Banking the Mexican Immigrant Population: Analysis of Profiling Variables

Quantitative Methods in the Social Sciences
Master's Thesis
Columbia University

Paulina Ennis

Special thanks to:
Julian Levin
Chris Weiss
Prof. Robert Shapiro
Ka-Yuet Liu

Contents

Tables and Figures

Introduction

The aim of this thesis is to provide actionable recommendations for banks to target the Mexican immigrant market. To achieve this, I analyze survey data collected from the Mexican immigrant population to amplify a subject commonly seen from a sociological viewpoint – the immigrants' use of bank accounts with the objective of accumulating money to send home. Specifically, the objective of this paper is to answer the following questions:

- Does having a bank account entail larger amounts of savings sent to Mexico at the end of the migration spell?
- What is the profile of a bank account user within the Mexican migrant population? What does this mean in terms of targeting the Mexican migrant market?

I. Historical Background

The socioeconomic impact of the migration of Mexicans to the United States has been of great interest to researchers of many disciplines since the early 1980s. More recent, however, is the rise in awareness of the dimension of the benefits associated with viewing the Mexican immigrant population as a targetable market. This has certainly caught the eye of the commercial banking industry. To begin to touch on this subject, it is very important to first expand on the current factors that are increasingly attracting the attention of commercial banks towards the Mexican immigrant market; then expand on the relevant information that leads to the recognition of immigrant savings as an

important conduct in the context of remitting money back home and banking services as a facilitator and important tool to save.

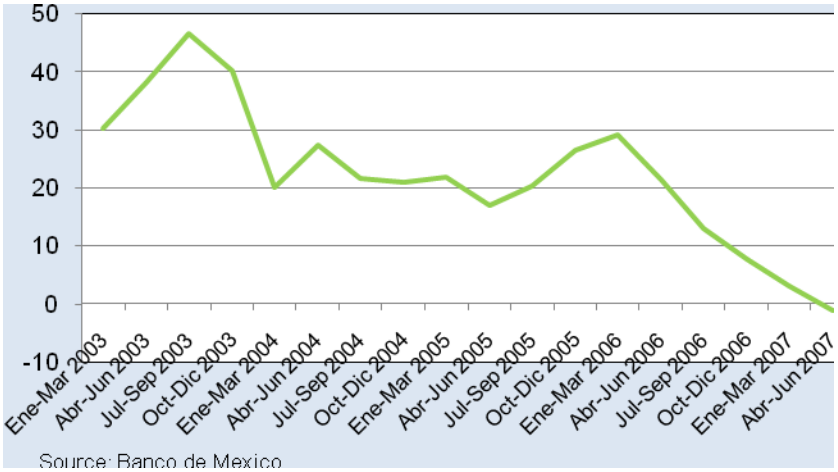
The Mexican immigrant population represents a very large portion of the Hispanic population that is currently residing in the United States. According to projections from the Pew Research Center in Washington, by 2050 nearly one in five Americans will be foreign-born and nearly 29% will be Hispanic. The Mexican immigrant population (including individuals who are residing legally in the United States and those who are doing so illegally) is becoming an attractive market because of its growing size and increasing affluence and henceforth purchase power. According to the U.S. Census, 9.2[1] million Mexicans were living in the United States as of the year 2000. Unfortunately, this information does not capture the conditions (legal or illegal) in which they are residing in the United States. The U.S. Department of Homeland Security took on this task and reported an estimate of 6.57 million unauthorized Mexican immigrants in 2006 (Hoeffer, Rytina et al. 2007). In terms of their purchasing power, it is important to note that according to Phoenix Multicultural, one of the most important research agencies specializing in the Hispanic market, the purchasing power of the Hispanic population as a whole as of 2002 was of 585 billion dollars, and it continues to increase.

Attracting the Mexican migrant market to commercial banking services started as an effort to capitalize on the large sums of money that are being sent home by the migrants. Money is sent in the form of remittances or lump sums of money taken back after the migration spell (the latter is recognized as savings returned to Mexico). Trends

[1] Source: U.S. Census Bureau, Census 2000 Special Tabulations (STP-159)

that are affecting the remittance front include decreasing rates of remittance sending and an increase in competition by commercial banks to capture this market. According to data reported by Banco de Mexico (the Mexican Central Bank), growth rates of remittance sending have decelerated since the first trimester of 2006. **Figure 1** shows that both the beginning of 2003 and the end of 2005 had been marked by a steady increase, but towards the beginning of 2006 started the longest deceleration in growth rates (lasting approximately one year and a half). This could be a large enough time frame to consider a potential change in remitting behavior. This poses several questions, one of which is relevant to the importance of monitoring and taking a closer look at remittances in the form of savings sent back at the end of the migration spell: Could this deceleration be indicative of a trend towards accumulation of money for later sending? If so, a trend towards money accumulation means that the Mexican immigrant market is either currently using or could be looking into a service that provides them the option of money accumulation.

Figure 1: Family Remittances Growth Rate



An increase in competition by commercial banks to capture the Mexican immigrant market has driven current players to look at the optimal service bundle as well as to effectively target the market and communicate the benefits of "being banked". Amongst the most important players are U.S. Bancorp, Citigroup Inc., Bank of America Corp., Wells Fargo & Amp. Co., and HSBC, who are currently looking to compete with traditional money transmitters such as MoneyGram and Western Union to provide accessible services to transfer money home. The service provided by commercial banks differs from that provided by money transmitters in that they offer all the facilities of having a checking and savings account as well as a substantially lower money transfer fee. To exemplify on how these services are offered: In 2005, HSBC introduced a service called EasySend in which customers can transfer money from their HSBC account into a secondary account, which can be accessed outside the country through automated teller machine cards that the sender mails to the recipient. However, unlike Bank of America, the sender is required to have a minimum balance of $1500 in the checking account and is charged $8 fee each month if the sender fails to maintain such balance. According to an HSBC spokesman, $8 is cheaper than the price of using traditional money transmitters that charge $17.85 for every $200 sent (Lindenmayer 2005). However, the most important challenge that commercial banks face is changing the way in which migrants remit, as they have been doing this through traditional money transmitters for a long time. It is a consensus among the banks that the aforementioned requires a lot of education, and above all "the biggest challenge is changing consumer behavior (Breitkopf 2004)". Finally, it is important to point out that

