

Savings Volatility Analysis: CARD Bank



Grameen Foundation, a global nonprofit organization, helps the world's poorest people – especially women – lift themselves out of poverty by providing appropriate financial services, life-changing information and unique business opportunities. Founded in 1997, Grameen Foundation has offices in Washington, DC; Seattle, WA; Colombia; Ghana; Hong Kong; Indonesia; Kenya; the Philippines; and Uganda. Microfinance pioneer Professor Muhammad Yunus, founder of Grameen Bank and winner of the 2006 Nobel Peace Prize, is a founding member of its Board of Directors, and now serves as director emeritus. For more information, please visit grameenfoundation.org.

This case study is a product of Grameen Foundation. We would like to acknowledge Karla Brom, a consultant to Grameen Foundation, as the writer of this case study. Additional assistance was provided by Julie Peachey, Debbie Dean and Kimberly Davies of Grameen Foundation. We would like to further acknowledge CARD Bank for its partnership and collaboration.



©2012 Grameen Foundation USA. All rights reserved.

Except for use in a review, the reproduction or utilization of this work or part of it in any form or by electronics, or other means not known or hereafter invented, including xerography, photocopying, recording, and in any information storage, transmission or retrieval system, including CD ROM, online or via the Internet, is forbidden without the written permission of Grameen Foundation.

Contents

Introduction / Purpose of this Case Study	2
Background on CARD Bank and its savings program	3
What is a Savings Volatility Analysis? Why would a bank do one?	3
CARD Bank’s Saving Volatility Analysis and Results	5
Branch-Level Analysis.....	11
Implications for Liquidity Risk Management	14
Regulatory reserves vs. internal reserves	14
Core deposits	15
Stress testing.....	16
Other Uses of Savings Analysis	17
Product pricing.....	17
Transfer pricing	17
Product development	18
Conclusions	20

Introduction/Purpose of this Case Study

In the past five years, the microfinance community has encouraged microfinance institutions (MFIs) to broaden the scope of product offerings for their clients beyond microcredit, especially by offering savings products. Microfinance clients need a safe, reliable, secure and convenient place to save, as much as – and sometimes more than – they need access to credit. However, providing savings products involves a different set of skills than those for providing loan products. MFIs must learn how to design and deliver products that meet their clients' needs while balancing the MFI's need for a stable and inexpensive source of funds. To establish trust and qualify for licenses, they need to demonstrate to clients and regulators that they have appropriate risk management policies, procedures and processes in place to safeguard deposits.

An important part of the risk management processes for savings products involves understanding what portion of deposits might be withdrawn on any given day, and what portion stays in the institution for a long time and becomes a stable funding source. When MFIs analyze and understand savings volatility¹ they can better manage liquidity risk, first by establishing internal reserve policies that define how much cash should be held in reserve for potential withdrawals and second by identifying the non-volatile, or stable, deposit base that they may use as a funding source.

The topic of analyzing savings behavior in MFIs has been examined by Joachim Bald ("Stability of Small Balance Deposits," CGAP Technical Note, January 2008) and Glenn Westley ("Is There a Business Case for Small Savers?" CGAP Occasional Paper, September 2010).

The purpose of our case study is to examine a savings volatility analysis done at CARD Bank in the Philippines, to highlight the process and share the results so that they can be applied in other MFIs.

We hope that this paper will demonstrate that implementing a savings volatility analysis is relatively simple, and that the results can be very useful for liquidity management, product development and costing. ***All deposit-taking MFIs should do a similar analysis to have a better understanding of their savings customers and products.***

This case study will present work done with CARD Bank in the Philippines as part of a larger savings mobilization project with Grameen Foundation to introduce a new type of savings product and expand CARD's market share to poor savings clients. The savings volatility analysis discussed is now a part of CARD's overall asset liability management process, in which results are discussed in the bank's Asset Liability Management Committee (ALCO), feed into asset liability matching reports and liquidity ratios, and inform decision making about internal liquidity reserves and transfer pricing.²

¹ Volatility is a measure of the frequency and magnitude of change. A variable can change frequently, but if the magnitude of change is small it would not be considered volatile.

² The ALCO is primarily responsible for funding and liquidity in a financial institution. Members include the finance manager, risk manager and heads of business lines (lending and savings), with MIS, audit and others invited to join as needed. The topic of savings volatility analysis is also discussed in the broader context of asset liability management in the CGAP Focus Note "Asset Liability Management for Deposit Taking MFIs," Brom, 2009.

Background on CARD Bank and its savings program

The Center for Agriculture and Rural Development (CARD), a Filipino MFI, was created as a social development foundation in 1986. Established with the vision of being a bank created for and owned by landless rural women, CARD began a Grameen-style group-lending program focused on outreach and sustainability. In 1997, CARD Bank, Inc. was created as a separate entity under the CARD Mutually Reinforcing Institutions (MRI) umbrella after securing a license from Bangko Sentral ng Pilipinas (BSP), the central bank of the Philippines, to operate as a microfinance-oriented rural bank. This enabled the newly transformed institution to accept deposits. CARD Bank is now one of ten CARD MRI institutions, and since inception has grown to more than 600,000 active members, most of whom also have voluntary savings with the bank. They currently have eight savings products, with an outstanding savings balance just over \$50 million, representing approximately 81% of total liabilities.

Though CARD has offered voluntary savings products since it was created in 1997, it had not achieved its desired outreach or portfolio volume. In 2009, it partnered with Grameen Foundation in a multi-year project funded by the Bill & Melinda Gates Foundation to enhance access to safe, flexible and convenient deposit accounts for the poor. Grameen Foundation has been assisting with market research and product development, financial literacy, technology improvements, human resources, treasury management and social performance management to help create a more robust savings approach for CARD Bank.

Grameen Foundation's holistic approach provides the framework and tools to build and offer safe, convenient and accessible poverty-focused savings programs to those living on less than \$1.25 per day, while building sound financial, organizational and institutional practices that transform MFIs from credit-led to client-focused, demand-driven financial service providers.

What is a Savings Volatility Analysis? Why would a bank do one?

Banks offer deposit products to their customers for a variety of reasons – customers want a secure place to save their money, and banks want long-term, stable funding sources, hopefully at a low cost. Banks offer different varieties of savings products to meet their clients' needs – demand deposits for liquidity, time deposits for investment purposes³ – while keeping in mind the bank's cost and liquidity management constraints.

Because depositors have the right to withdraw their funds at any time, they pose a specific liquidity management challenge; bank management needs to make sure that there are always adequate funds available to meet daily withdrawals. Despite the fact that clients have the right to withdraw all of their savings deposits on any given day, it is unlikely that **all** depositors will come in on the same day and withdraw all of their funds. It is also unlikely that **no** clients will come in on any given day to withdraw all or part of their funds. So how do banks determine what amount of funds to have on hand for potential withdrawals? How can MFIs replicate the savings volatility analysis done in banks and use it to understand better the savings volatility in their own institutions?

