To the Graduate Council:

I am submitting herewith a dissertation written by K. G. Viswanathan entitled "International Debt Crises and their Implications for Market Valuation in the Banking Industry." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

George C. Philippatos,
Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

INTERNATIONAL DEBT CRISES AND THEIR IMPLICATIONS FOR MARKET VALUATION IN THE BANKING INDUSTRY

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

K. G. Viswanathan

August 1991

ABSTRACT

The purpose of this dissertation is to test and compare the announcement and industry contagion effects of the Mexican and Brazilian foreign debt moratorium announcements of 1982 and 1987. In addition to measuring individual announcement and industry contagion effects, the learning that took place in the period between the two announcements is also analyzed by comparing the bank share price changes during the two events and analyzing several related events that occurred during the intervening period.

Three sets of hypotheses are tested. The first set of hypotheses examines whether the default announcements by Mexico and Brazil conveyed any new information to the market or whether there was information leakage prior to the announcements. The second set of hypotheses tests for contagion effects in the market following the moratorium announcements. The third set of hypotheses tests for learning in the market from 1981 to 1987.

The standard residual methodology is used to estimate abnormal returns. Intervention Analysis and chow-tests are conducted to confirm the results. Regression analysis is used to analyze various sub-events during the six-year period. A sample of ninety-four and eighty-seven banks are used for the Mexican and Brazilian events, respectively.

This study finds that the Mexican debt moratorium

announcement conveyed new information to the market. There was also a contagion effect where banks without any exposure to Mexico experienced downward adjustments in their security prices. Analysis of several events prior to the Mexican announcement indicated that there was some information leakage and bank equity price adjustments during these events. It also finds that the market did not react to the Brazilian moratorium announcement. However, the market did recognize and react to several of the events prior to the announcement. Finally, this study finds that the market response to debt default announcements changed over time. With each event, the magnitude of the market reaction became smaller. The market became increasingly aware of the deterioration in the quality of loan assets held by U.S. banks. The market did learn from the earlier events and modified its response to the latter events.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	STRUCTURE OF DISSERTATION	1
II.	THE LATIN AMERICAN DEBT CRISIS	11
III.	MARKET EFFICIENCY AND CONTAGION EFFECTS IN THE BANKING INDUSTRY	38
IV.	EFFECTS OF THE LATIN AMERICAN DEBT CRISIS UPON U.S. BANK STOCK PRICES	53
V.	HYPOTHESES AND DATA	66
VI.	METHODOLOGY	89
VII.	EMPIRICAL FINDINGS	121
VIII.	CONCLUSIONS	307
LIST OF REFERENCES		311
VITA		315

LIST OF TABLES

TABLE		PAGE
1.	External Debt of Non-Oil Developing Countries, 1973-1984	12
2.	Debt Service Ratios of Non-Oil Developing Countries, 1973-1984	14
3.	External Debt of Developing and Non-Fuel Exporting Countries, 1982-1990	15
4.	External Debt Service Payments of Developing and Non-Fuel Exporting Countries, 1982-1990	16
5.	Ratios of Total Foreign Loans to Capital : Comparative Data, 1977-1982	19
6.	Exposures of Major Banks as a Percentage of Capital as of the End of 1982	20
7.	Exposures of Major Banks as a Percentage of Capital as of the End of 1986	21
8.	Prices of Selected Latin American Loans in the Secondary Market as of 1987 and 1990	29
9.	Selected Measures of Exposure and Balance Sheet Items of Banks in 1982	82
10.	Selected Measures of Exposure and Balance Sheet Items of Banks in 1986	85
11.	Characteristics of Banks in the Sample Used for the Mexican Event	123
12.	Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Mexican Moratorium Announcement Using Binary Exposure Variables	125
13.	Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Mexican Moratorium Announcement Using Absolute Exposure Variables	128
14.	Estimated Cumulative Regression Coefficients of Exposed and Non-Exposed Banks following the Mexican Event	132

15. Estimated Cumulative Regression Coefficients of Exposed Banks following the Mexican Event 133

16. Daily Average Excess Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Mexican Event 135

17. Cumulative Abnormal Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Mexican Event 137

18. Daily Average Excess Returns of High and Low Exposure Banks During the Mexican Event 139

19. Cumulative Abnormal Returns of High and Low Exposure Banks During the Mexican Event 141

20. Daily Average Excess Returns of NYSE/ASE and OTC Banks During the Mexican Event 143

21. Cumulative Abnormal Returns of NYSE/ASE and OTC Banks During the Mexican Event 145

22. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Mexican Event 147

23. Daily Average Excess Returns of Small, Medium and Large Banks During the Mexican Event 149

24. Daily Average Excess Returns of All, Exposed and Non-Exposed Banks During the Mexican Event (Using a Longer Estimation Period) 160

25. Daily Average Excess Returns of High and Low Exposure Banks During the Mexican Event (Using a Longer Estimation Period) 162

26. Daily Average Excess Returns of NYSE/ASE and OTC Banks During the Mexican Event (Using a Longer Estimation Period) 164

27. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Mexican Event (Using a Longer Estimation Period) 166

28. Daily Average Excess Returns of Small, Medium and Large Banks During the Mexican Event (Using a Longer Estimation Period) 168

29. Sub-Events Related to the Mexican Moratorium Announcement as reported in the Wall Street Journal 174

30. Selected Sub-Events Related to the Mexican Moratorium Announcement as reported in the Wall Street Journal 186

31. Regression Coefficients of the Indicator Variables for Sub-Events Before and After the Mexican Announcement 189

32. Sub-Events Related to the Mexican Moratorium Announcement (as Reported in the Wall Street Journal) used in the Intervention Analysis . . . 196

33. Indicator Variable Coefficients Using Intervention Analysis for the Mexican Event . . . 198

34. Characteristics of Banks in the Sample Used for the Brazilian Event 203

35. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Brazilian Moratorium Announcement Using Binary Exposure Variable 206

36. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Brazilian Moratorium Announcement Using Absolute Exposure Variable 209

37. Daily Average Excess Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Brazilian Event 212

38. Daily Average Excess Returns of High and Low Exposure Banks During the Brazilian Event 214

39. Daily Average Excess Returns of NYSE/ASE and OTC Banks During the Brazilian Event 216

40. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Brazilian Event 218

41. Daily Average Excess Returns of Small, Medium and Large Banks During the Brazilian Event . . . 220

42. Daily Average Excess Returns of All, Exposed and Non-Exposed Banks During the Brazilian Event Using a Longer Estimation Period 226

43. Daily Average Excess Returns of High and Low Exposure Banks During the Brazilian Event Using a Longer Estimation Period 228

44. Daily Average Excess Returns of NYSE/ASE Banks and OTC Banks During the Brazilian Event Using a Longer Estimation Period 230

45. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Brazilian Event Using a Longer Estimation Period 232

46. Daily Average Excess Returns of Small, Medium and Large Banks During the Brazilian Event Using a Longer Estimation Period 234

47. Sub-Events Related to the Brazilian Moratorium Announcement Reported in the Wall Street Journal 239

48. Regression Coefficients of the Indicator Variables for Sub-Events Before and After the Brazilian Announcement 246

49. Indicator Variable Coefficients Using Intervention Analysis for the Brazilian Event . . 252

50. Daily Average Excess Returns of Sample of Banks Common to Both Mexican and Brazilian Events . . . 259

51. Exchange Rates Between the US$ and the Mexican Peso During the Mexican Event 262

52. Exchange Rates Between the US$ and the Brazilian Cruzado During the Brazilian Event 266

53. Simulated Dollar and Percentage Returns Generated by Different Investment Strategies During the Mexican Event 270

54. Simulated Dollar and Percentage Returns Generated by Different Investment Strategies During the Brazilian Event 272

55. Specific Events Related to Banks' Foreign Loans Reported in the Wall Street Journal During 1981-87 275

56. Daily Average Excess Returns of Banks During Specific Events : 1981-87 278

57. Comparison of Pre-Event Period and Event Period Volatility for Specific Events : 1981-87 279

58. Comparison of Pre-Event Period and Event Period Volatility for Specific Events : 1981-87 (Using Alternate Measure of Volatility) 280

59. Regression Coefficients of the Indicator Variables for Specific Events During 1981-87 . . 283

60. Capital Ratios and Foreign Loan to Total Assets Ratios of Banks, 1981-86 301

61. Loan-loss Reserves as a Ratio of Bank Capital and Total Assets, 1981-86 305

CHAPTER I

STRUCTURE OF DISSERTATION

1. Purpose of the Dissertation.

On August 19, 1982, Mexico declared a moratorium on its foreign debt payments, and sought additional funds from U.S. banks and the International Monetary Fund (IMF) to service its external debt in order to remain technically solvent. Since the Mexican announcement in 1982, Peru, Bolivia, Argentina, Chile, and, more recently, Brazil and Venezuela have faced difficulties in meeting their foreign debt obligations. On February 20, 1987, Brazil became the latest large borrower to default, when it announced that it would also halt payments on its $100 billion external debt.