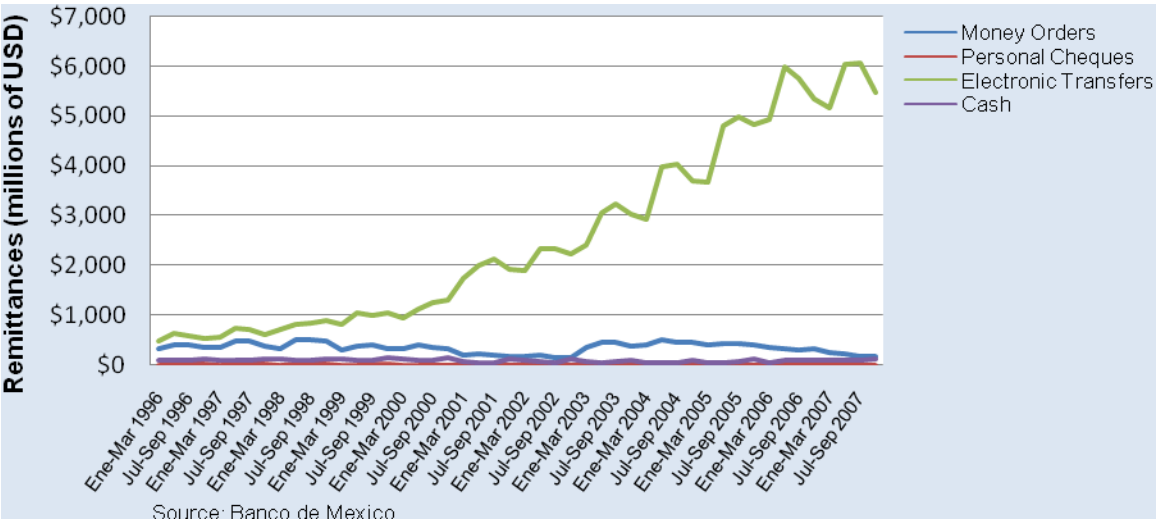
when considering the direct costs of saving to remit mentioned above (i.e. minimum balance fees) there are also indirect costs which include the risk associated with taking the cash money back home at the end of the migration spell.

To better understand the importance of banking services as facilitators in the process of saving to remit, other relevant information needs to be addressed, such as the trends in the usage of different transfer mechanisms and the effects that public policy, i.e., immigration reform have on the chosen transfer mechanisms.

To analyze trends in the usage of different transfer mechanisms, Banco de Mexico compiles data on the amounts of money remitted per trimester using four different transfer mechanisms: money orders, personal checks, electronic transfers, and cash. **Figure 2** shows the trends in amounts of money sent with each specific transfer mechanism from 1996 to 2007. The data shows that for the same time period analyzed in terms of a general deceleration in growth rates of remittances (2003 to 2007) there has been a steady increase in the use of electronic transfers as a mechanism of choice to send remittances. This could mean that as bank accounts have been more available as transfer mechanisms providing free electronic transfers from bank accounts in the United States to Mexican receivers (in large part due to the facilities provided by the PATRIOT ACT starting in 2002), they have also facilitated the accumulation of money in checking or savings accounts, which in turn provide attractive benefits for keeping the money in the United States (including interest gained from savings and the possibility of having a credit account with the same bank). These benefits, among others, could represent incentives for keeping the money in the bank to send at a later date, thereby

causing a decrease in frequency of the transfers and therefore resulting in a deceleration in the growth rate of the remittances sent.

Figure 2: Remittance Flows by Transfer Mechanism



Public policy in the shape of an immigration reform that indirectly affects the chosen remitting mechanism includes both the U.S. Government's clear gearing towards temporary worker programs that regulate the amount of time an immigrant can stay in the U.S.[2], potentially shortening both the amount of time immigrants stay in the host country and limiting their numbers as well, and the official recognition of the *matrícula consular*[3] as an acceptable alien identification by financial institutions in order to give

[2] In May 2007 an agreement on a Border Security and Immigration Reform was reached by the Administration and a bipartisan group of senators, which includes the creation of a Temporary Worker Program aimed to relieve the pressure on U.S. borders and meet the demand for jobs that Americans are not doing which both the amount of time spent in the U.S. is regulated to three two-year terms with at least a year spent outside the U.S. between them U.S. Treasury (2002). Section 326 Summary.

[3] In July 2002, a U.S. Treasury press release announced that it would issue proposed rules that will require financial institutions to establish minimum procedures for identifying and verifying the identity of customers seeking to open financial accounts. These included the acceptance of the *matrícula consular identity card.* These rules implement Section 326 of the USA PATRIOT Act White House Office of Communications (2007). Border Security And Immigration Reform.

Mexican nationals access to their financial services. Limiting the amount of time that a large portion of immigrants can stay in the U.S. to three two-year terms could have one of two consequences in terms of the chosen transfer mechanism: (i) it could gear immigrants away from services that are only useful to them if they stay for longer periods of time, such as credit accounts attached to the regular checking and savings accounts, or (ii) it could promote the accretion of money to be taken back at the end of the short migratory experience. The latter reason could entail savings and the tools required to do so. Finally, the use of the *matrícula consular* as a form of identification to open a bank account has provided banks with the means to offer their services to the Mexican immigrant market. Bank of America has teamed up with Mexican consulates across the country by sponsoring remote consular offices for immigrants to apply for this matriculation card and at the same time for bank employees to pitch them remittance services and other banking products (Lindenmayer 205).

It is clear that when looking at commercial banks in the context of how to market their products (i.e. savings accounts) to this attractive market, we need to construct information that useful to a marketing manager in terms of answering questions from a consumer behavior perspective. Therefore, the contents and structure of this paper will be customized from what would normally be viewed as a sociological paper to a more "marketing oriented" content.

This paper is aimed at answering the following questions:

- Does having a bank account entail larger amounts of savings sent to Mexico at the end of the migration spell?
- What is the profile of a bank account user within the Mexican migrant population? What does this mean in terms of targeting the Mexican migrant market?

The structure is as follows: Section 2 includes topics on the importance of savings and bank accounts as tools for this purpose; Section 3 includes description of the data; Section 4 includes the theoretical framework relevant to answering the research questions; Section 5 and 6 include the empirical methodology and its challenges, Section 7 has findings and marketing implications.

II. Topics on the Importance of Savings and Bank Accounts as Tools

Literature and previous studies have addressed the concept of Mexican immigrant savings within three important and useful subjects: The first and most important fact to take into account is that saving and remitting are not mutually exclusive behaviors. The second, is the use of savings for productive investments in the immigrants' home community. Finally, it is important to understand the temporal aspect of the migration trip in relation to the immigrants' saving patterns.

Many authors have recognized the fact that saving and remitting are not mutually exclusive behaviors. Migrants may do one, both or neither and the allocation decision is a simultaneous one, therefore utilizing models that take this into account is very useful in analyzing factors predicting the aforementioned behaviors (Durand, Kandel et al. 1996). These authors further dive into the simultaneity of these behaviors when mentioning their frequencies in the utilized dataset, in which 47% of the migrants remitted and saved, 22% only remitted, 13% only saved, and 18% did neither.

The use of savings for productive investment in many cases promotes a more long term economic stability of the receiving family and oftentimes the receiving community. A spatial analysis of the Mexican states receiving savings from Mexican migrants, utilizing data from the MMP 118 dataset[4] shows that the states that receive money with the primary purpose of productive investment are the central and more developed states.

[4] See Section 3 for a detailed description of the MMP 118 dataset.

