Converting Dormant Bank Accounts into a Dynamic Force in Latin America

Prepared for the Connectivity, Markets, and Finance Division by:

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July 2018

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Abstract

This paper discusses what are now known as dormant or "zombie" accounts, which have their origin in conditional transfer programs and other government programs that created accounts for beneficiaries at the respective state bank or in the banking system. The focus is on Peru, where these accounts were created at the Banco de la Nación. Based on statistical analysis, this paper adopts two definitions for an account to be "non-zombie". On this basis, on the deposit side, for Juntos only 4 percent of accounts were found to be non-zombie; for Pension 65, only 0.2 percent; and for Beca 18, 32 percent. On the expenditures side, 10 percent qualified as non-zombie for Juntos and Pension 65, and above 90 percent for Beca 18. Although zombie accounts can evolve into non-zombie accounts, under current conditions the process is slow. While significant prima facie benefits can come from converting dormant accounts to digital wallets, a number of requirements need to be fulfilled first, including users' requirements and minimum ecosystem requirements, and various sub-ecosystems must be integrated, such as payments between persons, digital payments to service institutions, and digital payments to businesses.

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Description and Quantification of Dormant Accounts

Genesis of Dormant Accounts in Peru and other Latin American Countries, Particularly in Various Government Programs

What are now known as dormant accounts have their origin in government programs known as conditional transfer programs, which became popular in the early 1990s as a response to the clear political need to do something for the poor. The prototypical programs originated in Mexico and Brazil, where families (typically mothers) were provided with cash grants provided they complied with two conditions (hence the name conditional transfers): (1) enroll their children in specified vaccination programs and (2) make sure that their children were enrolled in school and actually attended. The underlying logic was twofold: vaccinated children would save the state substantial public and private health costs, and children who went to school would grow up to be more productive adults and thus either be less of a burden on society or be able to actually contribute to positive economic growth. An argument could be made, therefore, that such conditional transfers were investment rather than expenditure. Even more narrowly, it could be argued that making sure children were vaccinated caused direct savings in public health costs. Education, in turn, would yield its own fiscal dividend in the future. Hence the net fiscal cost of these programs was considerably less than the ostensible gross costs. See Appendix 1 for a list and description of the conditional transfer programs in place in the Western Hemisphere.

Once a decision has been made to provide transfers, the question becomes how to deliver the requisite money to the qualifying citizens. The most obvious way is to have a delivery service go door to door and put the relevant cash amount into each beneficiary's hand. However, such a procedure is obviously very costly, and a less expensive way needs to be found to perform this service. Creating individual bank accounts for beneficiaries and depositing the conditional transfer money into those accounts then becomes the payment method of choice. If there is a national bank, then the accounts of beneficiaries can be created at this bank and the respective money transferred directly from the treasury to these accounts. If there is no national bank, the accounts can be created with the government fiscal agent, or, failing that, in one or more banking institutions that are part of the financial system.

Unfortunately, creating bank accounts by fiat only solves part of the problem: What if there are no bank branches where beneficiaries live? What distance would they have to travel and by what means to get to a place where they can access a cash-out point to collect the benefit they are entitled to?

Peru has a national bank, the Banco de la Nación, so creating accounts for the beneficiaries is possible and has, indeed, been done for the Juntos program. But

approximately 40 percent of the beneficiaries of this conditional transfer program live more than a six-hour trip from the nearest Banco de la Nación branch. Accordingly, six hours has been established as the maximum travel time for any beneficiary; for those who live more than six hours from a bank branch, it is the responsibility of the government to deliver the cash directly to the citizens. However, since all beneficiaries have bank accounts created for them where the funds are deposited, a further procedure is required to extract the money from the accounts in order to deliver it to the respective beneficiary: an armored truck staffed with three guards and a car carrying Banco de la Nación and Cash-Transfer Program functionaries drive to the relevant village centers and act in effect as a cashier's window, paying out the respective amounts and duly recording the delivery.

When a beneficiary lives within the six-hour travel limit, it is the beneficiary who pays the cost of travel and may have to sacrifice work hours in order to travel, so collecting the benefit is costly to the beneficiary. This clearly generates a strong incentive to withdraw all the money at the same time.

When a beneficiary lives outside the six-hour travel limit and therefore has the money delivered straight to her, all the money has to be withdrawn and delivered at the same time because it would be far too costly for the money delivery truck to make multiple trips within each payment cycle. Indeed, all conditional transfers in Peru are paid every two months precisely in order to reduce delivery costs.

One might have thought that the network of corresponding cashiers that have sprung up in various banking systems in Latin America and also have an extensive presence in Peru would have become a distribution network for the conditional transfers and other welfare payments. However, this has not occurred because these payments are highly concentrated on particular dates and would have completely overwhelmed the capacity of these cashiers to satisfy the withdrawal requests. Indeed, a new logistical problem would have been created: to provide the corresponding cashiers with the cash they could be expected to need.

A further consideration is the geographic location of the beneficiaries of the conditional transfer program, which differs considerably across the countries of the Western Hemisphere. Reaching urban beneficiaries is one thing, and reaching rural beneficiaries is another thing altogether. In many countries the urban/rural ratio of beneficiaries is around 50 percent; in Peru the rural component comes close to 100 percent (95.7 percent to be exact) because of the way the Juntos program was designed. The same is not true of Peru's two other social programs, Pensión 65 and Beca 18, that also entitle their beneficiaries to intermittent payments every two months. The first of these is a retirement pension for people in the same poverty areas as Juntos. Beca 18 is a scholarship program for high school and university students, who tend to be overwhelmingly urban. Still, there are at present roughly

1,174,206 conditional transfer beneficiaries in Juntos, 690,086 Pensión 65 beneficiaries, and some 83,758 scholarship beneficiaries in Beca 18, thus the rural beneficiaries predominate strongly in Peru.

The following contributing factors can cause total withdrawal of accounts:

- The belief that leaving any money in an account will cause it to be confiscated.
- A general distrust of the safety of bank deposits.
- The belief that leaving money in an account and thereby demonstrating the capacity for voluntary saving will be taken as proof that the transfer is not really needed.
- The belief that these accounts can only be used to receive the transfer amounts and not for any other transactions.

The first two of these beliefs are held with different levels of conviction by different subgroups of the population, despite the fact that they have absolutely no basis in reality. Peru's constitution guarantees private property rights and strictly circumscribes when property might be taken in the public interest. Furthermore, it specifies that full compensation needs to be paid. On the other hand, Peru's banking legislation guarantees total privacy of deposits, strictly forbidding any third parties, including the government, from acquiring information about any particular citizen's bank balance. What is more, bank deposit insurance exists, with coverage of up to approximately US$25,000 per account (about 90,000 *soles*). Considering that the amounts of the conditional transfers are 200 and 250 *soles* every two months for Juntos and Pensión 65, respectively, and monthly with variable amounts for Beca 18, the insurance coverage means that there is no way any deposit of this size could be lost in a bank failure.

Nonetheless, these two beliefs are mentioned again and again by the beneficiaries as reasons to distrust banks. The only remotely plausible basis for such fears can be found in a Ponzi scheme that collapsed spectacularly more than 20 years ago, and in unregulated financial cooperatives that launder money in the drug-producing areas and, every once in a while, shut their doors and leave their depositors in the lurch. Could it be that the relevant part of the public is unable to distinguish formal banking institutions from these counterfeits?

The other two beliefs are also incorrect but are much more plausible. Unfortunately, a mistaken interpretation has taken hold among some of the people involved in the social programs that individuals who do not spend all their transfer money do not really need the transfers. Accordingly, the informal "advice" making the rounds is, "if you want to keep receiving your transfer, do not leave any amount in the transfer account." Similarly, word has spread that use of the account is restricted to receiving the conditional transfer or social

program. Naturally, nobody would want to misuse their account, especially if that could lead to losing the transfer.

Thus these accounts, created by fiat in the Banco de la Nación, have overwhelmingly become dormant, or *zombie accounts*—so called because they are "reanimated" only once every two months and are otherwise "dead"—as the result of real access cost issues, bank operative considerations, and a set of completely erroneous convictions that are very hard to eradicate.

There is a second category of accounts in Peru that are also zombie accounts, perhaps even more dormant than the first. These are by-products of the increasing use of digital payroll in modern businesses. Wages were historically paid in cash, then with bank checks, and now are mostly paid by direct deposit. What occurs, however, is that employers either encourage or require their wage earners to open an account in their favored bank. As a result, workers changing jobs may find themselves also changing the bank in which they get paid. However, they typically do not close their previous bank account; they simply stop using it. It is not known how many dormant accounts of this type exist.

The Empirical Reality of Dormant Accounts in Peru

Banco de la Nación of Peru is where all the accounts pertaining to Peru's social programs are lodged. As mentioned before, there are three programs: the conventional conditional transfer program called Juntos, a pension program for extreme poverty individuals aged 65 and older called Pensión 65, and an educational fellowship program called Beca 18. All told, the Banco de la Nación has almost two million accounts pertaining to beneficiaries of these programs, with the following breakdown: Juntos: 1,174,206 accounts, Pensión 65: 690,086 accounts, and Beca 18: 83,758 accounts. The accounts pertaining to beneficiaries of those three programs have been made available for this study and are the basis for the current analysis.

The raw data is not directly usable because it contains a number of entries that are not significant: cents' worth of transaction taxes, cents' worth of interest credits, entries with zeroes for various reasons, and minor adjustments of all sorts. In addition, it becomes unduly cumbersome to work with the minutia of daily data. Table 1 shows the difference between gross and net transactions (large) and gross and net values (tiny).

Table 1. Total Transactions and Value

	No. of gross transactions	Gross total transactions in millions of *soles*	No. of net transactions (at least 1 *sol*)	Net total transactions in millions of *soles*
Juntos	172,113,645	14,612	84,198,819	14,606
Pensión 65	39,546,992	6,290	24,556,870	6,289
Beca 18	19,037,961	3,805	13,375,923	3,804

After cleanup and removal of the tiny transactions, it is possible to observe that for Juntos and Pensión 65, which have mostly rural beneficiaries, there is a minor gap between the number of deposits and the number of withdrawals, while in Beca 18, which covers young people in metropolitan areas, withdrawals are five times more frequent than deposits due to their comparative ease (see Table 2).

Table 2. Deposit and Withdrawal Transactions and Value (Historical)

	Number of Deposits	Value in thousands of millions of *soles*	Number of Withdrawals	Value in thousands of millions of *soles*
Juntos	43,812,253	7.36	40,386,566	7.25
Pensión 65	12,802,437	3.16	11,754,433	3.13
Beca 18	2,133,128	1.91	11,242,795	1.89

The Juntos program was created by President Toledo's administration in 2016, his last year of tenure, mostly inspired by a similar program in Brazil. It was focused on the 100 poorest districts of Peru, which comprised around 5 percent of the districts but only around 2 percent of the households. The following administration, that of President García, continued with Juntos and in its last year created Pensión 65 as a pilot program with 13,000 beneficiaries (less than 1 percent of the total population over 65 years old). The Humala administration won with an electoral promise of a massive upsizing for Pensión 65 and to create the Beca 18 program. The Kuczynski (PPK) administration continued the previous trend without creating any new programs. The data up to August 2017 shows that Humala did fulfill his promise: his administration enrolled 63 percent of total beneficiaries.

Table 3. Enrollment by Presidential Administration

Program	Toledo	García	Humala	PPK
Juntos	131,507	448,112	529,063	65,524
Pensión 65		13,019	618,237	58,830
Beca 18			74,660	9,098
TOTAL	131,507	461,131	1,221,960	133,452

The Banco de la Nación account records are usefully complemented by information from the RENIEC data on personal identification. There, we can find such information as sex, date of birth, place of birth, marital status, education level, and place of residence. This information was available in February 2017 for a subset of Juntos, but at present time is unavailable for Juntos or the other two programs.

The next step requires a definition of what is meant by an account that is "non-zombie." The simplest definition is one that accumulates balances and, therefore, becomes a store of value. However, even then, it is necessary to define a lower limit for such an

accumulation. Surely, accumulating US$30 over a 10-year period would not qualify an account as being non-zombie. In the Peruvian data, 6 percent of the accounts have balances above 400 *soles*—that is, two times the bimonthly conditional transfer amount; 3 percent have balances about 600 *soles*, and only 2 percent above 800 *soles*. One might conclude that account holders maintain only precautionary balances against shortfall or other failures by the government to deliver funds as expected, but do not really save in these accounts. It follows that it is worth looking at alternative definitions of dormant accounts.

Two other definitions are plausible: (a) use of the accounts to receive non-government deposits, and (b) use of the accounts to make payments well in excess of what comes in from the government deposits. Both definitions capture the conversion of what are originally passive government accounts into actively managed financial facilities. Because receipts and expenditures are naturally related, these definitions are organically related, as the statistical results eventually show. These twin definitions are henceforth adopted.

There is still an issue of threshold: how large do non-government deposits have to be, and/or how frequent, to qualify the account as non-zombie? Likewise, how much of an "excess" expenditure above and beyond the government-provided income makes an account a "financial facility"?

It is tempting to set the thresholds on the basis of some extraneous criterion. However, it is also possible to let the data speak and look to maximize the difference in behavior between the owners of zombie and non-zombie accounts.

On this basis, partial information available only for Juntos and that allowed extensive analysis shows that accounts receiving at least one non-government deposit of 300 *soles* or more per month qualify optimally as being considered non-zombie. Likewise, an account with an expenditure at least once per month of 700 *soles* or more is optimally non-zombie on the expenditure side. The income-expenditure link operates at two conditional transfers plus 300. For the respective econometric analysis, please see Appendix 3.