Given their potential to disrupt the U.S. banking industry and the world monetary order, it is important to analyze and understand the effects of sovereign debt defaults from the creditors' perspective. The primary objective of the creditor bank, like any other publicly held firm, is to maximize the wealth of its shareholders. Creditor banks should be concerned about any event that affects them adversely and causes a loss in wealth for their shareholders. The events that are considered in this study are significant, with the potential to cause financial distress and failure, not only to the individual banks, but to the whole banking industry.

The purpose of this dissertation is to test and compare

the announcement and industry contagion effects of the Mexican and Brazilian foreign debt moratorium announcements of 1982 and 1987. The two major, similar and sequential events, separated by a five year time period, provide a unique situation that allows us to test the market's ability to anticipate debt defaults by major Third World borrowers. There is enough of a time lag between the two events for the market to learn from the first event and modify its response to the second one. Between the Mexican and Brazilian moratoria, an efficient market should have become increasingly aware of the likelihood of Latin American borrower defaults, and should have impounded the learning that occurs in the form of anticipations. These anticipations would have been reflected in the market's ability to deal more effectively with the latter event.

While several studies have attempted to measure the market reaction to the Mexican moratorium announcement by studying the bank stock price adjustments before and after the event, very few have looked at the market reaction following the Brazilian moratorium announcement. This dissertation will analyze the bank stock price behavior for an extended period of time around both the Mexican and Brazilian announcements within a framework that allows resolution of the conflicting results from the earlier studies. In addition to measuring individual announcement and industry contagion effects, the learning that took place

in the period between the two announcements will also be analyzed, by comparing the bank share price changes during the two events. The learning in the market will also be examined by analyzing several related events that occurred during the intervening period.

Beginning in 1982, the creditor banks, the Lesser Developed Countries (LDC) borrowers, and the U.S. and international monetary organizations have made several policy changes trying to solve the Third World debt problem. By comparing the market adjustment to the two events, the market's view and success of the policies implemented will be implicitly tested.

2. Background.

Prior to the Mexican default announcement of August 19, 1982[1], Poland had defaulted on its external debts, but the brunt of the Polish default was borne mainly by European banks. Despite early signs of trouble with the Mexican debt, U.S. banks either underestimated the extent of the crisis, or were unable to do anything about it.[2] As a result of the Mexican default, the amount of non-performing loans exceeded the loan-loss reserves set aside by banks. Also, U.S. banks were heavily exposed in other Latin

---

[1] At the time of the default, Mexico had $62 billion of loans outstanding to foreign creditor banks.

[2] Cline, p.71-93.

American countries which were likely candidates for debt restructuring.

An outright default by any one of the major Latin American nations would have resulted in the failure of many of the large U.S. banks and would have seriously affected the international monetary system.[3] This was prevented by the intervention of the IMF and cooperation among the developed economies, which advocated new loans to the borrowers to help implement economic reforms. Since the Mexican announcement in 1982, Peru, Bolivia, Argentina, Chile and, more recently, Brazil and Venezuela have faced difficulties in meeting their debt obligations. In February, 1987, Brazil became the latest large borrower to default, when it announced that it would also halt payments on its $100 billion external debt. Creditor banks are now better equipped to deal with defaults, but the problem still exists and the market is closely monitoring the situation. New and innovative ways to deal with the crisis are being developed, the latest of which is the proposed Brady Plan involving a series of debt for equity swaps and other austerity measures, that will enable Mexico and other Third World borrowers to repay a portion of their external debt and strengthen the U.S. banking sector.

---

[3] Cline, p.26-29.

Beginning in 1982, the Group-Seven[4] nations, whose banks are the primary creditors to the Third World borrowers, have been concerned about the growing Third World debt and the problems it has created for the banks involved. In order to prevent a panic in the banking industry, the Group-Seven countries, led by the U.S., have encouraged increased bank lending so that the borrowers can service their external debts with the new loans. By allowing banks to carry the foreign loans at face value and by issuing new loans to borrowers to service the existing loans, the banks have managed to remain solvent.[5] But, the total debt (both private and government) owed to the industrialized nations by the Third World countries has been growing and currently stands at $400 billion, most of which is owed to banks in the U.S.

Recognizing the failure of all previous efforts to solve the debt crises, the Brady Plan, proposed by the U.S. Treasury, attempts to solve the problem by focusing on debt reduction policies. The plan calls for writing off a

---

[4] The Group-Seven nations include the United States, Japan, West Germany, Great Britain, France, Canada and Italy. The G-7 nations play a major role in the IMF and the World Bank as they contribute more to the international lending fund.

[5] The International Monetary Fund and the Brady Plan for debt relief call for increased lending to Third world countries so that the borrowers have more time to reduce their indebtness. Creditor banks agree to make new loans so that they do not have to recognize losses immediately. Also, they hope that eventually, the borrowers will fulfill their debt obligations.

portion of the loans, a series of debt for equity swaps, and new bank and IMF loan guarantees tied to economic reform by borrowers. If successful, it would have reduced the Third World debt by about 20% in the first three years of its operations.

Despite the various measures taken by the borrowers, lenders and the international economic community, the threat of debt default by a major LDC borrower causing a panic in any individual creditor bank or in the U.S. and international banking sector as a whole still persists. The quality of the assets (external loans) held by the creditor banks is still vulnerable to surprise adverse announcements by borrower nations.

The Mexican debt moratorium in August, 1982 was the first major sovereign debt default experienced by U.S. banks and financial markets. Prior to the Mexican moratorium, Poland, faced with economic problems, had been unable to meet its debt obligations in 1981. It was forced to place a moratorium on debt service payments on its $24 billion external debt. The Polish default did not have a significant impact on U.S. banks as most of its debt was financed by European banks and international monetary organizations.

The Mexican moratorium announcement was made on August 19, 1982 by the Mexican Finance Minister Jesus Silva-Herzog. At the time of the announcement, Mexico had over $60 billion

in foreign debt outstanding, and a major portion of it was owed to U.S. banks. About fifty U.S. banks had significant amounts of loans outstanding to Mexico. Many of the other U.S. banks had smaller amounts of exposure to Mexico, either through direct or syndicated lending.[6] Nevertheless, the largest U.S. banks were more heavily exposed to Mexico.[7]

Prior to the Mexican announcement, there were some indications of Mexican economic problems, the most prominent of which was the closing of the foreign exchange markets in Mexico. During the two weeks prior to the debt moratorium, the Mexican Peso to U.S. dollar exchange rate increased by about 140% in the Mexican financial markets, prompting the closing of the foreign exchange markets in that country.

The immediate effect of the Mexican default announcement on U.S. banks was to cause a deterioration in the quality of assets held by U.S. banks, especially the major creditors. The major banks had exposures to Mexico amounting to more than half their capital.[8] The U.S. financial markets reacted to the default by repricing downward the share prices of U.S. bank equities.

The long term effect of the Mexican default announcement was a deterioration in the quality of U.S. bank

---

[6] Various bank annual reports.

[7] Various bank annual reports.

[8] IMF World Economic Outlook. Chapter Two details the exposures of major U.S. banks in 1982.

loans not only to Mexico, but to all Latin American nations. In 1982 Mexico sought to reschedule its external debt and the banks were forced to negotiate new arrangements. Since then, other Latin American borrowers have taken the cue from Mexico and have made arrangements for debt restructuring with their creditors. A refusal to supply additional funds would have made Mexico and other Latin American nations default on their obligations, and the U.S. banking industry would have had to recognize losses that exceeded its capital. Nevertheless, even as it escaped a major financial crisis, the market valuation of the U.S. banking industry suffered significant reductions.

The Latin American debt crisis did contribute to the failure of Continental Illinois, and is responsible for some of the current problems faced by all major U.S. banks.[9] A second hand market for Latin American loans has since developed, where they are traded at less than half their face value on average.[10]

On February 20, 1987, Brazil became the latest large borrower to halt payments on its $100 billion external debt. Brazilian Finance Minister Dilson Funaro announced a unilateral suspension of all payments to creditor banks.

---

[9] Swary (1986) shows that the external loans issued by Continental Illinois formed a major portion of its non-performing loans. This, coupled with the large withdrawal of deposits in 1984, caused the eighth largest bank in the United States to fail.

[10] Dornbusch (1987), p.25.

Prior to Brazil, other Latin American borrowers had either defaulted on their foreign debt, or had rescheduled the debt service payments. The debt owed by borrowers from these countries to U.S. banks was not as large as either the Mexican or the Brazilian debt. When Brazil defaulted on its debt, U.S. banks were heavily exposed to it. Due to its economic prosperity, Brazil was thought to be of less risk than other Latin American borrowers. Hence, the moratorium announcement by Brazil was not anticipated by many of the market participants.

Studies by Cornell and Shapiro (1986), Schoder and Vankudre (1986), Smirlock and Kaufold (1987), and Bruner and Simms (1987) have dealt with the effect of the Mexican (and other Latin American) debt crises on the security prices of the U.S. banks (or bank holding companies) with foreign loans in their portfolios. These studies attempted, among other things, to determine if the adverse announcements had a significant influence on the market prices of bank securities, the rapidity with which the market reacted to such adverse information, and the market's ability to price the securities based on the degree of exposure of the various banks. The quality of bank assets represented by loans to Latin American countries deteriorated as a result of the adverse announcements. Consequently, the bank equity prices were also affected adversely.

