

Measuring Loss on Latin American Defaulted Bank Loans:

A 27-Year Study of 27 Countries

Lew Hurt
Vice President
Portfolio Strategies Group
Citibank, New York

Akos Felsovalyi
Vice President
Portfolio Strategies Group
Citibank, New York

August 1998

Acknowledgment: This study would not have been possible without the cooperation, assistance, and contribution of many people throughout Latin America and Citibank's Emerging Markets Portfolio Management team. Finally, Rod Ballek, Global Relationship Bank Portfolio Management, has been a source of unwavering support.

I. Introduction

The objective of this study is to describe the characteristics of commercial and industrial (C&I) bank loan defaults in Latin America. The most important attribute is the amount lost if a loan defaults. For banks, improved understanding of losses enables lenders to make better pricing decisions, to allocate capital more efficiently, and to obtain more accurate estimates of loan losses and valuations of existing loan portfolios. For investors, the benefit is a more informed decision about portfolio diversification.

The scope and scale of Citibank's global franchise allows us to analyze loan losses outside the U.S. Loss studies are an integral part of well developed internal debt rating systems. In these studies, loss in the event of default (LIED) is defined as the present value of all costs of credit incurred on a loan through the full workout process, expressed as a percentage of the initial default amount. That definition applied to the unique set of Latin American loan defaults yields a loss in the event of defaults value (LA LIED) of 31.8%. In other words, based on our past experience, an investor should expect to recover, on average, 68.2% of the default amount for C&I loans that default in Latin America. By comparison, a study by Citibank's Portfolio Strategies Group published in 1995⁽¹⁾ found U.S. LIED to be 34.8%, implying a 65.2% recovery rate in the U.S. loan market.⁽²⁾

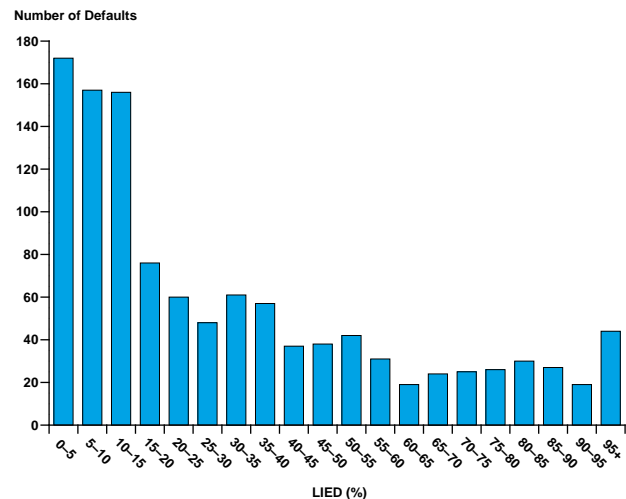
This paper summarizes, in Section II, the characteristics of a group of Latin American defaulted loans. Section III examines the composition of Latin American loans by country and depicts the stability of LA LIED by year. Finally, the effects of sovereign events on Latin American corporate loan loss rates are investigated in Section IV. A summary of the major findings concludes this study and the Appendix fully describes the data and definitions.

II. The Loss in the Event of Default in Latin America

The average LIED for the 1,149 Latin American defaults that were resolved from 1970 to 1996 was 31.8%, with a standard deviation of 28.8%. Chart 1 shows a clustering of loans with few or no losses and another small but distinct group with losses approaching or exceeding 100%.⁽³⁾

The differences between the two groups can be explained by a closer examination of the components⁽⁴⁾ of the LIED, principally write-offs. Write-offs constitute the largest component in the LIED – on average, 21.8% of the initial default amount is written-off. Therefore, the presence or absence of write-offs against a defaulted loan can cause large variations in the LIED value. Defaulted loans without write-offs have a much smaller LIED on average because the loss is primarily associated with the interest drag component. Interest drag is the second largest component, but constitutes only 14.6% of the default amount, and is a function of both the time to resolve a loan and the assumed interest rate.

Chart 1
Distribution of LA LIED 1970 – 1996



(1) Asarnow, E. and Edwards, D., "Measuring Loss on Defaulted Bank Loans: A 24-Year Study," *The Journal of Commercial Lending*, March 1995, Vol. 77, No. 7, 11-23.