The result shows that only 10 percent of accounts of Juntos beneficiaries received at least one deposit above 1 *sol* from a third party; of those, 38 percent were non-zombie accounts. A detailed breakdown by presidential administration can be found in Table 4. Note that successive administrations enrolled fewer poor people as the Juntos program expanded. For the other two, the inclusion criteria stayed unchanged.

Table 4. Threshold of 300 *Soles* for Identification of Zombie Accounts by Deposits from a Third Party, by Presidential Administration (Juntos)

Administration	Cohort Size	Beneficiaries with third-party deposits	% with deposit	Mean	Median	Of these, deposits of more than 300 *soles*
Toledo	131,507	8,979	6.8%	202	68	25.0%
García	448,112	44,479	9.9%	263	100	31.9%
Humala	529,063	65,613	12.4%	285	148	44.3%
PPK	65,524	2,131	3.3%	207	125	31.3%
Total	1,174,206	121,202	10.3%	269	116	38.1%

At Pensión 65, the situation is dire; only around 1 percent of beneficiaries received any deposit of more than 1 *sol* from a third party, and of these only one fifth are non-zombie. Pensión 65 thus appears to show low financial inclusion. The main reason for this low use of accounts appears to be the enforcement of an "only in-person transactions" rule for security purposes. This means no magnetic cards are authorized for withdrawals at ATMs or corresponding cashiers. That certainly makes these accounts less usable for any purpose other than withdrawing the beneficiary's pension.

Table 5. Threshold of 300 *Soles* for Identification of Zombie Accounts by Deposits from a Third Party, by Presidential Administration (Pensión 65)

Administration	Cohort Size	Beneficiaries with third-party deposits	% with deposit	Mean	Median	Of these, deposits of more than 300 *soles*
García	13,019	977	7.5%	158	10	12.6%
Humala	618,237	5,424	0.9%	341	214	19.5%
PPK	58,830	83	0.1%	165	150	8.4%
Total	690,086	6,484	0.9%	311	195	18.3%

In the case of Beca 18, whose beneficiaries are overwhelming young and urban, the incidence of deposits from third parties comprises more than two thirds of total deposits, and nearly half of all accounts are non-zombie. In addition to the socioeconomic characteristics of the beneficiaries, it is important to note that metropolitan areas are well serviced by financial institutions and the use of magnetic cards is extremely common.

Table 6. Threshold of 300 *Soles* for Identification of Zombie Accounts by Deposits from a Third Party, by Presidential Administration (Beca 18)

Administration	Cohort Size	Beneficiaries with third-party deposits	% with deposit	Mean	Median	Of these, deposits of more than 300 *soles*
Humala	74,660	50,637	67.8%	2892	700	50.4%
PPK	9,098	6,557	72.1%	610	10	23.1%
Total	83,758	57,194	68.3%	2630	561	47.3%

In terms of withdrawals, every account holder needs to withdraw at least the amount of the conditional transfer, and the threshold for being non-zombie is at least one withdrawal per month of 700 *soles* or more. A systemic result is found in older cohorts, which are located in poorer, more rural areas: They show the highest rate for non-zombie accounts. The explanation for this finding is most likely the lack of financial points of access; as soon as an opportunity to withdraw appears, a cash-out materializes.

Table 7. Average Withdrawal and Percentage above the 700 *Soles* Threshold to Identify Non-Zombie Accounts, by Presidential Administration and by Program

Administration	Juntos		Pensión 65		Beca 18	
	Beneficiaries	% above 700 *soles*	Beneficiaries	% above 700 *soles*	Beneficiaries	% above 700 *soles*
Toledo	131,507	15.6%				
García	448,112	11.2%	13,019	32.1%		
Humala	529,063	8.7%	618,237	10.8%	74,660	95.2%
PPK	65,524	1.2%	58,830	3.0%	9,098	75.9%
Total	1,174,206	10.1%	690,086	10.6%	83,758	93.1%

Prima Facie Potential for Converting Dormant Accounts to Digital Wallets

Consider what would happen if in addition to the government creating bank accounts for the social program beneficiaries, it also created digital wallets for each of them where the money would be routinely available. What might then become possible? The following are some of the more obvious consequences:

- *No one would need to go to a Banco de la Nación office to pick up their cash, or to meet a Banco de la Nación truck, because the funds would now appear in the digital wallet on a beneficiary's cell phone*. This would lead to large savings for the beneficiaries, who would no longer have to incur the time and money costs of travelling to a Banco de la Nación office to pick up their money. It would also provide a cost savings to the Banco de la Nación in terms of teller time and cash-transport

costs. In addition, it might raise the productivity of the Banco de la Nación offices, if they could now spend time on more productive tasks than attending to long queues of people looking to pick up their social program benefits. There are colorful anecdotes of "related services" provided by some Banco de la Nación offices to customers, but evidently at a cost to the bank. A particular one originates in offices where the beneficiaries arrive in town around 6 am by the available modes of transportation, but the Banco de la Nación offices normally open at 8 am. The bank pays vendors to be available outside the closed offices to provide hot drinks to the waiting customers, and the offices open an hour earlier on those days when beneficiaries are expected to come and collect their money.

- *Armored trucks no longer need to travel to far-away villages to deliver cash; it would appear in the beneficiaries' cell phones instead*. This generates a variety of savings related to cash-transport services, such as no longer needing Banco de la Nación functionaries or guards to accompany the trucks.

- *Older citizens as well as those with poor literacy will have problems accessing their money*. These beneficiaries will have to be taught how to operate cell phones. Fortunately, even people who are functionally illiterate tend to know numbers, but there will be quite a few people who will have trouble learning the steps to operate even the simplest cell phone. The option to continue to receive cash as before will therefore need to be maintained for this section of the beneficiary population.

- *The major problem with this change will occur when the beneficiaries want to spend the money they have received. Will there be anybody willing to accept digital money?*

There does appear to be an enormous potential benefit in delivering social payments digitally, but only if the digital funds are usable. The next sections will explore this and related topics in detail.

Basic Requirements for Converting Dormant Accounts to Digital Wallets

In the preceding section we came to the conclusion that putting the social program money in digital wallets was preferable to the current system of putting it into what are often zombie accounts, on the single condition that there be a way to spend that digital money on goods and services. Now we will examine in more detail what is required for digital money to be acceptable, other than there being a way to spend it.

Users' Requirements

End-user needs

The end user of a digital wallet (i.e., the consumer) requires the digital wallet to satisfy certain characteristics for it to satisfy his or her needs and for the digital wallet therefore to be used:

- *Absolute certainty*: When somebody pays in cash, the receipt of the money is absolutely certain. When somebody pays by check, there is no absolute certainty, only a high probability that the check will clear. With a digital wallet, absolute certainty is expected—*and obtained*. When payment is made from a digital wallet, the payer sees his balance go down and the receiver sees his balance go up *in real time*. Hence it takes no more time to pay by cell phone than it takes to hand over cash. In both cases, there is absolute certainty that payment has taken place.

- *Ease of use/simple to learn*: To pay in cash, you need to be able to read numbers and count; to pay on a cell phone, you also need to know which buttons to push in a particular sequence. To make digital payments, *one does not need to know how to read and write*, although it would help. As long as somebody shows users how to use the digital wallet, they can then use it by rote. There was considerable doubt as to whether cell phone users in remote areas would be able to quickly learn how to use digital wallets. The evidence from Peru is that learning is very fast, especially because the Peruvian system is not based on smartphones but on more basic non-smart cell phones. In addition, it has become clear that young children willingly show their parents how to perform the requisite operations. On the other hand, evidence from Paraguay indicates that swipes are easier to learn to use than phones but are significantly less secure.

- *Cost savings*: Here the goal is for paying by digital wallet to be no more expensive than paying in cash. This is easy to say and difficult to quantify. How much does the use of cash actually cost the consumer? One might be tempted to say that the cost is the interest that could be earned if one could keep the cash on deposit until the moment one needs to spend it. But this argument uses a hypothetical standard that in reality applies to a minuscule fraction of people. To begin with, there is no practical way at present for most people to withdraw funds just in time" before they need them, for the simple reason that most citizens do not live close enough to a cash-out point to

make such a practice a realistic option. So interest lost or earned is not a good indicator.

It is more realistic to consider the cost of withdrawing the money from a cash-out point in order to have it available. This cost comprises the actual fee charged by the cash-out location, the cost of travel to and from the respective location, and the value of the time spent to complete the transaction (including travel time). The largest of these is usually the transportation cost; next comes the time cost. Neither is negligible. Because obtaining cash is costly, both in money and in time, it makes sense to compare the cost of obtaining cash to the cost of obtaining a credit in a digital wallet. Unquestionably, the latter is substantially lower than the former, though where the cash is delivered to the beneficiary by the fiscal agent via armored truck, as occurs for some of the beneficiaries of Juntos in Peru, the cost to the consumer of obtaining the cash is minimal.

The implication of considering the cost of obtaining cash is that a rational user should be willing to pay some amount for the cost savings arising from the use of a digital wallet. Behavior here may well differ from strict rationality, however, and it may be that the average consumer is unwilling to pay more for a bar of soap when using a digital wallet than they would pay for the same soap using cash. Might this be different once *most* transactions are completed digitally? Possibly. *But during the transition period it will not be so.*

- *Time savings*: Time can enter the equation at several points. One is at the completion of a transaction; another can be at the time when cash needs to be procured. The latter of these has been discussed in the preceding point: cash takes time to be procured, and insofar as time has a cost, saving time will be advantageous.

  Time related to the completion of a transaction focuses on a different dimension: consider the case of a mother who wishes to send her son, who is studying in town, money to pay for additional books he needs to buy. With the digital wallet, this is done instantaneously. Without a digital wallet, the mother will need to go to a bank and stand in line to complete the transaction.

- *Convenience*: While this element is akin to saving time, there is a difference. The digital wallet is easy to use, *but only once one has learned how to do so.* So there is, at minimum, a transition problem. However, with digital wallets, many transactions are facilitated, less complex planning is needed to make or

receive payments, and one's financial life becomes simpler. This is what convenience is all about.

- *Ease of conversion to/from "ordinary money"*: Cashing in and out should be easy, quick, and have no explicit transaction cost. One obvious way to implement such conversion is to allow seamless transfers between a customer's regular bank account and digital wallet—in both directions. The importance of such a practice is slowly being recognized by bankers.

- *Safety*: It is difficult to steal from a digital wallet! Stealing the cell phone does not steal the money. What is more, if the cell phone is stolen, it is easy to block the account. Digital money is thus safer than cash by a significant dimension. Of course, it is not impossible to steal money from a digital wallet, but it requires forcing the owner to actually initiate a transfer to the thief's phone, from where the thief would then need to cash out the money. Along the way, the danger to the thief of becoming identified is not negligible. So there is a considerable disincentive for theft from digital wallets.

- So far, we've covered the plusses. However*, there is also a minus: cash transactions are anonymous; payments from a digital wallet are not.* This may be important in some circumstances, such as when participants suspect that some third party—say the tax authority—may wish to be informed about payments and/or revenues. As a practical matter, this concern is more a fear than a reality, because digital transactions are typically small enough to be clearly non-taxable. But such fear may be enough of a motivator to keep some potential users away from digital wallets until such time as the perceived benefits will outweigh the perceived dangers of the absence of anonymity by a sufficiently large margin.

Cost to end users and intermediaries

Cost of usage evidently matters, as does who pays these costs. Pagos del Perú, the digital transactions platform of the Peruvian financial system, has thought long and hard about these issues and has established the following tariffs:

Cash-in: to put money into a digital wallet	Free
Cash-out: to withdraw money (up to 100 *soles*)	1 *sol*
Cash-out: to withdraw money (more than 100 *soles*)	1 percent (max 5 *soles*)
Remittances: Regarded as equal to cash-in plus cash-out, hence same as cash-out	

There are not yet published rates for other digital wallet activities. However, there are some payments that can currently be made with no cost, such as RUS tax payments (SME benefit), TECSUP labor training program, and recharging cell phones.

The tariff for remittances was set taking into account the cost of alternative delivery systems, such as bank remittances, sending a package with the money inside by bus or cab, or using any one of many courier services. Another consideration was the potential for developing a whole new (and large) market if the price of the service was kept low. In turn, the cash-out tariff was set at a level that would make it attractive for a correspondent cashier to become a cash-out point.

A recent innovation in two major banks consists of connecting regular deposit bank accounts to digital wallets. These banks allow an automatic transfer from regular accounts to BIM accounts (the name for Peru's digital wallets). In essence, this implies an automatic overdraft protection: whenever there is not enough money in a BIM account but the owner has funds in his/her regular account, those funds can automatically cover withdrawals or payments from the BIM account. Movement in the opposite direction has not yet been made equally simple, however, and withdrawing from a digital wallet still requires users to go to a cash-out point.

There is a presumption that the cost of personal digital payments to businesses (P2B) will need to be zero, in order to avoid providing an apparent incentive to pay in cash. Note the discussion above regarding the true cost of using cash in relation to the perceived cost of cash and digital wallets. If the consumer faces a price of $1 for a product when paying in cash, and $1.05 when paying with the digital wallet, then the consensus view is that he will pay in cash, *and want to avoid moving his cash into the digital wallet, so that he will not have to pay more than absolutely necessary for his purchases.*

In the Peruvian system, it has not yet been established who will pay for the P2B costs that will exist and who will pay for the B2B costs. Some relevant principles for pricing will be discussed in a later section. In any case, these rates do not directly affect the personal use of digital wallets.

