

FocusNote

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FOREIGN EXCHANGE RATE RISK IN MICROFINANCE: WHAT IS IT AND HOW CAN IT BE MANAGED?

Introduction

Many borrowing microfinance institutions (MFIs) are not adequately managing their exposure to foreign exchange rate risk. There are at least three components of foreign exchange rate risk: (1) devaluation or depreciation risk, (2) convertibility risk, and (3) transfer risk.

Devaluation or depreciation risk typically arises in microfinance when an MFI acquires debt in a foreign currency, usually U.S. dollars (USD) or euros, and then lends those funds in domestic currency (DC). The MFI then possesses a liability in a hard currency and assets in a DC (in which case, an MFI's balance sheet is said to contain a "currency mismatch"). Fluctuations in the relative values of these two currencies can adversely affect the financial viability of the organization.

Convertibility risk is another possible component of foreign exchange risk. For the purposes of this note, convertibility risk refers to the risk that the national government will not sell foreign currency to borrowers or others with obligations denominated in hard currency. Transfer risk refers to the risk that the national government will not allow foreign currency to leave the country regardless of its source.

Since MFIs operate in developing countries where the risk of currency depreciation is highest, they are particularly vulnerable to foreign exchange rate risk. And, as any veteran of the sovereign debt restructurings of the 1980s and '90s is likely to observe, convertibility and transfer risks, although less common than devaluation or depreciation risk, also occur periodically in developing countries. However, a recent survey of MFIs conducted by the Consultative Group to Assist the Poor (CGAP)¹ indicates that 50 percent of MFIs have nothing in place to protect them from foreign exchange risk. Those who are not protecting themselves from exposure—or are only partially protecting themselves—have several reasons for not doing so. It is not always necessary to hedge 100 percent of exchange risk. However, the response to the survey indicates a general lack of understanding of foreign exchange risk and the extent of an MFI's exposure to it.

The primary goal of this Focus Note is to raise awareness in the microfinance sector of the issues associated with foreign exchange risk. First, it explains what exchange risk

¹ CGAP/MIX Survey of Funding Needs (see Ivatury, G., and J. Abrams, "The Market for Microfinance Foreign Investment: Opportunities and Challenges" presented at KfW Financial Sector Development Symposium).



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CGAP, the Consultative Group to Assist the Poor, is a consortium of 31 development agencies that support microfinance. More information is available on the CGAP Web site: www.cgap.org.



is. Second, it looks at the techniques being employed by MFIs and investors to manage this risk. Finally, it makes recommendations on managing or avoiding exposure to exchange risk.

What Is Foreign Exchange Risk in Microfinance?

Most often, foreign exchange risk arises when fluctuations in the relative values of currencies affect the competitive position or financial viability of an organization.² For MFIs, this devaluation or depreciation risk typically arises when an MFI borrows money in a foreign currency and loans it out in a DC.

Foreign currency financing brings numerous potential advantages to MFIs. It can provide capital that might not be available locally; it can help mobilize domestic funds; its terms can be generous and flexible; foreign lenders can become future equity investors; and it often is more accessible than domestically available funds.

If liabilities denominated in foreign currency (such as loans denominated in dollars or euros) are balanced by an equal amount of assets denominated in the same foreign currency (for example, investments denominated in dollars or euros), an exchange rate fluctuation will not hurt the MFI. But if foreign currency liabilities are not balanced by foreign currency assets, then there is a currency mismatch. The MFI can suffer substantial losses when the value of the DC depreciates (or loses value) in relation to the foreign currency, meaning that the value of the MFI's assets drops relative to its liabilities.³ This increases the amount of DC needed to cover payment of the foreign currency debt.

For example, assume that an MFI borrows USD 500,000. The loan is a 3-year, interest-only loan⁴ at a fixed rate of 10 percent per annum, with interest payments made every 6 months. At the time of the loan, the exchange rate is 1 USD:10 DC. The MFI's debt is equivalent to DC 5.0m at the beginning of the loan.

If the DC loses its value at a steady rate of 5 percent every 6 months, by the time the loan matures, DC 6.7m will be needed to pay back the USD principal. Once this is taken into account,⁵ the

original fixed loan rate of 10 percent per annum has, in effect, increased to 21 percent.⁶ The depreciation alone effectively adds 11 percent to the interest rate, an increase of more than 100 percent over the original fixed nominal interest rate.

If the value of the developing country's DC should collapse to 1 USD:30 DC in the first year of the loan, the effect is even worse. The MFI would need DC 15m to pay back the USD principal by the time the loan matures—an increase of 300 percent, in DC terms. The effective interest rate would be 59 percent or 400 percent over the original 10 percent per annum fixed rate.⁷

This is not the entire story of foreign exchange risk. In addition to the exchange rate risk, MFIs are also likely to be affected by convertibility and transfer risks to the same extent as any other institution that has a cross-border obligation denominated in hard currency. In both cases—convertibility risk and transfer risk—the MFI has the capacity to make its hard-currency payments, but can't do so because of restrictions or prohibitions imposed by the national government on making foreign currency available for sale or transferring hard currency outside the country.

What Are MFIs and Investors Doing About Foreign Exchange Risk?⁸

Organizations exposed to foreign exchange risk have three options. First, they can choose to do nothing

² See Eun, C., and B. Resnick. 2004. *International Financial Management*. McGraw Hill Irwin, p. 26.

³ See Appendix A to learn more about why relative values of currencies change.

⁴ An interest-only loan is a loan where interest is paid throughout the life of the loan, but the principal is not repaid until loan maturity.

⁵ This effective interest rate is calculated by determining the internal rate of return, i.e., the discount rate that would provide the cash flows with a net present value of zero.

⁶ See Scenario 1 in Appendix B.

⁷ See Scenario 2 in Appendix B.

⁸ This section draws from several recently published papers, including Holden, P., and S. Holden, 2004, *Foreign Exchange Risk and Microfinance Institutions: A Discussion of the Issues*; Crabb, P., 2003, *Foreign Exchange Risk Management Practices for Microfinance Institutions*, 2003; and Women's World Banking, 2004, *Foreign Exchange Risk Management in Microfinance*.

Example 1. Conventional Hedging Instruments

Thaneakea Phum Cambodia (TPC) is a Cambodia-based MFI that often makes loans in Thai baht (THB) to clients living near the Cambodia/Thailand border. In early 2003, TPC borrowed EUR 655,100 on a short-term (3-month) basis and lent those funds in THB. To protect itself against adverse movements in the EUR–THB exchange rate, TPC purchased a forward contract. This contract obliged it to sell THB and buy euros in the future in such a quantity that it was able to repay its EUR 655,100 loan with incurred interest. Through the acquisition of this forward contract, TPC was able to mitigate its exposure to adverse movements in the EUR–THB exchange rate.