³ Throughout this case study, "demand deposit" refers to deposits that can be withdrawn at any time; and "time deposits" refer to deposits with minimum balances that are held for a specific amount of time. At CARD Bank, no certificate is issued with a time deposit.

Banks want to understand the volatility of their savings balances for reasons other than liquidity management. Deposit products are just one type of liability that banks use to fund the asset side of their balance sheet. They want to diversify their funding sources and they need to understand the costs of borrowing from a variety of sources, including retail and institutional depositors.⁴ Are small balance savings deposits a cheap and stable funding source? What about time deposits? We might think that time deposits are an attractive funding source because they are larger in amount and because clients are contractually obligated to leave their deposit in the bank for a fixed amount of time. But what are the true costs of providing savings deposits and time deposits? And which type is a more stable source of funding, during business as usual as well as during a crisis?

Banks seek to answer all of these questions based on the results of a quantitative analysis of changes in aggregate savings balances. This analysis shows, in different levels of detail (in this case, by product and by branch), how savings balances change over time. **Once banks do this analysis, they can use the results to inform their liquidity management, pricing and product development.**

In the microfinance sector, the practice of analyzing depositor behavior and aggregate savings balances is still nascent. Instead of using a quantitative analysis to determine potential withdrawals, MFIs establish internal liquidity reserves according to regulatory or funder requirements, or according to suggestions from global networks or trainings. There is not yet a good understanding of whether small balance deposits (those favored by typical MFI clients) are stable funding sources, largely because this volatility analysis is not done.

Different banks have different approaches to analyzing savings volatility, but the basis is the same:

- Collect end-of-day aggregate savings balances by product, by branch.⁵
- Store the data in a database in the management information system (MIS) or core banking system.
- Analyze a sufficiently long *time series* of the data to understand how balances change over time. The longer the time series the better, but a minimum of two years is desirable, to demonstrate the effects of seasonality throughout the year (and to compare year-to-year), and to include behavior over year-end.

The analysis itself may be as simple as graphing balances, to see deposit-balance behavior, but it may also include identifying minimum, maximum and average savings levels over time, and maximum changes on any given day. A more sophisticated analysis might use a regression analysis or statistical software, but that is not always feasible for an MFI. The most important thing is that management and staff understand how to analyze the data themselves, and how to use the results to make decisions.

⁴ When financial institutions collect deposits then use those deposits to make loans, it is known as financial intermediation. They “borrow” money from clients in the form of deposits and lend that money to other clients in the form of loans. The interest paid on deposits plus the operating expenses associated with providing those products equals the cost of funds of the deposit.

⁵ Analyzing daily balances is much better than weekly or monthly balances because this gives a more detailed understanding of balance behavior, which allows for more precise liquidity management.

CARD Bank's Saving Volatility Analysis and Results

As discussed above, CARD Bank has been offering a variety of savings products to its clients since 1997. The treasury management part of the Grameen Foundation's project focused on:

- Better understanding current savings products, for liquidity risk management purposes
- Refining and enhancing the asset liability reporting and the ALCO process, based on that understanding
- Providing inputs and support to the product development team, especially as they looked at the costs of providing savings products

The starting point for this work involved introducing and implementing a "bank-like" savings volatility analysis. To do this, one must:

- Collect data in a format that is easy to analyze
- Analyze the data
- Integrate the results of the data into existing liquidity risk management reports and tools and/or create new reports and tools as necessary
- Work with the ALCO and the bank's Board of Directors to make decisions and recommendations based on the results

Data Collection/Process at CARD Bank

- Each day, each branch at CARD Bank saves its end-of-day financial positions into the branch database. Those databases are backed up and stored, and data from each of the branches is consolidated, to produce total CARD Bank reports. CARD Bank currently has no time limit on how long the data is stored, which is very useful for this and other types of historic analyses.
- The IT team at CARD created a script to query each of the databases and extract data for end-of-day balances for each savings product.
- That data is "dumped" in a master spreadsheet showing daily savings balances by product, in separate spreadsheets for each of CARD Bank's branches. The data in each of those spreadsheets is consolidated into an aggregate spreadsheet that shows the total end-of-day balance for each savings product.

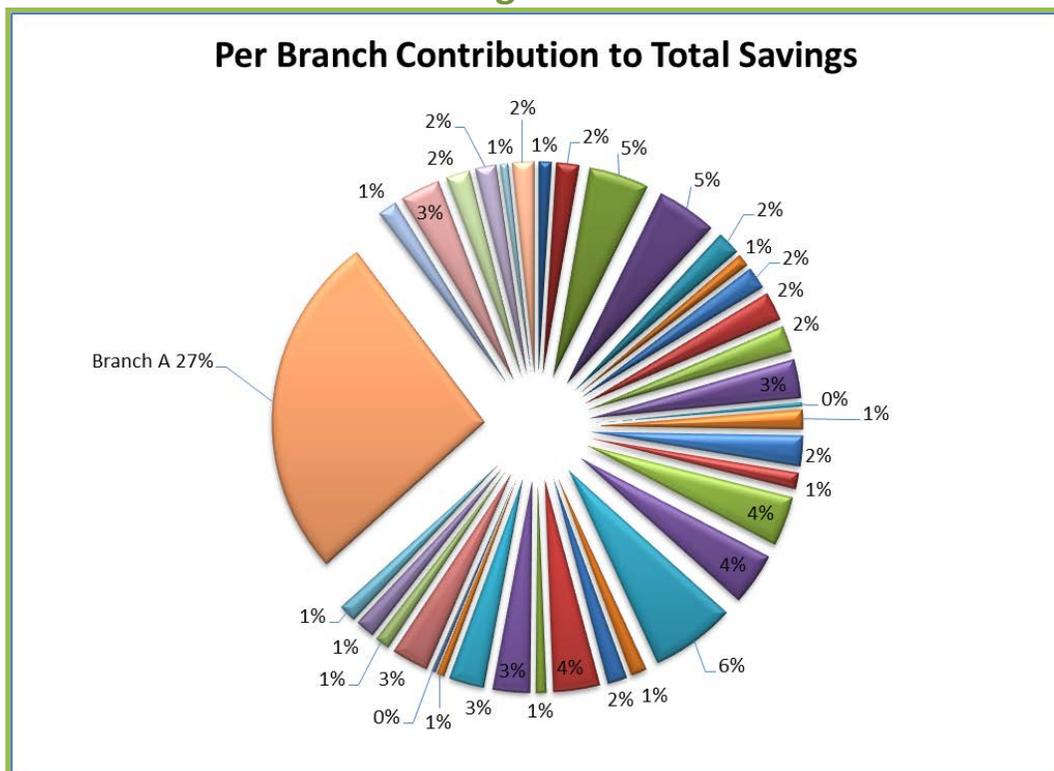
We decided to begin with 2.5 years' worth of data because it would have been too time-consuming for the IT team to go back and extract daily data for a longer period. By the end of the savings analysis implementation, we were working with three years of historical data, which is a very good base. It is very important that MFIs collect and store this data, and CARD Bank is in a strong position because it does.