Assurance of a valid value proposition

User needs have been detailed in the preceding section, and they do not seem hard to satisfy. Compared to the use of cash, digital wallets can be equally effective as a means of payment, as well as more available, more convenient, cheaper to operate, and safer, among other benefits. It is not even a true drawback that digital wallets are not anonymous.

The question that needs to be explored is whether in the whole financial ecosystem the digital wallet turns out to be cheaper and better. The answer again is yes: a fully functioning ecosystem of digital money is certainly cheaper, safer, more reliable, and faster

than our conventional "old-fashioned" system based on cash and conventional money transfers.

Consider, for example, what happens in the payment chain for beer. At the end of the chain is the consumer who buys the beer from the tiny retail shop in the village. One level down is a slightly larger village shop that supplies the tiny retail shop not only with beer but with most of the other products the tiny shop sells. At the third level, there is likely to be a small distributor who supplies a number of stores in a defined area. Let us assume, now, that the beer company's delivery truck actually supplies this third-level distributor directly. This means that the truck's driver will need to receive payment for the merchandise delivered. However, before the cash reaches the truck, it has already gone through three levels of retail merchandising. It has had to be counted at least twice at each level, once by the payer and another time by the receiver. It may have actually been counted four times at each level, perhaps as the husband-and-wife owners needed to make sure there was no mistake in the money handed over or received.

Once the money reaches the truck, it needs to be counted and recorded and entered into a ledger, at least once by the payer and another time by the truck driver. Then, as the truck makes its rounds and receives payment, it may well exceed the maximum the truck driver is allowed to transport. If that occurs, he needs to return to an intermediate base to unload the money, which is counted by the driver and the receiver. In turn, the "collection consolidator" needs to expedite the money further, which may involve transporting it in an armored vehicle or depositing it in a bank, depending on the geographical availability of banking institutions. All of that is expensive and time consuming.

It follows that replacing that whole chain of cash handling will save time and money. Accordingly, breweries and other sellers of basic staples should have a very strong interest in moving to digital payments. Indeed, the accrued savings for these sellers over handling cash would more than pay for the costs of the whole digital payments system. If the players at every level could make the switch at the same time, in one fell swoop so to speak, there would be a value proposition for everyone in the payments chain. But that would require an unrealistic level of coordination. It is far more likely that digitalization will occur in fits and starts and very partially. Under such circumstances, the business case and value proposition are much less obvious.

The challenge then is how to design a feasible path to replacing cash with digital wallets. The difficult part is not filling up the digital wallet of the consumer, but generating the interlocking system for receiving the consumers' digital expenditures in a technically feasible fashion, without undue costs, and with incentives to all participants along the payments chain to move to using digital money.

Minimum Ecosystem Requirements for Digital Wallets to Function

As one considers the requirements of an ecosystem of digital finance (wallets), it becomes apparent that there are some absolutely indispensable requirements and others that range from highly desirable to somewhat dispensable. The following comprise an appraisal of the situation.

- *Connectivity in cell coverage*: An absolute requirement. Without cell coverage there can be no digital wallets, although there may be other types of digital finance, such as that provided by credit or debit cards. But cell phones and their digital wallets provide a potential of geographic penetration that no other medium has. That is why digital wallets are the most notable innovation in payments systems since the invention of paper money.

  Note, moreover, that when the older SMS and SDDA protocols are used, there is no need for smartphones and less bandwidth is required than is needed for voice communication.

- *Cash-in/cash-out facilities:* These facilities are necessary for the conversion of old-fashioned paper (or bank) money to digital currency. They are particularly critical in the early stages of the creation of a digital money ecosystem, while there are not yet many establishments that will accept payments from the digital wallet. As the system matures and payments between one digital wallet and another become the standard medium for transacting, they will decline in importance. During the transition period, however, the availability, extent, and accessibility of cash-in/cash-out points is very important.

- *Interoperability of platforms*: Interoperability can be used for different parts of the system and to different extents.

  - *Telephone company (Telco) interoperability* comes closest to being indispensable, yet that is not quite so. M-Pesa in Kenya and Tigo in Paraguay function quite well without being universally interoperable. Still, just as we think all phones should be able to communicate with each other, so, in principle, should digital wallets be connected. There is a question of price, though. Should the cost within telcos be the same as across telcos? The constructive answer is that there should be one rate, even though it is not clear that a system with different rates for different services within the same telco and across telcos could not survive perfectly well.

- *Bank and other financial institutions' interoperability is certainly desirable.* The whole point of digital wallets is to enable easy shuttling around of funds. If that disappears because each set of bank customers has to stay within his or her own bank, much of the advantage of digital wallets would be lost. Hence, while not an absolute necessity, a major part of the banking system should be connected.

- There is also another aspect of the banking system's interoperability that is very important: *two-way automatic transfers between digital wallets and their owners' bank accounts.* Since in most systems digital wallets are differentiated from bank accounts, even when owned by the same person, two-way automatic transfer needs to be specifically recorded as of importance. Even more important is to have automatic pay-in from owners' bank accounts, which provides an easy way to replenish digital wallets.

- *Interoperability of corresponding cashier networks* is another aspect of interoperability that contributes mightily to the ecosystem's effectiveness, especially in the early stages of development. As mentioned earlier, during the start-up phase of the ecosystem, cash-in and cash-out are much more frequent than once the system is fully developed. For one thing, people want to put only as much cash into their digital wallets as they expect to be able to use in the few places that accept digital payments. For another, if they receive digital payments, they will want to convert these to cash because, again, they have limited outlets for the digital version. As the ecosystem develops and more payments are received and made by means of digital wallets, it will also become more common for value to be stored in these wallets. Accordingly, there will be much less urgency to cash out, and therefore also less need for cash-in/cash-out points of service. In this context, the two-way link between a person's bank account and digital wallet, allowing for seamless transfer between them, will also substantially reduce the demand for cash-in and cash-out points.

  It should be noted that corresponding cashiers are not automatically interoperable because each is, in principle, the corresponding cashier for a particular bank. Nonetheless, multiple banks can be served by the same corresponding cashier, provided the proper interface is set up on the point-of-sale system (POS).

- *A formula for paying for the net costs of the system*: For every link in the payments chain, from the consumer on down through the various levels of merchandising, there must be an advantageous business case, or at least one that leaves no one worse off in comparison to using cash. Because the major savings from using cash are concentrated at the producer, wholesaler, and large retailer levels, it becomes necessary to develop a system whereby any additional costs that may appear at the small retail level are paid for by the beneficiaries lower down on the selling chain.

Market requirements for effective operation

The ecosystem embedding the digital wallets must be market sustainable. That translates to a set of minimal requirements:

- *Microeconomic incentives:* The business model must be attractive.
  - The business case must be attractive at all levels:
    - Consumers must find that to receive their income is cheaper and more convenient if it is paid into a digital wallet.
    - Small village retailers must find that it is better for them to receive payment from digital wallets, despite the learning costs involved, and then, in turn, to make digital payment to their suppliers.
    - Larger retailers selling to small village retailers must find that it is attractive and convenient to receive payment in digital form and then, in turn, to pay their bills in the same way.
    - Retail networks and producers must find that they benefit from the economies involved when they move from handling cash to digital payments
  - Tax obligations and tax-reporting requirements must be set in such a manner as to avoid generating a binding disincentive to digital payments.
  - The business case must be attractive not only once the ecosystem is established; it must incorporate the incentives to actually trigger the ecosystem's development. There is a chicken-and-egg aspect to the development of the ecosystem, where consumers need to find a place to spend their digital currency and sellers need to find buyers that want to pay from digital wallets. Such a situation offers potential for a public policy intervention to become the trigger, and one such intervention could be the massive funding of digital wallets as part of the social transfer policies.

- Finally, it is important for all market participants to be aware of the potential profitability of the ecosystem, so that expectations and business projections are realistically aligned. This will enable individual businesses to make proper projections of profitability three and five years hence, and on the basis of such projections decide their investment and general business strategy.

- *Cost considerations:*
  - The payments industry is characterized by decreasing cost as a result of enormous economies of scale. Hence the challenge is how to cover the initial cost in setting up the different parts of the ecosystem, and then recover these costs over a time period consistent with a profitable business model, while keeping the price of the service low enough to avoid discouraging users.
  - In addition, this industry is characterized by a continuous updating of technology. Therefore, the business model must incorporate a recurrent investment cost to stay abreast of the most recent improvements. Consider, for instance, the need for updates in the area of cybersecurity.

- *Minimum Required Scale*: Some jurisdictions are simply too small to be able to install a digital wallet system, even if every single inhabitant had two digital wallets. The solution then becomes a multinational one: several small jurisdictions need to band together and share a platform. This does not mean that there need be interoperability between the different national systems, but it does mean that the operating platform and significant parts of the hardware and software need to be standardized so that the requisite economies of scale can be garnered.

Regulatory and institutional requirements

A framework is always needed for new social arrangements to work, and digital wallets are no exception. It follows that a regulatory and institutional structure is needed, and that structure comes in two varieties: (i) laws, rules, and regulations and (ii) private agreements.

(i)   Laws, Rules, and Regulations

Social arrangements beget laws, laws beget regulations, and regulations beget implementation guidelines. Those are the "natural laws" of social organization. Hence, digital wallets need to operate and be seen to operate within a well-structured framework that guarantees their safety, reliability, and permanence. Moreover, there needs to be a regulator

charged with ensuring proper functioning who is also available to improve the regulations or implementation guidelines as needed and also to adjudicate disputes and ensure that the public interest is always kept in mind.

(ii)   Private Agreements

Interoperability, interconnectedness, sharing of cash-in/cash out points, and interoperable POSs are all matters subject to agreement at the industry level. The same is true of pricing and the related sharing of the new revenue pie that becomes available as a result of this new activity.

However, it should be noted that moving to digital wallets will also eliminate some preexisting sources of revenue. Consider, for example, the charges levied by banks when making transfers, be it between accounts belonging to different individuals or between individuals in different locations. Digital wallets will replace all but the largest of these operations.

On the other hand, as digital wallets significantly reduce the requirement for bank tellers and even ATMs, banks will benefit from significant savings. It might even be that some number of banks' branch offices will become redundant. Banks will then be able to sell off real estate and put the resulting cash to work in earning assets.

The various participants in the market—telcos, banks, other financial operators, payment platform operators, corresponding cashier networks, producers of basic staples, wholesaling and retailing networks—all belong to industries that are substantially concentrated. It follows that there are many possible market outcomes, any one of which could be long lasting but not therefore optimal in market or in public policy terms. Hence, again, the need for the presence of a regulator to ensure that the market outcome is not too far removed from what might considered a reasonably close to optimal outcome.

Integration of the Various Sub-Ecosystems

The previous section reviewed a number of requirements that are pertinent to dormant accounts becoming active agents for the diffusion of a digital payments system based on digital wallets. This section reviews specific parts of the ecosystem and explores how they might be assembled to facilitate the development of the ecosystem as a whole.

Digital Payments between Persons (P2P)

Payments by cell phone between persons is the most traditional use for digital wallets. The incentive to use this means of payments is very clear: it is substantially cheaper to make small payments by cell phone than by any other means. Consider that the alternative may

be to send a package by bus containing a check or currency! Or, at best, one needs to find a bank branch and then pay the cost of a bank remittance. These are often not free even within the same bank, unless the same branch is involved.

However, three basic ingredients are needed to make the use of digital wallets effective: (a) a cash-in point, (b) a cellular carrier, and (c) a cash-out point. None of these is automatically available. Putting cash into a digital wallet may require finding a corresponding cashier of a bank network to accept the cash and convert it to digital form, perhaps charging a fee for the service. A cellular carrier may or may not have connectivity in the locality of the remitter. In turn, getting the cash back out of the phone's digital wallet requires again finding a corresponding cashier, unless the digital funds are used to make a further payment, so the final recipient is the one that needs to find the cash-out agent.

Interconnectivity is highly important all along the way. Most obviously between cellular carriers: if cellular networks do not transfer money as easily as they interconnect phone calls, digital wallets will be hampered in their effectiveness. But it is also important that cash-in/cash-out points be seamlessly interconnected so that there is effectively a single network serving all the digital wallets.

The importance of cash-in/cash-out points will decline as an increasing proportion of the flow stays within the digital wallet network. Then, individual users will be (a) able to pay others directly from their digital wallets to the recipient's digital wallet, and, (b) willing to hold balances in their digital wallets for future use.

Finally, to make it all happen it must also be allowed—that is, payments by cell phone must have regulatory sanction and be permitted. It is certainly possible to imagine a system in which no "money" changes hands but individuals shuttle around the balances of their phone minutes. But then, such minutes would effectively be "money" and it would not be long until the state concluded that its monopoly on the issue of money was being infringed. In addition, the issue of the safety and reliability of the relevant telcos would arise. After all, the original reason for regulating banks is to make sure that the public's money is safe. Unregulated banks had a bad history in the 19th century and there is no reason to repeat it. Hence regulation of payments systems is a must.

As soon as we introduce the requirement of regulation, we start on a slippery slope. How much regulation? What minimum requirements should be insisted on before a digital "bank account" can be opened? Fortunately, this question has been answered by a consensus of regulators and market participants: a "small" account ("simple" or "basic") requires only having an ID and can be opened on the phone. No physical presence nor presentation of an ID at a bank or corresponding cashier is required. It should be noted that this consensus is a major achievement and a conceptual breakthrough: it means that the principle of proportionality of risk and documentation has finally been accepted.