3. Organization of Dissertation.

This dissertation is divided into eight chapters. Chapter II provides a review of the origins and causes of the Third World debt problem. The economics and finance literature identifies several factors and omissions that led to the current state of the problem. These and the magnitude of the problem are discussed in this chapter. Some of the proposed solutions are also addressed. Chapter III is a summary of the theories of market efficiency as they relate to the banking industry. The literature on contagion effects in the banking industry is also reviewed. Since the Mexican debt crisis in 1982, several studies have attempted to measure the impact of the Mexican moratorium announcement on U.S. bank stocks. A review of this literature is provided in Chapter IV.

Chapter V is divided into two parts. The first one develops the hypotheses to be tested in this study, while the second one describes the data used to test these hypotheses. The specific methodology that is employed in the empirical study and possible variations are detailed in Chapter VI. In Chapter VII, the empirical findings of this study are analyzed and compared with those of other related studies. The final chapter, Chapter VIII, summarizes the primary results and major conclusions of this dissertation.

CHAPTER II

THE LATIN AMERICAN DEBT CRISIS

1. The Debt Problem.

During the 1970s, there was an increase in the amount of international lending by the banks in the industrialized countries. While some of this lending was intended to facilitate trade among industrialized nations, most of it was funneled into LDCs which were implementing several development programs. The excess funds that were generated by industrialized and oil producing countries were transferred to developing countries. The LDCs were trying to keep up with the rest of the world in making economic progress, and were willing to absorb more debt.

Table 1 shows the growth in the external debt of non-oil developing countries for the 1973-84 period. Prior to the oil price increases by the Organization of Petroleum Exporting Countries (OPEC), the nominal debt owed by non-oil producing LDCs was about $130 billion. Since the price increase, the debt grew rapidly to $710 billion by 1984. Most of the borrowing was in the form of medium and long-term debt. The ten major borrowers, who accounted for more than one-half of the total borrowing, included Brazil and Argentina among other Latin American nations. In addition to them, Mexico and Venezuela, which are oil producing LDCs, were also borrowing to finance their ambitious development programs.

Table 1. External Debt of Non-oil Developing Countries, 1973-1984 (in $ billions)

Year	Nominal Debt	Long Term	Short Term
1973	130.1	111.8	18.4
1974	160.8	138.1	22.7
1975	190.8	163.5	27.3
1976	228.0	194.9	33.2
1977	280.3	237.2	43.2
1978	334.3	282.7	51.6
1979	395.3	336.2	59.1
1980	475.2	290.8	84.5
1981	559.6	455.8	103.8
1982	633.3	508.2	125.1
1983	668.6	566.4	102.2
1984	710.8	622.8	88.2
Ave Rate of Change	15.4	15.6	14.2
25 major borrowers accounted for 79% of debt			
10 major borrowers accounted for 50% of debt			

Source: Claudon(1986) p 24-25.

The Third World borrowers took advantage of the relatively cheap financing rates to invest in several domestic projects, many of which needed to be financed for an extended period of time.[11] Towards the end of the 1970s, the real interest rates began to rise, making it more expensive for borrowers both to service the existing foreign debt and to engage in additional external borrowing. Table 2 shows the debt service ratios for non-oil developing countries during 1973-84. The total dollar amount of debt service in each year is made up of interest expense and amortization of the debt for that particular year. Beginning in 1980, the interest expense became larger than the yearly amortization amounts. The dollar value of debt service increased from $11.9 billion in 1973 to $103.4 billion in 1984, a 477 percent increase. The interest expense portion of debt service increased ten times from $6.9 billion to $63.7 billion during the same period. The primary source of foreign exchange for the developing countries was their exports to the industrialized countries. To service their large foreign debt, they had to use up to one-fourth of their export income.

Tables 3 and 4 show the growth in external debt and debt service payments of developing countries and non-fuel exporting countries for 1982-1990. The total debt of developing countries grew from $836.1 billion in 1982 to

---

[11] Cline, p.14-17.

Table 2. Debt Service Ratios of Non-oil Developing Countries, 1973-1984.

Year	Interest Expense ($ bil)	Amortization Expense ($ bil)	Debt Service ($ bil)	Interest to Exports (%)	Amortization to Exports (%)	Debt Service to Exports (%)
1973	6.9	11.9	17.9	6.1	9.8	15.9
1974	9.3	12.8	22.1	6.1	8.3	14.4
1975	10.5	14.6	25.1	6.7	9.4	16.1
1976	10.9	16.8	27.8	6.0	9.3	15.3
1977	12.7	20.2	32.8	5.7	9.1	14.8
1978	18.1	29.2	47.5	6.9	11.2	18.1
1979	25.9	35.1	61.0	7.7	10.4	18.1
1980	39.0	34.3	73.4	9.1	8.0	17.2
1981	54.7	42.5	97.2	12.0	9.3	21.3
1982	63.0	44.6	107.7	14.3	10.2	24.5
1983	59.2	37.4	96.6	13.2	8.4	21.6
1984	63.7	39.7	103.4	13.0	8.1	21.1

Source: World Economic Outlook, 1984.

Table 3. External Debt of Developing and Non-Fuel Exporting Countries, 1982-1990 ($ billions)

Year	Total Debt	Long-term Debt	Short-term Debt
		Developing Countries	
1982	836.1	651.8	184.3
1983	886.9	713.8	173.1
1984	926.3	757.8	168.5
1985	998.4	834.0	164.4
1986	1095.3	922.3	173.0
1987	1211.8	1011.0	200.8
1988	1216.4	1004.7	211.6
1989	1213.5	996.7	216.8
1990	1265.2	1058.7	206.5
		Non-Fuel Exporting Countries	
1982	588.2	470.1	118.0
1983	629.0	510.3	118.7
1984	667.2	543.1	124.1
1985	726.7	610.6	116.2
1986	797.8	679.4	118.5
1987	885.6	746.1	139.5
1988	889.0	741.9	147.1
1989	888.6	730.9	157.7
1990	931.7	784.7	147.0

Source: World Economic Outlook, 1990.

Table 4. External Debt Service Payments of Developing and Non-Fuel Exporting Countries, 1982-1990

Year	Debt Service ($ billions)	Debt Service (% of Exports)	Int. Service (% of Exports)
	Developing Countries		
1982	134.2	19.3	10.8
1983	119.3	18.2	10.8
1984	134.6	19.5	11.5
1985	137.8	20.8	11.7
1986	140.2	22.1	11.6
1987	144.7	19.2	9.1
1988	162.8	19.0	9.2
1989	153.5	16.1	8.2
1990	162.7	15.9	8.7
	Non-Fuel Exporting Countries		
1982		22.9	12.8
1983		19.8	11.9
1984		19.9	12.0
1985		21.1	11.9
1986		21.5	10.9
1987		18.2	8.1
1988		16.8	8.0
1989		13.9	6.8
1990		14.8	7.9

Source: World Economic Outlook, 1990

$1,265.2 billion in 1990. Most of the growth in external debt was in the form of long-term debt (which increased from $651.8 billion in 1982 to $1.058.7 billion in 1990). During the same period, the external debt of non-fuel exporting countries increased from $588.2 billion to $931.7 billion. While the debt service payments of developing countries increased from $134.2 billion in 1982 to $171.0 billion in 1990, the debt service payments as a percentage of exports reached its peak in 1986 (22.1%) and then declined to 15.9% in 1990, indicating an increase in the export of goods and services from developing countries. The trend was similar for non-fuel exporting countries.

Many U.S. banks have been actively involved in international banking for the past thirty years. With the growth in international trade and multinationals in the 1960s, banks became more involved in international activities, especially trade financing. Following the OPEC oil price hike in 1973, U.S. banks were flush with deposits from oil exporting countries. At the same time, LDCs were seeking loans to finance their domestic projects. The U.S. banks, with their expertise in international banking, were in position to intermediate and help the LDCs with their loan needs. The so called 'herd instinct' common in the banking industry, started taking effect and most banks competed to increase their lending to the Third World

countries.[12] Table 5 shows the growth in lending by U.S. banks during 1977-82. The figures shown are exposure (measured as the ratio of total foreign loans to capital) of all U.S. banks and the nine largest U.S. banks to different groups of LDCs.

U.S. bank exposure to East European countries such as Poland was not large, and started declining between 1977 and 1982. During the same period, their exposure to non-oil exporting LDCs and Latin American nations was growing rapidly. While the total exposure of all U.S. banks was about 155% in 1982, it was 235% for the nine largest banks. Mexican and Brazilian loans accounted for most of the exposure. In the event of an outright default by either Mexico or Brazil, the U.S. banks would have lost one-third to one-half of their capital. In order to write off the loss due to the bad foreign loans, the banks would have had to reduce their capital and increase their loan-loss reserves and recognize the loss.[13] This was true for all the banks, especially the larger ones. Tables 6 and 7 show the exposures of some of the large U.S. banks to individual Latin American borrowers for 1982 and 1986.[14] Since 1982,

---

[12] Ibid.