The savings volatility analysis described in this case study focuses on total savings, the pledge savings product, and a passbook demand deposit product. Details are listed below:

- Total savings balances provide CARD Bank with a starting point for understanding savings balance volatility. Once staff understands total savings, they can drill down and look at other products.
- Pledge savings is a combination of compulsory savings (a percentage of loan principal plus a fixed deposit amount per week) and voluntary savings (members can deposit more than the required amount at each weekly center meeting). These deposit balances represented the largest percent of total savings (approximately 60%), and they were expected to be the most stable because there were strict limitations on withdrawals until very recently.
- A new demand deposit product was being introduced as part of the overall work of Grameen Foundation’s savings initiative, and we wanted to understand the volatility of the current demand deposit product before launching a new product. Demand deposits represented approximately 12% of total savings when this analysis was first done.

As a starting point for the analysis, we wanted to understand which branches had the largest percentage of savings balances for different product types. These are the branches that CARD Bank might focus on first, because any changes to savings products in those branches would have a large impact on total savings. To have an idea of which branches are most significant for different types of savings products, we have created pie charts showing the percent of total savings, pledge savings and demand deposits by branch.

Figure 1

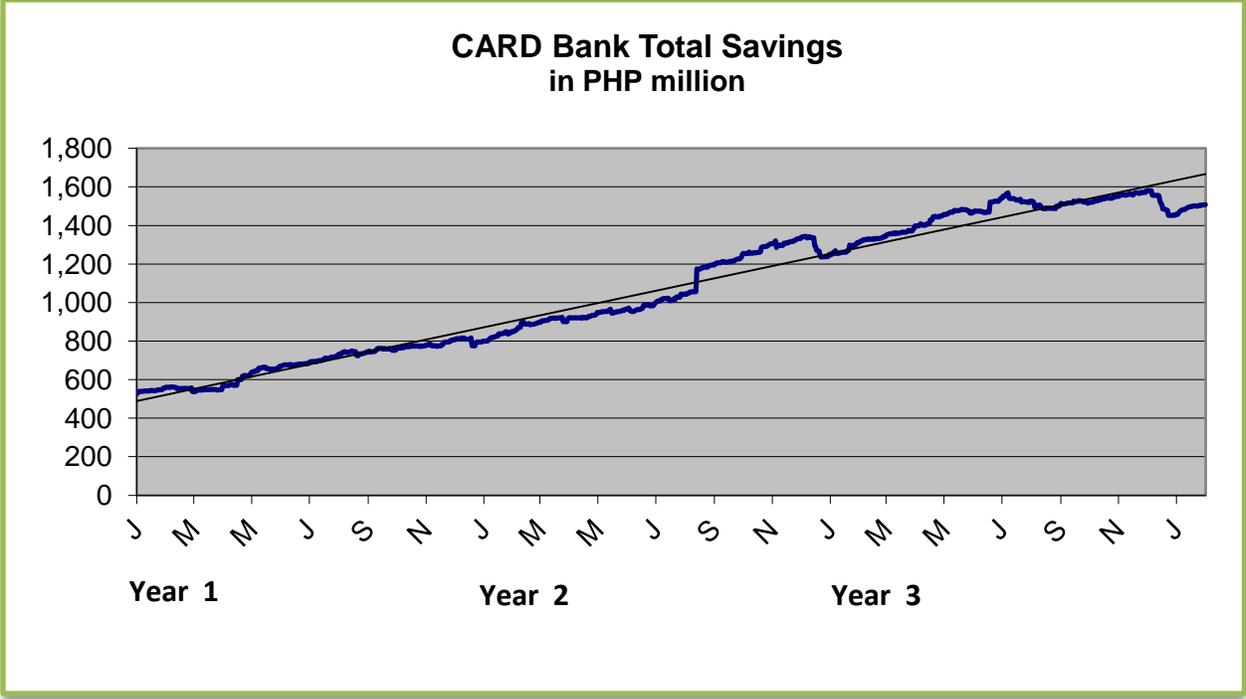


Looking at the pie charts, we see that Branch A is the most significant for total savings (Figure 1) and for demand deposits (Figure 3). This makes sense because Branch A is one of the largest and oldest branches, and CARD Bank’s headquarters are there. It is interesting to note that the pledge savings balances are more evenly distributed by branch than demand deposits (Figure 2). This makes sense because pledge savings are collected as part of the lending process – deposits are made as part of the mandatory weekly center meetings. Until recently it wasn’t as easy to transact in pledge savings, due to constraints on withdrawals. For demand deposits, we also note that three other branches represent a significant percent of savings balances – Branch X, Branch Y and Branch Z (Figure 3).

To analyze savings behavior we went through a few basic steps for each of the branches, and then for the aggregate.

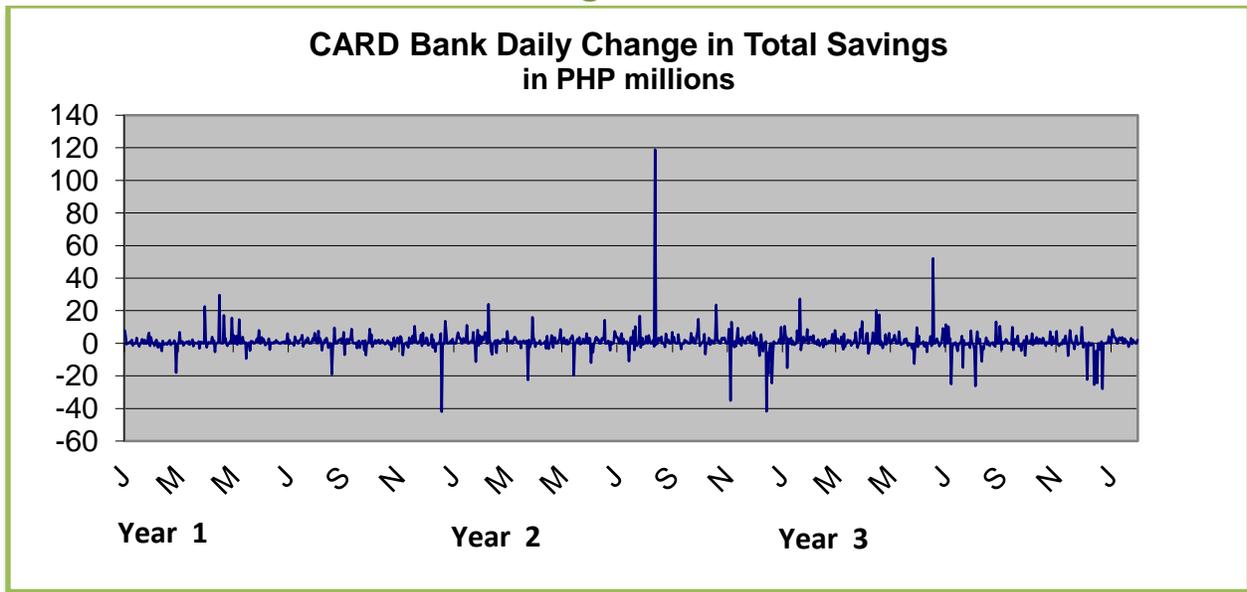
We graphed the daily balances for all products, by branch and at the aggregate level.