A further concern, also now laid to rest, relates to "smurfing"—that is, money laundering via repeated small remittances. Improvements in computer tracking have made this technique far too expensive for money launderers and far too easy for authorities to detect for it to be an effective means for remitting laundered funds.

Sophisticated use of P2P will no doubt appear with time: two-way transfers are now common, and three-way, four-way, or even crowd-way transfers are certainly conceivable. Informal payment agents will also appear: more financially sophisticated individuals will operate digital transfers to the less financially nimble for a fee. Or perhaps informal cash-in and cash-out operations will spring up. In countries with fractured geographies, this is certainly possible and may well be efficient.

There is no direct evidence at hand of the extent to which beneficiaries of government transfer payments make use of P2P, for the simple reason that there is no origin-destination tracking of withdrawals from the accounts where those payments are deposited. The Peruvian statistics cited earlier, possibly the most detailed set of data developed so far, indicate that from a cash-in perspective 3.8 percent of beneficiaries make active use of their bank accounts, while from a cash-out perspective 13.8 percent of beneficiaries are active users. However, so far the proportion of these accounts that are digital wallets is minuscule. Hence all of the potential is still only that: potential to be tapped into in the interest of building an effective digital payments ecosystem. At the same time, it should be noted that until there is a network of retail outlets willing to take payments from digital wallets in exchange for products and services, the expansion of digital "money" will be severely hampered. P2P will therefore really take off only when P2B is effective.

Digital Payments to Service Institutions (P2S)

The most applied use in this category is payment for mass transit. This is not at all surprising because mass transit has had card-read tickets for a long time. These were needed once there was a desire to charge passengers in accordance with the distance travelled. As long as a single fare was charged, no matter the distance, a simple drop box was sufficient. But once price differentiation by distance was introduced, there was a need either for a human to sell different colored tickets, or for a machine to be able to read tickets and then let people exit the system only when they had paid the requisite fare.

Making the transition from a digital ticket to a digital payment by cell phone requires some changes in hardware, but not much evolution in conception of the system. However, there are obstacles to the transition: the companies currently handling the fare collection have fixed assets that would become useless and need to be replaced if cell payments became ubiquitous, and the profits from the float represented by the sale of prepaid tickets would disappear. It follows that the operators would at minimum wish to obtain some

revenue from acceding to an integration of transport ticket sales into a wider payments system.

Beneficiaries of social transfers can make a considerable contribution to the transition to digital payments, for the beneficiaries are sizable in number; to the extent that they use the formal transport system, they represent scale. Scale in turn helps absorb the costs of transition. Insofar as social transfer payments are to urban citizens and likely users of mass transit, their use of digital wallets to pay fares will have a significant impact.

The shift to billing for utilities such as water, gas, and electricity to digital accounts instead of sending out paper bills or automatically charging bank accounts would seem to be a smooth transition. However, it is occurring very slowly. There is little evidence so far on where the obstacle lies. Is it that individuals are reluctant to move to digital wallets when they now pay with automatic debits on their bank accounts? Or is it that large sectors of the public want to be conscious of when they pay and hence do not want any kind of automatic payment, and they feel that paying by digital wallet is the first step on a slippery slope? Moreover, what role does monthly budgeting play in the public's payment habits? Again, is there a resistance to excess automaticity?

Budgeting and installment payments also play a role in the public's willingness to use digital wallets: school payments, insurance payments, health plans, and all other regular periodic payments are subject to the same concerns: what if there is a sudden shortfall; how does one cope with a personal payment crisis? Automatic payments represent a loss of flexibility and therefore make it more difficult to cope with liquidity crises.

There is however, a silver lining to this particular dark cloud: digital wallets can help establish a payments record and thereby facilitate credit. In turn, credit represents a means to cope with a sudden need for liquidity. Hence, the indirect benefits of digital payments may well overcome the immediate apparent shortcomings in their use.

The preceding is all from the point of view of the potential user of the digital wallet. The business case for receiving digital payments is quite different: digital payments save money by reducing the handling of cash. They also generate greater predictability of cash inflow. The only drawback may be that digital revenues can be easily tracked by the tax man.

A move towards receiving digital payments may also increase revenue, if there is some price and income elasticity of demand. To illustrate the point: consider the extreme case of the market woman who needs to pay the school fees for her child and, to make the payment each month, loses a half day's work and has to pay three round-trip bus fares. With digital payments, her cost for the school has gone down, and in addition her disposable income has gone up because she now no longer loses the half day of work. There has been a price effect as well as an income effect.

Juntos beneficiaries use almost no formal services and make minimal use of private service institutions. There is fairly ample usage of cell phones, but with small billings; there may be some usage of rural electricity grids, and also some formalized transport use by urban beneficiaries. Accordingly, the impact to these beneficiaries is small. By the same token, the scale effect of demand from this source is also small.

The case of Pensión 65 is quite different. This program's population of beneficiaries has a significant urban and near-urban component. Hence, they are potential users of services that could be paid from digital wallets. By the same token, a wholesale shift to payment by such digital means could imply a significant demand shock. However, to avoid identity theft, not even ATM cards have been issued, so Pensión 65 is an ultra-conventional bricks-and-mortar bank operation, without plans to develop digital payments.

Beca 18 beneficiaries are of an age and location that makes them the main population to be impacted by a shift to digital wallets. As it is, the data shows that they are the most assiduous users of their government-created accounts for all purposes. Thus, at the same time that they are the beneficiary category benefiting the most, they can also contribute the most on a per capita basis to furthering the goal of a transition to the extensive use of digital wallets. However, as their absolute number is small, the aggregate effect from this source is unlikely to be large.

Digital Payments to Businesses (P2B and B2B)

Money is not money if you cannot buy anything with it. Therefore, if a customer walks into a corner grocery store and cannot buy a coke or a beer or a hot dog and pay for it with his digital wallet, the digital ecosystem will have failed! Digital payments to businesses (P2B and B2B) are essential to making the whole ecosystem work.

Beneficiaries of transfer programs are paradigmatic candidates for deriving benefits from being able to pay out of their digital wallets. Once payments in faraway places, where the beneficiaries typically live, can be made with digital money, all the costs attendant to receiving the social transfers disappear. As a result, net income of the very poor increases, and, in some instances, quite considerably. If, in addition, the markets in which they buy become more competitive, then there is an additional increase in real income. There is only one caveat: the price of what is bought must be the same whether paid for in cash or via the digital wallet, as discussed earlier.

Notice that there is an issue of perception here. Because obtaining cash is expensive compared to the digital wallet, consumers should be willing to pay a bit more when allowed to do so using a digital wallet. However, that is not how the consumer perceives it. When faced with a higher price for payment by digital means, the usual consumer will prefer to pay in cash.

It should be noted that digital wallet operators are well aware of this typical customer behavior and therefore typically charge no fee for purchases made with digital wallets.

Cash is expensive to handle: it needs to be counted, it needs to be protected, and it needs to be insured. Cash can disappear in many ways and once gone, it is hard to trace. But even setting aside the possibility of disappearance, when cash passes through many hands, as it does in a lengthy supply chain, counting it alone turns out to be costly. Say there are five levels through which the revenue of sales passes before it gets deposited at a bank. That means that at every stage four people need to count it: two for the payer and two for the recipient. In addition, there are people who provide protection to keep the cash from being hijacked.

Replacing cash with digital transactions is vastly cheaper. Digital payments require the installation of POSs, and/or some software may need to be acquired. However, switching to digital payments requires reorganization of the payment chain and might even affect the supply chain itself.

The further down the supply chain you go, the less specialized the seller becomes, until you reach the corner store that stocks all the staples and, therefore, is in effect the terminal point for all the producer conglomerates. However, this means that different distribution chains will converge and the requisite software needs to have the capacity to keep the sales values of different chains separate. Product coding makes that possible, and, in principle, should be able to ensure that no commingling of revenues occurs.

However, coordination problems are still likely to arise when different producers' sales chains move to digital payments at different times or with different speeds. More problems will crop up if they do so with incompatible computer programs or use programs that are incapable of speaking to each other.

At the same time, as volume of throughput increases, marginal costs go down. Now we face attribution problems: should early adopters get some benefits for having led the way, or should the later adopters be entitled to keep all the gains from having increased the scale? Similarly, as different supply chains increase the scope of sales that are digitally handled, are there grounds on which some "cross-subsidization" is in order?

The characteristic of transfer programs is that they contribute scale. Hence, where scale and scope matter, incorporating a few million users at one fell swoop cannot but make any transition to digital payments easier. There may be an initial hiccup in the transition, but if programs are constructed from the outset to handle large numbers of transactions, this hiccup should not amount to much.

We are left, then, with a very significant potential contribution by transfer program accounts in the effort to make it more feasible for digital wallets to become money with which you can actually buy something.

Conclusions

- Most transfer accounts are indeed "zombie" accounts.

- In Peru, from a cash-in perspective, zombie accounts are 96.1 percent of Juntos conditional transfer accounts, 99.8 percent of Pensión 65 pensioner accounts, and 67.7 percent of Beca 18 student accounts.

- In Peru, from a cash-out perspective, zombie accounts are 89.9 percent of Juntos conditional transfer accounts, 89.4 percent of Pensión 65 pensioner accounts, and 6.9 percent of Beca 18 student accounts.

- What is particularly surprising is the high percentage of student accounts that are zombie from the cash-in perspective. One would have expected that this population, which is modern and educated, would use their accounts widely with third-party (parents') deposits. But that is not what the data presents. One possible cause may be the conviction that using these accounts for general purposes will show wealth and will therefore cause loss of the scholarship.

- Zombie accounts can evolve into non-zombie accounts, but under current conditions, this is a very slow process: for example, the first cohort of Juntos beneficiaries, which entered the program in the last year of Toledo's tenure (2006), reached 1.7 percent of non-zombie accounts by 2017, while the latest cohort to enter (August 2016 to August 2017) appears with an initial 1.0 of non-zombie accounts already. The implication is that the beneficiaries are learning to use these accounts more actively, but that learning is overwhelmed by other factors.

- The importance of geographic location is in evidence when relating zombiness to incorporation of beneficiaries by administration. The Toledo cohorts are in more remote locations by any criterion of availability of financial services, and the PPK cohorts are the least remote. Non-zombiness increases notably across administrations, reflecting this particular circumstance.

Policy Recommendations

The most powerful impact that can be achieved by exploiting the potential demand effect of zombie accounts is the "instantaneous" demand that can be created for products sold by retailers who accept payment from digital wallets wherever beneficiaries reside. This can be achieved by several methods:

- *Work from the bottom up* with the producers of staples who have the largest costs related to using cash. In this modality, agreements are reached with the producers of the main staples—beer and soft drinks, edible oil and margarine, flour and pastas,

and fuel—to take payment from their distributors and sub-distributors in digital form. Even more effective is when these large corporations *require* their distributors, all the way down the chain, to accept payment from their customers out of digital wallets. Because moving from cash to digital payments generates substantial savings, it is only reasonable that these corporations pay the digital wallet providers for the cost involved in the transaction. Indeed, there is an additional issue about who should cover the cost of digital payments for third parties who sell through the corner grocery store. Such is the case of MSMEs who produce a variety of products on a small scale. The answer here is that MSMEs should bear no cost for this service, nor should their retail customers. The cost savings for the large staple producers is large enough, and they have a sufficiently important volume of the sales, for them to be able to cover the full cost of the digital services involved.

- *Work from the top down* by fostering the appearance of itinerant merchants who will take payment from digital wallets. At the same time, all transfer payments should be made in digital form on a weekly basis. This has no significant additional cost to the government; more frequent digital entries are essentially costless. However, the impact on the beneficiaries can be considerable. With money now available on a weekly basis, products can be bought from the itinerant merchants and the need to travel to collect the transfer each month or every two months disappears. Thus, efficiency gains are realized. In addition, it may well be that prices in the countryside come down. Currently, the bunching of receipt of transfers has led to markets that only operate on the days the transfer payments are received. But because being present in these markets is costly in terms of time and money, the demand for products sold in them is inelastic. Consumers either buy on that day or have to wait one or two months until the next payday. Inelastic demand is a prescription for temporary monopolies. With such markets losing importance to the itinerant merchants, the temporary monopolies also disappear. True, itinerant merchants may also develop their recurrent clientele, but entry into the profession of itinerant merchant is very open, so one can expect competition to flourish in this segment of the market. While the itinerant merchants build up their network, the current system for paying out the benefits should be maintained in addition to the option of digital payment. No doubt the current payment system will gradually wither as beneficiaries discover the benefits of home delivery of merchandise. In the interim, it is important not to push anyone out of the existing system. Let it decline on its own. In one way or another, then, "promoting the other side of the market" is a possible policy, and is likely to be very effective indeed. Note that with the number of social program

beneficiaries, economies of scale are assured for whatever policy departure is attempted.

There is also scope for cost savings in the provision of various services, from transportation through education, health care, and insurance. This depends in part on the extent to which beneficiaries are urban dwellers and therefore make greater use of such services. The principal effect of incorporating beneficiaries as digital users comes from scale. Insofar as minimum scale is needed to install the software required to operate in the digital space, the incorporation of one or two million potential users can have major impact.

 While not the subject of this report, the advantages of the state itself accepting digital payments should not be neglected. Not only are there efficiency gains when queues at state bank tellers are replaced by cell phone entries, human error and other foibles are reduced, and, above all, citizen satisfaction is substantially increased when queues disappear.