[13] Citicorp was the first among a large group of banks to do this in May of 1987. A similar reduction in capital and recognition of losses due to non-performing foreign loans took place in 1989.

[14] The figures shown are as of the end of 1982 and 1986.

Table 5. Ratios of Total Foreign Loans to Capital: Comparative Data, 1977-1982. (All ratios in percentage)

Category	1977	1978	1979	1980	1981	1982
			All U.S. Banks			
Eastern Europe	16.7	15.8	16.1	13.9	12.9	8.2
Non-oil LDCs	114.9	114.4	124.2	132.2	148.3	146.8
Total	131.6	130.2	140.3	146.2	163.5	155.0
Mexico	27.4	23.4	23.0	27.6	34.3	34.5
			Nine Largest U.S. Banks			
Eastern Europe	25.0	23.5	23.9	21.8	19.5	13.9
Non-oil LDCs	163.2	166.8	182.1	199.3	220.6	221.2
Total	188.2	190.3	206.0	221.1	240.1	235.2
Mexico	32.9	30.4	29.6	37.8	44.4	44.4
Brazil	41.9	42.4	40.3	39.3	40.8	45.8

Source: Federal Reserve Board of Governors, Country Exposure Lending Survey.

Table 6. Exposures of Major Banks as a Percentage of Capital as of the end of 1982.

Bank	Argentina	Brazil	Mexico	Venezuela	Chile	Total	Capital ($ mil)
Citicorp	18.2	73.5	54.6	18.2	10.0	174.5	5989
Bank America	10.2	47.9	52.1	41.7	6.3	158.2	4799
Chase	21.3	56.9	40.0	24.0	11.8	154.0	4221
Morgan Guaranty	24.4	54.3	34.8	17.5	9.7	140.7	3107
Man. Hanover	47.5	77.7	66.7	42.4	28.4	262.8	2592
Chemical NY	14.9	52.0	60.0	28.0	14.8	169.7	2499
Continental	17.8	22.9	32.4	21.6	12.8	107.5	2143
Bankers Trust	13.2	46.2	46.2	25.1	10.6	141.2	1895
First Chicago	14.5	40.6	50.1	17.4	11.6	134.2	1725
Sec. Pacific	10.4	29.1	31.2	4.5	7.4	82.5	1684
Wells Fargo	8.3	40.7	51.0	20.4	6.2	126.6	1201
Crocker Nat.	38.1	57.3	51.2	22.8	26.5	196.0	1151
First Int.	6.9	43.9	63.0	18.5	3.7	136.0	1080
Marine Mid.	na	47.8	28.3	29.2	na	na	1074
Mellon	na	35.3	41.1	17.6	na	na	1024
Irving Trust	21.6	38.7	34.1	50.2	na	na	996
First Boston	na	23.1	28.1	na	na	na	800
Interfirst	5.1	10.2	30.1	1.3	2.5	49.2	787

Source: Various annual reports and SEC 10-K reports.

Table 7. Exposures of Major Banks as a Percentage of Capital as of the end of 1986.

Bank	Argentina	Brazil	Mexico	Venezuela	Chile	Total	Capital ($ mil)
Citicorp	na	58.2	35.5	na	na	na	7821
Bank America	14.1	53.8	49.7	25.0	9.2	151.8	5030
Chase	16.1	46.1	27.6	18.2	10.4	118.4	5947
Morgan Guaranty	16.0	35.2	20.8	na	na	na	5467
Man. Hanover	33.5	53.2	57.4	23.1	18.8	186.0	4353
Chemical NY	11.2	33.2	32.8	15.6	10.3	103.1	3903
Bankers Trust	na	31.7	47.7	na	na	na	2682
Sec. Pacific	na	26.3	23.7	na	na	na	2828
Wells Fargo	na	25.1	24.8	na	na	na	2365
Marine Mid.	na	44.6	23.0	19.3	13.7	na	1464
Irving Trust	21.3	33.7	29.8	35.5	na	na	1180

Source: Various annual reports and SEC 10-K reports.

when the consequences of the debt problem were first really understood by the lender banks and the borrowers, both groups, along with the International Monetary Fund (IMF) and the World Bank, have tried to find solutions to the problem. Banks altered their loan policies to reduce the risk of their international loan portfolio. By maintaining a larger reserve for loan losses and writing off some of the loans gradually, they were also able to reduce their exposure to the Latin American countries (as the numbers in the tables show). And for the first time, banks acknowledged publicly the poor quality of the loans in their asset portfolio. Yet, despite these measures, the foreign loan exposure of banks continues to be too large for banks to withstand an outright default by a major borrower.[15]

2. Factors Contributing To The Latin American Debt Crisis.

The beginning of the international debt crisis that has plagued the world economy since 1982 can be traced back to the steep hike in oil prices by the Oil and Petroleum Exporting Countries (OPEC) in 1973. In an unexpected move OPEC decided to raise oil prices which had an adverse effect on the balance-of-accounts of all other countries. The oil price increase resulted in the increase of the general price level, as oil was the primary source of energy for all

[15] For example, an outright default by Brazil in the end of 1986 would have reduced Citicorp's capital by 58.2%.

industries.[16] Through the higher energy prices, production costs and the general price level increased. The primary dependence on oil as a major source of energy by all economic sectors to the increase in the general price level, a case of cost push inflation. The U.S. monetary authorities responded to the oil price increase by implementing an expansionary monetary policy in 1976. Even during the highly inflationary period, the real interest rates were relatively low.

The rise in oil prices increased the funds available to the oil exporting countries. The OPEC members invested a part of their excess funds in U.S. banks. At the same time, oil importing countries had to use a larger fraction of their budgets for oil purchases and other essential imports. Their balance-of-account was further adversely affected when their exports to foreign countries declined.

Expecting the oil prices to rise even further, Mexico and Venezuela initiated several domestic programs based on their large oil reserves. Not to be left behind, the other Latin American nations in the region implemented their own development programs, even though they did not export any oil that would have earned additional foreign exchange. The LDCs borrowed funds from U.S. banks to finance their budget deficits. The OPEC members' excess funds were recycled into the LDCs to pay for their domestic programs.

---

[16] Cline, p.8-10.

The banks' lending policies had some structural weaknesses. In the absence of an effective regulating authority, banks assumed heavy concentrations of LDC exposures. Commercial banks were either uniformly naive in assuming that they were immune to debt defaults, or were short sighted in assuming that the probability of debt shocks affecting their international loan portfolio was very low.[17] The banks were also guilty of "herd instinct" in their international lending policies, regardless of their ability to handle the portfolio of assets and its consequences on the financial operations of the of the bank. When any one major bank increased its foreign loan exposure, the others followed the leader in issuing additional risky loans and increasing their exposure.[18]

While the banks can be faulted for issuing loans that increased the risk of their asset portfolio, the borrowers are to be blamed for not using the loans judiciously. Foreign loans were used to finance the consumption needs of the borrowers instead of financing capital intensive development programs. The LDC governments were constantly pressured into making short-sighted policy errors such as protecting programs of industrialization based on import substitution, mispricing of capital, and overpricing of labor, rather than investing in projects that were

---

[17] Makin, p.129-153.

[18] Ibid.

beneficial to the economy in the long-run.[19] Also, they allowed their currencies to be overvalued and could not control their budget deficits.[20]

In 1979, the second oil price increase by the OPEC had an adverse effect on the world's economies, and was followed by an economic recession in 1982. While the developed countries were able to weather the recession, Third World countries that were heavily indebted were hit hard. The U.S. monetary authorities responded to the inflation of late 1970s by implementing a restrictive monetary policy. Prior to 1979, the U.S. Federal Reserve conducted its policies by pegging the interest rates. In 1979, the central banks of the U.S. and other industrialized nations changed the direction of monetary policy by focusing on the money supply, rather than attempting to influence interest rates. This coincided with a severe and prolonged recession in 1980-82. The anti-inflationary restrictive monetary policy resulted in unprecedented high real interest rates throughout the world. The high real interest rates, coupled with the prolonged worldwide recession, affected the international trade and the debt-servicing capacity of the LDC borrowers.

During 1981-82 a majority of the countries faced a severe recession. Faced with a recession of their own, the

---

[19] Cline, p.14-17.

[20] Ibid.

industrialized countries imported less from the LDCs. This cut into the export income of the LDCs. Previously, the borrowers depended on the income from their exports to service their external debt. With the drop in export revenues, borrowers found it difficult to service their external debt. Lobbying by the various protectionist trade groups did not help the cause of the borrowers either.

During the 1970s oil prices were continually rising, and were expected to do so in the early 1980s. Mexico and Venezuela had issued large amounts of debt hoping to repay the loans with the income from higher priced oil exports. But, dissension within the OPEC and excess supply caused the oil prices to decline and stabilize at a value much lower than that expected. This resulted in a large budget deficit for Mexico.