Figure 4



Then we calculated daily changes (Day 2 minus Day 1) for all savings, and by product, for the entire time period and graphed them.

Figure 5



Looking at the above graphs (Figures 4 and 5) we can see that CARD Bank’s total savings balances have been growing steadily over the time period, from a starting point of 528 million PHP to a level in December of Year 3 of almost 1.6 billion PHP, for an annual growth rate of about 65% (Figure 4). We can also observe that daily changes are typically plus or minus 20 million PHP, with a few notable exceptions (Figure 5). If we look at the largest absolute change, we see that it was a net *inflow* (deposit) of almost 120 million PHP in August of Year 2. The largest net outflow (withdrawal) ever was approximately 42 million PHP in December of Year 1 (a similar large net outflow happened in December of Year 2).

It is important to investigate the reasons for these large movements – are the numbers correct, or was there a data error? Both of the large outflows happened at year end, but weren’t repeated in Year 3 – why? In this case, the answers to these questions are specific to CARD Bank, but looking behind large or unusual changes is essential to verifying that data is correct before using it to make decisions.

What do these numbers tell us? At an aggregate level, CARD has stable deposits of 528 million PHP, which have been in the bank for three years. Those deposits have therefore replaced other liabilities that CARD Bank may have otherwise used to fund client loans, provide for liquidity reserves, etc., and can be considered *core* deposits (long-term stable funding sources).

Looking at inflows and outflows, we identified some *absolute* numbers (average changes of +/- 20 million, 120 million inflow, 42 million outflow). However, all of these absolute numbers are not useful to us when we know that savings balances change every day. Therefore we look at *relative* values – for example, maximum change divided by average balances – and express that relation in percentage terms. This enables us to understand whether the absolute number that we identified is large or small compared to the overall savings balances we are working with.

We identified minimum, maximum and average balances for total savings, pledge savings and demand deposits for the three-year time period (see Figure 6 below).

Figure 6 – Minimum, Maximum and Average Balances by Product

Product type	Minimum balance	Maximum balance	Average balance
Total Savings	528 million	1.58 billion	1.07 billion
Pledge savings – all branches	223 million	1.05 billion	637 million
Demand deposits – all branches	63.6 million	126 million	92.7 million

- We identified the largest outflow (withdrawal) and inflow (deposit). This could also be done by looking at the graphs.
- We expressed the largest inflow and outflow as a percentage of the minimum, maximum and average savings balance for each product. This gives us the magnitude of the inflows and outflows by product.

Figure 7 – Inflow and Outflow Magnitude by Product

Product	largest outflow (withdrawal)			
		as % of min	as % of max	as % of avg
Total Savings	(42,038,919)	-8.0%	-2.7%	-3.9%
Total Pledge Savings	(16,904,201)	-3.2%	-1.1%	-1.6%
Total Demand Deposits	(22,671,901)	-4.3%	-1.4%	-2.1%
Product	largest inflow (deposit)			
		as % of min	as % of max	as % of avg
Total Savings	118,854,094	22.5%	7.5%	11.0%
Total Pledge Savings	19,139,591	3.6%	1.2%	1.8%
Total Demand Deposits	23,311,891	4.4%	1.5%	2.2%

The percentages in Figure 7 give us a starting point for thinking about the correct level for internal reserves, which we will discuss further in the section on liquidity risk management, below. We will also revisit the topic of core deposits when we talk about liquidity and transfer pricing.

All of the numbers above are important for understanding deposit behavior at an aggregate level at CARD Bank. Ideally, this analysis will also be done for all products in all branches, because different branches may show different depositor behavior and therefore require different levels of liquidity reserves. No matter what level (total bank or branches), this analysis should be updated every month and discussed by the ALCO, to make sure that there is a good understanding of deposit behavior and how it affects the institution’s liquidity and cash management.

Branch-Level Analysis

For our work with CARD Bank, we did all of the above analysis at the branch level as well as the aggregate level. We graphed deposit behavior for total savings, pledge savings and demand deposits per branch, and we calculated minimum, maximum and average savings balance levels and minimum and maximum outflows. We focused especially on the behavior of demand deposit balances because, at the time, CARD Bank was in the process of creating a new demand deposit product. In the graphs below, we look at the results for three of the branches that have the largest percentage of savings deposits (see Figure 3) – Branch A, Branch X and Branch Y.