Appendix 1

Conditional Transfer Programs in the Western Hemisphere

- **Brazil**: Bolsa Família (formerly Bolsa Escola) started in the 1990s and expanded rapidly in 2001 and 2002. It provides monthly cash payments to poor households if their school-age children (between the ages of 6 and 15) are enrolled in school, and if their younger children (under age 6) have received vaccinations.

- **Chile**: Chile Solidario, established in 2002, requires the family to sign a contract to meet 53 specified minimum conditions seen as necessary to overcome extreme poverty. In exchange, they receive from the state psychosocial support, protection bonds, guaranteed cash subsidies, and preferential access to skill development, work, and social security programs.

- **Colombia:** Familias en Acción, established in 2002, is a conditional cash transfer program very similar to the Mexican Progresa/Oportunidades, consisting of cash transfers to poor families conditional on children attending school and meeting basic preventive health care requirements.

- **Guatemala:** Mi Familia Progresa, established April 16, 2008, is a conditional cash transfer program that is intended to provide financial support to families living in poverty and extreme poverty and who have children age 0 to 15 years and/or to pregnant women or nursing mothers who live mainly in rural and marginal areas of the peripheries of urban centers (cities).

- **Honduras:** The Family Allowance Program (PRAF II), created in 1998, was based on the PRAF I program created in 1990 as a social compensation program of the government of the Republic of Honduras.

- **Jamaica:** Program of Advancement through Health and Education (PATH), administered by the Ministry of Labor and Social Security, is a conditional cash transfer program that provides cash to poor families who comply with conditions that promote the development of the human capital of their members. PATH was created in 2001 as part of a wide-ranging reform of the welfare system carried out by the government of Jamaica.

- **Mexico:** Oportunidades is the principal anti-poverty program of the Mexican government. (The program was originally called Progresa; the name was changed in 2002.) Oportunidades focuses on helping poor families in rural and urban communities invest in human capital to improve the education, health, and nutrition of their children. The Progresa program was one of the first large-scale conditional cash transfer programs.

- **Nicaragua:** The Social Protection Network, established in 2000 and implemented by the Social Emergency Fund (FISE), was terminated in 2005.
- **Panama:** Red de Oportunidades is a program offered by the government of Panama to the population under age 18 to provide them access to health services and education.
- **Peru:** Juntos was established in 2005. The program provides a monthly dividend to mothers (married or single) living in extreme poverty. Mothers can only qualify for the program if they send their children to school and take them for regular medical checkups.

Source: Wikipedia.

Statistical Tables on Peru's Social Transfer Programs

Table A1. Total Transactions and Their Value (net = excluding values below 1 *sol*)

	Number of gross transactions	Total transacted in thousands of millions of *soles* (gross)	Number of net transactions (equal to at least 1 *sol*)	Total transacted in thousands of millions of *soles* (net)
Juntos	172,113,645	14.61	84,198,819	14.61
Pensión 65	39,546,992	6.29	24,556,870	6.29
Beca 18	19,037,961	3.81	13,375,923	3.80

Note: Juntos is the program that has the most transactions of tiny size (less than 1 sol), while Beca 18 is exactly the opposite. One of the reasons is that Juntos began in 2006 and there were a number of learning-curve errors committed in entering the data, such as the way the ITF transaction tax was handled.

Table A2. Transactions of Deposits and Withdrawals (Quantity and Value, Historical)

	Number of deposits	Total in thousands of millions of *soles*	Number of Withdrawals	Total in thousands of millions of *soles*
Juntos	43,812,253	7.36	40,386,566	7.25
Pensión 65	12,802,437	3.16	11,754,433	3.13
Beca 18	2,133,128	1.91	11,242,795	1.89

Note: All programs have a "float." For Pensión 65 and Beca 18, that float is about 1 percent; for Juntos it is larger, most likely again due to early errors in data entry.

Table A3. Transactions of Deposits and Withdrawals (Quantity and Value, 2016)

	Number of deposits	Total in millions of *soles*	Number of withdrawals	Total in millions of *soles*
Juntos	4,568,054	938	4,796,710	931
Pensión 65	3,010,919	753	2,844,601	746
Beca 18	756,665	589	3,888,570	585

Note: The difference in float between Juntos and the other two programs has disappeared in this table*.*

Table A4. Channels for All Transactions Recorded by Banco de la Nación

CANAL	CONCEPTO
A	ATM BN (CAJ LOCALES)
0	POS O CAJERO ATM FORANEO NAC O EXTR
1	TELEPROCESO (VENTANILLA) INTERNET/CORRESP
2	
3	SITB (TB00 TNX X EMULAC) TNX INTERNA
4	PRESTAMOS MULTIRED
5	DEBITO AUTOMATICO
5	SOBREGIROS
6	ENCARGOS DE TERCEROS
7	PAGO DE HABERES / INTERES (TRANSACCION INTERNA)
8	+ CTRAN = 702 O T11 O 902 EMBARGO
8	COMIS MANTENIMIENTO ANT.
9	COMIS MANTENIMIENTO ACT.

Note: This table was transmitted as presented here by Banco de la Nación. Channels 3 and 7 correspond to deposits from the state to individual persons.

Table A5. Deposits Made by the State (Channels 3 and 7) and Made by All Others (Historical)

	Channels 3 and 7	Total in thousands of millions of *soles*	All other channels	Total in thousands of millions of *soles*
Juntos	42,931,048	7.11	881,205	0.247
Pensión 65	12,790,374	3.16	12,063	0.004
Beca 18	1,462,854	1.76	670,274	0.151

Note: Pensión 65 is the program in which deposits of third parties are an insignificant part of the total as compared to Juntos or Beca 18. This needs to be borne in mind in later analyses.

Table A5-A. Deposits Made by the State (Channels 3 and 7) and Made by All Others (Historical) by Transactions and Value

	Composition by Transactions		Composition by Value	
	Channels 3 and 7	Other channels	Channels 3 and 7	Other channels
Juntos	79.89%	20.11%	96.64%	3.36%
Pensión 65	99.91%	0.09%	99.89%	0.11%
Beca 18	68.58%	31.42%	92.10%	7.90%

Note: Juntos began in 2006, while the other two programs began in 2012. With Juntos having twice as long a series, statistical comparability is affected.

Table A6. Deposits Made by the State (Channels 3 and 7) and Made by All Others (2016)

	Channels 3 and 7	Total in millions of *soles*	Other channels	Total in millions of *soles*
Juntos	4,249,068	854	318,986	84
Pensión 65	3,007,918	752	3,001	1
Beca 18	488,266	532	268,399	56

Table A6-A. Deposits Made by the State (Channels 3 and 7) and Made by All Others (2016) by Transactions and Value

	Composition by Transactions		Composition by Value	
	Channels 3 and 7	Other channels	Channels 3 and 7	Other channels
Juntos	93.02%	6.98%	91.07%	8.93%
Pensión 65	99.90%	0.10%	99.90%	0.10%
Beca 18	64.53%	35.47%	90.45%	9.55%

Note: In terms of monetary value, third-party deposits are around 10 percent for Juntos and Beca 18, but only 0.1 percent for Pensión 65, presumably because of the differences in the target populations. Note the reduction in the difference between Juntos and Beca 18, due to this data corresponding only to the year 2016.

Table A7. Total Number of Beneficiaries (Channel 3 and 7) (Historical and 2016, 2015, and 2014)

	Number of beneficiaries	Active beneficiaries, 2016	Active beneficiaries, 2015	Active beneficiaries, 2014
Juntos	1,174,206	812,876	877,704	867,582
Pensión 65	690,086	547,146	532,075	475,835
Beca 18	83,758	56,660	55,868	24,381

Note: the slight reduction in beneficiaries in Juntos 2016 and the strong increase in Beca 18 beneficiaries in 2015 and 2016.

Table A8. Beneficiaries Accepted into the Programs, by Presidential Administration

	Toledo	García	Humala	PPK
Juntos	131,507	448,112	529,063	65,524
Pensión 65		13,019	618,237	58,830
Beca 18			74,660	9,098
TOTAL	131,507	461,131	1,221,960	133,452

Note: During the Humala administration, some 63 percent of all beneficiaries were admitted into the programs.

Table A9. Beneficiaries Accepted into the Programs, by Calendar Year

Year	Juntos	Pensión 65	Beca 18
2006	160,614		
2007	224,322		
2008	88,007		
2009	23,585		
2010	71,995		
2011	35,203	32,137	
2012	183,720	236,145	5,382
2013	118,530	85,177	6,850
2014	157,050	171,857	14,588
2015	39,665	86,510	36,660
2016	28,321	48,307	16,007
2017	43,194	29,953	4,271
TOTAL	1,174,206	690,086	83,758

Table A10. Number of Deposits from Third Parties, by Calendar Year and Percentiles (10-25-50-75-90) in *Soles* (Juntos)

Year	Deposits	p10	p25	p50	p75	p90
2006	324	100	100	100	100	200
2007	837	70	100	100	100	200
2008	1,353	100	100	100	100	250
2009	1,290	52	100	100	200	350
2010	2,144	10	20	100	200	400
2011	10,848	5	50	110	250	700
2012	21,758	10	50	140	300	800
2013	38,317	20	70	150	300	650
2014	80,441	22	60	130	280	500
2015	170,014	20	55	120	250	500
2016	318,986	30	60	120	250	500
2017	234,893	40	70	130	265	500
Total	881,205	30	60	120	250	500

Note: The stability of the soles amounts over time, but also how starting in 2011 the number of transactions doubles each year. This can be interpreted to mean that total volume deposited does not increase due to the amount of each deposit but due to the frequency of the deposits themselves.

Table A11. Number of Deposits from Third Parties, by Calendar Year and Percentiles (10-25-50-75-90) in *Soles* (Pensión 65)

Year	Deposits	p10	p25	p50	p75	p90
2011	490	2	8	30	100	303
2012	1,105	8	50	150	250	500
2013	1,747	10	100	250	250	500
2014	1,970	10	80	200	250	500
2015	2,465	10	50	130	250	500
2016	3,001	20	50	100	250	415
2017	1,285	50	70	120	250	500
Total	12,063	10	50	150	250	500

Note: As distinct from the case of Juntos, in this case there is no increase in the number of transactions nor in the thresholds of the percentiles. This subgroup of the population does not show an increase in financial inclusion.

Table A12. Number of Deposits from Third Parties, by Calendar Year and Percentiles (10-25-50-75-90) in *Soles* (Beca 18)

Year	Deposits	p10	p25	p50	p75	p90
2012	2,610	10	50	140	400	1456
2013	14,029	30	60	120	300	887
2014	44,874	20	50	100	200	500
2015	139,853	10	50	100	200	410
2016	268,399	20	50	100	200	420
2017	200,509	21	50	100	200	500
Total	670,274	20	50	100	200	500

Note: As in the case of Juntos, here we have an increase in the number of transactions but no increase in the amounts of the transactions themselves.

Table A13. Number of Deposits from Third Parties, by Cohort 2006 of Juntos and Percentiles (10-25-50-75-90) in *Soles*

Year	Deposits	p10	p25	p50	p75	p90
2006	323	100	100	100	100	200
2007	386	40	100	100	100	266
2008	340	85	100	100	200	400
2009	342	100	100	100	200	340
2010	636	10	20	100	200	400
2011	1,549	5	10	130	200	505
2012	1,724	5	30	100	300	604
2013	2,630	5	50	150	300	623
2014	4,887	10	50	100	250	500
2015	7,383	10	50	120	300	500
2016	13,898	10	50	100	250	500
2017	9,657	50	100	150	300	500
Total	43,755	10	50	102	250	500

Note: This is the cohort (160,614 persons) with which Juntos began and it corresponds to the 100 poorest districts of Peru. Around 2012–13 one can see an increase in the value for all of the thresholds, which may well have been caused by Peru's macroeconomic cycle. On the other hand, there is also a significant increase in transactions. Note that in 2016, transactions have reached 9 percent of the cohort.

Table A14. Number of Deposits from Third Parties, by Cohort 2012 of Juntos and Percentiles (10-25-50-75-90) in *Soles*

Year	Deposits	p10	p25	p50	p75	p90
2012	451	5	40	136	201	502
2013	8,007	8	50	120	250	500
2014	22,511	20	53	120	250	500
2015	49,307	30	60	120	250	500
2016	93,636	40	60	101	240	500
2017	68,422	40	70	120	250	500
Total	242,334	38	60	110	250	500

Note: This is a cohort (183,720 persons) of Juntos that is situated approximately at the midpoint of the expansion of Juntos's coverage. The levels of the thresholds are very similar to those of the cohort of 2006. But the number of transactions in 2016 is equivalent to 51 percent of the members of the cohort. Thus, we can see that for 2016,

the first cohort had 10 years of existence and its financial inclusion, as measured by the number of transactions per beneficiary, was only one tenth, assuming full homogeneity. For the second cohort, four years of existence produced a financial inclusion, as measured by the number of transactions per beneficiary, of 50 percent. Later on, we shall see how the access to agencies and/or corresponding cashiers varies substantially by cohort, with earlier cohorts having less access to cash-out locations.

Table A15. Number of Deposits from Third Parties, by Cohort 2012 of Pensión 65 and Percentiles (10-25-50-75-90) in *Soles*

Year	Deposits	p10	p25	p50	p75	p90
2012	360	50	120	250	250	500
2013	733	50	100	250	250	500
2014	642	50	100	250	250	500
2015	645	10	50	150	250	500
2016	664	20	50	100	250	500
2017	282	40	60	103	250	350
Total	3,326	30	100	200	250	500

Note: In this case, holding the cohort constant (236,164 persons), one finds the same stability as in the aggregated data for cohorts as far as the number of transactions are concerned. Compared to Juntos 2006 or Juntos 2012, the apparent financial inclusion, as measured by the number of transactions per beneficiary, stands at a minuscule 0.3 percent.