(Source: Societe Generale)

about their exposure and accept the consequences of variations in currency values or the possibility that their government may impose restrictions on the availability or transfer of foreign currency. (A “do nothing” approach is not recommended, at least for substantial exposures.) Second, they can “hedge” against their exposure. For example, they can purchase a financial instrument that will protect the organization against the consequences of those adverse movements in foreign exchange rates. Finally, after a careful review of the risks, they can adopt a position whereby their risks are partially hedged. The CGAP survey⁹ indicates that only 25 percent of MFIs with foreign currency denominated borrowings are hedging against depreciation or devaluation risk, and 25 percent are only partially hedging. Fewer still are taking steps to limit or minimize convertibility and transfer risk.

Hedging is not without cost, and it has proved quite challenging. Because the financial markets in the countries in which most MFIs operate are underdeveloped, the costs of hedging, combined with the small foreign exchange transactions MFIs typically make, can be considerable and appear prohibitive. In some countries, the hedging product

may not be available. Moreover, the duration of the hard-currency loan is often longer than that of the available hedging products. Nonetheless, some MFIs and investors in the microfinance sector are managing to hedge or otherwise cover their foreign exchange exposures. The methods most commonly employed are briefly reviewed next.

Conventional Hedging Instruments

A variety of conventional instruments exist with which to hedge foreign exchange risk:

- **Forward contracts and futures**—Agreements made to exchange or sell foreign currency at a certain price in the future. (See Example 1.)
- **Swaps**—Agreements to simultaneously exchange (or sell) an amount of foreign currency now and resell (or repurchase) that currency in the future.
- **Options**—Instruments that provide the option, but not the obligation, to buy (a “call” option) or sell (a “put” option) foreign currency in the future once the value of that currency reaches a certain, previously agreed, “strike” price.

Advantages

- Using conventional hedging instruments eliminates an MFI’s exposure to capital losses as a result of DC depreciation.
- Using these instruments provides access to capital that might not be available locally or to capital with more generous and flexible terms than are available locally.
- Using these instruments provides the means to eliminate convertibility or transfer risk through swap arrangements.

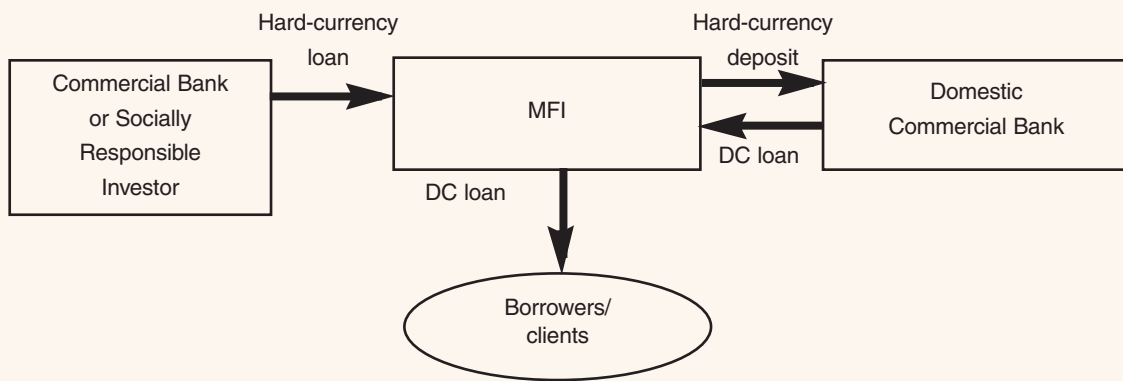
Why don’t MFIs hedge against foreign exchange risk?

Hedging is too expensive	20%
Local currency appears stable	20%
MFI can absorb risk	20%
Other reasons*	40%

*Other reasons include:
 “We never gave it much thought!”
 “[The hedging instrument] is not easy to get.”
 “[Hedging] is not relevant to us because it is too expensive.”
 “The risk is incorporated into the interest rates we charge [clients].”

⁹ Of the 216 MFIs that responded to CGAP’s survey, 105, or about half, indicated that they had hard-currency loans.

Chart 1. Back-to-Back Lending



Disadvantages

- Many of the financial markets in the countries in which most MFIs operate do not support these instruments; however, there is evidence that use of these instruments is starting to emerge in some developing countries.¹⁰
- The costs of using these instruments may be prohibitive because of the small size of foreign exchange transactions typically made by MFIs. Also, the duration of foreign loans often exceeds that of the hedging products available in thinner, local financial markets.
- Creditworthiness issues may make it difficult for MFIs to purchase these derivative instruments.

Back-to-Back Lending

Currently, back-to-back lending is the method most commonly used by the microfinance sector to hedge against devaluation or depreciation risk.¹¹ However, the back-to-back loan mechanism can expose the MFI to the local bank's credit risk to the extent that a foreign currency deposit is placed with that local bank to entice it to make a local currency

denominated loan to the MFI. Moreover, most back-to-back loans are structured in such a way that they do nothing to protect the MFI from convertibility and transfer risks.

This structure typically involves the MFI taking a foreign currency loan and depositing it in a domestic bank. Using this deposit as cash collateral or as a quasi-form of collateral by giving the local bank a contractual right of set-off against the deposit, the MFI then borrows a loan denominated in DC that it uses to fund its loan portfolio. The DC loan is typically unleveraged. That is, the foreign currency deposit provides complete security for the domestic bank. Once the MFI repays the domestic loan, the domestic bank releases the foreign currency deposit, which is then used to repay the original lender's foreign currency denominated loan. (See Chart 1 and Example 2.)

¹⁰ Korea, India, Indonesia, Philippines, Thailand, Czechoslovakia, Hungary, Poland, Slovakia, Mexico, South Africa, Brazil, and some others have, to one degree or another, markets in these derivative instruments (*ibid*, page 15).

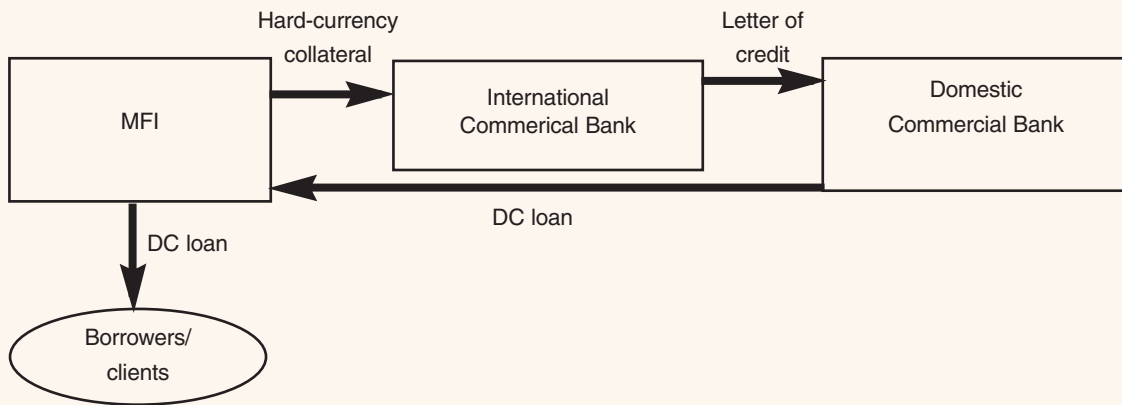
¹¹ Holden and Holden, p. 8.