The only source of foreign exchange for the non-oil developing countries was their exports to industrialized countries, and a major portion of this foreign exchange was spent on servicing the external debts. Another problem that the borrowers had to deal with was capital flight from their own countries. Faced with economic uncertainties and very high inflation, investors in the LDC financial markets were moving their capital abroad to U.S. and European markets which were more stable and could withstand economic downturns. This left very little for the development of the

domestic economies, and there was mounting pressure on the governments to default on their external debts.

Unlike the 1973 crisis, real interest rates were very high following the second OPEC oil price hike. (In 1973, the real interest rate was about 1%, while in 1982 it was close to 10%.[21]) The austerity measures initiated by the U.S. Federal Reserve System and the central banks of other industrialized countries so as to fight inflation led to a tightening of the credit markets. The loans made following the first oil shock were maturing and banks were unwilling to renew the loans at the original rates. This raised the specter of multiple country defaults, especially in Latin American countries.

In August 1982, Mexico announced that it would no longer be able to service its huge external debt and requested relief from its foreign creditors. With Mexico taking the initiative to default on its external debt, the other Latin American nations were expected to follow it in stressing their inability to service their debt to U.S. banks. It became evident that debt defaults or moratoria by a few of the larger borrowers could adversely affect the capital position of the largest U.S. banks, and propagate financial shocks through the banking industry.

---

[21] Claudon, p.10.

3. Remedies To The Debt Problem.

The 1982 Mexican debt moratorium was immediately followed by a decline in international lending, especially to LDCs. The only lending that flowed from the industrialized countries to the high-risk LDCs was coerced by the U.S. monetary authorities to prevent an immediate loss in the capital position of the banks. The new short-term loans issued by the banks were used to service the huge debt of the LDCs. By rolling over the debt of the Third World countries, banks were able to carry the loans at face value in their books and avoid an immediate loss in their capital position.

Realizing that the debt problem could not be quickly resolved, banks started a series of measures to reduce their exposures. They increased their foreign loan loss reserves and wrote-off a larger fraction of the loans each year. A secondhand market for foreign debt has since developed, where foreign loans are traded at a discount. Table 8 shows the discounted prices of Latin American loans in the secondhand market as of 1987 and 1991. Latin American loans traded at 7 to 85 cents on the dollar in 1987. The market value of these loans deteriorated furhter in 1991. The deep discounts suggest that the market still assigns a significant probability to partial or complete default by the borrowers.

The debt crisis raised questions about the role of U.S.

Table 8. Prices of Selected Latin American Loans in the Secondary Market as of 1987 and 1990

	1987		1990	
Country	Loan Price (cents on the dollar)	Total Debt ($ bil)	Loan Price (cents on the dollar)	Total Debt ($ bil)
Argentina	63	49.6	18	51.9
Bolivia	7	4.2	na	3.7
Brazil	76	104.5	25	113.0
Chile	68	21.5	78	17.1
Colombia	85	13.6	na	14.0
Ecuador	64	7.7	na	8.6
Mexico	60	97.3	50	102.7
Peru	20	14.2	na	20.0
Uruguay	64	4.7	56	1.6
Venezuela	77	36.5	56	33.2

Source: Dornbusch (1987), Wall Street Journal (various issues) and Barron's (various issues)

supervisory agencies in regulating international lending. U.S. banks and supervisory agencies were criticized by their European counterparts for the irrational growth in lending. The reserve requirements of U.S. banks were much lower than that of European banks. In response to this criticism, the U.S. Congress passed the International Lending Supervision Act (ILSA) in late 1983. Under this law, a comprehensive supervision system was mandated. The general objective of the ILSA was to encourage risk diversification by banks and improve their financial position so as to be able to withstand unexpected shocks to the banking system.

The concerned parties have acknowledged that the debt problem has no easy solutions and will not be resolved in a short period of time. The various responses that address the debt problem involve one or more of the following :

A. International Cooperation.

The creditors and the debtors have realized that the problem cannot be resolved unilaterally. Any plan to control the problem should involve the creditor banks, the borrowing LDCs, the monetary authorities of the industrialized countries, and international monetary organizations such as the IMF and the World Bank. Given the scope of the problem, any plan to manage the debt should have the broad approval of all the above mentioned groups.

B. LDC Economic and Financial Performance.

One of the principal goals of any meaningful plan should be to improve the economic and financial performance of the LDCs. The borrowers should be able to sustain economic growth to restore their credit-worthiness. Sustained economic growth would lead to easing the burden of servicing the debt. To maintain a healthy rate of economic growth, LDCs should reduce consumption and increase investment. During the 1970s and early 1980s, investment as a fraction of GNP declined for all LDCs, as consumption accounted for a larger portion of their budgets. For economic growth and progress, LDCs should consume less and convert the excess savings into capital investments, along with new investment financing from creditor banks. New lending should be conditional on economic reforms and austerity programs aimed at reducing consumption as a fraction of the GNP.

C. External Markets.

To reduce the imbalance in the balance-of-payment accounts of the LDCs, they should be able to have more access to major export markets. To offset the larger imports by LDCs, they have to increase their exports. Economic growth in the developing countries cannot be sustained without help from the industrialized countries, especially Japan and West Germany. These two countries

currently enjoy a large current account surplus. They should play a more active role in absorbing more imports from the LDCs.

D. Continued Lending and Official Liquidity Support.

In many instances, disruptions in debt repayments occur because the developing countries are illiquid and not insolvent. If the problem is illiquidity for the borrowers, cutting off all sources of lending will only worsen it. In such cases, there should be mechanisms for continued lending by either creditor banks, or by multilateral agencies, to meet the short-term needs of the borrowers.

E. Capital Flight Reversal.

The instability and uncertainty in the LDC financial markets led to the 'capital flight' of more than $100 billion away from the developing countries.[22] Reversing the capital flight would make it possible for the LDCs to reduce their debt by up to 30%. Much of the debt that was rolled over in the 1980s was used to finance the transfer of private capital from the developing countries to the industrialized countries. The trend in capital flight should be reversed so that the LDCs can retain all their borrowing and use it for domestic economic growth. To do this, the LDCs have to build the confidence in their

[22] Makin, p.129-153.

private-sector and attract larger amounts of foreign investments in their countries. At the same time, capital flight is possible only because of loopholes in the financial markets of the industrialized countries which allow investors to move their capital out of the LDCs. The primary beneficiaries of capital flight are the major banks and the developed economies.

F. Debt-Equity Swaps.

A recent trend in reducing the bank loan exposure has been securitization of the loans by swapping debt-for-equity. Debt-equity swaps are attractive due to the deep discount at which foreign loans are traded in the secondhand market. A corporation planning on making a capital investment in an LDC will buy some of the foreign loans to the LDC at a discount from the banks. The corporation will then exchange the loans at par value for the domestic currency of the LDC. The proceeds are applied to capital investments in the developing country. The advantage to the banks is a reduction in their exposure to the LDC. There is a transfer of value from the LDC to the corporation and the lender. The corporation benefits by the amount of the discount, and the LDC has made investing in its private sector attractive. While debt-equity swaps do not represent any new flow of investment, they create an atmosphere of

economic development in the debtor country and promote future foreign investments.[23]

4. Proposed Solutions.

A. The Baker Plan.

The Baker Plan to solve the Third World debt problem was announced by the then Treasury Secretary James Baker in 1985. The proposed initiative stressed the need for economic growth in the debtor countries. The focus shifted from austerity (which led to economic contraction) to growth in capital investment, output and LDC exports. The plan called for increased lending to the debtors to maintain economic growth. It was based on the assumption that the marginal productivity of the additional loans would be large enough to generate growth and exports. It also called for a larger role by multilateral agencies in lending to the developing countries, and by surplus current-account countries in absorbing the LDC exports.

The Baker initiative succeeded in building the confidence of investors in the economies of developing countries. In the past three years, several countries have succeeded in reducing, and in some cases reversing, the trend in capital flight. Japan has been playing a larger

---

[23] However, not all Third World countries favor such debt-equity swaps on a large scale, as no new capital is being invested in these countries. It is also inflationary in the LDCs as the currency in circulation increases.

role in lending to the LDCs and absorbing their exports. The IMF and the World Bank have also increased their lending to the Third World, especially the fifteen select countries identified by the plan. Following the announcement of the plan, the number of debt reschedulings have increased, and there has been an increase in lending to the debtor nations.

Despite the early success, the Baker Plan is generally considered to have failed in dealing with the debt problem. The marginal productivity of the additional capital has been lower than the initial expectations, and economic growth has been slow.[24] The multilateral agencies that did provide funds insisted on economic reforms and austerity which inhibited economic growth and expansion. The objectives of the Baker Plan were obviously not met, as evidenced by the Brazilian moratorium in 1987. The different aspects of the plan did ameliorate the Third World debt problem, but the results were far from that expected, and there still does not exist a stable system to deal with the problem.