Table A16. Number of Deposits from Third Parties, by Cohort 2012 of Beca 18 and Percentiles (10-25-50-75-90) in *Soles*

Year	Deposits	p10	p25	p50	p75	p90
2012	2,607	10	50	140	400	1462
2013	8,207	40	70	133	300	920
2014	11,398	30	50	100	250	527
2015	13,495	30	50	100	300	500
2016	13,890	31	60	120	300	500
2017	8,473	32	60	140	300	500
Total	58,070	30	51	110	300	550

Note: This cohort of Beca 18 (5,382 persons) shows a financial inclusion, as measured by the number of transactions per beneficiary, of 258 percent for 2016, five times that of the Juntos cohort of 2012. The apparent reason is that the Beca 18 beneficiaries are urban, which makes transactions much easier.

Table A17. Threshold for Percentiles (min-1-5-10-25-50-75-90-95-99-max) in *Soles* for Float (Historical)

	Juntos	Pensión 65	Beca 18
Beneficiaries	1,174,206	690,086	83,758
min	-401	-15,001	-31,050
p1	0	-253	-2,219
p5	0	-250	-645
p10	0	-250	0
p25	0	-1	3
p50	2	0	14
p75	37	0	146
p90	206	251	955
p95	404	750	1,339
p99	1,200	1,250	4,149
max	48,758	15,740	70,300

Notes:

Juntos: The top 10 percent has a float above 206 soles (one transfer including two months of payments), and 5 percent has more than 405 soles (two transfers' or four months' worth). The total float is 20 million soles.

Pensión 65: The top 10 percent has a float above 250 soles (one transfer including two months of payments).

Beca 18: The top 10 percent has a float above 955 soles. This compares as follows to the stipends received by students: to study in Lima, a Lima-residing student receives 860 soles a month, while one residing originally in the provinces receives 1,200 soles. The top 10 percent therefore keep liquidity of approximately one month's worth of the midpoint of flows of students from Lima and from the provinces. The total float is 20 million soles.

Table A18. Threshold for Percentiles (min-1-5-10-25-50-75-90-95-99-max) in *Soles* for Float (2016)

	Juntos	Pensión 65	Beca 18
Beneficiaries	829,485	558,462	62,375
min	-116,150	-7,018	-67,440
p1	-406	-500	-1,895
p5	-201	-250	-307
p10	-200	-1	-89
p25	-1	0	-2
p50	0	0	3
p75	1	0	18
p90	200	250	201
p95	200	250	598
p99	591	500	2,794
max	30,018	6,076	94,922

Note: As distinct from the total historical series, in 2016, the top 10 percent and top 5 percent of Juntos and Pensión 65 hold similar liquid balances, about one month's worth of transfers. That may imply that the higher float observed in the historical series may reflect data errors. In contrast, for Beca 18, despite the fact that the monthly payments are higher, the float for the top 19 percent and 5 percent is less than one month's worth of transfers, presumably due to the ease with which funds can be withdrawn.

Figure A1. Comparison of Tables A10, A11, and A12 for 25th Percentile
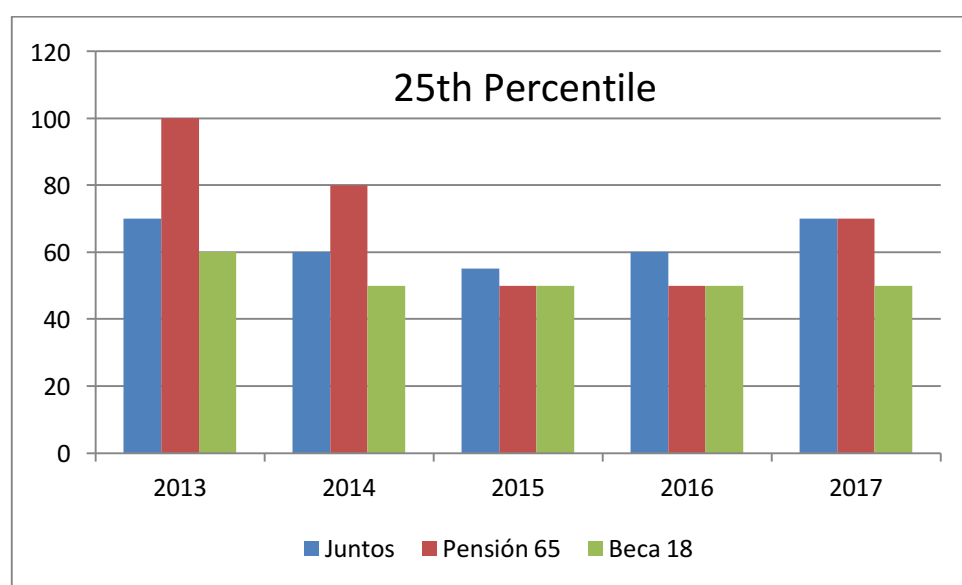
Figure A2. Comparison of Tables A10, A11, and A12 for 50th Percentile
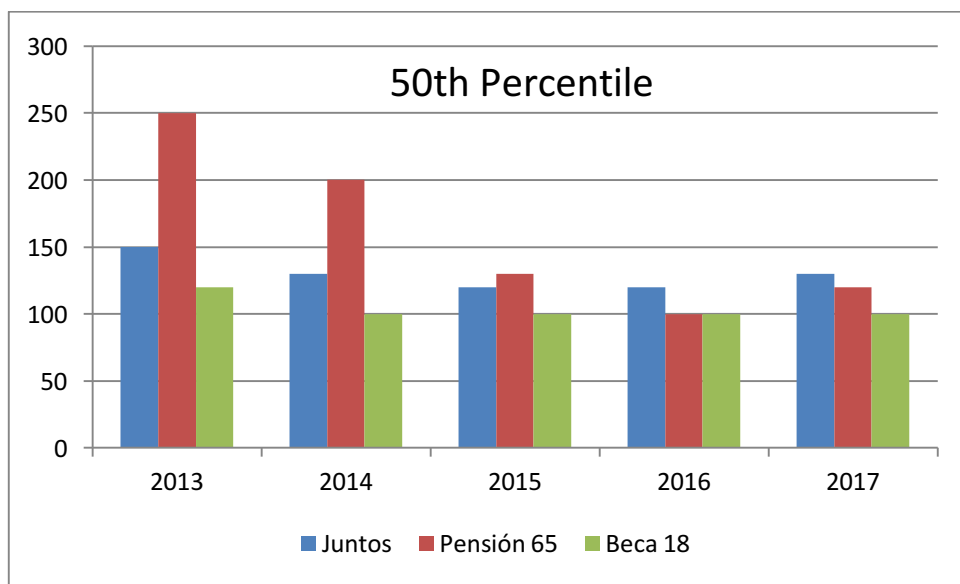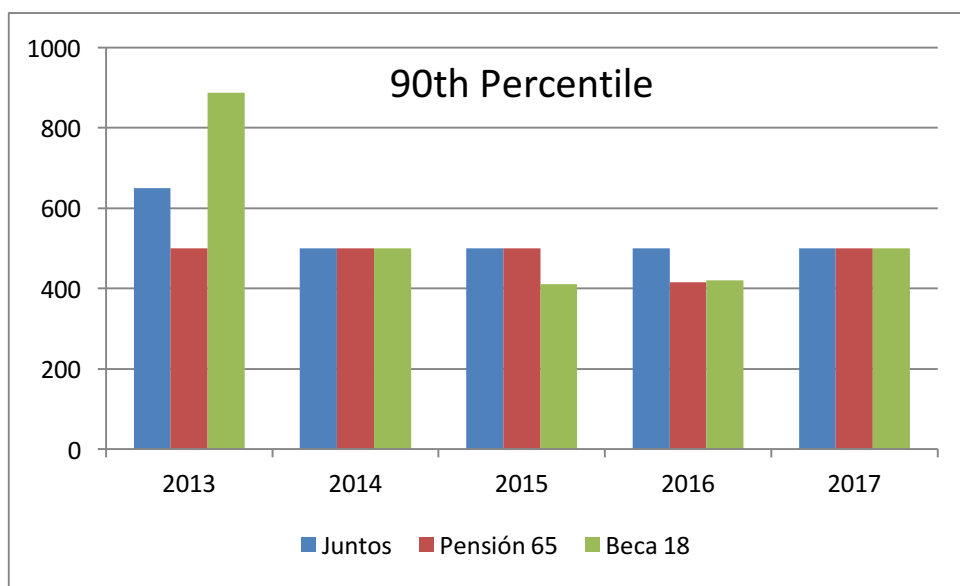

Figure A3. Comparison of Tables A10, A11, and A12 for 90th Percentile

Note: All three tables show the highest threshold levels for 2013, which is the top of the Peruvian economic cycle. On the other hand, the thresholds of the three percentile levels shown do not present substantial differences between the three programs.

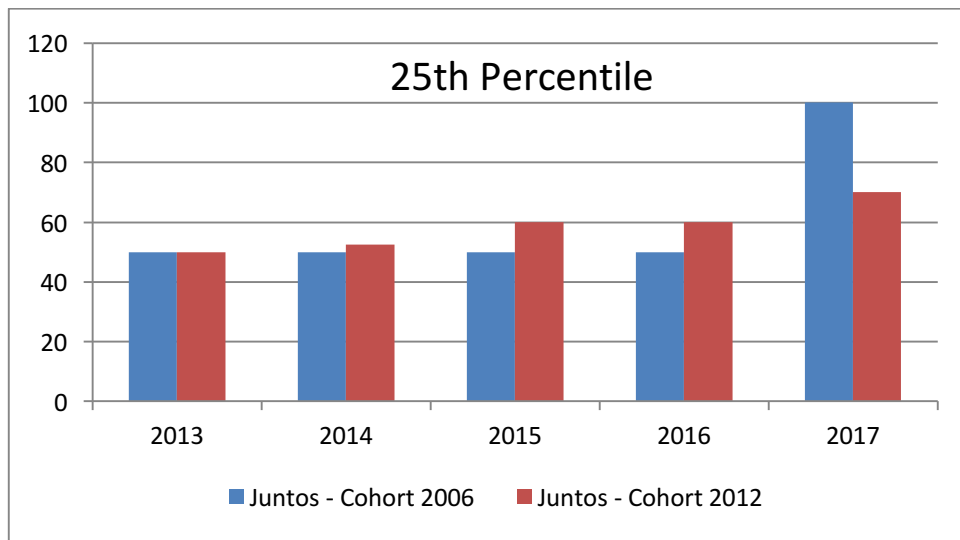**Figure A4. Comparison of Tables A13 and A14 for 25th Percentile**

Figure A5. Comparison of Tables A13 and A14 for 50th Percentile
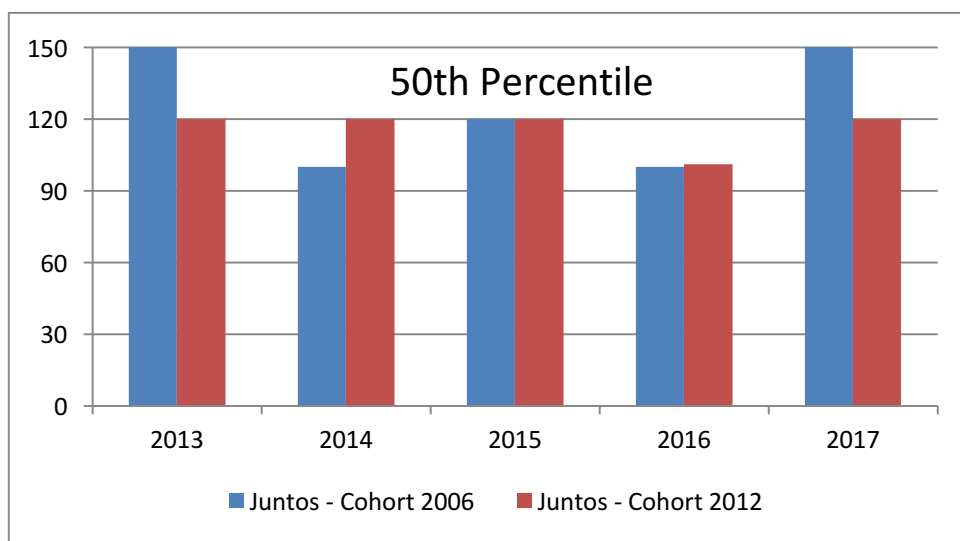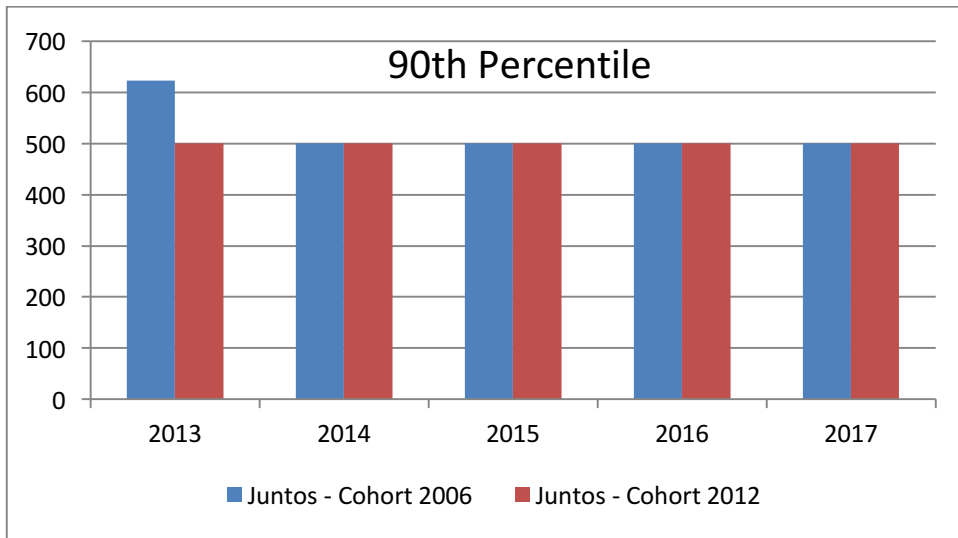
Figure A6. Comparison of Tables A13 and A14 for 90th Percentile

Note: Figures A4, A5, and A6 illustrate that the comparison of cohorts 2006 and 2012 of Juntos does not show differences in the thresholds of the percentiles. As noted before, the differences in these cases are in the transactions volume.