Example 2. Back-to-Back Lending

Women's World Banking's (WWB) Colombian and Dominican affiliates deposit their USD loans into a commercial bank. That bank, in turn, issues a DC loan to those affiliates. The USD deposit is taken as collateral against the DC loan. In some countries, a single bank can both receive and issue the deposit and loans noted above, whereas in others—Colombia, for example—a foreign bank affiliate is needed to take the USD deposit while a local bank issues the DC loan. WWB carefully considers the financial strength of the institution taking the deposit. It also looks at the existence and level of deposit insurance available to protect against the risk that its affiliates will not lose their deposit if the institution that holds the deposit fails.

(Source: WWB, *Foreign Exchange Risk Management in Microfinance*, 2004)

Chart 2. Letters of Credit



Advantages

- Is not exposed to capital loss if the DC depreciates.
- Provides access to capital that might not be available locally and can mobilize local funds.
- Provides access to capital that has potential for more generous and flexible terms than are available locally.

Disadvantages

- Is still exposed to increase in debt-servicing costs if DC depreciates.
- Must pay interest on domestic loan and the difference between the interest charged by the hard-currency lender and the interest earned on the hard-currency deposit.
- Is exposed to convertibility and transfer risks that could limit access to foreign currency or prohibit transfers of foreign currency outside the country, thereby making it impossible for an otherwise creditworthy MFI to repay its hard-currency loan. This makes it unlikely that an investor will lend.
- Is exposed to credit risk on the hard-currency deposit if domestic bank fails.

Letters of Credit

The Letters-of-Credit method is similar in many ways to the back-to-back lending method and is used by some of the larger MFIs. Using the Letters-of-Credit method, the MFI provides hard-currency collateral, usually in the form of a cash deposit, to an international commercial bank that then provides a Letter of Credit to a domestic bank. Sometimes the domestic bank is directly affiliated with the international commercial bank (as a branch or sister company) or the domestic bank may have a correspondent banking relationship with the international bank. Sometimes the two banks are unrelated. The domestic bank, using the Letter of Credit as collateral, extends a local currency loan to the MFI. (See Chart 2 and Example 3.)

Advantages

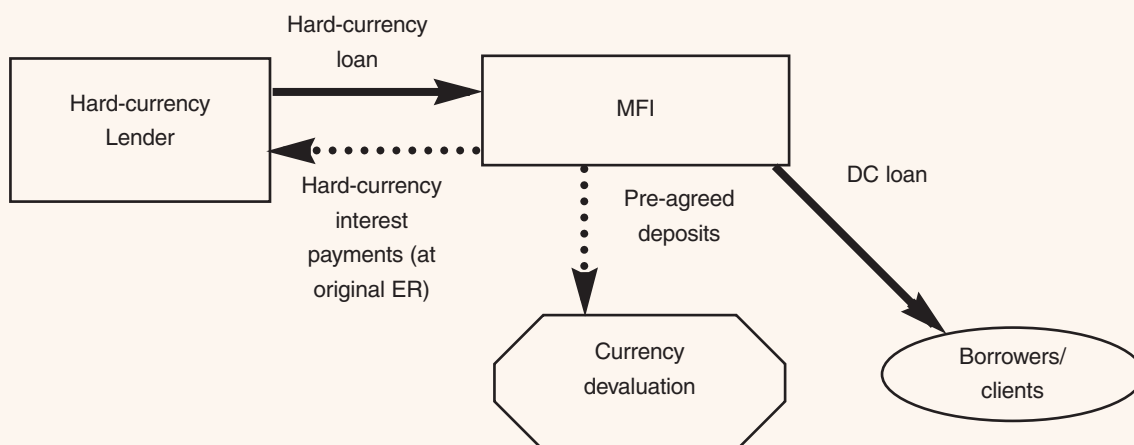
- Is not exposed to capital loss if DC depreciates (protects against devaluation or depreciation risk).
- May leverage cash deposit and Letter of Credit to provide a larger domestic loan.

Example 3. Letters of Credit

Al Amana (AA), an MFI based in Morocco, recently sought assistance from USAID to grow its domestic loan portfolio. The loan granted to AA by USAID was in USDs. AA deposited these funds with a branch of Societe Generale (SG) in the United States. With this deposit as collateral, SG issued a Letter of Credit in euros to Societe Generale Marocaine de Banque (SGMB) in Morocco. Against this Letter of Credit, SGMB issued a loan to AA based in the local currency of Morocco—the dirham. In this way, AA's exposure to adverse fluctuations in the USD–dirham exchange rate was mitigated.

(Source: Societe Generale)

Chart 3. DC Loans Payable in Hard Currency with Currency Devaluation Account



- Provides access to capital that might not be available locally and can mobilize local funds.
- Is not exposed to the credit risk of the local bank because no hard-currency deposit is placed with the local bank.
- Is not at risk for convertibility or transfer risk because no hard currency needs to cross borders.

Disadvantages

- Is still exposed to increases in debt-servicing costs if DC depreciates.
- Is more difficult to obtain than back-to-back lending.
- Some local banks are not willing to accept a Letter of Credit in lieu of other forms of collateral. These banks may require some “extra” credit enhancements in the form of cash collateral, pledge of loan portfolio, etc. Also, Letter-of-Credit fees add another cost to the transaction.

Local Currency Loans Payable in Hard Currency with a Currency Devaluation Account

Under this arrangement,¹² a lender makes a hard-currency loan that is to be repaid in hard currency, translated at the exchange rate that prevailed when the loan was made, to an MFI. The MFI converts that loan into local currency to build its loan portfolio. Throughout the lifetime of the loan, in addition to its regular interest payments, the MFI also deposits pre-agreed amounts¹³ of hard currency into a “currency devaluation account.” (See Chart 3 and Example 4.)

At loan maturity, the principal is repaid according to the original exchange rates, and any shortfall is made up by the currency devaluation account. If there

¹² See WWB, *Foreign Exchange Risk Management in Microfinance*, p. 6, for further discussion on these arrangements.

¹³ The size of these deposits is determined by an historical assessment of the depreciation of the local currency against the hard currency.