Figures 3 and 4 show the receiving states of savings from the two U.S. states in which the larger portion of immigrants indicated productive investment as the primary use of the money sent. **Figure 3** shows that over one fourth of immigrants who live in California send savings aimed at productive investments (indicated by the dark blue area of the pie chart) with another very small portion indicating that the money is used for more than one productive project (indicated by the light blue are of the pie chart). The receiving states of the largest part of this capital are Jalisco and Michoacán. **Figure 4** shows a similar analysis for the states receiving savings from immigrants who reside in Illinois. The receiving states of the largest amount of this financial stimulus are Guanajuato, Estado de México, and Jalisco. It is also important to note that although consumption is very often the primary use of the repatriated money in general, the effect is different when the focus is on savings or accumulated money. In this context it is worth noting that "migrants' needs will be determined largely by the balance between their family situations at the time of migration and their potential income-earning capacities" (Massey and Basem 1992). However, in a paper studying the remitting patterns of immigrants, the authors found that "overall, it is worth noting that, despite first impressions of immigrants claiming to transfer financial resources to their families mainly for consumption purposes the dollar amounts transferred tend to be larger when investment is claimed as the primary motive for remitting or taking sums home" (Amuedo-Dorantes, Bansak et al. 2005).

Figure 3

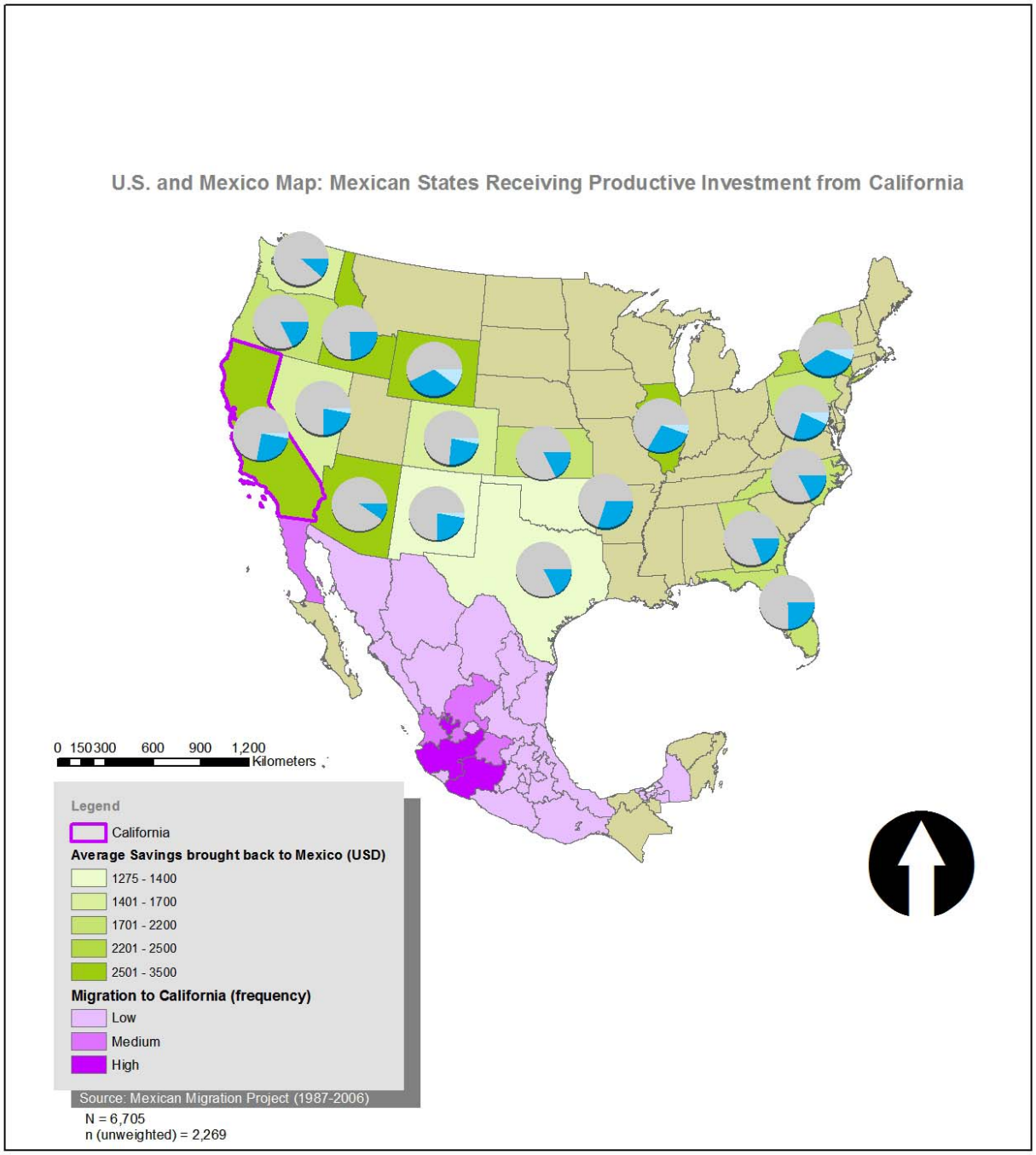
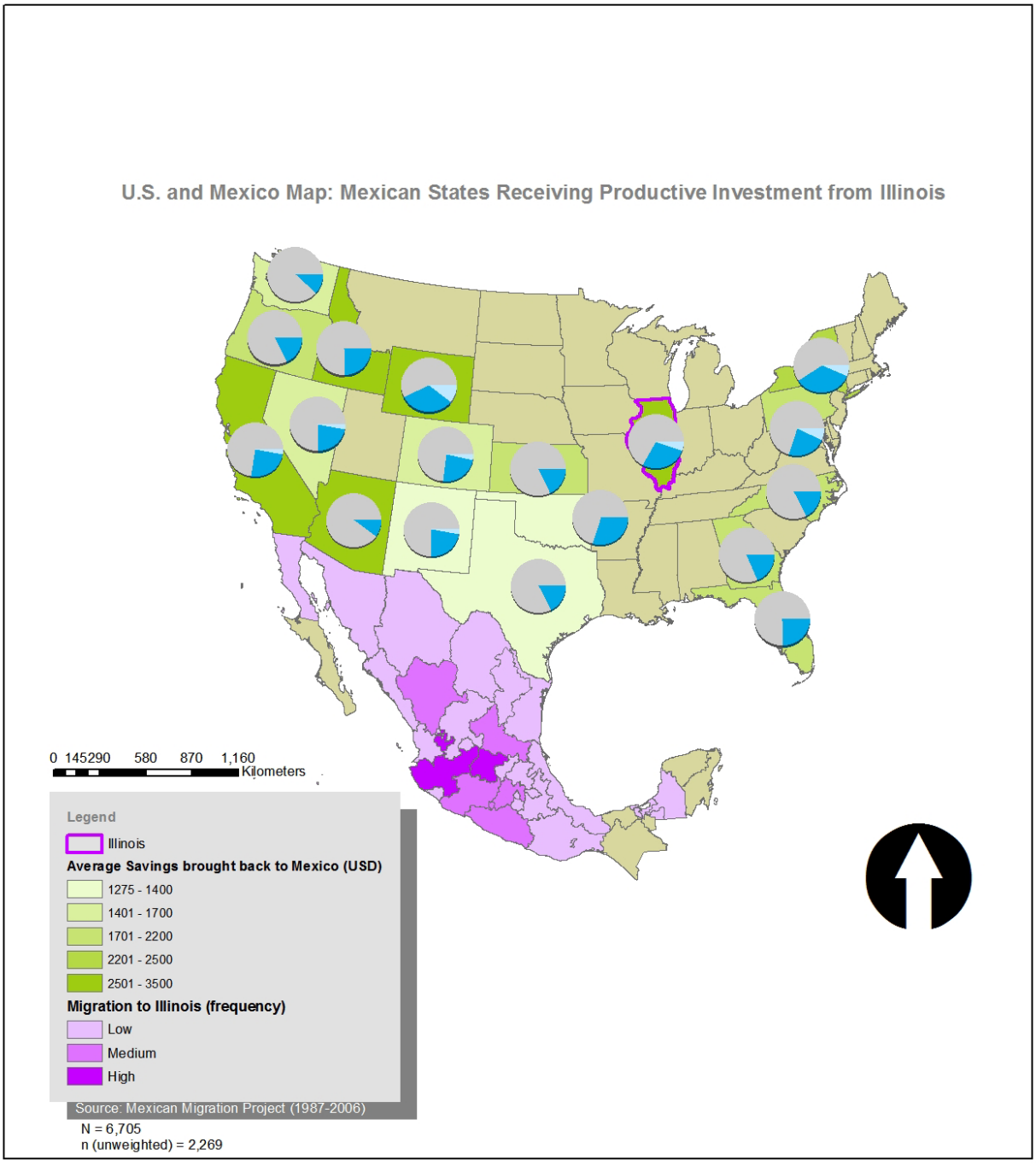