Figure 8

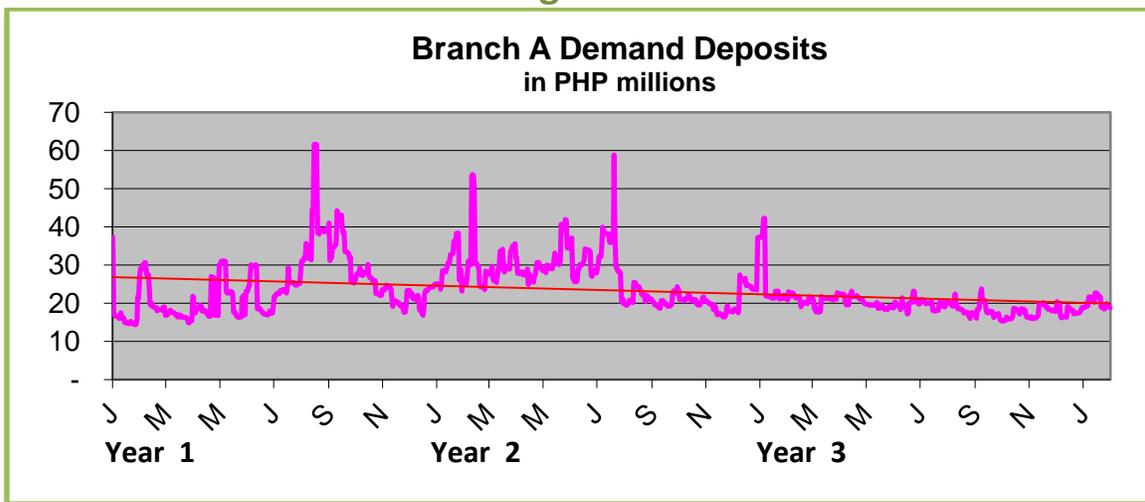


Figure 9

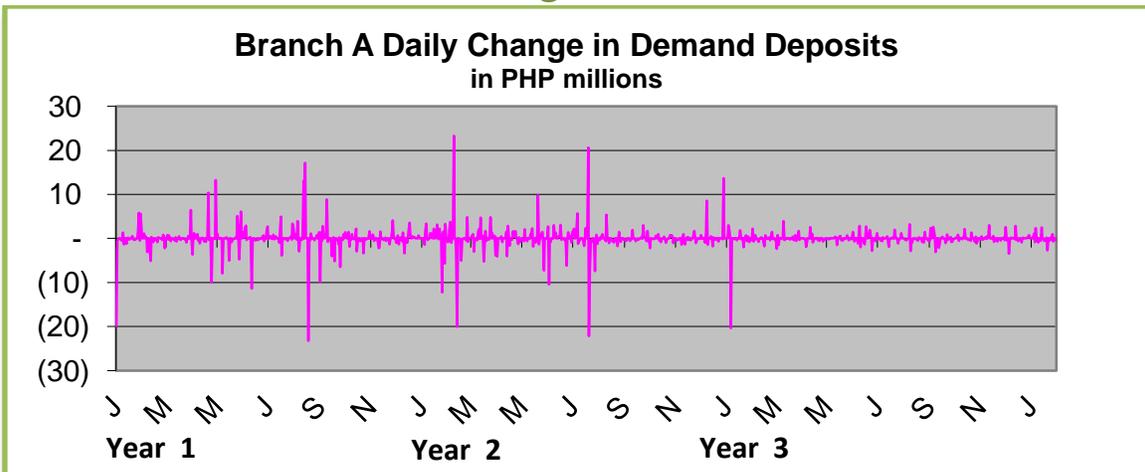


Figure 8 graphs the daily balances of demand deposits at Branch A (recall that, according to Figure 3 above, Branch A has the largest percentage of demand deposits of all of the branches). What we see from this graph is that demand deposit balances have not grown from the beginning to the end of the time period, despite some period of growth in Year 1 and Year 2. Figure 9 shows that deposit levels

were volatile until early Year 3, when daily balances stabilized and inflows and outflows also decreased appreciably.

Figure 10

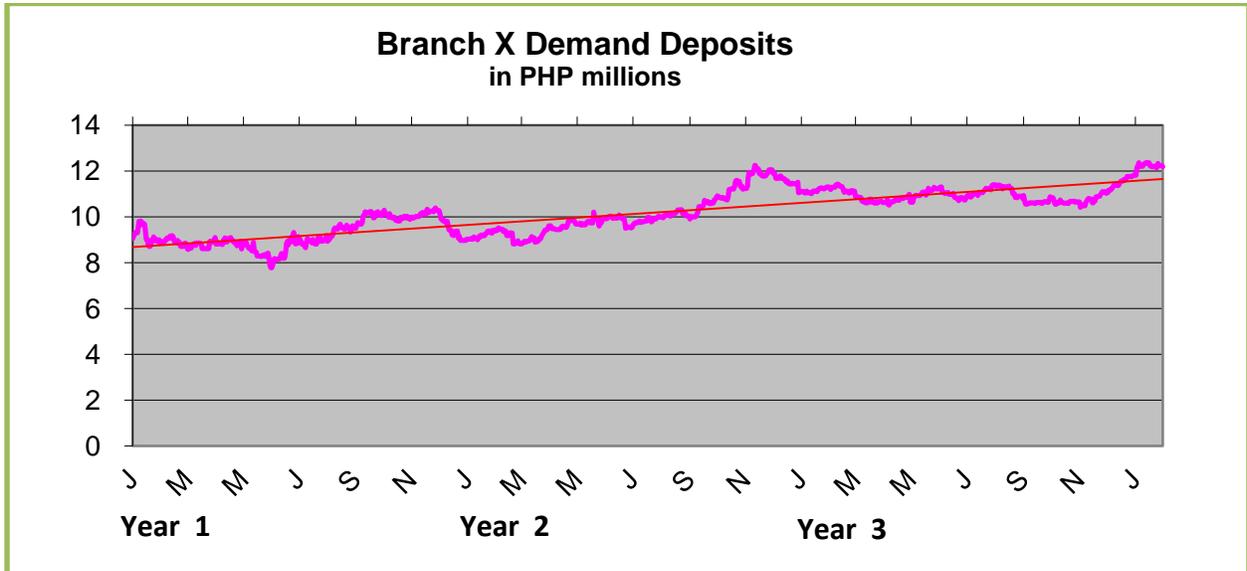
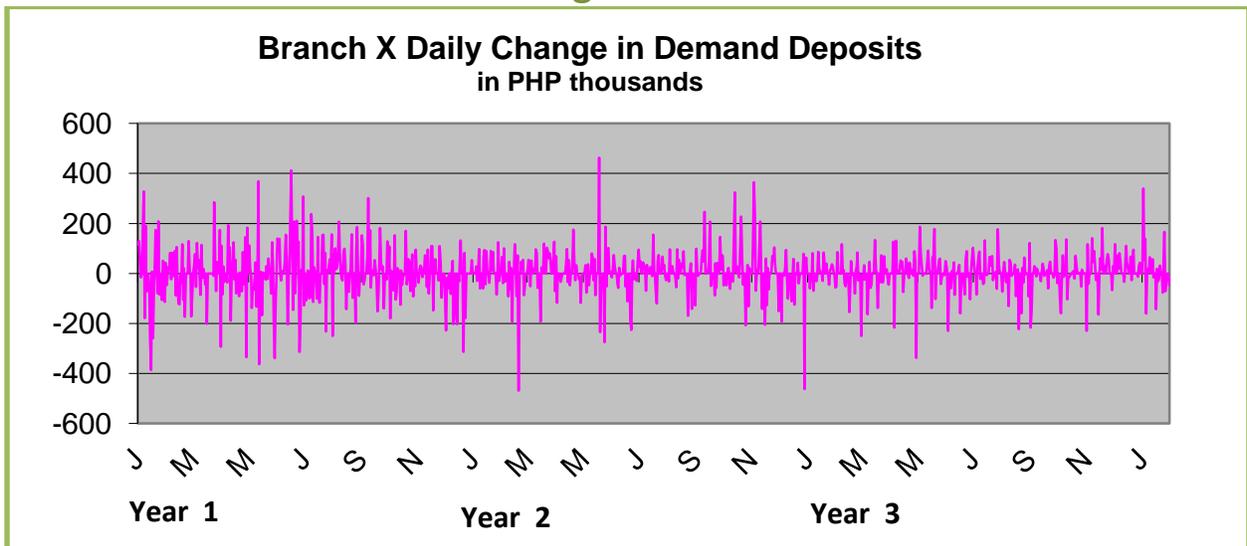


Figure 11



Looking at the Figure 10 and 11 graphs for Branch X, we see that there has been a slow and somewhat steady growth in demand deposit balances of about 30%, starting in the middle of Year 1. Daily changes are typically +/- 200,000 PHP – they are frequent, but not of a large magnitude (less than 2% of total savings). For the same demand deposit product we see a very different behavior in this branch compared to Branch A. Branch X has two savings officers who pick up customer deposits, while most branches do not have a dedicated savings officer, so these results may show a positive correlation between having deposit collection and the growth and stability of aggregate demand deposit balances.