Figure A7. Comparison of Tables A14, A15, and A16 for 25th Percentile
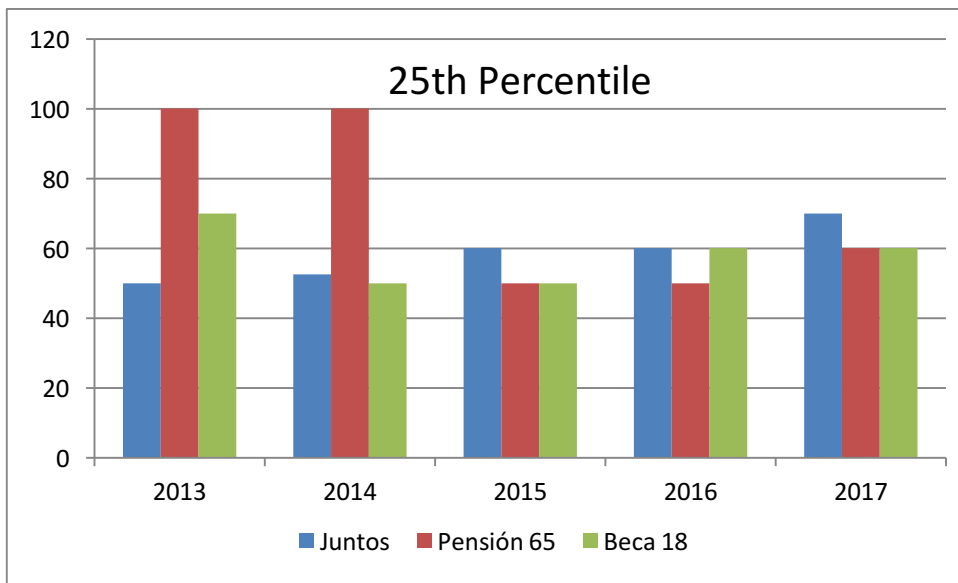
Figure A8. Comparison of Tables A14, A15, and A16 for 50th Percentile
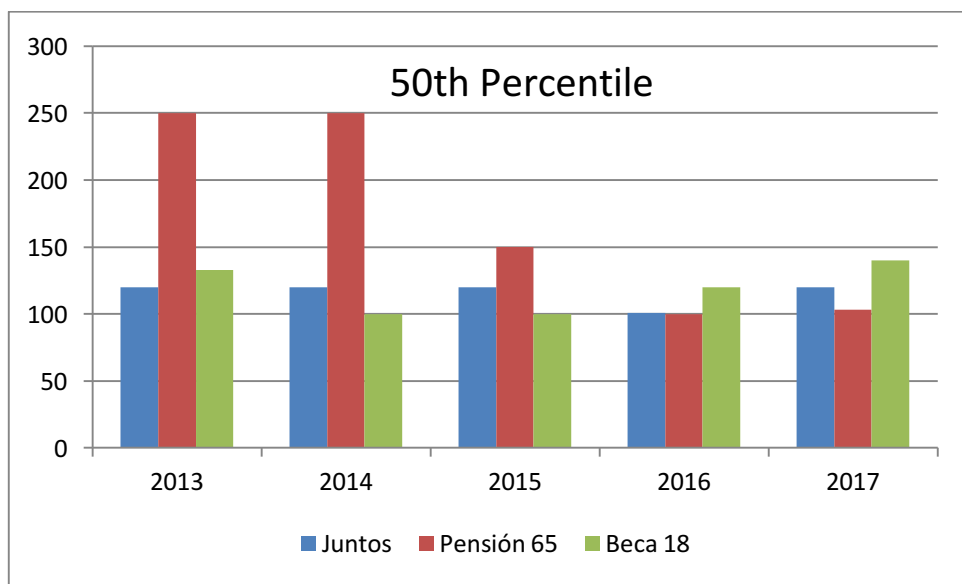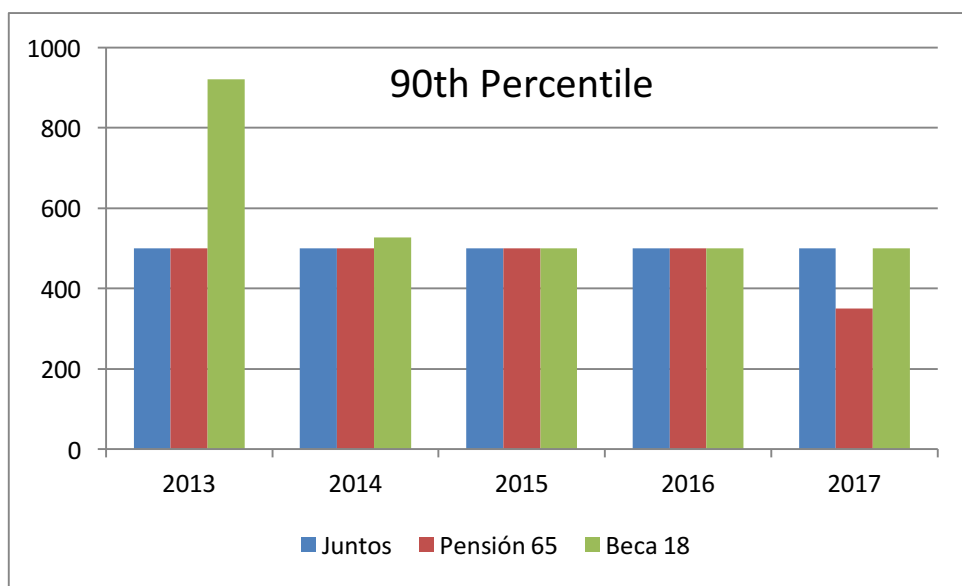

Figure A9. Comparison of Tables A14, A15, and A16 for 90th Percentile

Note: Figures A7, A8, and A9 show the same cohort of 2012 for the three social programs. From 2015 onwards, where one can argue that the learning process has been substantially completed for the cohort, there are no important differences in the thresholds of the percentiles analyzed.

Table A19. Threshold of 300 *Soles* for Zombie Identification in Deposits from Third Parties, by Presidential Administration (Juntos)

Administration	Cohort size	Beneficiaries with deposits	% with deposit	Mean	Median	Above 300 *soles*
Toledo	131,507	8,979	6.8%	202	68	25.0%
García	448,112	44,479	9.9%	263	100	31.9%
Humala	529,063	65,613	12.4%	285	148	44.3%
PPK	65,524	2,131	3.3%	207	125	31.3%
Total	1,174,206	121,202	10.3%	269	116	38.1%

Note: The progression in values from Toledo to García and from García to Humala. The degree of poverty is greater for the Toledo cohort than the García cohort and so on. The average for PPK is as low as Toledo's, but that might be because the beneficiaries were less needy and therefore already have other accounts or because they have not yet informed their networks of the availability of their account. Recall that in the case of Juntos, in the more recent cohorts, their percentage of non-zombie accounts goes up, basically because more recent cohorts live in areas of higher average incomes, and therefore also of greater number of cash-out facilities.

Table A20. Threshold of 300 *Soles* for Zombie Identification in Deposits from Third Parties, by Presidential Administration (Pensión 65)

Administration	Cohort size	Beneficiaries with deposits	% with deposit	Mean	Median	Above 300 *soles*
García	13,019	977	7.5%	158	10	12.6%
Humala	618,237	5,424	0.9%	341	214	19.5%
PPK	58,830	83	0.1%	165	150	8.4%
Total	690,086	6,484	0.9%	311	195	18.3%

Note: As in other cases, the low incidence of third-party deposits in Pensión 65 accounts; only 6,484 beneficiaries out of 690,086 received at least one deposit. The high incidence during the García administration can be explained by data entry errors, which were also found for Juntos during the Toledo administration. Regarding Pensión 65, one should note the low percentage of non-zombie accounts, even though the temporal evolution does not show a clear pattern. On the other hand, it is important to recall the low level of cash-in/cash-out operations of the beneficiaries in this program.

Table A21. Threshold of 300 *Soles* for Zombie Identification in Deposits from Third Parties, by Presidential Administration (Beca 18)

Administration	Cohort size	Beneficiaries with deposits	% with deposit	Mean	Median	Above 300 *soles*
Humala	74,660	50,637	67.8%	2892	700	50.4%
PPK	9,098	6,557	72.1%	610	10	23.1%
Total	83,758	57,194	68.3%	2630	561	47.3%

Note: the percentage of financial inclusion as measured by the number of transactions per beneficiary is practically similar in both administrations, but much higher than for Juntos or Pensión 65. This is the result, as previously pointed out, because Beca 18 is situated in an urban context. In addition, Beca 18 also has a larger proportion of non-zombie beneficiaries, which is also likely to be due to the urban context, which facilitates cash-in/cash-out operations.

Table A22. Average Withdrawal and Percentage above 700 *Soles* (Zombie Threshold), by Presidential Administration and by Program

Administration	Juntos		Pensión 65		Beca 18	
	Beneficiaries	% above 700 *soles*	Beneficiaries	% above 700 *soles*	Beneficiaries	% above 700 *soles*
Toledo	131,507	15.6%				
García	448,112	11.2%	13,019	32.1%		
Humala	529,063	8.7%	618,237	10.8%	74,660	95.2%
PPK	65,524	1.2%	58,830	3.0%	9,098	75.9%
Total	1,174,206	10.1%	690,086	10.6%	83,758	93.1%

Note: the early cohorts live in zones with less access to cash-out points. Accordingly, withdrawals of more than 700 soles occur more frequently due to the scarcity of cash-out opportunities.

Table A23. Beneficiaries Who Receive Cash Transfers Locally by Armored Truck, by Presidential Administration and by Program

Administration	Juntos		Pensión 65		Beca 18	
	Beneficiaries	% with truck	Beneficiaries	% with truck	Beneficiaries	% with truck
Toledo	131,507	61.92%				
García	448,112	47.07%	13,019	56.21%		
Humala	529,063	19.37%	618,237	28.67%	74,660	0.47%
PPK	65,524	8.07%	58,830	19.67%	9,098	0.04%
Total	1,174,206	43.23%	690,086	29.42%	83,758	0.46%

Note: the early cohorts live in areas with less access to cash-out points, hence it is more common for the withdrawal of funds to take place by armored truck.

Appendix 3

Statistical Analysis of What Makes an Account a Zombie

Database

Recall that the conditional transfer program of Peru, "Programa Juntos," is operated through Peru's Banco de la Nación. Accordingly, each beneficiary of Juntos is issued a bank account. All banking transactions are recorded in these accounts: deposits from the government, deposits from third parties, interest, fees and taxes, and miscellaneous adjustments.

All Juntos-related operations through Banco de la Nación in 2015 and 2016 were obtained for a subset of 509,917 beneficiaries. These data were cleaned up for "noise" entries as described when presenting Table 1.

The data were then merged with data from RENIEC, the government's National Identity Card Authority. Here we can find, for each ID owner, information on age, sex at birth, marital status, education level, municipality at birth, and municipality of present residence.

Finally, the government's Social Welfare Authority has a classification of districts by level of poverty. This classification of municipalities was associated with each Juntos account in our database, in order to connect each beneficiary to his or her socioeconomic context.

To reduce the size of the data set, each month's operations were aggregated for each account holder. Government deposits occurred once every two months. In turn, most withdrawals also occurred on the same schedule. The number of transactions within the month was retained. Hence, aggregating to monthly operations involved simplification of the database with minimal loss of information.

A second step was to cull from the financial database the maximum withdrawal in any month for each of the 664,820 persons in this sample, albeit for the whole historical period of their participation in the program. This was identified by analyzing the monthly withdrawal transactions (26,339,799). The resulting number was associated to each individual as appropriate. In the same way, the month in which each beneficiary entered into the system was identified and added to the database.

Deposit and Withdrawal Behavior

Account holders may have two sources of deposits: government transfers and transfers from private citizens. On the side of withdrawals, only the account holder may withdraw, so the only substantial difference is the nature of teller. The following analysis will first tackle the pattern of deposits from private citizens, because government deposits are a recurrent

activity with a pre-determined pattern. Thereafter, the pattern of withdrawal for every beneficiary will be analyzed.

(1) Non-Government Deposits

Deposits from third parties are a prima facie indication of a non-zombie account, more so if such deposits are repeat events. Thus such deposits are of special interest.

Non-government deposits were identified by a combination of mnemonic codes and location of transactions. The database contains 159,316 such transactions for 44,069 persons. In the process of consolidating data from daily to monthly, the new number of transactions becomes 141,980. The total number of individuals with monthly transactions and individual characteristics remains at 44,069.