U.S. and Mexico Map: Mexican States Receiving Productive Investment from California
0 150300 600 900 1,200
Kilometers
Legend
California
Average Savings brought back to Mexico (USD)
1275 - 1400
1401 - 1700
1701 - 2200
2201 - 2500
2501 - 3500
Migration to California (frequency)
Low
Medium
High
Source: Mexican Migration Project (1987-2006)
N = 6,705
n (unweighted) = 2,269

Figure 4


U.S. and Mexico Map: Mexican States Receiving Productive Investment from Illinois
0 145290 580 870 1,160
Kilometers
Legend
Illinois
Average Savings brought back to Mexico (USD)
1275 - 1400
1401 - 1700
1701 - 2200
2201 - 2500
2501 - 3500
Migration to Illinois (frequency)
Low
Medium
High
Source: Mexican Migration Project (1987-2006)
N = 6,705
n (unweighted) = 2,269

The duration of the migration spell is important in relation to the immigrants' saving patterns. In terms of the duration of stay of immigrants in the U.S. across different time periods, it has been found that earlier cohorts may have contained a greater share of temporary migrants relative to permanent immigrants given that less strenuous border patrol efforts were in place during earlier decades; temporary immigrants appear more likely to accumulate and remit larger sums than permanent immigrants do. However, when looking at the amount saved dependent on the duration of stay, the same authors found that "there is a growing magnitude of savings brought back home by immigrants as the duration of their U.S. stay lengthens…total savings are likely to be larger the longer migrants stay simply because they are able to accumulate more with time" (Amuedo-Dorantes, Bansak et al. 2005).

To address the topic of banks as important tools for immigrant savings, it is important to revisit the potential endogeneity between the immigrants' banking status and their money-transferring behavior, which was first addressed in the introduction, looking at the amount of remittances transferred utilizing different mechanisms as well as their growth over time (**Figures 1 and 2**). However, the material of most relevance covers previous findings on the effects of being banked on the amount of money saved with the object of repatriation.

There is two-way causal relationship between an immigrant's banking status and the money-transferring method of choice. According to a paper that studies various factors around money transfers among banked and unbanked individuals, "the endogeneity of

immigrants' banking status may be originating from various sources… one source of endogeneity of banking is its potential simultaneity of banking with remitting as well as with saving… Mexican immigrants planning to remit or bring money back home may choose to become banked during their stay in the United States given the advantages of remitting through banks, such as greater safety and lower transferring costs, and the saving and wealth accumulation process often facilitated through banking (Amuedo-Dorantes and Bansak 2006)." The aforementioned statement is supported by the data in **Figure 2** which depicts the effect of an increase in access to bank accounts (starting in 2002) on increasing amounts of money remitted using electronic transfers. Access to bank accounts in turn promotes saving, which in time decreases the rate in which the money is sent but in the long run increases the amount sent, as suggested by previous studies' temporal analysis of repatriated savings.

The effect of being banked on the amount of repatriated savings by both legal and illegal immigrants is also considered central to the argument of importance of banking the currently unbanked immigrant population. This is especially important when comparing remittances versus lump sums of money, the latter, again, being larger compared to remittances when the senders are part of the active commercial banking population. This topic has been addressed in terms of trends of bank utilization to repatriate savings over time as well as in comparing the legal and illegal immigrant population. An analysis of data from the *Secretaría de Trabajo y Previsión Social* (Ministry of Labor) showed that by the 1999–2000 wave, a substantial shift in remitting methods occurred. The fraction of unauthorized Mexican immigrants remitting through

informal methods had been cut in half; furthermore, unauthorized immigrants now appeared more likely than their legal counterparts to remit money home through banks (Amuedo-Dorantes, Bansak et al. 2005). A second study carried out by the same authors showed a generally robust significance of banking on immigrants' money transfer practices, whether controlling other factors or not. Access to banking increases the lump sum brought back home by undocumented (relative to legal) immigrants at the end of their migration spells (Amuedo-Dorantes and Bansak 2006).

III. Data Description

The Mexican Migration Project (MMP118)[5] dataset will be used (produced in 2008). The Mexican Migration Project was created in 1982 by an interdisciplinary team of researchers to increase our understanding of the complex process of Mexican migration to the United States. The sampling frame is the Mexican migrants in communities throughout Mexico that experience out migration (based on a migratory index provided by the National Population Council) and Mexican migrants in the destination areas in the United States from 1982 to 2006. The sampling design uses a snowball sampling technique, which entails a type of referral process. A random sample of 200 households in Mexican communities is selected for interviews. Interviewed members of the Mexican communities are asked for their destination area of their last migration trip, and identical questionnaire is then applied to members of the destination areas in the United States.

[5] See the Mexican Migration Project (2006) at mmp.opr.princeton.edu for details on study design, geographic coverage, codebooks, and appendices.

Due to the fact that communities are selected as long as there is out migration (there is no specific index level that is used to select communities), and that locations of communities are selected so that they have all four specific levels of urbanization (*ranchos* with fewer than 2,500 inhabitants, *pueblos* having 2,500 to 20,000 inhabitants, mid-sized cities containing 10,000 to 100,000 inhabitants and metropolitan setting) population heterogeneity is not compromised with this sample design. Additionally, the MMP yields a high degree of representativeness at a community level, as the design emphasizes on the random selection of 200 households in one community, rather than selecting 20 households in each community.