(2) A second study by Moody's found the recovery rate for senior secured U.S. loans to be 79%. See Carty, L. and Liberman, D., "Defaulted Bank Loan Recoveries," *Moody's Investors Service*, November 1996.

(3) Nine LIED values exceeded 100%. The average LIED for those nine defaults was 104.2%. The highest value was 107.1%. A value greater than 100% is possible, particularly for loans with lengthy resolution times.

(4) The mathematical formulation of LIED appears in the Appendix. A simplified definition is LIED equals the sum of write-offs, interest drag, and other expenses minus recoveries and interest payments. This total is then divided by the initial dollar amount of the loan.

Table 1
LIED Components – Differences between Defaults with and without Write-offs

Category	All Defaults	Defaults with Write-offs	Defaults without Write-offs
Number of Defaults	1,149	525	624
Average Months to Resolve Default	19.7	24.7	15.6
LIED	31.8%	53.8%	13.2%
Write-offs	21.8%	47.8%	0.0%
Interest Drag	14.6%	15.6%	13.6%
Recoveries	(3.7%)	(8.2%)	0.0%
Interest Collected	(0.9%)	(1.3%)	(0.5%)
Expenses	0.1%	0.2%	0.0%

Two important points need to be recognized. First, the absence of write-offs does not mean there were no losses. The average length of time to resolve loans without write-offs was 15.6 months, compared with 19.7 months for the full sample and 24.7 months for loans with write-offs. The opportunity cost of funds measured by the interest drag component over this 16-month period was a significant contributor to the correctly calculated losses. Second, smaller default amounts had fewer write-offs. Only 6.7% of all defaults in the 0-10% LIED category had write-offs. At the other extreme, 98.5% of defaults with greater than 90% losses had write-offs.

We know size is a contributing factor effecting loss rates. Small defaults tended to have fewer write-offs and therefore lower LIED values, as Table 2 indicates. A common corporate structure found throughout this group of diverse and distinct countries may explain the relationship between size and LIED.

Table 2
Defaulted Loans by Size of Default

Size of Default	Number of Defaults	Mean LIED (%)	% of Defaults with Write-offs
Less than \$250,000	369	26.1	29.3%
\$250,000 – \$500,000	258	29.0	38.8%
\$500,000 – \$1 million	182	34.3	52.7%
\$1 million – \$10 million	298	38.7	63.8%
Greater than \$10 million	42	38.0	73.8%

(1) Real GDP dollar estimates for all countries were derived from purchasing power parity (PPP) calculations rather than from conversions at official currency exchange rates. Source: CIA World Factbook 1997.

Although generalizations across such a broadly defined region are difficult, one distinct feature of the Latin American corporate landscape is the presence of economic groups. Economic groups can be either formal legal entities composed of more than one company or more informal groupings of companies that need not be wholly or even majority owned.

Larger loans often involve economic groups that are frequently family owned. Recovery of these larger defaulted loans may be more difficult because of the informal structure of many of these groups, lack of integrated management, and the multiple banking relationships that economic groups generally maintain. In many countries, bank creditors are not accustomed to working efficiently in creditor committees. In addition, much of the lending to economic groups is not secured by specific assets. By contrast, lending to smaller companies in Latin America is frequently secured or like secured lending. Much of the lending is done based on trade receivables or trade bills with collection managed through the lender. Smaller companies generally have a relationship with only one bank, making the connection stronger. Furthermore, the legal system in many countries provides lenders with leverage over small borrowers via security registration and or extra-judicial procedures. Larger borrowers often have the legal resources, connections, and “name” recognition, which allow them to put off acknowledging problem loans. Often they are able to borrow more with larger and more adverse future consequences for creditors.

Therefore, provided concentrations are minimized and all other things being equal, a portfolio of smaller Latin American loans should have a lower rate of loss in the event of default than a portfolio of larger Latin American loans.

III. Characteristics and Trends of Defaulted LA Loans

Citibank’s extensive presence in Latin America spans many years. As a result, we were able to collect default information in 27 countries, listed in Table 3, for 1970 to 1996. The table also includes a measure⁽¹⁾ of the relative size of each country’s economy.