Example 4. DC Loans Payable in Hard Currency with Currency Devaluation Account

The Ford Foundation (FF) disbursed a USD loan to the Kenya Women Finance Trust (KWFT). It was converted into DC. The principal KWFT owed at maturity is set at the DC amount disbursed. To protect FF from depreciation of the Kenyan shilling, FF established a currency devaluation account, initially funded through a grant from FF. KWFT is required to deposit pre-determined amounts of USDs (based on the average depreciation over 10 years of the Kenyan shilling against the USD) into the account. At maturity, KWFT pays the principal amount set in local currency converted to USDs at the prevailing exchange rate, plus the funds held in a devaluation account. If the funds in the account are insufficient to cover the principal in USDs, then FF carries that loss. If the funds are more than sufficient, then the surplus is returned to KWFT.

(Source: WWB, *Foreign Exchange Risk Management in Microfinance*, 2004)

is more in this account than required, the balance is returned to the MFI. If there is less, the lender suffers that loss. Thus, under this arrangement, exchange rate risk is shared between the MFI and the lender. This arrangement can be tailored to suit the level of risk the MFI and the lender are willing to bear.

Advantages

- Risk of DC depreciation is shared between MFI and lender, and the MFI's risk is capped.
- Provides access to capital that might not be available locally and can mobilize local funds.
- Potentially has more generous and flexible terms than are available locally.

Disadvantages

- In addition to regular interest payments, hard-currency deposits must be paid into the “currency devaluation account.”
- Is still exposed to unpredictable local-currency cost to fund interest payments and devaluation account deposits if DC depreciates.
- Depending on where currency devaluation account is held, may still be exposed to convertibility and transfer risks. Risks are minimized if account is located offshore.

Self-imposed Prudential Limits

Given some of the difficulties and costs associated with implementing the foreign exchange risk hedging arrangements described, some MFIs—either of their own accord or with prompting by investors or regulators—are limiting their foreign currency liabilities.¹⁴ In doing so, they are not hedging their exposure to adverse movements in the relative values of currencies, but are limiting their exposure to those movements. The limitations imposed depend on the level of risk an MFI is willing and able to bear but, typically, limits of 20 to 25 percent of total liabilities are being applied.¹⁵ When considering an appropriate prudential limit, MFIs should also consider the level of equity they carry and the ability of that equity to withstand increases in liabilities as a result of local currency depreciation. For instance, an MFI

might limit its foreign currency exposure to 20 percent of its equity capital and, perhaps, create a reserve (allowance) on its balance sheet for potential foreign exchange losses. The lower an MFI's equity capital is as a percentage of total assets, the lower the limit should be on foreign-currency exposure as a percentage of that equity capital.

Advantages

- Exposure to capital losses and increases in debt-servicing costs as a result of DC depreciation is limited.
- Costs of hedging or back-to-back arrangements are avoided.
- There is access to capital that might not be available locally and can mobilize local funds.

Disadvantages

- Amount of hard-currency borrowing is limited, thus advantages of hard-currency borrowings are not recognized.

Indexation of Loans to Hard Currency

Using this method, MFIs pass on foreign currency risk to their clients.¹⁶ The interest rates MFIs charge are indexed to the value of the hard currency used to finance them. When the local currency depreciates, interest rates increase. This enables the MFI to raise the additional DC required to service the hard-currency debt. In other words, the MFI bears no devaluation or depreciation risk. This creates devaluation or depreciation risk for the MFI's loan clients, except in those rare cases where clients' income is denominated in, or pegged to, hard currency.¹⁷

¹⁴ For MFIs subject to prudential regulation, such as MFIs that are taking deposits from the public and intermediating those deposits, bank regulators may have zero tolerance for any mismatches of the currencies in which the regulated MFI's assets and liabilities are denominated. Or there may be limits imposed by regulators—such as prohibitions in dealings in foreign exchange—that make it impossible for an MFI to buy a foreign exchange hedge.

¹⁵ Interview with International Finance Corporation, August 2004.

¹⁶ See Crabb, *Foreign Exchange Risk Management Practices for Microfinance Institutions*, p. 3.

¹⁷ In some cases, MFIs might act even more directly and make loans denominated in foreign currency to their clients. This is more likely to happen in countries where MFI loan clients are working in “dollarized” economies and are generating dollar-denominated income.

Advantages

- Is not exposed to capital losses or increased debt-servicing costs as a result of DC depreciation.
- Provides access to capital that might not be available locally and can mobilize local funds.
- Provides access to capital that has potential for more generous and flexible terms than are available locally.

Disadvantages

- Clients—those least able to understand foreign exchange risk—are exposed to capital losses and increased debt-servicing costs if the DC depreciates or devalues.
- Increases the likelihood of default by MFI's clients if DC depreciates.
- Is still exposed to convertibility and transfer risks.

None of these techniques is perfect; they each come with advantages and disadvantages. The most appealing and efficient methods—conventional instruments—often are either unavailable or problematic because of the small size of the transactions and the longer duration of loans typical to MFIs. The other techniques are cumbersome to arrange and can be expensive.

Recommendations

The CGAP survey indicates that a significant portion of MFIs that have hard-currency liabilities either do not understand the level of risk these liabilities create, or are not managing that risk as effectively as they could. Foreign exchange rate risk can be complicated and difficult to understand, and the instruments typically used to manage this risk are not always available to MFIs. The industry needs to pay more attention to foreign exchange risk and learn more about techniques to manage it—including avoiding it by using local funding sources where possible. Broad recommendations for players in the microfinance sector are discussed next.

MFIs

MFIs should give high priority to domestic sources of funding or foreign funding in local currency when making funding choices. A simple comparison of domestic interest rates with foreign interest rates can be misleading in making funding choices. Higher

domestic rates commonly reflect higher domestic inflation and should be a strong signal that the country's currency will depreciate relative to the country with lower inflation.

If MFIs must obtain foreign currency debt, they should adopt positions to limit their exposure to foreign exchange risk. There is a range of instruments available to MFIs to counter the effects of the unpredictable and potentially devastating nature of exchange rate fluctuations. MFIs need to analyze and then adopt suitable methods to mitigate their exposure to this risk.

MFIs should seek training or advice to help them negotiate the best terms with foreign and domestic lenders, including negotiating for local currency loans when possible. It is a worthwhile investment to employ competent legal counsel to ensure the documentation and resulting structures are well executed, particularly for the more complicated approaches being taken to minimize foreign exchange risk.

Those responsible for the treasury function within MFIs need to learn to recognize and manage foreign exchange risk as an important aspect in overall financial risk management. However, this is not a matter only for management. Boards and governing bodies of MFIs also need to focus on ensuring their MFIs establish appropriate risk parameters and limits, and boards and governing bodies need to have a way to evaluate compliance with these policies and parameters.