Figure 12

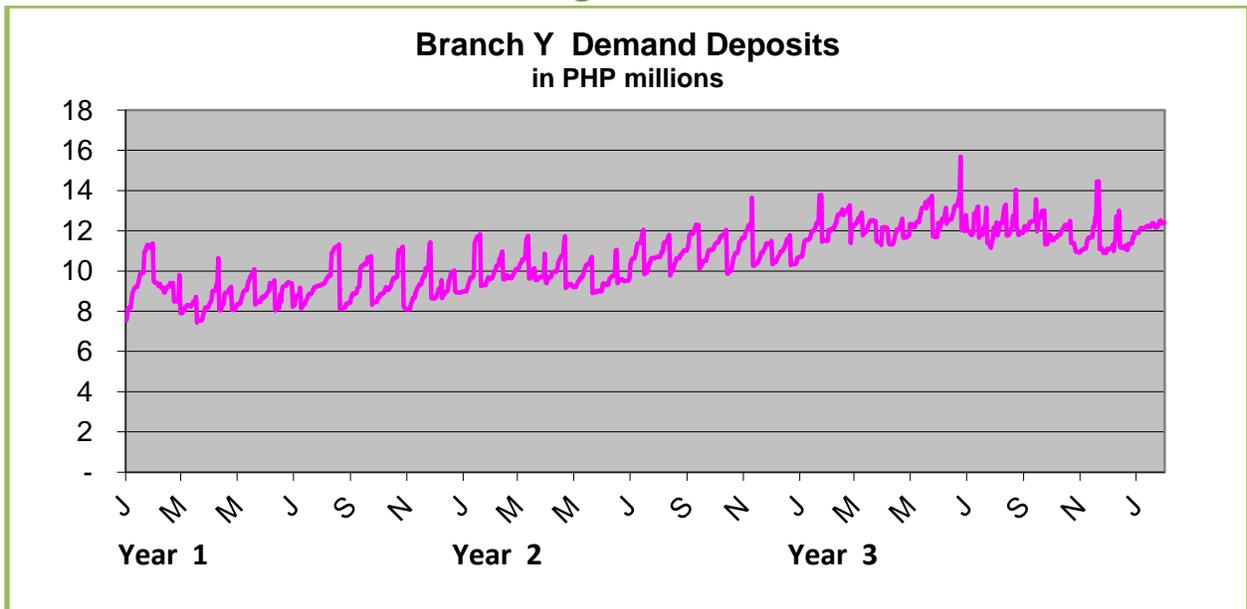
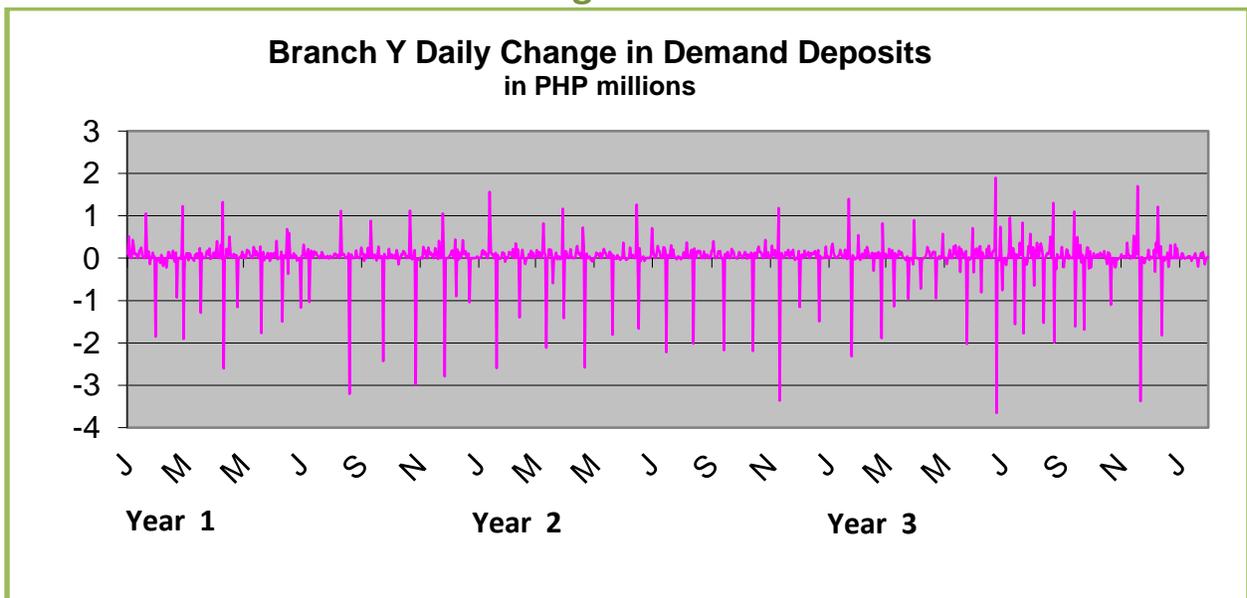


Figure 13



Looking at Figures 12 and 13, we see that the behavior of demand deposits in Branch Y is different from that of deposits in both Branch A and X. In this case, savings balances have grown about 25% over the period, but there seems to be some definite patterns in the way savings balances move, especially in inflows and outflows. Outflows (net withdrawals) seem to happen regularly – approximately the same amount flows out about every 15 days. These patterns merit further attention to better understand to what the patterns can be attributed. At the very least, it is important information to have for cash and liquidity management purposes, since there are 15 days' worth of small net inflows followed by a large net outflow.

Implications for Liquidity Risk Management

Now that we've discussed the savings volatility analysis and looked at some of the results, how can CARD Bank use this information for liquidity risk management purposes?

In banks, this savings volatility analysis would be done daily, because savings balances change daily, and because it is important to monitor changes in any of the decisions or assumptions made as a result of the savings volatility analysis.

Since a daily analysis is not possible for most MFIs, we recommend it be done at least monthly (and more frequently as needed). The analysis should be discussed at the monthly ALCO meeting, and the ALCO is responsible for recommending actions to take based on the analysis. Some of the main decisions or actions are discussed below.

Regulatory reserves vs. internal reserves

Philippine bank regulators – the BSP – require that CARD Bank hold a certain percentage of deposits as regulatory reserves at the central bank.⁶ These regulatory reserves are not available to CARD to use for withdrawals – they are held in case of emergency. Regulatory reserve percentages are the same for all rural banks and don't take into account the savings volatility analysis above, which is specific to CARD Bank's savings products and customers.⁷

ALCOs in deposit-taking institutions need to establish internal liquidity reserve levels, review them frequently and perform stress testing and scenario planning to anticipate accelerated deposit withdrawals in case of political or economic uncertainty.

Looking back to Figure 7, we can see that the largest *change* (inflow or outflow) that ever occurred in the three-year time period was an inflow of almost 119 million PHP. CARD Bank might start with the assumption that, if that amount of money can flow into the bank in one day, then it is possible that the same amount could flow out in one day (even though there has not been such a large outflow in the three-year time period).