Yearly waves of interviews from 1987 to 2006 were conducted during the winter months (when seasonal migrants are home). The study's questionnaire follows a semi structured format to generate an interview schedule that is flexible, unobtrusive and non-threatening. It requires that identical information be obtained for each person, but question wording and ordering are not fixed. The precise phrasing and timing of each query is left to the judgment of the interviewer, depending on circumstances. The questionnaires are applied in three phases. In the first phase, basic social and demographic data are collected from all members of the household. The interview begins by identifying the household head and systematically enumerating the spouse and children, beginning with the oldest. Altogether, the MMP provides reasonably representative data on authorized and unauthorized Mexican immigrants in the United States (Amuedo-Dorantes, Bansak et al. 2005).

The following two variables are the primary focus of this analysis: (i) the savings returned to Mexico and (ii) the banking status of the immigrant. In addition I take account for the migrant's wage, marital status, and occupation (all at the time of the last U.S. migration trip), participation in social organizations, the number of banks in the migrant's community of origin, duration of the last migration trip, and number of dependents in the migrants household (HH) of origin. A detailed description of the variables including variable type and definition is included in **Appendix I**.

IV. Theoretical Framework

Devising an effective marketing strategy to target the Mexican immigrant market demands for a considerable acculturation effort. Although this concept is usually used in the context of product introductions in foreign countries, in this case we wish to understand consumers and markets in foreign countries, in order to understand the domestic immigrant market. This is because most of the values and behaviors are transferred from the immigrant's home country (Mexico) to the United States. This section first addresses the perception of bank accounts by Mexican immigrants and then dives into the theoretical framework relevant in answering the two main research questions, including a brief description of the statistical method used to answer these questions[6].

[6] For a more detailed description of the empirical methodology utilized as well as the challenges in the empirical methodology, please refer to the appropriate sections.

A. Relevant Information on Banking Mexican Immigrants

In general, a bank account seen in terms of the benefits it provides to the customer covers a very important need within the widely recognized Maslow Hierarchy of Needs – the need for safety (Solomon 2006). A bank account, and in specific a savings account, provides for financial stability as it enables a person to accrue money either for a specific objective (as is the case of target savers or those who save to invest productively) or as a contingency plan in the event of limited liquidity, hence the term "I'm saving for a rainy day". However, in the context of the Mexican consumer, bank accounts are considered low-involvement products (i.e. the consumer is not particularly knowledgeable about these products (Solomon 2006)) because of two main reasons: (i) an overall limited access to commercial banking services and therefore a lack of instated values with regards to banking education; and (ii) a less developed banking system that competes with a more traditional cash-based economy. This behavior is well-embedded in the consumer and is therefore actively carried to the migrant's host country.

B. Estimating the Effect of Having a Bank Account on the Savings Behavior

In order to determine whether a product such as a bank account can be offered to the Mexican immigrant market, it is important to first assess the effect of having a bank account on their savings behavior. This requires a Ordinary Least Squares model that predicts the likelihood of savings when an immigrant has a bank account, also controlling for other factors. These factors include wage, marital status, occupation, and

participation in social organizations. To improve model fit and to conform to OLS assumptions, the lump sum of migradollars is expressed in terms of a natural logarithm. Various economic characteristics of the trip are relevant to decision making because they determine a migrant's relative ability to hold back a portion of U.S. earnings for repatriation. The most important of these characteristics is wage, which ultimately determines the immigrants' capacity to remit or save. Not surprisingly, the odds of repatriating funds rise with monthly earnings: the more dollars a migrant earns each month, the more likely he is to transfer a portion of his earnings home (Durand, Kandel et al. 1996). It has been found that both the decisions to save and remit are sensitive to general trip characteristics such as marital status and occupation during the migration trip. The repatriation of earnings is considerably less likely if a respondent is settled in the United States and is accompanied by a spouse (Durand, Kandel et al. 1996). Human capital is relevant to migrants' savings and investment decisions because it determines earnings potential not only in the sending community, but more importantly, in the United States (Massey and Basem 1992; Durand, Kandel et al. 1996). It is reasonable to think that because occupation is directly tied with wage, different occupational levels will yield significantly different propensities to save, with occupations that generally entail higher wages such as administrative or managerial occupations allowing for higher money accumulation.

C. Profiling Users of Bank Accounts

In order to better customize a product offering as complicated as a bank account to better target the Mexican immigrant market, it is important to profile such market in terms of users and non-users of bank accounts. Choosing the correct profiling variables is important such that the two consumer segments (users and non-users of bank accounts) can be identifiable and measurable for the purposes of data analysis. Additionally, as is the case with any effective segmentation strategy, the identified segments must be: (i) large enough to be profitable; (ii) reached effectively (for example, its members must be exposed to the same type of media); (iii) responsive to marketing; (iv) stable and not expected to change quickly (Kotler 1983).

The dimensions used to profile the segments must also respond to the most relevant issues concerning banking the Mexican immigrant population, these include demographic and socioeconomic characteristics and other factors directly affecting product choice including: situational effects, the influence of reference groups and a memory element in the context of familiarity and recall at the moment of product choice. While the use of demographic and socioeconomic characteristics is relatively straightforward in their usefulness for this specific segmentation task, it is important to explore the factors affecting product choice. A consumption situation is defined by factors beyond the characteristics of the immigrant or of the bank account features. According to Solomon (2003), situational effects can be behavioral (e.g., entertaining friends) or perceptual (e.g., being depressed or feeling pressed for time). In this specific

case, situational factors include the duration of the migration spell and the number of dependents in the immigrant's household of origin. Choosing a product that will aid an immigrant in the saving process could be affected by the length of the migration trip, where immigrants whose duration in the U.S. is longer have more time to get exposed to the advantages of utilizing bank accounts for the mentioned purpose. The number of dependents in an immigrants' household of origin describes a situation in which an immigrant could have more or less responsibility for their everyday sustainment and therefore have less money to set aside.

A reference group is an actual or imaginary individual or group conceived of having significant relevance upon an individual's evaluations, aspirations, or behavior (Solomon 2006). In the context of an immigrant's experience in the host country, belonging to a social organization (usually referred to as a hometown organization) perfectly simulates a reference group. In fact, according to Massey (1992), one kind of social capital that is particularly relevant to migrants' decisions about savings, remittances, and investments is their relationships to people and organizations in the receiving country. Therefore, it is reasonable to assume that people who are part of social organizations know the value of savings and therefore tend to save more. Finally, memory is defined as a process of acquiring information and storing it over time so that it will be available when needed. In terms of immigrant retrieving information at the time of the choice of a product that will facilitate money accumulation with the purpose of repatriation, it is important to note that prior familiarity with the product enhances recall, and therefore and immigrant prior familiarity with savings accounts will find himself looking for the

same product in the host country and therefore will be more likely to save money for repatriation. The most effective measure to determine prior familiarity with bank accounts is the presence of a commercial bank in the immigrant's community of origin. The presence of a commercial bank ensures the immigrants' exposure to information regarding savings accounts and their usefulness. Keeping with this argument are the earlier results of Massey and Basem (1992), who found that community-level factors such as this one are strong determinants of savings decisions.