Investors

Investors are typically more financially sophisticated than the MFIs to whom they lend. Therefore, they need to take more responsibility with respect to managing foreign exchange risk. They need to consider the possibility that a hard-currency loan may damage an MFI. They should make sure their borrowers not only understand the extent of the foreign exchange risk they are taking on, but also have appropriate plans for managing it.

Other Sector Players

The microfinance sector needs to encourage development of local capital markets to increase access to local currency funding.

Ratings agencies need to include foreign exchange risk in their assessment of the creditworthiness of MFIs. This will raise the profile of the

issue of foreign exchange risk in microfinance and encourage MFIs and investors alike to educate themselves on the issue.



Appendix A

Why Do Relative Values of Currencies Change?

That relative values of currencies vary over time is a complex phenomenon. Economists have expended countless hours over the years trying to understand and explain it. The following is a general outline of the key principles that explain the basics of exchange rate volatility.

Currency Movements and Relative Interest and Inflation Rates

Interest rates vary from one country to another. Nominal interest rates can appear lower in the United States and Europe than they do in domestic markets. This makes borrowing in hard currencies look cheaper because the price of those loans—the nominal interest rates they demand—is lower than rates demanded by DC-denominated debt. Indeed, that is one of the reasons MFIs might be attracted to hard-currency debt. However, a simple comparison between interest rates is only one part of the picture MFIs must examine when they assess the cost of borrowing in hard currency. Inflation and exchange rates must also be assessed.

When inflation is high, banks are required to pay high interest rates to attract savings. In turn, they are required to charge high interest rates on loans to cover the interest payments they must make to savers. High inflation, therefore, leads to high domestic interest rates.

But high inflation also leads to currency depreciation. Inflation is, in essence, the depreciation of a currency against the goods and services it is able to buy. If another currency is depreciating against the same goods and services more slowly—that is, if inflation in this other country is lower—then the value of the first currency with respect to the second will depreciate. The nature of this depreciation depends, to a large degree, on the type of exchange rate regime a country has.

Exchange Rate Regimes¹⁸

There are basically three types of exchange rate regimes available to governments,¹⁹ although there are many variants to each of these broad possibilities. The regime adopted depends on the government's economic and monetary objectives. In choosing a regime, governments have three goals to balance: exchange rate stability, freedom of cross-border capital flows, and monetary policy autonomy. Only two of these three objectives can be achieved by adopting a particular exchange rate policy. A government's basic choices of exchange rate regimes are a floating exchange rate; a "soft peg" exchange rate with capital controls; and a "hard peg" exchange rate.

These exchange rate regimes affect a borrower's risk in a variety of ways. If the country has a floating currency, the value of that currency will be volatile on a day-to-day basis, but, over time, it will be expected to adjust according to the country's relative inflation and nominal interest rate levels. If the country's currency is pegged via a soft peg to a hard currency, the value of that currency is likely to be stable (but can be adjusted by government policy). It is also susceptible to large depreciations in the event of currency crises that result from differences in inflation levels or large capital outflows. If a country's currency is hard pegged via a common currency union or dollarization, its currency will be stable relative to the currency to which it is linked because it has no control over monetary policy. Its inflation rate would be similar to the country's to which its currency is fixed.²⁰ If

¹⁸ This section relies on Obstfeld and Krugman, *International Economics: Theory and Policy*; DeGrauwe, *International Money*; and Fischer, *Exchange Rate Regimes: Is the Bipolar View Correct?*

¹⁹ See the International Monetary Fund's 2004 annual report at www.imf.org/external/pubs/ft/ar/2004/eng/pdf/file4.pdf for a list of countries and their exchange rate regime.

²⁰ The exception to this occurs if that country pulls out of the common currency union or reverses its dollarization.

a country's currency is hard pegged via a currency board, it is also likely to be stable but can be subject to damaging crises as the example of Argentina demonstrates.

Foreign Exchange Rates over Time

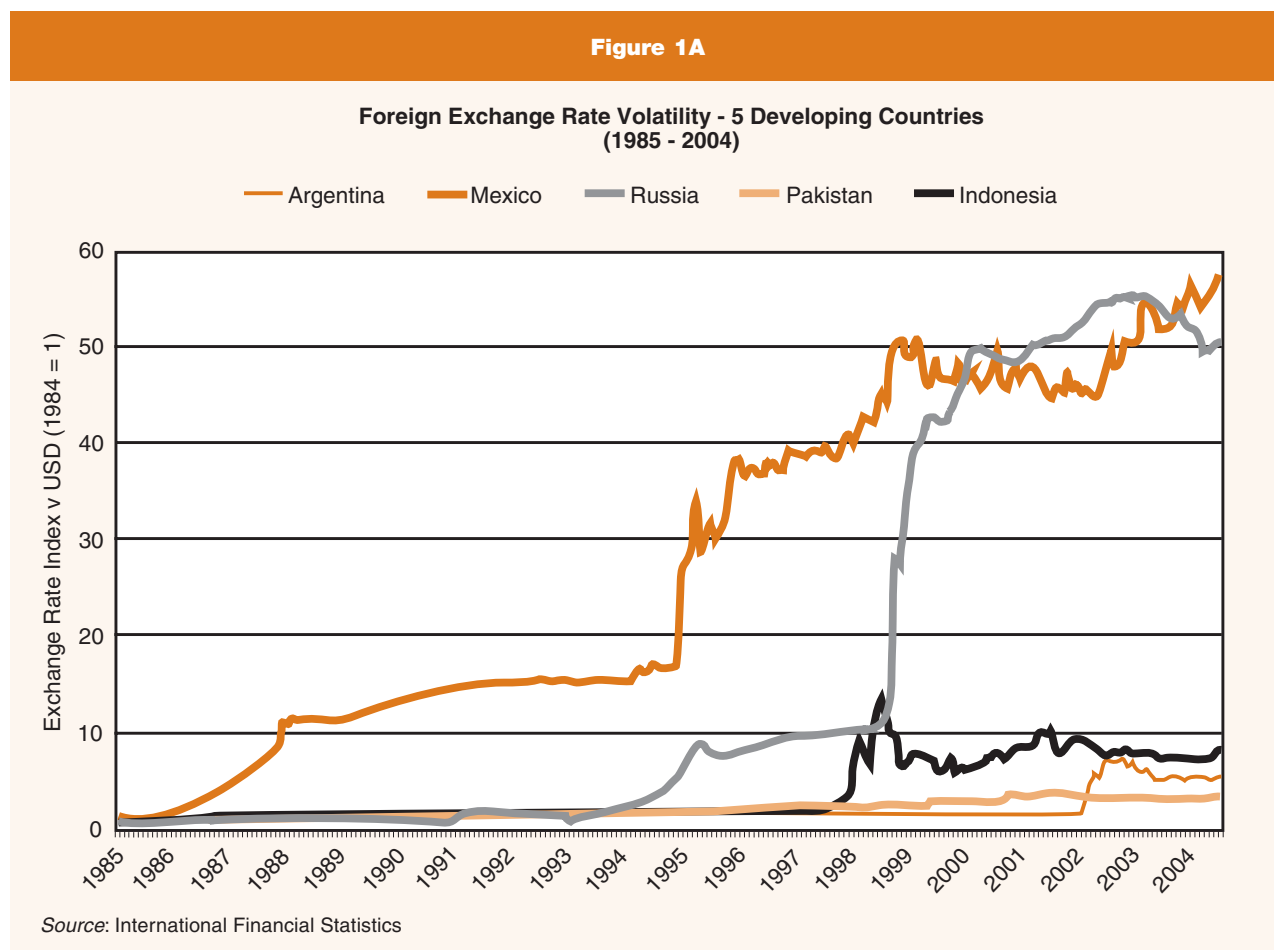
Nearly all developing country currencies depreciate, in one way or another, over time. Figure 1A shows how certain developing country currencies have fared against the USD over the past 2 decades. It also highlights some of the notable crises that have occurred in recent times.