After discussing the different options,⁸ we agreed to compare the amount of the largest change to average deposit balances during the time period, to calculate the change as a percent of average total deposits. The result was 11%. CARD Bank's ALCO could then propose with a maximum degree of confidence that if the bank held 15% of total deposits as an internal reserve, it would have adequate liquidity to meet potential withdrawals. This is because 15% of average deposits represents 4% more than the largest daily change that had ever occurred in the previous three years. Because CARD's internal reserve policy was 25%, the ALCO might also recommend decreasing the internal reserve level

⁶ BSP requires 4% regulatory reserves for demand deposits and savings accounts, and 2% for time deposits for all rural banks. Different countries have different levels for regulatory reserves.

⁷ Central banks also often use deposit reserve levels to control inflation, by limiting money supply in the economy.

⁸ For example, largest change/maximum deposit balances or largest change/minimum balances.

in increments – from 25% to 20% for 6 months, then from 20% to 15% for 6 months – to test the decrease in internal reserves and ensure that the levels are always adequate.⁹

Analyzing savings volatility and setting internal reserve levels at the total CARD Bank level is a good starting point. In that case, each branch would have the same level of internal reserves (in our example, 15%). Yet we’ve seen from the branch-level analysis above that different branches show different balance levels and daily changes. A good liquidity risk management process would use the results of the savings volatility analysis – largest change as a percent of average deposits – at a branch level to fine tune the internal reserve policy.

We recommend that MFIs eventually set internal reserve levels by branch, where some branches may have higher internal reserve requirements than others, but where the weighted average total for the bank would equal the internal reserve level for the bank in total. This final stage of setting reserves by branch may not be possible at all MFIs, as many MFIs are not able to track reserve levels at the branch level due to MIS and other operational issues, but it is a goal.

The point of analyzing aggregate savings balance behavior and setting internal reserve policy according to the results is two-fold:

- The MFI is reasonably sure that it is holding an adequate amount of reserves to meet customers’ withdrawal needs, as shown by a historical analysis.
- This then enables the MFI to use some part of the remaining savings balances to invest in its loan portfolio, which is the highest-yielding asset.

Core deposits

Another reason it is important for an MFI to analyze savings behavior is to understand what portion of its savings balances can be considered to be a long-term, stable funding source. This is one of the reasons that banks provide savings to their customers. If a bank or MFI is providing a good product to its clients, it is likely that they will continue to save there and that new clients will open accounts. Though each client will transact frequently, as a whole, savings balances should grow and stay in the institution.

Figure 14 – Minimum Balances as a percent of Average Balances

Product	minimum balance	average balance	min balance as % of avg balances
Total Savings	527,999,900	1,078,063,191	49.0%
Total Pledge Savings	222,901,667	648,248,000	34.4%
Total Demand Deposits	63,601,810	93,387,410	68.1%

⁹ The BSP uses a CAMELS analysis when examining rural banks. At the time of this analysis, under the liquidity section of that analysis, the BSP had determined that internal reserves of 25% merit the strongest rating, so CARD Bank had set its internal reserves according to the BSP CAMELS guidelines. That level has since been increased to 36%.

In Figure 14, we look at minimum balances for all savings products at the CARD Bank level. We also look at minimum balances for pledge savings and demand deposits at the CARD Bank level. The minimum balance has by definition remained in the Bank for three years and therefore can be considered as long-term, stable funding. Looking at total savings, we observe that almost 50% of average total savings balances are long-term and stable. This represents funding that CARD Bank has not had to borrow from other sources and therefore may represent a savings in funding costs for CARD Bank if the cost of raising deposits is cheaper than the cost of borrowing from banks (we will return to this when we discuss product costs and transfer pricing).

Looking at core, or stable, deposits by product also gives us an idea of which savings products provide the most stable funding sources and may help determine which products an MFI would want to promote. When looking at the table above, we see that demand deposits, though small in volume, might be considered more stable than pledge savings, because a larger percentage of these savings has remained in the institution for three years. As an MFI becomes more sophisticated in its management of savings products, it will want to track core deposits by product, to fine tune its product offerings and to assign appropriate revenues to each product.

It is often believed that time deposits are the most stable sources of funds, both because the average deposit size is larger than that of a demand deposit, and because customers are contractually obligated to keep their savings in the organization for a pre-determined length of time. It is beyond the scope of this paper to talk about time depositor behavior, but it is important that financial institutions that provide time deposit products look at the costs of providing this product to customers, and the amount of core deposits they generate, to verify whether they are indeed stable funding sources. Time depositors are typically sensitive to interest rates paid and will move their funds to banks that offer higher interest rates. They may also be more sensitive to bank credit ratings and other reputation issues. It is not always a fact that time deposits are stable funding sources, and it is important to test assumptions through a similar volatility analysis.

Stress testing

Another important use for savings analysis is stress testing. All of the analysis done at CARD Bank used data for savings balances during three years when there was no crisis or stressed situation. Therefore it represents savings balance behavior during business as usual. A simple way to use the analysis results for a stress test could be to look at the largest change during a business-as-usual time period and assume that that change would be greater during a stressed time period. Unless the institution has data from a time period that includes a time of stress, management needs to use its judgment to determine what a potential deposit outflow might look like during a crisis.

We recommend coming up with two stress scenarios – one for a minor crisis and one for a “meltdown.” Examples of a minor crisis could be unusual depositor behavior due to uncertainty around elections or around a localized natural disaster. A meltdown could be a major run on deposits due to a loss of confidence in the MFI or in the banking sector of the country, due to a coup or other major political event, or due to a large and prolonged economic crisis (for example, due to a sudden change of a foreign

exchange rate regime)¹⁰. Argentina in 2001 (when the peso/dollar peg broke) is a good example of this, as is the current crisis in Greece, where there are concerns that the country will leave the Euro. In both cases, there was a rapid withdrawal of large amounts of savings from depositor accounts.

During a crisis, banks would hold larger liquidity reserves to meet increased withdrawal demands. The results of stress testing can help the bank determine how much to increase these reserves. At the same time, the central bank or other regulator may *decrease* the amount of regulatory reserves that they require banks to hold. Central banks often inject liquidity into the economy during a crisis, to calm the markets.

Other Uses of Savings Analysis

Product pricing

Analyzing the volatility and behavior of different savings products is essential for refining liquidity risk management, and especially for determining what level of internal reserves to hold for potential withdrawals, both during business as usual and during times of stress. This analysis is also important in determining the costs of funds of savings, which in turn helps MFIs understand what interest rate to pay to depositors to provide savings products sustainably.¹¹

Transfer pricing

When MFIs borrow from banks it is relatively easy to determine the costs of those funds by calculating an effective interest rate on the loans payable. When MFIs borrow from their clients in the form of savings, the cost calculations are more complicated. First, the MFI needs to do a costing exercise to understand the cost of providing savings. The details of a costing exercise are beyond the scope of this paper, but organizations can look at allocation-based costing or activity-based costing, as well as full or marginal costing (see Glenn Westley).

When determining the cost of providing savings, the MFI must look at interest expenses (financial expense), labor and other costs (operating expenses) on the one side, and “revenue” on the other side. Revenue from the savings product can be thought of as the value that the funds bring to the organization because they replace funds that would otherwise be borrowed from banks. Looking at the revenue minus the expenses gives the true cost of the product.

