-employ	-0.2727	0.1424	0.0420	0.9036
Number of HH income-earners	0.2557	0.0448	**0.6448**	0.5168
Number of HH members	0.0684	0.1337	**0.9336**	0.1059
Number of children under10 years	-0.1294	0.1774	**0.7085**	0.4498
HH-head education level	0.4024	**0.4819**	-0.1314	0.5886
At least 1 member w/college educ.	0.3774	0.2818	-0.0755	0.7725
HH-head health-care	**0.6579**	-0.0787	0.0601	0.5574
Car	**0.4355**	0.2547	-0.0179	0.7452
TV	**0.4448**	0.0212	0.2853	0.7203
Fridge	**0.4558**	0.3782	-0.0226	0.6487
Air conditioning	0.2762	0.2205	-0.1322	0.8576
TV Cable	0.4073	0.3439	0.1344	0.6978
DVD	0.3680	**0.5234**	0.1582	0.5656
PC	0.4003	**0.5027**	0.2723	0.5129
Dish-washing machine	0.2119	0.1714	0.0118	0.9256
Washing machine	**0.5421**	0.1452	0.0781	0.6790
Microwave	**0.5780**	0.2208	0.0193	0.6168
Fix phone	**0.6134**	-0.1457	-0.1030	0.5919
Maid	0.0869	0.1681	-0.0039	0.9642
Roof quality	**0.5185**	0.0880	-0.0718	0.7183
HH members per bathroom	-0.0824	0.0227	**0.9068**	0.1705
Neighborhood	0.0714	0.0308	-0.0641	0.9898

Factor analysis/correlation   Rotation: orthogonal varimax (Kaiser off)

Factor	Variance	Difference	Proportion	Cumulative
Factor1	4.00393	0.80803	0.1540	0.1540
Factor2	3.19590	0.20561	0.1229	0.2769
Factor3	2.99029	0.1150	0.3919	
LR test: independent vs. saturated: chi2(325) = 3301.97 Prob>chi2 = 0.0000				

Score variables (factor)

Rotation: orthogonal varimax
Method: principal-component factors