For the purpose of a more effective data analysis, a preliminary cross tabulation will be executed in order to evaluate the variables in terms of their goodness of fit (explanatory power on being banked) and then the variables will be selected so that they yield segments that possess the aforementioned qualities. A multivariate probit model will be used to determine how each independent variable contributes to the probability of having a bank account. Each of the chosen independent variables will be used as proxies for the theoretical framework included in this section. These probabilities will be analyzed in terms of their marginal effects (overall effects) on the dependent variable and discrete changes assessing the effect of the each independent variable depending on the value that each one takes on; the latter with the purpose of identifying which values of the independent variables have a larger effect on the probability of being banked[7].

[7] Idem.

V. Empirical Methodology

To empirically examine the effect of having a bank account in the likelihood of saving money to return to Mexico, I used a multivariate OLS model. An analysis of the dispersion in the observations for each variable and an assessment of the potential linearity of the relationships between the dependent and the independent variables preceded the construction of the model. This analysis resulted in the following adjustments to the model:

- Upon examining the dispersion of the independent wage variable, I found that wage across all individuals in the sample (99.6% of the observations) were within 1 to 1000 USD, with 15 outliers that took values up to 37,000 USD. These outliers were removed to ensure better estimations and more generalizability of the findings to the Mexican immigrant population. One these outliers where removed the sample produced a mean wage of 21.5 USD.
- Because it is reasonable to assume that the percentage increase in savings returned to Mexico is not the same given different values of the continuous independent variables included in the model, the natural log of the independent variable is utilized in the model. This imposes a constant percent effect of the independent variables on the savings returned (Wooldridge 2006).
- It is my hypothesis that wage has an increasing marginal effect on the percent increase in savings returned to Mexico. This means that for very low wages, savings returned to Mexico could be negative, and then increase exponentially

until it reaches a certain point (Wooldridge 2006). Therefore, a quadratic form of wage will be utilized to capture this effect.

With the mentioned functional adjustments, the equation of the proposed model is as follows:

$$\ln(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2^2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + u \quad (5.1)$$

Where x_1 is wage, x_2 is the squared wage term, x_3 indicates that person is married, x_4 indicates that a person has a non-agricultural occupation, x_5 indicates that a person participates in a social organization, x_6 indicates that the person has a bank account, and u indicates its error term.

Finally, in order to predict the dollar value of the estimated effect of each of the independent variables, I used the following equation:

$$E(y/x) = a_0 \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2^2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6) \quad (5.2)$$

Where a_0 is the expected value of exp(u), which must be greater than unity.

To empirically analyze the potential different profiles of bank account users, I used a multivariate probit model with the primary goal of explaining the effects of each of the independent variables on the response probability P(y=1|x), where y takes a value of 1 when an immigrant has a bank account. This in turn will aid in assessing both the marginal effects of each independent variable (to what extent each independent variable increases or decreases the probability of being banked) as well as their

discrete effects (the increase in probability resulting from different values that the independent variables can take on). In order for the model to yield more interpretable discrete effects of each of the values of the independent variables, the continuous independent variables included in the model were recoded to include equal intervals according to the distribution of their values (see **Appendix I** for Variable List).

An initial analysis of descriptive statistics of variables was executed in order to first look at potential profiling variables. The extent to which each of the variables was effective in describing the categorical (having a bank account) variable was analyzed in order to assess their usability in the probit model. **Table 1** includes descriptive statistics on various demographic, situational and socioeconomic variables for all the individuals in the sample, without putting restrictions on wage level. These results suggest that wage, duration of the migration trip, number of dependents in the household of origin, number of banks in the community of origin, and participation in social organizations are all usable explanatory variables.

The following is the equation for the previously mentioned probit model:

$$P(y = 1/x) = G(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5) \quad (5.3)$$

Where x_1 is the hourly wage in one dollar intervals, x_2 indicates whether an immigrant participates in a social organization, x_3 indicates the number of banks in the immigrant's community of origin, x_4 is the duration of the last migration to the U.S. in 6 month intervals, and x_5 indicates the number of dependents in the immigrants household (HH) of origin.

Table 1: Descriptive Statistics of Potential Explanatory Variables[a]

Migrant Characteristics	Sample	Banked	Unbanked
N	*6845*	*938*	*5678*
Demographic Variables			
Average age	46	43*	46
Percent male	95%	95%	94%
Percent married**	73%	65%	74%
Situational Variables			
Average duration of the last migration trip (months)	24	71*	18*
Average number of dependents in HH	2.9	2.7*	3.2*
Average number of banks in community of origin	1.9	2.16*	1.85*
Percent in non-agricultural occupation**	64%	84%	61%
Percent who participate in social organizations**	7%	18%	5%
Socioeconomic Variables			
Average wage (USD)	56	205.25*	27.6*
Average monthly savings (USD)	158.38	309.19*	129.88*
Average savings returned to Mexico (USD)	1109.9	1875.5*	976.77*

[a] Tabulations using MMP118. Dollar amounts are not inflation adjusted.
* Signifies that differs significantly from sample mean at the 5% level.
** Signifies p-value < 0.05 from chi-squared (goodness of fit of variable).

VI. Empirical Challenges

First, as noted in Equation 5.1, some of the values for our dependent variable are observed (i.e., those cases in which Mexican immigrants remitted or took money back home), whereas the remaining values (i.e., those instances in which Mexican immigrants do not remit nor take money back home) are censored or unobserved. When some of the data are censored, the distribution that applies to the sample data is a mixture of discrete and continuous distributions, rendering the use of OLS

inappropriate (Wooldridge 2006). To correct this, all the unobserved or zero values for the dependent variable were recoded to have a value of 1 and Equation 5.2 was used in the calculations of the dollar effect of each independent variable.

To address potential problems of heteroskedasticy, I analyzed the correlation of each of the variables with the squared residual term (see **Appendix II**). None of the variables were found to have a high correlation with the squared residual term, which indicated that there is no heteroskedasticiy in the data.

VII. Findings

The findings will be divided into two sections according to the posed research question. Because it is important that these findings produce actionable recommendations, each relevant finding will include implications relevant to a marketing manager in the commercial banking industry.

A. The Importance of Being Banked in Returning Savings Back to Mexico

The effect of each of the independent variables on the likelihood of returning lump sums of money back to Mexico and the calculated change in savings in USD are included in **Table 2**. The results from the OLS regression show that controlling for wage, marital status, non-agricultural occupation, and participation in social organizations, having a bank account increases the probability of repatriating savings by 81%. This translates to a 7.44 USD increase in savings repatriated to Mexico after the migration trip. Although this amount does not seem important at a first glance, it is important to note

that it constitutes a 33% (7.44 of 21.5 = 32.6%) of the average wage earned by the immigrant. The effect is statistically significant at a 95% confidence level ($p<0.05$). It is also important to point out that the proposed model explains 12% of the variance in the dependent variable. The individual effects of each of the independent variables support the proposed hypotheses included in the theoretical framework.