Comparing the size of the economy with the number of defaults is one possible gauge of the expected number of defaults. For example, Brazil, the country with the greatest number of defaults (150), could reasonably have been expected to have had more defaults based on the size of its economy within the region. However, by this measure, Brazil represents 33.8% of the region's GDP but only 13.1% of the collective defaults, indicating a lower-than-expected default frequency.

The region's largest economies, Brazil, Mexico, and Argentina have a fewer number of defaults than expected. However, the average dollar value of the defaults for these large countries were significantly higher than the region's average, as Column 5 of Table 3 illustrates.

The long time period, from 1970 to 1996, of this study provides a perspective on the historic stability of the LA LIED measure, the number of defaults and their relationship to economic cycles.

Table 3
Country Defaults Relative to Country Size

Country	Number of Defaults	% of Region's Defaults	% of Region's GDP	Default Index ⁽¹⁾	Relative Default Amount ⁽²⁾
Argentina	65	5.7	9.8	58	2.2
Bahamas	20	1.7	0.2	870	0.1
Barbados	18	1.6	0.1	1,567	0.2
Bolivia	17	1.5	0.7	211	0.5
Brazil	150	13.1	33.8	39	1.7
Cayman Islands	4	0.3	0.0	1,188	0.5
Chile	12	1.0	4.0	26	1.4
Colombia	27	2.3	6.7	35	0.5
Costa Rica	2	0.2	0.6	29	0.3
Dominican Republic	36	3.1	1.0	313	0.2
Ecuador	63	5.5	1.6	343	1.1
El Salvador	16	1.4	0.4	348	0.2
Guatemala	5	0.4	1.3	33	0.8
Haiti	24	2.1	0.2	1,044	0.2
Honduras	22	1.9	0.4	479	0.3
Jamaica	65	5.7	0.3	1,886	0.2
Mexico	61	5.3	25.7	21	4.8
Netherlands Antilles	6	0.5	0.1	522	0.4
Nicaragua	42	3.7	0.3	1,218	0.3
Panama	77	6.7	0.5	1,340	0.4
Paraguay	20	1.7	0.6	290	0.3
Peru	5	0.4	3.0	15	0.2
Puerto Rico	113	9.8	1.0	983	0.5
Trinidad Tobago	22	1.9	0.6	319	0.5
Uruguay	95	8.3	0.9	919	0.3
Venezuela	158	13.8	6.5	212	1.0
Virgin islands	4	0.3	0.0	851	0.1
Total	1,149	100	100	100	1.0

(1) The Default Index is a measure of the under- or over-representation of defaults. Any country with a value of 100 could be said to have the same proportion of loan defaults as its share of economic activity.

(2) Average dollar default amount of a country divided by the average dollar default amount in the region. Actual amounts are masked to maintain confidentiality but interpretation is straightforward. For example, Argentina's relative default amount is 2.2 times greater than the regional average.

Table 4
Defaulted Loans by Year of Default

Year	Number of Defaults	Mean LIED (%)	Relative Default Amount ⁽¹⁾	Real LA GDP Growth (%)
1970	3	26.5	0.6	4.8
1971	13	28.3	0.2	6.4
1972	10	35.3	0.2	7.1
1973	42	34.6	0.2	8.1
1974	31	34.3	0.3	6.7
1975	50	29.1	0.3	3.7
1976	98	32.6	0.5	6.1
1977	84	30.5	0.4	4.8
1978	47	37.4	0.2	4.6
1979	47	25.9	0.4	6.7
1980	69	32.5	0.4	6.5
1981	71	31.0	0.5	0.7
1982	140	25.4	1.0	-0.7
1983	106	42.6	0.9	-2.6
1984	55	38.3	2.1	4.0
1985	30	31.2	1.0	3.3
1986	45	31.9	1.9	3.7
1987	54	29.0	2.1	3.2
1988	13	23.8	0.7	0.8
1989	7	9.9	1.3	1.8
1990	21	19.1	3.4	0.4
1991	31	28.2	1.5	3.2
1992	10	31.0	4.3	2.6
1993	21	26.5	3.4	3.8
1994	31	36.1	2.0	5.1
1995	14	46.6	1.8	0.9
1996	6	21.6	2.2	3.9

(1) Average dollar default amount in a year divided by the average dollar default amount in all years. Actual amounts are masked to maintain confidentiality but interpretation is straightforward. For example, in 1970 the average default amount was 0.6 times the average default amount from 1970–1996.