As the graph indicates, currencies can lose considerable value rather quickly. Mexico's peso, for example, now worth less than 2 percent of the value it held in 1985, lost most of its value between 1994 and 1999. The decline in value of the Russian ruble has been even more dramatic. Like the Mexican peso, it's now worth less than 2 percent of the value it held in 1985; it lost most of its value between 1998 and 1999. The Indonesian rupiah is now

worth only a little over 10 percent of what it was worth in 1985. And consider Argentina's peso. Between December 2001 and February 2002 its worth more than halved. The currencies of Nigeria, Uganda, and Turkey, not shown in Figure 1, have lost more of their worth since 1985 than any of the currencies shown.

These types of currency movements can devastate an MFI if it carries a significant unhedged foreign currency liability. The scenarios provided in Appendix C demonstrate what an MFI can expect in the real world. As research has demonstrated,²¹ rate fluctuations are difficult to predict. Neither professional economists nor financiers (speculators aside) attempt to predict exchange rate levels. The most prudent strategy for MFIs, therefore, is to hedge their foreign exchange risk—even if the costs of doing so appear prohibitive.

²¹ See Obstfeld and Krugman, p. 349.





Appendix B

Scenario 1—Steady Depreciation of DC by 5 Percent Every 6 Months

In this scenario, assume that an MFI has borrowed USD 500,000 to finance its growing portfolio. Assume the loan is a 3-year, interest-only loan²² at a fixed rate of 10 percent per annum, with interest payments made every 6 months. The loan commences in January 2000. The nominal exchange rates and cash flows from this scenario are depicted in Table 1B and Figure 1B.

In this scenario, the principal of USD 500,000 was equivalent to 5.0m, in DC terms, in January 2000, when the DC/USD exchange rate was 1:10. By maturity of the loan in January 2003, DC 6.7m is required to pay back the USD principal, a nominal increase of around 34 percent in DC terms. This is caused by the decrease between January 2000 and January 2003 in the relative value of the DC to the hard currency.

The average nominal interest rate on the USD loan over its duration was 10 percent. Once the exchange rate depreciation is considered, the effective interest rate is 21 percent.²³ Thus, the depreciation of the DC against the USD effectively adds

10 percent to the interest rate, an increase of 100 percent over the original fixed nominal interest rate. (See Table 1B.)

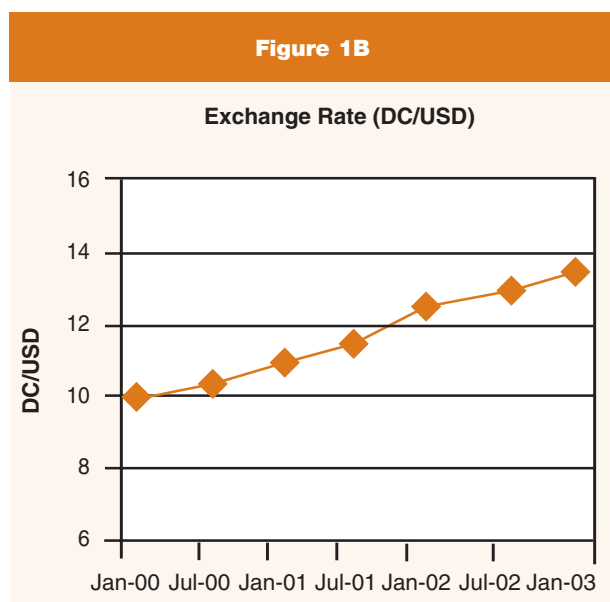
Scenario 2—Collapse of DC 1 Year into the Loan

In this scenario, again assume that an MFI has borrowed USD 500,000 to finance its growing portfolio. Also, assume the loan is a 3-year, interest-only loan at a fixed rate of 10 percent per annum with interest paid every 6 months. Again, the loan commences in January 2000. However, instead of a steady depreciation of the DC as in the previous scenario, its value collapses from an exchange rate of DC/USD 10 to 30 over 1 year. The nominal exchange rates and cash flows from this scenario are depicted in Table 2B and Figure 2B.

In this scenario, the principal of USD 500,000 was equivalent to DC 5.0m in January 2000, when the DC/USD exchange rate was 1:10. By maturity of the loan in January 2003, DC 15m is required to pay back the USD principal, a nominal increase of 300 percent in DC terms. This is caused by the depreciation of the DC between January 2001 and January 2002.

The average nominal interest rate on the USD loan over its duration is 10 percent. Once the

Figure 1B



²² An interest-only loan is a loan where interest is paid throughout the life of the loan, but the principal is not repaid until loan maturity.

²³ This effective interest rate is calculated by determining the internal rate of return, i.e., the discount rate that would provide the cash flows with a net present value of zero.