Table 2: OLS Regression on Likelihood of Savings

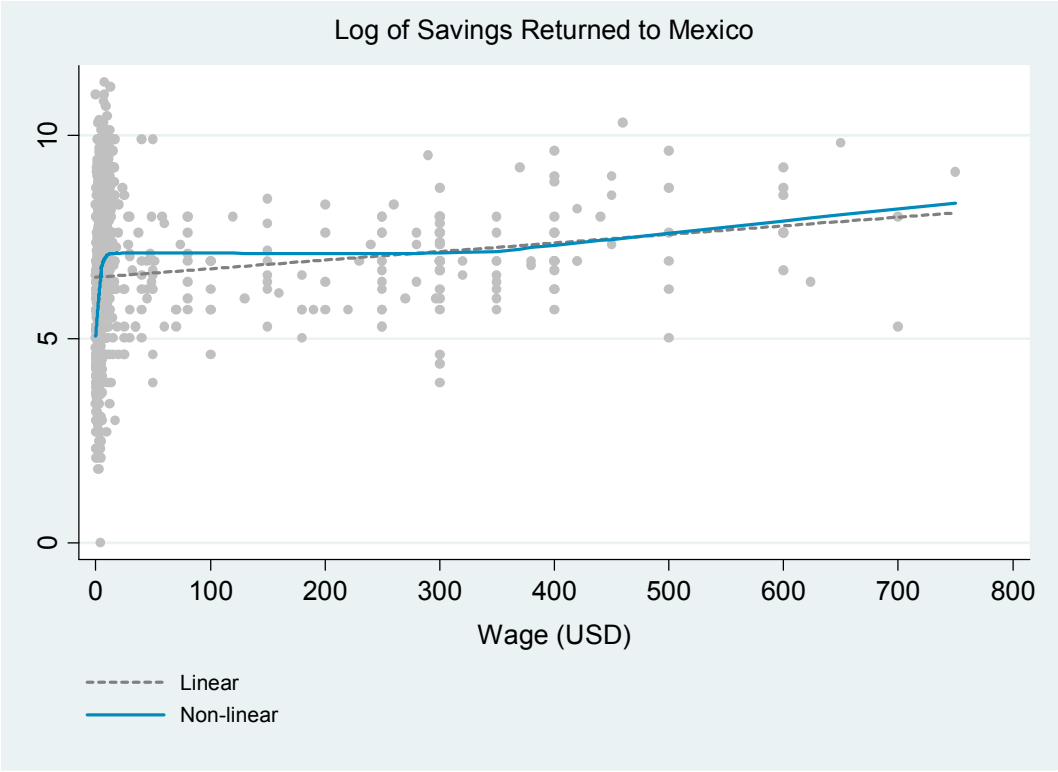
Independent Variables	**Outcome Variables**	
	Log of Savings Returned to Mexico	**Change in Savings Returned to Mexico (USD)**
N[a] = 702		
Wage	-0.001	3.30
$Wage^2$	$4.45e^{-6}$*	--
Married	-0.127	2.91
Non-agricultural occupation	0.608*	6.06
Participate in social organizations	0.001	3.30
Banked	0.813*	7.44
Intercept	6.562	--
R-squared	0.12	--

[a] Number of observations conditional on wage less than or equal to $1000.
* $p<0.05$

Figure 5 was constructed to further analyze the non-linear effect of wage on the likelihood of returning savings to Mexico as well as the potential wage values at which this effect increases and the value at which the effect is diminished. This scatterplot suggests that when an immigrant's wage is between 0 and 20 USD the likelihood of returned savings increases drastically, until it plateaus at values above 20 USD. This effect then increases again when an immigrant's wage is greater than 400 USD. The

results from **Table 2** confirm this. Although the effect of the wage term is initially negative, the squared wage term is positive. This means that at very low wage values an immigrant does not find himself in a position to accumulate savings for the objective of repatriation, this of course changes with higher wages, hence the positive effect on the squared wage term.

Figure 5



B. The Potential Profile of Users versus Non-Users of Bank Accounts

In order to assess the potential profile of users and non-users of bank accounts, I utilized proxy variables for the concepts outlined in the theoretical framework relevant to

the dimensions used to segment the Mexican immigrant market. **Table 3** shows that 18% of banked immigrants participate in social organizations. Additionally, banked immigrants have significantly less dependents that the sample mean (2.7 versus 2.9 dependents), have significantly more banks in the community of origin than the sample mean (2.16 versus 1.9 banks) and the duration of their last migration trip was also significantly longer than the sample mean (71 versus 24 months). Finally, their wages were significantly higher than the sample mean (205.25 versus 56 USD).

The analysis of the discrete changes and marginal effect (the average of the instantaneous rate of change with a one unit increase of the independent variable) yielded the following results and marketing implications:

- Discrete changes in the probability to have a bank account at different hourly wage brackets earned are relatively constant, until a person earns between $9 and $10 or more. This means that it is only at very large hourly wages and therefore monthly earnings, probably more than $1,600 per month ($10 x 8hrs x 5 days x 4 weeks) that a person finds himself in the possibility of having a bank account. Additionally, the marginal effect of the variable when immigrants are affiliated to social organizations is larger than when they are not (2.3% increase probability of having a bank account versus 1.2%, holding all other variables fixed), which needs to be taken into consideration, especially when 64% of the immigrants earn between $0 and $10 and only 5% of the unbanked individuals belong to social organizations. This may mean that banks need to focus on facilitating the application process to individuals in this wage bracket, thus

lowering the minimum amount of money needed to open an account and providing information on the benefits and interest earned from savings and investments.

- The same is true for the changes in probability to have a bank account when the immigrant comes from a community in which there are more banks. When immigrants belong to a social organization, there is an increase in probability of having a bank account of 3% (versus a 1.6% when they are not affiliated to a social organization) holding all variables fixed. In this case it is also important to point out that half of the immigrant population comes from communities that have from zero to two banks, which may explain the small marginal effect of this variable. This finding confirms the low-involvement hypothesis, which means that the Mexican immigrant must go through the following process in order to promote the use of bank accounts:

Cognition – Behavior – Affect – Attitude (Solomon 2006): This means that in order to promote a behavior such as the use of bank accounts, the consumer must first be exposed to the benefits of banking services (cognition), which will in turn slowly create a behavior and therefore an affect towards the “perks” of having a bank account, which will reinforce an attitude based on a behavioral learning process. One strategy to increase involvement may be using a

communications campaign with prominent stimuli to attract the attention of the target segment (non-users of bank accounts).

- Duration of the last migration trip is the variable that has the highest effect (holding other variables fixed), an additional 6 months spent in the U.S. increases the probability of having a bank account by 2.4%, and nearly doubles to 4.2% when immigrants are part of social organizations). More than half of the immigrant population is comprised of "temporary workers" (61% staying from 6 months to a year). Taking into account these temporal differences is important to the marketing efforts. In fact, banks are currently doing this by reaching out to potential consumers as soon as they arrive to the country, by sponsoring the set-up of remote consular offices where they can also inform them about their products.

- The marginal effect of having dependents at home is of a 1.3% increase in probability of having a bank account. Since almost half of the immigrants have 3 or more dependents (47%), it is obvious that the decision to have a bank account could be a joint decision (influenced by other dependent adults in the household of origin). Therefore, information on the benefits of opening a bank account needs to reach those individuals as well.