In Table 4, we identify the 1,149 loan defaults by the year in which the defaults occurred. The LIED is relatively stable across years. The largest value, 42.6%, corresponds to a large economic downturn in 1983. The lowest value, 9.9% in 1989, was drawn from a sample of only seven defaults, casting some suspicion on the comparability of that number.

The number of defaults appears to be related to the broadly defined, regional economic cycle. Two recessions are evident, 1982/83 and 1990. The beneficial effects of higher oil prices on the region's largest economies masked a third global recession in 1975. Nevertheless, a pattern

emerges between the number of defaults and the change in real GDP, with the number of defaults increasing as the economy falters. This generalization holds during the 1975 period when individual country defaults are matched to country-specific real GDP growth.

However, generalization about the relationship between LIED and the economic cycle is not so easily made. Country and loan specific factors, as well as prevailing credit policies, make the relationship between economic cycle and LIED a more challenging analysis that is beyond the scope of this study.

IV. LA LIED during Sovereign Events

Finally, this study addresses sovereign events⁽¹⁾ and their effects on losses in corporate lending.⁽²⁾ There were a significant number of corporate defaults either fully or partially influenced by specific sovereign events that directly affected the companies' ability to repay. Nevertheless, the LIED for loan defaults influenced by a sovereign event is not significantly different from the LIED for loans that defaulted during other periods. The default amount is two times greater during sovereign events but the recovery rate is similar to that in more sedate years.

Table 5
LA LIED and Sovereign Events
1987 – 1996

Sovereign Event?	Number of Defaults	Mean LIED (%)	Relative Default Amount ⁽¹⁾
No	166	31.5	0.7
Yes	95	30.9	1.5
Did not Respond	76	30.2	0.9

(1) Average dollar default amount in a category divided by the average dollar default amount of all defaults for 1987–1996. Actual amounts are masked to maintain confidentiality but interpretation is straightforward. For example, the average amount of defaulted loans occurring during a sovereign event is 1.5 times greater than the average default value from 1987 to 1996.

V. Summary

Over the last five years, two forces have worked together to produce a mutually beneficial pairing of banks and investors. Banks' understanding and use of portfolio management techniques have increased interest in active management of their loan portfolios. At the same time, investors, now willing to consider bank loans as a complementary asset class to bonds in their fixed-income portfolios, have demanded more bank loan products. The market for syndicated bank loans recently passed \$1.1 trillion – tangible evidence that investors recognize the merits of the risk-adjusted return characteristics of bank loans.

Lenders and investors will both benefit from a better understanding of defaulted bank loans in Latin America. Therefore, this study summarizes the loss characteristics of 1,149 Citibank commercial and industrial loans defaulted from 1970 to 1996 in 27 countries in Latin America. The average loss in the event of default was 31.8%. In other words, based on past experience, the recovery rate on defaulted loans was 68 cents for every dollar in C&I loans that defaulted.

The distribution of losses around the average, measured by the standard deviation, is 28.8%. The shape of the distribution reflects a large number of loans with small losses and a small number of loans with losses approaching or exceeding 100%. Typically, larger loans have higher rate of loss in the event of default. Conversely, smaller loans have lower rate of loss.

Although the number of defaults does rise and fall consistently with broadly defined economic cycles, the trend of LA LIED over the 27-year period does not reveal changes associated with economic fluctuations. The diversity in the economic environment over the period is not reflected in the variation of the LIED values.

Finally, bank loans that default during sovereign events have loss rates that are not different from those of loans that default during other periods.

(1) The type of events that were identified by the countries included: convertibility, convertibility and strong devaluation, convertibility/transferability restriction, no payment on external debt, and sucretization (Ecuador).

(2) The period covered was 1987 to 1996. Defaults that were resolved prior to 1987 could not be easily associated with specific sovereign events. Defaults that were resolved during or after 1987 and were the result of a sovereign event were confirmed as such by Citibank personnel in the specific countries.

Appendix

Data and Definitions

The definitions of default, resolution, and loss in the event of default (LIED) are critical to this analysis. Among the three, the definition of default will have the greatest influence on the final calculation of losses. Therefore, a great deal of thought went into identifying a loan default, including in some cases, confirmation of the defaults by country credit and relationship management.