B. The Brady Plan.

Conceding the failure of the Baker Plan, U.S. Treasury Secretary Nicholas Brady announced a new policy for dealing

---

[24] A major portion of the new loans were used by the borrowers to service existing debt to creditor banks. With increase in the dollar amount of borrowings, the debt service payments increased. Borrowers had to use a larger fraction of their Gross national Product to service their debt and remain solvent.

with the Third World debt problem in March, 1989. This new plan represents a shift in policy from one of economic growth through increased lending to debt reduction through voluntary forgiveness and repayments. It calls for increased lending by the IMF and the World Bank in place of commercial banks. The commercial banks would have to voluntarily forgive a certain portion of the debt. At the same time, Japan will increase its contributions to the multilateral agencies and will play a larger role in the activities of the IMF.

The plan identifies three forms of debt reduction for qualifying LDCs. The bank debt would be swapped for either bonds of lower face value, or for bonds with the same face value but lower interest rates. A third type of debt reduction is already in place -- debt-for-equity swaps. Only LDCs which are successful in reducing the net transfers out of the country will qualify for the debt reduction program. A fraction of the loans from the IMF and the World Bank will be used by the LDCs to retire their bank debt.

The plan, if successful, is expected to cut the existing Third World debt by about 20% over the next three years. Preliminary reaction to the plan has been favorable as most of the major banks would be able to reduce their exposure to foreign loans and they are not coerced into increased lending. At the same time, debtors will still be able to borrow from banks that are willing to lend to them

as special 'pools' of money from the existing resources of the IMF will be used as guarantees for new bank lending.

5. Summary.

This chapter looked at the magnitude of the Third World debt problem. The growth in the size of external borrowing by Third World countries and the growth in their debt service payments in the 1980s were examined. The factors that caused the debt problem were also analyzed. Finally, some of the remedies and proposed solutions to the debt problem were examined.

The next two chapters review the literature in market efficiency in the banking industry, and the effects of the Mexican and Brazilian debt defaults on the U.S. banking industry.

CHAPTER III

MARKET EFFICIENCY AND CONTAGION EFFECTS IN THE BANKING INDUSTRY

1. Market Efficiency.

A. Definition.

An efficient capital market is one in which security prices react rapidly to the arrival of any new information that has an impact on the assets underlying the securities. The current stock prices of an efficient market fully reflect all available information about the securities. In other words, the observed security prices are based on the market's evaluation of all available relevant information.

It is important to distinguish between operational and informational market efficiency. A market may be operationally efficient, without necessarily being informationally efficient. Operational market efficiency relates to the efficiency in the physical operation of the capital markets, while informational efficiency pertains to the processing of information. A capital market is said to be informationally efficient with respect to a set of relevant information, if the security prices in the market reflect all information in the information set. Informational market efficiency holds that,[25]

$$P_{it} = E[P_{it}^{*}] = E\left[(\Sigma C_{im}(1+r)^{t-m}) \mid \Omega_t\right] \qquad (1)$$

---

[25] Fama (1976)

where C_{im} is the cash inflow in each period m for security i,

$(1+r)^{t-m}$ is the discount factor in each period m,

E is the expectations operator,

P_{it} is the price of the security i at time t,

P_{it}^{*} is the true value of the security i at time t, and,

Ω_t is the set of information available to the market participants at time t.

Equation (1) can be restated as

$$E(R_{it}) = E\left(\frac{P_{i,t+1}}{P_{it}} - 1 + \frac{(1+r)C_{it}}{P_{it}}\right) \qquad (2)$$

where, R_{it} is the return on security i at time t.

Equation (2) is the operational form of informational market efficiency that is usually tested. The risk involved is implicitly reflected in the prices and returns.

The principle of capital market efficiency is based on three important assumptions:

(i) The capital market has a large number of profit-maximizing participants. The market participants operate independently of each other. Each participant is involved in analyzing and valuing securities. This assumption is critical because it implies that, on the average, the market is correct in its valuation of securities. The individual valuations may not be perfect, but the aggregate is the correct value.

(ii) New information about the assets underlying the securities arrives in the market at random. The announcements over time are independent of each other. (iii) Market participants adjust security prices rapidly. The adjustment reflects the arrival of the new information and its impact on the underlying assets. The price adjustments are unbiased, independent and random. This follows from assumptions (i) and (ii).

B. Alternative Forms of Informational Market Efficiency.[26]

Three different forms of informational market efficiency can be formulated based on the constraints placed on the information set Ω. Each version holds that the capital market is informationally efficient with respect to a particular form of the information set.

(i) Weak Form Market Efficiency.

The weak form market efficiency holds that current stock prices fully reflect all stock market information. The information set includes all historical market data such as market prices, volume and time of trade. Since price changes are random and independent of each other, trading strategies based on past prices are of no value in predicting future prices in weak form efficient markets.

---

[26] Reilly (1985), p.163-166.

(ii) Semi-Strong Form Market Efficiency.

The semi-strong form market efficiency holds that current stock prices fully reflect all public information. Security prices adjust rapidly to the release of all new public information. The information set includes all market data and non-market data such as earnings, dividends and other events that are reported in the news media. Since current stock prices reflect all available information and are accurate, it would not be possible to earn arbitrage profits consistently in a semi-strong form efficient market.

(iii) Strong Form Market Efficiency.

The strong form market efficiency holds that current stock prices fully reflect all information, public and private. The information set encompasses market data, all public information and all private information that any market participant might have access to. Private information is any information that has not yet been published or broadcasted, but is accessible to certain participants. In a strong form efficient market, no investor will have monopolistic access to any information that can be used to earn above-normal profits consistently. Hence, it will not be possible for any investor to earn above-average profits consistently.

C. Tests of Market Efficiency.[27]

Tests on the alternative forms of market efficiency involve the use of equation (2). It can more generally be expressed as

$$R_{it} = r + e_{it} \qquad (3)$$

where e_{it} is serially uncorrelated and independent of Ω. If the market is weak form efficient, e_{it} will follow a white noise process. Tests of semi-strong form efficiency use additional regressors from the set of information. A special version of equation (3) is used in such tests.

$$R_{it} - r = bI + e_{it} \qquad (4)$$

where I is a relevant variable from Ω. If the market is semi-strong form efficient, the coefficient b will equal zero.

One group of tests of weak form market efficiency involves statistical tests of independence of stock price adjustments. Results of such tests indicate that stock price changes over time are uncorrelated. A second group of tests examines alternative trading rules through simulation. These tests indicate that when transactions costs are ignored, it is possible to earn above-average profits. However, when transactions costs are included, the profits disappear. These results suggest that capital markets are predominantly weak form efficient.

Semi-strong form market efficiency is tested by

---

[27] Fama (1976) and Reilly (1985)

examining stock price adjustments around the time of specific events. If the relevant adjustments were made prior to or at the time of the announcement (event), the market is semi-strong form efficient. If the adjustments consistently occur after a considerable time has elapsed since the announcement, then it would be possible for investors to earn above-average profits consistently. The results of the semi-strong form market efficiency tests are mixed. While security prices react rapidly to events such as stock splits and accounting changes, making it impossible to earn abnormal profits after the event, the price adjustments in cases such as small firm and January anomaly effects allow investors to earn above-normal profits.

Tests of strong form market efficiency involve analyzing the returns of different groups of market participants such as corporate insiders, specialists and professional portfolio managers. The results of these tests are not conclusive either. While corporate insiders and stock exchange specialists are able to derive above-normal profits through their monopolistic access to information, professional portfolio managers were not able to beat the simple buy-and-hold strategy consistently.[28]

---

[28] The empirical evidence predominantly supports efficient capital markets. However, Summers (1986) argues that the standard tests used may be failing to detect certain types of inefficiencies in market valuation and that the evidence confirming the efficient market hypothesis has been vastly exaggerated.

2. Market Efficiency in the Banking Industry.

The empirical evidence on the efficiency of the markets for bank equities is mixed. If the market for the shares of banks (or bank holding companies) is efficient, information about events that have adverse effects on creditor banks, such as the moratorium announcements by major third world borrowers, should immediately translate into lower market prices. But, if the market has some inefficiencies due to asymmetric information between the affected institutions and the market participants, either there should be no significant adjustments to the market prices of the securities, or the price adjustments should be proportional to the degree of information asymmetry.

Bank regulators tend to defend regulation by rejecting implicitly the notion of efficient markets for bank equities, although academic researchers [Pettway and Sinkey (1980), Beighley (1977), Murphy (1979), and Pettway (1980), among others] find the market for large bank equities to be efficient. Regulators argue that the market for bank equities lack the necessary information to price correctly the bank obligations and portfolio of assets consistent with their risk.[29] The imperfect information on the part of some market participants results in inefficiencies in bank equity markets.

Pettway (1980) suggests that while it may be true that

---

[29] Pettway (1976).

the market for small and medium-sized bank equities may be lacking the necessary information to make them efficient, the market for large-bank stocks is active and, hence, efficient. He analyzes stock returns of failed and non-failed large banks, and concludes that there is no support for the view of bank regulators that the market is inefficient.