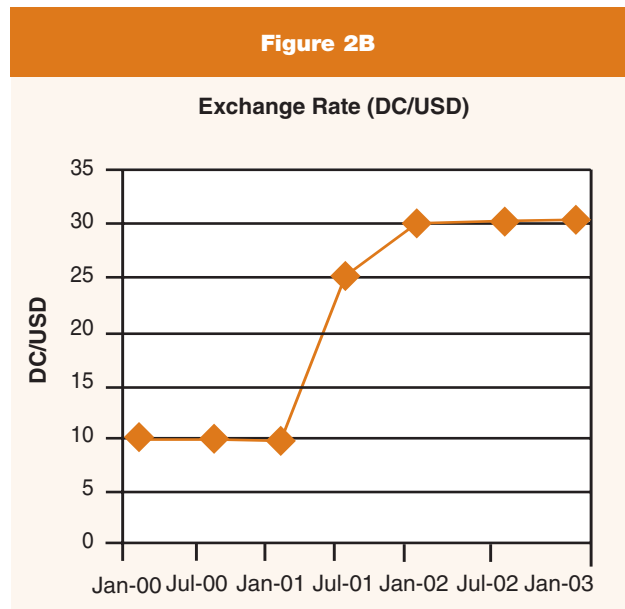
Table 1B

	Jan 00	Jul 00	Jan 01	Jul 01	Jan 02	Jul 02	Jan 03
USD Interest Rate (%)	10	10	10	10	10	10	10
Cash flows ('000 USD)	500	-25	-25	-25	-25	-25	-525
Exchange Rate (DC/USD)	10	10.5	11.0	11.6	12.2	12.8	13.4
Cash flows ('000 DC)	5,000	-263	-276	-289	-304	-319	-7,036

exchange rate crisis is considered, the equivalent average interest rate is 59 percent. (This effective interest rate is calculated in the same way it was calculated in the previous scenario.) Thus, the depreciation of the DC against the USD effectively adds almost 50 percent to the interest rate paid,

an increase of 400 percent over the original fixed nominal interest rate.

	Jan 00	Jul 00	Jan 01	Jul 01	Jan 02	Jul 02	Jan 03
USD Interest Rate (%)	10	10	10	10	10	10	10
Cash flows ('000 USD)	500	-25	-25	-25	-25	-25	-525
Exchange Rate (DC/USD)	10	10	10	25	30	30	30
Cash flows ('000 DC)	5,000	-250	-250	-625	-750	-750	-15,750



Appendix C

Scenario 1—Hard-Currency Loan to Fund Microfinance Operations in Thailand, 2000–02

In this scenario, assume that an MFI has borrowed USD 300,000 to finance its growing portfolio in Thailand. Assume the loan is a 3-year, interest-only loan, with an interest rate of LIBOR plus 5 percent

(paid every 6 months). The loan commences in January 2000. The interest and nominal exchange rates are depicted in Figures 1C and 2C. The cash flows associated with this loan are depicted in Figure 3C.

The principal of a USD 300,000 loan was equivalent to Thai baht (THB) 11.247m in January 2000. By maturity of the loan in January 2003, THB 12.816m is required to pay back the USD principal, a nominal increase of around 14 percent,

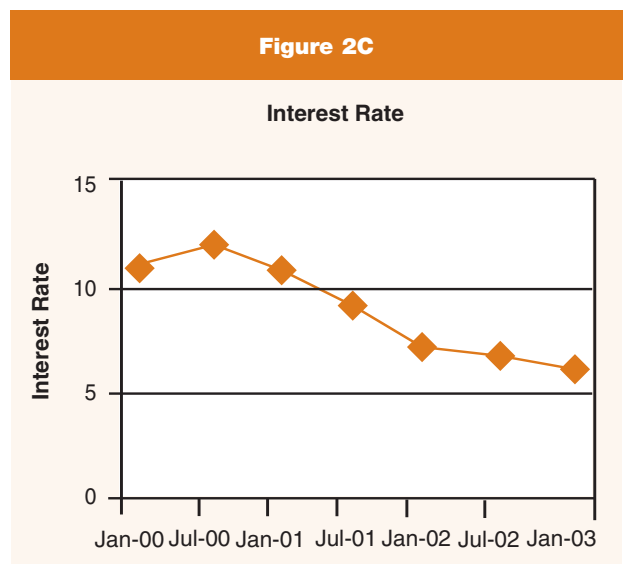
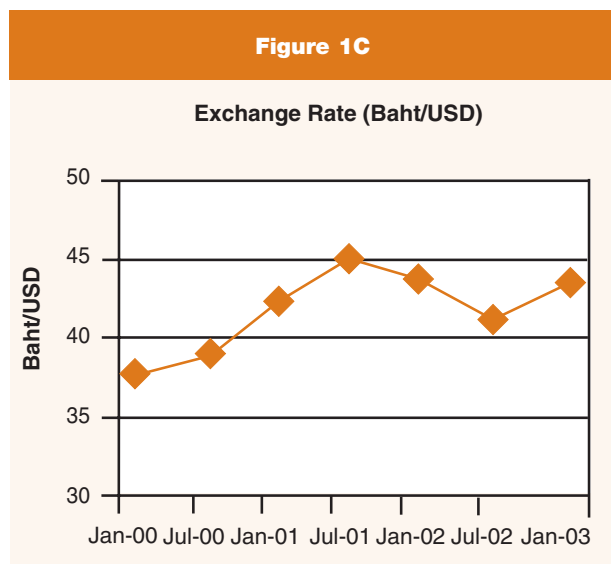
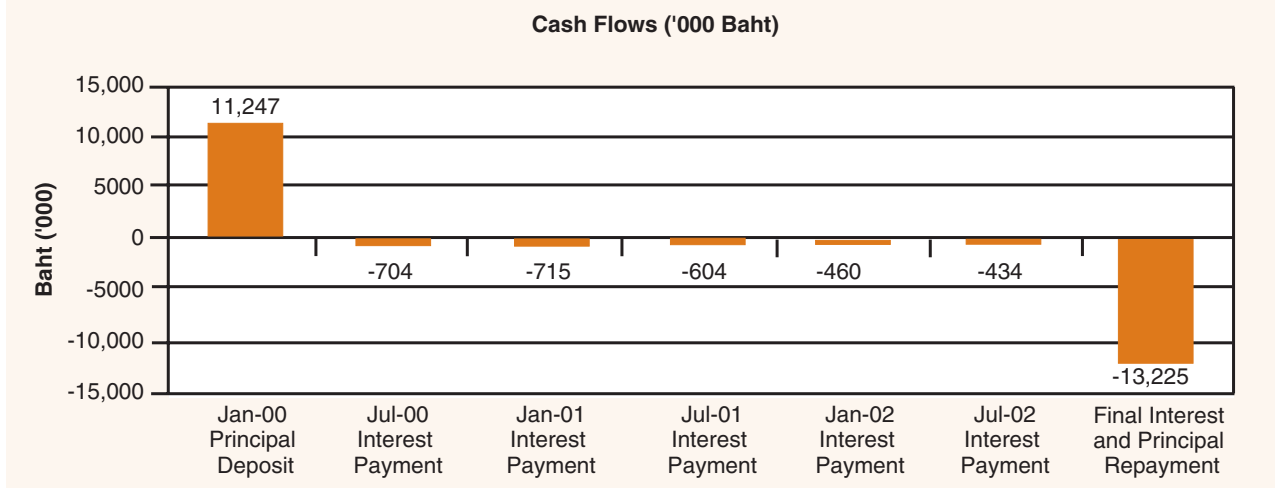


Figure 3C

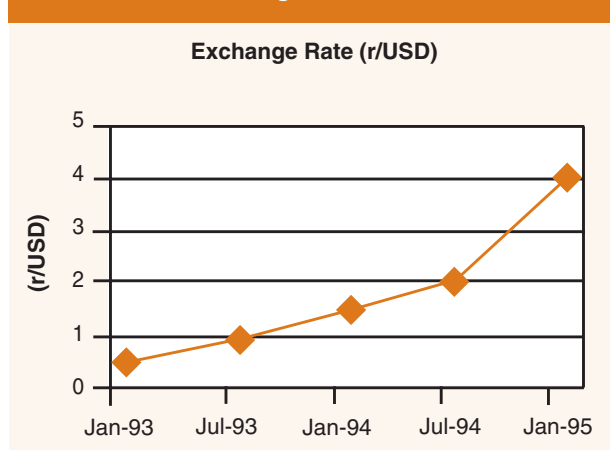


in THB terms. This is caused by depreciation of the THB between January 2000 and January 2003.