Citibank has compiled a historical database that tracks problem loans. Each loan is classified as “performing,” “substandard,” “doubtful”⁽¹⁾ or “non-accrual”⁽²⁾. “Doubtful” and “non-accrual” are considered defaults. From 1970 to 1996, 1,149 defaulted loans in Latin America were identified to be included in this study. However, the “doubtful” category may include loans that never missed a payment or whose terms were significantly altered. A closer examination of loans in the “doubtful” category reveals that only 34 of the 1,149 loan defaults remained “doubtful” throughout the entire resolution period; most (1,115) of the loans migrated into “non-accrual” status during the resolution process.

A defaulted loan was deemed to be resolved when the most recently reported outstanding balance was reduced to zero through repayments, write-offs or reclassification to a performing status. The total default event spans the period from initial classification or write-off, called the time of default, to the ultimate resolution. This definition closely corresponds to the public market definition of default and is consistent with that used in other internal LIED studies produced at Citibank.

The LA LIED calculations excludes

- Sovereign loan defaults
- Any default of less than US\$100,000
- Loans that were not resolved prior to December 1996
- Loans that defaulted and were resolved prior to 1970

(1) A “doubtful” credit is one for which full repayment appears to be questionable on the basis of available information, and which therefore suggests an eventual loss the amount or timing of which is not yet determinable.

(2) A “non-accrual” is a credit that is uncollectible.

Citibank C&I defaults are a mixture of secured and unsecured senior loans. It is not possible to identify which loans were secured at the time of origination. However, a defaulted loan can be dissected into components that more clearly represent the underlying losses. Those components include write-offs, interest drag, recoveries (repayments), and miscellaneous expenses such as legal expenses. Equation 1 defines the relationship among the components.

Definition of LIED

Let loan default i take m_j months from the time of default to resolution and function $PV(\cdot)$ be the present value of its argument calculated to the date of default. Then, the definition of percentage loss in the event of default of loan i (i.e. $LIED_i$) is given by equation (1).

$$LIED_i = 100 \frac{(W_i + ID_i + MSC_i) - (R_i + IC_i)}{IDA_i}, \quad (1)$$

where

$W_i = \sum_{j=1}^{m_i} PV(w_{ij})$	and w_{ij} is the dollar value of the write-off taken on loan i in month j ,
$ID_i = \sum_{j=1}^{m_i} PV(id_{ij})$	and id_{ij} is the interest drag (the total dollar amount of foregone interest on the outstanding default balance) on loan i in month j ,
$MSC_i = \sum_{j=1}^{m_i} PV(msc_{ij})$	and msc_{ij} is the dollar amount of other expenses (income) incurred on loan i in month j ,
$R_i = \sum_{j=1}^{m_i} PV(r_{ij})$	and r_{ij} is the dollar amount of unanticipated principal recovery on loan i in month j ,
$IC_i = \sum_{j=1}^{m_i} PV(ic_{ij})$	and ic_{ij} is the dollar amount of interest payment on loan i in month j and
IDA_i	is the initial dollar amount of loan i .

The $LIED_i$ for any one loan represents the present value of net losses as a percentage of the initial default amount. The $LIED$ for Latin America is the simple average of all individual loan losses or

$$LIED = \frac{\sum_{i=1}^n LIED_i}{n}, \quad \text{where } n \text{ is the total number of loan defaults.}$$

The discount rate, in theory, should be the loan-specific contractual lending rate. In practice, this rate was not consistently available. Therefore, we used the yearly average interest rates on non-U.S. C&I loans as reported in Citibank's annual financial statement. Most of the defaulted loans were U.S.

dollar-denominated. The small percentage of defaults that were originated in local currency (less than 5%) were converted to U.S. dollars at the foreign exchange rate in effect at the time of the default or subsequent write-off.

This document is for information purposes only. Under no circumstances is it to be considered as an offer to sell or solicitation to buy any investment. The information contained herein has been obtained or is based upon sources which we believe to be reliable, but we do not guarantee its accuracy or completeness. We (or any company in which Citicorp has a direct or indirect interest or its officers, directors, or employees) may from time to time have positions or options in, or buy and sell, investments referred to herein.