Table 3: Multivariate Probit Analysis on Banking

Independent Variables	Codes	Change	Summary of Effects			
			Discrete	*Marginal*	*Marginal if "not social"*	*Marginal if "social"*
N = 6500						
Hourly wage						
1	$0-$0.99			0.013*	0.012*	0.023*
2	$1.00-$1.99	1→2	0.0062			
3	$2.00-$2.99	2→3	0.0071			
4	$3.00-$3.99	3→4	0.0082			
5	$4.00-$4.99	4→5	0.0092			
6	$5.00-$5.99	5→6	0.0104			
7	$6.00-$6.99	6→7	0.0116			
8	$7.00-$7.99	7→8	0.0130			
9	$8.00-$8.99	8→9	0.0143			
10	$9.00-$9.99	9→10	0.0158			
11	$10.00 plus	10→11	0.0172			
Participate ina social organization						
0	No			0.125*		
1	Yes	0→1				
No. of banks in community of origin						
0	0			0.017*	0.016*	0.029*
1	1	0→1	0.0131			
2	2	1→2	0.0152			
3	3 or more	2→3	0.0174			
Duration of last migration trip						
1	0-6 moths			0.024*	0.023*	0.042*
2	7-12 months	1→2	0.0142			
3	13-18 months	2→3	0.0180			
4	19-24 months	3→4	0.0222			
5	25-30 months	4→5	0.0267			
6	31-36 months	5→6	0.0317			
7	37-42 months	6→7	0.0367			
8	49-54 months	7→8	0.0416			
9	55-60 months	8→9	0.0463			
10	61-66 months	9→10	0.0503			
11	More than 66 months	10→11	0.0537			
Number of dependents in HH						
0	0			-0.008*	-0.007*	-0.013*
1	1	0→1	-0.0083			
2	2	1→2	-0.0079			
3	3	2→3	-0.0074			
4	4	3→4	-0.0069			
5	5 or more	4→5	-0.0065			

* p<0.05

Conclusions

The importance of banking the Mexican immigrant population has been discussed both in terms of the attractiveness of this market and more importantly in terms of the benefits that the use of bank accounts for money accretion brings to immigrant users. Although some banks have taken some initiative in capturing this market, its size and characteristics demand for a more complex and customized marketing strategy to augment their customer base. The identification of the characteristics of both the user and non-user segments of bank accounts aids in the justification of the use of, for example, a larger scale communications campaign to communicate to the current non-user segment the benefits of "being banked". Additionally characteristics such as number of dependents, length of the migration trip and wage help identify both groups. Finally, it is important to point out that with an increasing awareness of the importance of targeting the Mexican immigrant population will come more formal behavioral and attitudinal studies that will yield better data on immigrant's attitudes towards commercial banking products.

VIII. Appendices

A. Appendix I: Variable Descriptions

Variable List	Variable Type	Variable Definition / Code Definition
Outcome Variables		
Log of savings returned to Mexico	Continuous	Logged amount of savings returned to Mexico (USD)
Banked	Dichotomous	Migrant has a bank account in the United States
Explanatory Variables		
Wage	Continuous	Migrant's wage (USD) during last migration trip
Wage^2 (Wage squared)	Continuous	Squared amount of migrant's wage during last migration trip
Hourly wage	Interval	Migrant's hourly wage (USD) during last migration trip. Coded in 10 intervals of 1 USD and one interval of 10 USD plus.
Married	Dichotomous	Married at time of last migration trip
Non-agricultural occupation	Dichotomous	Has an occupation other than in the agricultural industry during last migration trip
Banked	Dichotomous	Migrant has a bank account in the United States
Participate in social organizations	Dichotomous	Migrant is part of a social organization while in the United States
No. of banks in community of origin	Ordinal	Number of banks in migrant's community of origin. Coded 0-3, 3 meaning 3 or more banks.
Duration of last migration trip	Interval	Number of months of last migration trip
Number of dependents in HH (HH: household of origin)	Ordinal	Number of non workers in the migrant's household of origin. Coded 0-5, 5 meaning 5 or more dependents.

B. Appendix II: Test for Heteroskedasticity

```
. corr lnsavretrn uswagel uswagelsq nonagriwork bankacctnew usmarlnew socialnew  squ
> ared_e absolute_e
(obs=702)
```

	lnsavr~n	uswagel	uswage~q	nonagr~k	bankac~w	usmarl~w	social~w
lnsavretrn	**1.0000**						
uswagel	**0.0811**	**1.0000**					
uswagelsq	**0.1103**	**0.9417**	**1.0000**				
nonagriwork	**0.2525**	**0.0552**	**0.0702**	**1.0000**			
bankacctnew	**0.2257**	**-0.0355**	**-0.0253**	**0.1023**	**1.0000**		
usmarlnew	**-0.0755**	**-0.0216**	**-0.0396**	**-0.0454**	**-0.0720**	**1.0000**	
socialnew	**0.0347**	**0.0780**	**0.0825**	**0.0745**	**0.0426**	**-0.0303**	**1.0000**
squared_e	**-0.0027**	**0.0065**	**0.0256**	**-0.0065**	**-0.0149**	**-0.0057**	**0.0542**
absolute_e	**-0.0050**	**-0.0036**	**0.0163**	**-0.0141**	**-0.0102**	**-0.0344**	**0.0677**

IX. Bibliography

Amuedo-Dorantes, C. and C. Bansak (2006). "Money Transfers among Banked and Unbanked Mexican Immigrants." Southern Economic Journal **73**(2): 374-401.

Amuedo-Dorantes, C., C. Bansak, et al. (2005). "On the Remitting Paterns of Immigrants: Evidence from Mexican Survey Data." Economic Review **First Quarter 2005**.

Breitkopf, D. (2004). "Getting High-Powered Help in Mexican Outreach." American Banker **169**(121): 7.

Durand, J., W. Kandel, et al. (1996). "International Migration and Development in Mexican Communities." Demography **33**(2): 249-264.

Hoeffer, M., N. Rytina, et al. (2007). Estimates of the Unauthorized Immigrant Population Residing in the United States: January 2006. Department of Homeland Security.

Kotler, P., Ed. (1983). Principles of Marketing. Englewood Cliffs, N.J., Prenctice Hall.

Lindenmayer, I. (205). "Remittance Lift for B of A By Mexican Government." American Banker **170**(131): 2.

Lindenmayer, I. (2005). "HSBC's Offer: Free Money Transfers to Anywhere " American Banker **170**(161): 5.

Massey, D. S. and L. C. Basem (1992). "Determinants of Savings, Remittances, and Spending Patterns among U.S. Migrants in Four Mexican Communities." Sociological Inquiry **62**(2): 185-207.

Solomon, M. R. (2006). Consumer Behavior: Buying, Having and Being. Upper Saddle River, New Jersey, Pearson Prenctice Hall.

U.S. Treasury (2002). Section 326 Summary.

White House Office of Communications (2007). Border Security And Immigration Reform.

Wooldridge, J. M. (2006). Introductory Econometrics: A Modern Approach. Mason, Ohio, South-Western Publishers.

Other webpages cited:

www.banxico.org.mx
www.census.go