The average nominal interest rate on the USD loan over its duration is 9.08 percent. Once the exchange rate depreciation is considered, the equivalent average interest rate is 14.05 percent. Thus, the depreciation of the Thai baht against the USD effectively adds 5 percent to the interest rate paid, an increase of 55 percent more than the original average nominal interest rate. Domestic lending rates in Thailand during this period averaged a little over 10 percent.²⁴

The 6-monthly interest payments reduce in DC terms, even though the DC has depreciated slightly against the USD. This is due to the falling variable interest rates.

Figure 4C



Scenario 2—Hard-Currency Loan to Fund Microfinance Operations in Russia, 1993–94

Following its implosion in the early 1990s, Russia’s ruble (RR) suffered significant devaluation in the years that followed. To demonstrate the effect of this currency crisis on the hard-currency debt of an MFI, assume this MFI takes out a 2-year, interest-only loan for USD 500,000, with a fixed interest rate of 8.5 percent (paid every 6 months), commencing in January 1993. The interest and nominal exchange rates are depicted in figures 4C and 5C. The cash flows associated with this loan are depicted in Figure 6C.

²⁴ International Financial Statistics

Figure 5C

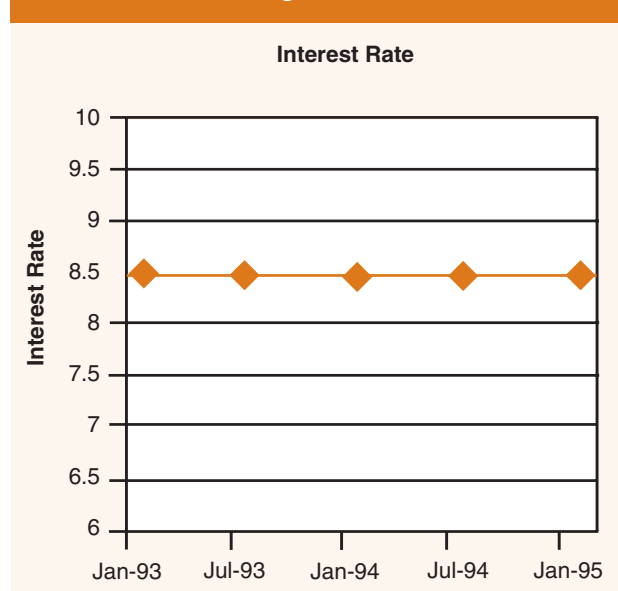
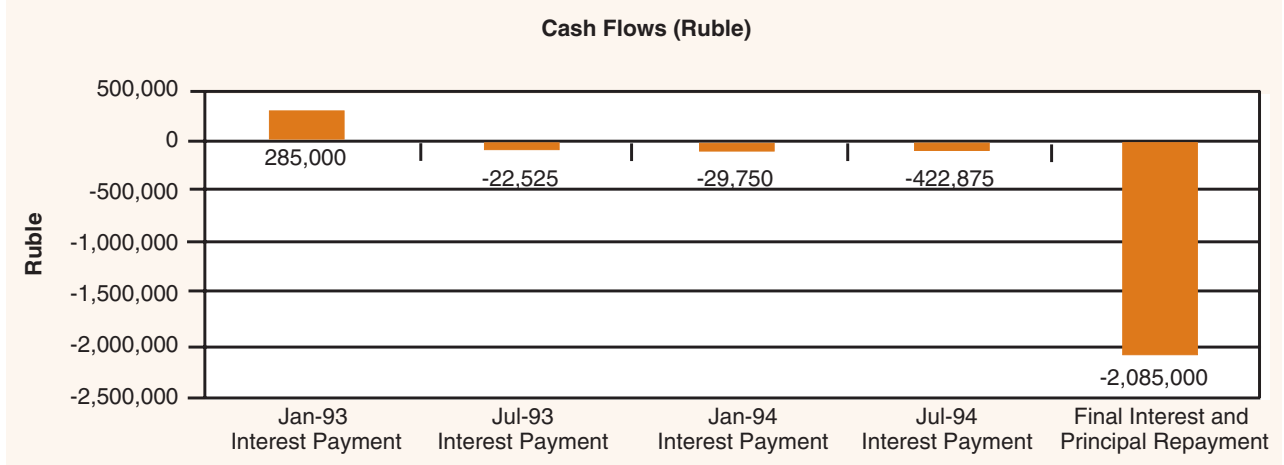


Figure 6C



In this scenario, the 6-monthly interest payments, in terms of RR, increase over time because of the rapid depreciation of the ruble. The initial payment due in June 1993 amounted to RR 22,525. The final interest payment was RR 85,000—an increase of almost 300 percent. As for the principal, the USD 500,000 loan was equivalent to RR 285,000 in January 1993. At the end of the 2-year loan, however, it amounted to RR 2 million. This represents a nominal increase of over 600 percent and reflects the significant depreciation of the RR in the early 1990s.

The average nominal interest rate on the USD loan between January 1993 and January 1995 is 8.5 percent (the fixed rate). (See Table 1C.) Once the exchange rate depreciation is considered, the equivalent average interest rate applied to the loan is over 138 percent (this is calculated in the same manner as in the previous example). Thus, the depreciation of

the RR adds more than 130 percentage points to the hard-currency interest rate paid. Domestic lending rates during this period, although domestic funds were difficult, if not impossible, to access at the time, averaged around 320 percent.²⁵

²⁵ International Financial Statistics

Table 1C

	Jan 93	Jul 93	Jan 94	Jul 94	Jan 95
USD Interest Rate (%)	8.5	8.5	8.5	8.5	8.5
Repayment ('000 USD)	500	-21.3	-21.3	-21.3	-521.3
Exchange Rate (RR/USD)	0.57	1.06	1.4	1.99	4
Repayment ('000 RR)	285	-22.5	-29.8	-42.3	-2,085



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