For the econometric analysis, the following variables were available:

1. DATE — year and month of transaction
2. VALUE — value of transaction in cents of Peruvian *sol*
3. BRANCH — transaction made in bank branch (dummy)
4. N_DEPOSIT — number of transactions made in DATE
5. UBIGEO_R — code for municipality of residence
6. FIRST_D — first entry date observed for a beneficiary
7. LAST_D — last entry date observed for a beneficiary
8. GESTION — presidential tenure when beneficiary admitted (three categories: Toledo, García, Humala)
9. TOP_06 — observed value of maximum withdrawal
10. DOB — date of birth
11. MIGRANT_M — beneficiary resides in different municipality than birth (dummy)
12. MIGRANT_P — beneficiary resides in different province than birth (dummy)
13. FEMALE — beneficiary is female (dummy)
14. MARRIED — beneficiary is married (dummy)
15. EDUC_R — education attained by beneficiary (four levels: none, elementary, secondary, college/university)
16. QUINTIL — poverty of municipality of residence (five levels)
17. ENTRY_DATE — month of beneficiary's admission to Juntos (from 1 to 132)
18. DATE_GAP — monthly gap between admission and transaction (from 0 to 131)

(1a) Econometric estimation of determinants of third-party deposits received by Juntos beneficiaries

As explanatory variables for the private deposits received by Juntos beneficiaries, three blocks of variables were defined:

- Inherent characteristics of the individual, such as age, sex, marital status, educational level, municipality at birth, municipality of residence, poverty level of municipality of residence
- Static relationship of the individual to the welfare program: admission date, retirement date, presidential tenure at admission, historical maximum withdrawal
- Dynamic relation to the welfare program: transaction value, teller type for transaction, monthly frequency of transaction, how long in program

The specification of the model to be estimated is a panel with fixed effects given the large dominance of static variables to individual characteristics. The criteria for exclusion are very stringent; this means if a variable has a chance of 1 in 1,000 of being non-significant, then it is excluded, then the second block is added and the same procedure of exclusion is followed. The same is done for the third block. The result is that conventional statistical tests of significance are applied to determine which variables to maintain ultimately as explanatory and which to remove as collinear and not adding to the explanation.

(1b) Zombie account identification

How large do non-governmental deposits have to be each month to qualify an account as non-zombie? Ideally, we want to have a discriminant function that maximizes the difference between zombie accounts and non-zombie accounts.

In the previous section, the procedure was explained that was used to select the variables that have greater explanatory power for the amount of deposit. We now require a procedure to identify if there exists a threshold that will split the accounts of beneficiaries between those that are non-dormant only when the government makes a deposit, and those others that are non-dormant all the time due to their use by private citizens.

The method followed was to introduce a dummy variable with a threshold from 100 *soles* to 1,200 *soles* in steps of 100 *soles*; therefore, 12 new regressions were run for each step. The indicator chosen was Wald Chi Squared (which is a function of residuals), where a larger Wald implies better adjustment.

The maximum was found at 300 *soles*. Account holders receiving more than 300 *soles* per month from non-government sources are maximally different from those receiving less than 300 *soles*.

(1c) What affects being a non-zombie by deposits

The final regression result is shown below:

```
Random-effects GLS regression              Number of obs     =     141,978
Group variable: PERSON                     Number of groups  =      44,067

R-sq:                                      Obs per group:
    within  = 0.0192                                    min =           1
    between = 0.0269                                    avg =         3.2
    overall = 0.0277                                    max =          24

                                           Wald chi2(9)      =     2745.03
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =      0.0000
```

(Std. Err. adjusted for 1,410 clusters in UBIGEO_R)

VALUE_S	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.FEMALE	-118.5277	38.29431	-3.10	0.002	-193.5832	-43.47224
EDUC_R						
1	126.1802	19.04356	6.63	0.000	88.85553	163.5049
2	209.4213	19.67131	10.65	0.000	170.8663	247.9764
3	250.4902	43.9136	5.70	0.000	164.4211	336.5592
ENTRY_DATE	4.526179	.9452391	4.79	0.000	2.673545	6.378814
DATE_GAP	3.855572	.9480915	4.07	0.000	1.997347	5.713797
2.N_DEPOSIT	310.6904	14.81418	20.97	0.000	281.6551	339.7256
1.BRANCH	240.9331	13.90625	17.33	0.000	213.6773	268.1888
1.DUMM	-460.981	11.81422	-39.02	0.000	-484.1365	-437.8256
_cons	-206.3508	126.1217	-1.64	0.102	-453.5447	40.84313
sigma_u	928.59169					
sigma_e	1203.4					
rho	.37320913	(fraction of variance due to u_i)				

The total number of observations is 141,978 for 44,067 beneficiaries. The average number of deposits per beneficiary is 3.2 per month, where some beneficiaries received only 1 deposit and others 24 deposits. Remember that we have 24 months in this restricted panel, so this means that some beneficiaries received a deposit every month. Those accounts are strongly non-zombie!

From the first block of variables, sex and educational level are relevant: females receive fewer deposits than males, and education has a positive impact (more education is even more positive).

From the second block, the admission month and months of gap between admission and transaction are relevant. The later the entry date, the greater the probability of not being a zombie. This probably reflects the order in which people were enrolled: the poorer and more remote beneficiaries were enrolled earlier. On the other hand, the longer an account

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holder has been a beneficiary, the more likely the account to be a non-zombie. This implies there is discovery and learning in the usage of the accounts.

From the third block, number of transactions and type of bank teller are relevant. DUMM is the dummy variable for the threshold of 300 *soles*. More transactions per month means an account is less of a zombie; using the bank teller rather than, say, a corresponding cashier, is also associated with an account not being a zombie. Notice that corresponding cashiers are generally more remote and tend to be associated with smaller transactions; therefore, their users are more likely to hold zombie accounts.

(2) Withdrawals

This second analysis was carried out for withdrawals made from beneficiary accounts. There are four ways to effectuate a cash-out:

1) From an established bank branch,
2) From a corresponding cashier of the bank,
3) From an ATM or POS with the VISA logo, and
4) From armored trucks in villages.

It is possible to identify which channel was used to withdraw by selecting a combination of mnemonic codes and location of transactions. The database for 2015 and 2016 has 4,941,092 entries for 509,917 persons of the total 692,504 beneficiaries in the system.

In the process of consolidating data from daily to bimonthly, the new number of transactions becomes 4,182,899. These transactional data are merged with the individual database, with combined data available for the same 509,917 persons.

(2a) Econometric analysis

For the econometric analysis, these variables were available:

1. PERSON — unique ID for each beneficiary
2. DATE — year and month of transaction
3. VALUE — value of transaction in cents of Peruvian *sol*
4. A_OFFICE — transaction made in bank branch (dummy)
5. N_OFFICE — number of transactions made in bank branch
6. A_TRUCK — transaction made in armored truck (dummy)
7. N_TRUCK — number of transactions made in armored truck
8. A_ CASHIER — transaction made in corresponding cashier (dummy)
9. N_ CASHIER — number of transactions made in corresponding cashier
10. A_ ATM_POS — transaction made in ATM or POS (dummy)
11. N_ ATM_POS — number of transactions made in ATM or POS

12. UBIGEO_R   code for municipality of residence

13. FIRST_D   first date observed for a beneficiary

14. LAST_D   last date observed for a beneficiary

15. GESTION   presidential tenure when beneficiary admitted (three categories)

16. TOP_06   observed value of maximum withdrawal

17. DOB   date of birth

18. MIGRANT_M   beneficiary resides in different municipality than birth (dummy)

19. MIGRANT_P   beneficiary resides in different province than birth (dummy)

20. FEMALE   beneficiary is female (dummy)

21. MARRIED   beneficiary is married (dummy)

22. EDUC_R   education attained by beneficiary (four levels)

23. QUINTIL   poverty of municipality of residence (five levels)

24. ENTRY_DATE   month of beneficiary admission (from 1 to 132)

25. DATE_GAP   monthly gap between admission and transaction (from 0 to 131)

As explanatory variables for the withdrawals by Juntos beneficiaries, again three blocks of variables were defined:

- Inherent characteristics of the individual, such as age, sex, marital status, educational level, municipality at birth, municipality of residence, poverty level of municipality of residence

- Static relationship of the individual to the welfare program: admission date, retirement date, presidential tenure at admission, historical maximum withdrawal, how long in program

- Dynamic relation to the welfare program: transaction value, teller type for transaction, monthly frequency of transaction

The specification of the model to be estimated is a panel with fixed effects given the large dominance of static variables to individual characteristics. The criteria for exclusion are very stringent; this means if a variable has a chance of 1 in 1,000 of being non-significant, then it is excluded, then the second block is added and the same procedure of exclusion is followed. The same is done for third block. The result is that conventional statistical tests of significance are applied to determine which variables to maintain ultimately as explanatory and which to remove as collinear and not adding to the explanation.

(2b) Zombie account identification

How large do withdrawals have to be each month to qualify an account as non-zombie? Ideally, we want to have a threshold identification function that maximizes the difference between zombie accounts and non-zombie accounts.

In the previous section, the procedure was explained that was used to select the variables that have greater explanatory power for the amount of withdrawal. We now require a procedure to identify if there exists a threshold that will split the accounts of beneficiaries between those that are non-dormant only when the government makes a deposit that is withdrawn, and those others that are non-dormant all the time due to their use for a variety of withdrawals.

The method followed was to introduce a dummy variable with a threshold from 100 *soles* to 1,200 *soles* in steps of 100 *soles*; therefore, 12 new regressions were run for each step. The indicator chosen was Wald Chi Squared (which is a function of residuals), where a larger Wald implies better adjustment.

The maximum was found at 700 *soles*. Account holders withdrawing more than 700 *soles* per two months are maximally different from those withdrawing less than 700 *soles*.

(2c) What affects being a non-zombie by withdrawals

The final regression result is:

```
Random-effects GLS regression                    Number of obs     =  4,182,899
Group variable: PERSON                            Number of groups  =    509,917

R-sq:                                             Obs per group:
    within  = 0.0965                                          min =          1
    between = 0.1881                                          avg =        8.2
    overall = 0.1335                                          max =         12

                                                  Wald chi2(16)     =   14871.74
corr(u_i, X)    = 0 (assumed)                     Prob > chi2       =     0.0000
```

(Std. Err. adjusted for 1,725 clusters in UBIGEO_R)

VALUE_S	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.FEMALE	-10.97081	1.533477	-7.15	0.000	-13.97637	-7.965254
1.MIGRANT_P	4.199298	1.259539	3.33	0.001	1.730648	6.667948
EDUC_R						
1	.876676	.7293788	1.20	0.229	-.5528801	2.306232
2	8.343993	1.15215	7.24	0.000	6.085821	10.60216
3	22.95017	4.862923	4.72	0.000	13.41901	32.48132
ENTRY_DATE	-.3885582	.074328	-5.23	0.000	-.5342385	-.2428779
DATE_GAP	-.4388338	.0734843	-5.97	0.000	-.5828603	-.2948072
1.A_CASHIER	21.2147	4.398889	4.82	0.000	12.59303	29.83636
1.A_OFFICE	67.30335	5.780834	11.64	0.000	55.97313	78.63358
1.A_TRUCK	72.1628	21.88132	3.30	0.001	29.2762	115.0494
1.A_ATM_POS	28.94636	4.433452	6.53	0.000	20.25695	37.63577
N_CASHIER	246.0519	3.61706	68.03	0.000	238.9626	253.1412
N_OFFICE	233.7234	3.486015	67.05	0.000	226.891	240.5559
N_TRUCK	216.7116	20.93549	10.35	0.000	175.6788	257.7444
N_ATM_POS	242.3666	3.642045	66.55	0.000	235.2283	249.5049
1.DUMM	-223.7119	5.589743	-40.02	0.000	-234.6676	-212.7563
_cons	205.1679	10.93325	18.77	0.000	183.7391	226.5967
sigma_u	176.3323					
sigma_e	295.26842					
rho	.26288463	(fraction of variance due to u_i)				

The total number of observations is 4,182,899 for 509,907 beneficiaries. The average withdrawal per beneficiary is 8.2 every two months, where some beneficiaries made only 1 withdrawal and others made 12 withdrawals. This implies that there is a wide range of withdrawal behaviors.

From the first block of variables, sex, migrant condition, and educational level are relevant. Female gender is associated with more likeliness of zombie behavior. Non-migrants are also more likely to show zombie behavior. On the other hand, high school and university education is associated with non-zombie behavior.

From the second block, the admission month and size of the gap between admission and transaction are relevant. Early entry generates more non-zombie behavior; less time within the system favors non-zombie behavior. Notice that this means that date of entry and time within the system operate in opposite directions. However, this could be the result of later entrants having higher income and therefore needing less time to become non-zombie.

From the third block, number of transactions and type of bank teller are relevant. Repeat transactions by themselves increase the probability of an account not being a zombie, but they also raise the total withdrawn, which works in the same direction. On the other hand, smaller amounts are withdrawn from trucks and larger ones from corresponding cashiers. Statistical differences between all four withdrawal modes are significant.

DUMM is the dummy variable for a threshold of 700 *soles*. However, it should be understood as telling us that the zombie, ceteris paribus, withdraws 233 *soles* less than the non-zombie account holder. Putting together the findings of non-zombie behavior from the deposit and the withdrawal side, we can conclude that a beneficiary might be a non-zombie because:

(a) he/she receives third-party deposits of at least 300 *soles*

(b) he/she accumulates deposits of at least 700 *soles* before withdrawing

(c) he/she does a combination of the previous two