A study by Cornell and Shapiro (1986) suggests that the market for bank stocks might be weak-form efficient, at least as it relates to the case of the Mexican announcement of August 19, 1982. Applying a different methodology, Bruner and Simms (1987) find the market to be semi-strong efficient for the same event.

3. Contagion Effects.

A. Definition.

Banks face several types of risk, namely, credit or default risk, liquidity risk, sovereign risk and foreign exchange risk. At the individual bank level, any one of these risks has the potential to cause financial distress and lead to the bank's failure. At the overall market level, the failure of any one bank may not be too costly, especially if there are a large number of banks in the system. But, the costs of a single bank failure will be large when the individual bank's risk impacts the systematic risk of the entire banking industry. Such effects, where

the financial distress at one bank (or a few banks) is perceived to affect adversely the financial operations and security prices of other banks are called contagion effects. Regardless of the cause of the individual bank's distress or failure, its effects spill over to other banks.

There can be contagion effects at two different levels that are relevant to this study. First, the financial distress at any one bank could spill over into other banks and cause panic in the banking system. A second level of contagion effect involves the loss of confidence in the banking system due to deficiencies in institutional and regulatory features. The failure of a bank due to improper regulation could be mistakenly perceived as a common problem with the entire banking industry. Consequently, the market adjust downward the equity prices of all banks, causing a contagion effect in bank stock prices.

Saunders (1988) identifies two mechanisms through which contagion effects are transmitted - institutional and informational channels.

Contagion effects can be transmitted from one bank to another through the institutional structure of the banking system. A run in any one bank may affect or cause a run in other banks if the first bank readjusts its portfolio by withdrawing its funds deposited in other banks. Such a liquidity crisis is a problem only when depositors seek higher quality instruments such as government securities.

Otherwise, the funds withdrawn from any one bank are recycled into the system in the form of new deposits at other banks.

A more plausible means through which contagion effects are transmitted is through information channels. In the case of 'pure' information contagion, financial distress at a bank caused by bank specific events such as fraud and bad loans, undermines the market's confidence in the system being able to regulate and prevent bank losses. The distress at one bank causes the market to revise its perception about the systematic risk of some or all other banks in the system. In the case of 'noisy' information contagion, financial distress at any one bank caused by events such as adverse foreign exchange currency fluctuations, is transmitted to other banks in the system due to asymmetric information on the part of the market (depositors). The imperfect information about the banks that investors have could cause a shift in the market's perception about the risk-class of the banks.

Contagion effects can impact the banking industry in different ways. At the minimum, investors in bank equities would require a higher return to compensate for the increase in the systematic risk of the securities. The multiple creation of deposits would slow down as risk averse investors seek other higher quality instruments. At the other extreme, the loss of confidence in the banking system

could cause a financial crisis. One of the main reasons the banking industry is regulated is to prevent the collapse of the banking system through the contagion effect.

B. Evidence of Contagion Effects in the Banking Industry.

Swary (1986) analyzes the market's response to the Continental Illinois 1984 crisis in an attempt to discover contagion effects in the banking industry. By using stock market data, he concludes that while there was a clear market reaction to information revealed about banks' asset quality and regulation policy, there were no significant institutional contagion effects. Depositors, especially foreign investors, did withdraw large amounts of money from the bank, causing it to borrow $3.6 billion from the Federal Reserve of Chicago, but the funds were recycled into the system when they made new deposits in other banks. The regulators and other money center banks were willing to extend credit to Continental Illinois to meet its deposit withdrawals.

Aharony and Swary (1983) analyze three bank failures in the U.S. in an attempt to detect contagion effects on the performance of the banking industry. The main thrust of their results is a lack of support for the 'pure' information contagion effect. They conclude that the contagion effect is event specific. Financial distress caused by bank specific events such as fraud or internal

irregularities does not affect the banking system as a whole. But, financial distress caused by economy-wide events such as losses due to foreign exchange transactions can be contagious. The market interprets the event as a common type of adverse signal and impounds it while pricing bank securities. A similar study by Pettway (1976) supports the same argument.

Bruner and Simms (1987) find support for the contagion effect in the bank equities market following the Mexican announcement. But the market corrects itself after a lag of four days and responds to the signal by adjusting the bank equity prices based on the level of exposure of each individual bank. This has important implications for market equilibrium. While the market correctly recognizes the effects of the adverse signal on the banks' business operation and responds by adjusting its valuation of the bank equities, the magnitude of the adjustment does not reflect the banks' true financial distress. There is a temporary disequilibrium in the market during the four days following the event, when it may be possible to earn arbitrage profits.

Lamy, Marr and Thompson (1986) use a sample of 57 exposed and non-exposed banks to test for contagion effects following the Mexican announcement. They conclude that the market possessed a high level of informational efficiency. However, they find that the equity market discounted Mexican

loans by only a small fraction of the actual loans. They attribute this to the regulation policy that protects the banking industry. The market expected the regulators to intervene in the event of a financial crisis.

A high degree of contagion effects in the banking industry implies that the potential for a major crisis in the monetary system as a result of a single major borrower default is large. The loan write-offs and losses due to the default of the borrower would reduce the bank capital available to meet future losses. Since most of the major banks were involved in external lending, especially to Latin American nations, the capital held by banks would be inadequate to cover the losses. The problems facing the major banks would cause the market to lose confidence in the banking industry. Due to the nature of the contagion effect, the systematic, or undiversifiable, risk is magnified throughout the banking industry. On the other hand, the absence of any contagion effects implies that the potential for a single event causing a financial crisis is minimum.

It is interesting to note that prior to 1982 banks were not required to reveal information about their exposure to foreign countries on a country-by-country basis, except, on a confidential basis, to the Federal Reserve Bank Board of Governors. Thus, the market at large had very little information about country-specific exposure. However, since

1982 banks are required to make public all information about significant exposure to foreign loans in their annual reports. The market disequilibrium following the Mexican crisis could have been due to the informational asymmetry that existed in 1982. Now that the market has more or less symmetric information with bank managers about foreign loan exposure, it remains to be tested whether such disequilibria still exist, and if they do, the speed with which the market reverts back to equilibrium.

This raises an interesting question regarding the type of information contagion effects in the U.S. banking industry following Third World debt moratoria announcements. Is the contagion effect resulting from a moratorium announcement 'pure' or 'noisy' information contagion? If it is a 'pure' contagion effect, then the market perceives a shift in the systematic risk of the banking industry as a result of unregulated lending by banks and the inability of the affected banks and debtors to find suitable solutions to the problem. The market loses confidence in the existing regulation policy. Consequently, it re-evaluates the risk of the banking industry, adjusting it upward. On the other hand, if it is a 'noisy' contagion effect, then the market has imperfect information about the business and financial operations of banks. The market mis-estimates the risk faced by some or all banks. The asymmetric information could lead to above-average profits for informed investors.

4. Summary.

This chapter reviewed the relevant literature in market efficiency as it applies to the banking industry. The standard tests of market efficiency and the empirical evidence on informational market efficiency for bank equities are analyzed. Finally, informational contagion effects in the banking industry are described and the literature on contagion effects is briefly reviewed.

The next chapter reviews the literatures in the areas of market efficiency and contagion effects in bank equities associated with external borrower defaults.

CHAPTER IV

EFFECTS OF THE LATIN AMERICAN DEBT CRISIS UPON U.S. BANK STOCK PRICES

1. Literature Review.

An important issue related to debt default announcements by Third World borrowers is their effects on the financial and business operations of US commercial banks. A default by a major borrower will have to be written-off against the loan-loss reserves of the lending commercial banks. This will alter the capital structure of the lenders, making them more leveraged.[30] While it is evident that the quality of the portfolio of loan assets held by the creditors deteriorate when borrowers default, it also may affect the market values of bank stocks in the secondary market, making it more expensive for banks to use equity financing. It also affects the wealth of the bank shareholders. Investors in bank equities will demand a higher return to compensate them for the higher business risk of the banks.

Several studies have attempted to determine if the default announcements by Mexico and other Latin American

---

[30] In 1989, several of the money center banks increased their loan-loss reserves, acknowledging the low quality of their external loan assets. By this action, some of the lenders were effectively leaving the external lending market. Others, such as Citicorp, decided to continue to operate in the international loan market. One of the reasons cited for the lowering of the Citicorp bond rating by Standard and Poors in april of 1990 is the size of its losses on its loans.

borrowers had any significant impact on the market prices of bank equities and shareholder wealth. They have also tried to detect any adjustments prior to and long after the announcements, by focusing on the 'announcement' effects of the default and on subsequent regulatory responses. A second group of studies has concentrated on the rapidity with which the market reacted to the announcements and its ability to price securities proportionate with the risk of the banks issuing the securities. The latter has important implications for the policies implemented by regulating agencies. If the market is mispricing securities due to asymmetric information, regulators are justified in mandating more disclosure by banks, in order to improve the operational efficiency of capital markets.