Assigning revenue internally from one product to another product is known as transfer pricing. Interest earned from the client loan portfolio is the main source of revenue for an MFI and is used to pay for funding costs, operating expenses and loan loss reserves. Any remaining revenue is then profit. When “funds” are savings (instead of loans payable, for example), a portion of interest income generated from the client loans business is “paid” (or transferred) to the savings product business to cover funding costs;

¹⁰ A foreign exchange rate regime refers to a currency which is actively managed by the central bank or monetary authority rather than allowed to float freely versus other currencies. One example would be a currency which is pegged at a specific rate to a reference currency like the USD or Euro.

¹¹ For a more thorough discussion of product pricing, see *Savings Services for the Poor*, chapters 9 and 14, Maddie Hirschland, editor, Kirkland Press, 2005.

funding costs are determined by looking at a comparable cost of funds if borrowed from other sources. For example, if we look again at Figure 14, we can see that 528 million PHP of savings have been in CARD Bank for three years, so those balances have eliminated the need for CARD to borrow that amount of money for three years from a bank or other funding source. If three-year funding in the market costs 10%, then CARD Bank would allocate 52.8 million PHP of revenue from the client loan product line to the savings product line.¹²

Once revenue is allocated, costs from the costing exercise can be deducted to determine the profitability of the savings business. As with the rest of the analysis, looking at transfer pricing at the CARD Bank total savings level is only a starting point – it is important to look at profitability by product and, eventually, by product by branch. Understanding the profitability of a product is usually an important factor in deciding whether to change interest rates paid to savers, fine tune the product or eliminate it altogether.¹³

Transfer pricing is essential in understanding the true profitability of savings products, but there are other results from the savings volatility analysis that can be used to make decisions about what kind of savings products to offer.

Product development

Looking at deposit behavior through a savings volatility analysis is also very useful for product development purposes. MFIs need to balance their clients' need for certain types of savings products with the MFI's liquidity and cost constraints.

If the goal is to provide savings products that will grow and remain in the institution, then it is important to test whether that is what is actually happening. Slow growth or large net withdrawals may be a sign of customer dissatisfaction. Customers may also have seasonal cash-management needs, and different products could be developed to meet those needs. Small-business clients may need a cash management account rather than a demand deposit account, and that product should be developed and priced accordingly.¹⁴

For purposes of the savings volatility analysis done with CARD Bank, we focused on demand deposit products. It is also important to look at time deposit products, to understand whether those customers are:

- Leaving their savings in the bank for the full contractual period of the time deposit
- Withdrawing funds early
- Renewing time deposits when they mature, for the same time period or for a different time period

¹² Note that this is a very rough example, because an MFI or bank would normally be transferring income on a quarterly or annual basis.

¹³ MFIs should also look at profitability by client to inform decision making about what products to offer. An institution may “lose” money in providing a savings product to a client, but make money by providing the same client with a loan product, so the net income from that client is positive. If the client would leave the MFI if the loss-making product was eliminated, then it would be a net loss for the MFI.

¹⁴ For a more in-depth discussion of savings product development for MFIs, see Hirschland, Part II.

If we return to Figures 8 through 13, we see how the same demand deposit product behaves quite differently at three different branches of CARD Bank. Branch A shows a high flow of transactions, but no sustained growth over the three-year time period. Branch X, on the other hand, shows a steady level of growth (simply broken down, about 10% a year), with relatively small daily changes of +/- 200,000 PHP.

Why would the same deposit product generate very different types of client behavior at these two branches? Assuming that we prefer client behavior in Branch X to that in Branch A, how can we make customers in Branch A behave more like those in Branch X? There are two main variables to look at – the CARD side and the client side. On the CARD side, factors to examine include:

- Employees – number of employees, time with CARD Bank, training on savings products, customer service
- Branches – location, size, upkeep, hours

On the client side, factors to examine include:

- Basic demographics of the client base – age, gender, family status
- Major employers in the branch area and how that might affect client cash flow needs
- Whether or not one business type dominates (e.g., agriculture) and drives cash flow needs
- Whether there are any market research surveys or focus groups done in the branch area, which would provide insight into what clients said they wanted in a deposit product

When we look at the demand deposits behavior in Branch Y (Figures 12 and 13), it is important to understand if the patterns that are demonstrated are due to individual clients' deposit and withdrawal behavior, or if there is some other reason that the patterns exist. One possibility is that a local business is using a demand deposit account to manage its payroll (given that withdrawals happen every 15 days or so). In that case, the ALCO should discuss whether those accounts should remain demand deposit accounts or whether a cash management account might be a better alternative for the customer and for the bank.

The results of all decisions made in an MFI should be reviewed and analyzed to make sure that the desired results are achieved. If an MFI creates a product in response to perceived client demand and then product uptake is low, something went wrong. Either client needs were not well understood or product design did not respond to those needs. Analyzing savings balances by product type and by branch, as CARD Bank is doing, is an important part of the overall analysis of results.

Conclusions

When microfinance institutions expand from lending money to clients to borrowing money from clients (in the form of savings), they take on a very important responsibility. They need to guard the savings of clients carefully, and to earn the trust of clients, regulators and the general public. They also need to balance the need of their clients for a secure and convenient place to save their money with the need of the MFI for low-cost, stable funding sources.

The design and delivery of deposit products is very different from the design and delivery of credit products. The risk management processes related to these products are different, too. When an MFI is lending money to a client, the emphasis is on evaluating the client's ability and willingness to repay, and on designing products that match the client's cash flows. When an MFI is borrowing money from clients in the form of deposits, product design is focused on meeting clients' need for cash management or investment income.

Risk management emphasizes building confidence in the MFI and in its liquidity risk management capabilities, because clients will feel safer putting money in an MFI that has demonstrated that depositors' money is protected and will be available for withdrawal according to the terms of the saving product.

The savings volatility analysis described in this case study is an essential part of liquidity risk management, and of making more intelligent decisions about deposit products generally. An MFI could certainly provide deposit products to its clients and not do this analysis, but the analysis is a powerful tool for understanding more accurately:

- The amount of internal reserves to hold for potential withdrawals
- The amount of deposits that can be used to invest in the loan portfolio (core deposits)
- The costs of providing different types of deposit products

This accuracy of understanding should mean a better product for clients, and a more profitable and sustainable institution.

MFI regulators could also benefit from examining and understanding savings volatility analyses. Different institutions have different types of clients and products, so it doesn't make sense that they would all need the same amount of internal reserves or have the same liquidity ratios. Regulators should also understand that liquidity risk management changes in times of stress and that this volatility analysis can help in refining stress tests and scenario planning.

Performing this analysis and using the results to make better decisions about liquidity risk management, product pricing and product development are the next steps in the evolution of MFIs from credit-only institutions to efficient and sustainable institutions that provide a wide variety of financial products and services to their clients. All MFIs that are currently offering or planning to offer deposit products should learn from the example of CARD Bank and integrate a savings volatility analysis into their asset liability management and their strategic decision making.