One of the first studies to analyze the U.S. stock market responses to the Mexican default announcement in 1982 was conducted by Cornell and Shapiro (1986). They use a cross-sectional regression approach to test for a Latin American exposure effect on annual, bi-annual and monthly returns of exposed U.S. banks. Implicitly, they test the extent to which the market incorporates the riskiness of foreign loans in valuing bank stocks. They also test the degree to which investors are able to discriminate between banks with different exposures in the absence of disclosure. Their data set consists of 43 NYSE listed banks. The authors argue that the classical event study methodology

cannot be applied to this case due to difficulty in identifying the event date, and suggest a new cross-sectional regression approach. The methodology involves regressing three proxies for returns (raw returns measured changes in share prices, excess returns measured by using the Dimson beta, and excess returns measured by using a Bayesian-adjusted Dimson beta) against a set of variables that might affect the return on bank stocks.

The regression model they use is

$$r_{it} = a_{0t} + b_{it}L_i + b_{2t}E_i + b_{3t}P_i + b_{4t}R_i + b_{5t}F_i + b_{6t}N_i + b_{7t}S_i + U_{it}$$

They estimate the coefficients of the above cross-sectional regression model using continuously compounded returns measured over intervals of one month, one year and two years for the period January 1, 1982 to December 31, 1983. The equation is also estimated for 71 individual days around the announcement. The variables expected to have an effect on bank stock returns (r_{it}) are Latin American exposure (L_i),[31][32] energy loans (E_i), real estate loans (R_i), Penn

---

[31] Cornell and Shapiro define loan exposure as the ratio of total loans to total assets of the bank. Other studies define exposure as a fraction of equity. The latter definition is a better bankruptcy measure, as in the event of bankruptcy, creditors' claims are satisfied by paying out from the equity. Not all of the total assets of a firm can be liquidated.

[32] Cornell and Shapiro use Latin american loan exposure and not Mexican exposure due to the non-availability of foreign loan exposure data by country or region. Loan exposure data was provided to them by Goldman, Sachs and Salomon Brothers.

Square loans purchased by banks (P_i), non-Latin American exposure (F_i) (all measured as a fraction of total assets), size of the bank (S_i),[33] and net purchased liabilities of the bank (N_i). U_{it} is an error term with mean zero.

Cornell and Shapiro find Latin American exposure to be a significant determinant of annual returns,[34] but insignificant in determining monthly returns around the announcement day (August 19, 1982). They conclude that information about the Mexican debt crisis had been arriving prior to the announcement date, and that the market had been impounding this information continually into bank stock prices. They call this the 'dribs and drabs'[35] phenomenon, where the predominantly negative information was slowly disseminated throughout the study period. This, they contend, is the reason why Latin American exposure is a significant determinant of annual and bi-annual returns, but not of monthly returns.

None of the other variables seemed to have a

---

[33] This study uses market capitalization in billions of dollars as a proxy for the size of the bank. Another formulation of the model would be to use a ratio as a proxy for the size instead of market capitalization, which is an absolute value.

[34] The empirical tests show that during 1982, each percentage point increase in the ratio of Latin American loan exposure to total assets cost a bank, on average, 4.3 percent in annual return. The authors contend that money center banks, which had high Latin American exposure, experienced larger losses in annual returns compared to non-money center banks.

[35] Cornell and Shapiro (1986), p.62.

significant influence on bank stock prices. This shows that holding non-Latin American loans in their portfolio of assets did not have a significant effect on bank stock returns. This implies that despite the absence publicly available information about foreign lending, the market was able to distinguish between banks with exposure to different countries.

Schoder and Vankudre (1986) test for a Mexico exposure effect on the announcement date returns. They use the classical event study methodology to a sample of 45 banks and find an insignificant negative effect on the announcement day. They also test for a relation between bank stock price adjustment and foreign loan exposure to Mexico. Schoder and Vankudre conclude that the bank stock prices around the announcement date did not reflect the exposure to Mexico of individual banks. This conclusion suggests either informational inefficiency or a 'pure' information contagion effect for the entire U.S. banking industry. The existence of informational inefficiency or the persistence of a contagion effect during shocks to the banking system may significantly influence access to capital markets and arbitrage opportunities. In the presence of asymmetric information about the quality of assets held by banks, investors with superior information can benefit due to mispricing of bank equities in the short-run. The longer

the contagion effect persists, the more the number of investors who would benefit from being informed.

Smirlock and Kaufold (1987) contend that the study by Schoder and Vankudre has some shortcomings that make it difficult to draw the correct conclusions. Schoder and Vankudre use book value of loans and market value of equity to measure exposure. This makes the loan exposure figures inaccurate as they fluctuate with changes in bank stock prices. Also, the power of the tests used by Schoder and Vankudre may be low as they do not account for the covariance of returns across bank stocks.

Smirlock and Kaufold use a modified version of the classical event study methodology to test for a Mexico exposure effect on bank stock returns around the event date. Since the returns are cross-sectionally correlated for the exposed and the non-exposed banks, they apply a Seemingly Unrelated Regressions (SUR) technique to conduct their tests. This technique involves a series of regression equations, one for each bank in the sample (or subgroup). They also test whether investors were able to distinguish between banks with varying degrees of exposure.

The sample of 60 banks are divided into two groups - 23 exposed and 37 non-exposed - and regressions are analyzed separately. Stock price returns for a period of 60 days on either side of the announcement day are computed and tested. Exposure is measured as the ratio of book value of loans to

the book value of equity. A dummy variable is included in the regression to indicate the event day or otherwise.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \delta_i D_t + \epsilon_{it} \; ; \quad i = 1,\ldots,n \; ;$$

where, R_{it} is the return for bank i on day t,

t ranges from 60 days before the announcement to 60 days after the announcement,

R_{mt} is the market return (return on NYSE Index) on day t,

D_t is the dummy variable where

D_t = { 1 if t is the event day, 0 if otherwise;

n is the number of banks in the subgroup;

α, β, δ are parameters.

The coefficient of the dummy variable reflects the effect of the Mexican default on the bank stock returns. Smirlock and Kaufold conclude that there was a significant relationship between exposure and returns during the announcement period. They also suggest that investors were able to differentiate between banks with different exposures. (However, they do not report the exact days during which the market was able to do so.) The authors contend that the market was able to discriminate between those banks with extensive Mexican loan portfolios, those with lower levels of exposure, and those with no Mexican exposure, even in the absence of disclosure rules. This implies that there is no justification for the regulators' opinion that there should be increased regulation in the area of public disclosure by banks.

A caveat with this study is that it does not control for the varying sizes of the banks in the sample. Banks with exposure are several times larger than those without any exposure. This size effect might have influenced the results that they obtained. Further, the 37 banks that constitute the group of non-exposed banks may be indirectly exposed through syndicated lending, leading to confounding results.

In contrast to the above studies, Bruner and Simms (1987) test for "the rapidity of the market's response to the actual deterioration in asset quality caused by Mexican exposure".[36] They test two sets of hypotheses. The first set tests whether the market impounded the information following the August 19 announcement on or after the event date (the new information hypothesis), or whether it had already anticipated the adverse event and had previously impounded it in the market price of the bank stocks (the information leakage hypothesis). The second set of hypotheses tests to see if the size of the investor response to the Mexican announcement is related to the degree of exposure of the bank (the rational pricing hypothesis), or whether investors were unable to differentiate among the banks with varying exposures and uniformly penalize all banks - a contagion effect (the investor contagion hypothesis).

---

[36] Bruner and Simms (1987), p.47.

Bruner and Simms employ the standard event study methodology to a sample of 48 banks. The excess returns for 100 days before and 57 days after the Mexican default are analyzed. They find support for the new information hypothesis and conclude that the market impounded the information quickly in the share prices of the exposed banks.

To test for a contagion effect in the banking industry following the default announcement, Bruner and Simms group the banks according to their degree of exposure, and compute the excess returns for the subgroups. They also regress the cumulative excess returns of individual banks (for different time intervals following the announcement) against their exposures. They find that initially (during the first four days following the announcement) the market penalizes all banks, regardless of their degree of exposure. But later on, the market recognizes the varying exposure levels and prices securities based on these levels. A four day lag on average between the event and the market's recognition of the exposure level is established.

Lamy, Marr and Thompson (1986) also use the standard event study methodology to test for announcement and contagion effects. (They name Bruner and Simms' investor contagion hypothesis as the 'irrelevance of exposure' hypothesis.) They use a sample of 57 exposed and non-exposed banks. This study is different from Bruner and

Simms only in the number of subgroups formed. Lamy, Marr and Thompson divide the sample into 10 subgroups depending on the degree of exposure, while Bruner and Simms use only two subgroups. They conclude that the market possesses a high level of informational efficiency, as exhibited by significant exposure coefficients. However, they find that the equity market discounted the Mexican loans by only a small fraction of the actual loans. They attribute this to the 'bailout theory', which holds that the IMF and the Federal Reserve System protect the commercial banking industry. While the Mexican default was an adverse signal, the market perceived its effects to be minimal. The market expected the regulators to intervene in the event of a crisis.

To the best of this author's knowledge, there has been only one study that has looked at the announcement and contagion effects of the Brazilian debt default of February, 1987. Musumeci and Sinkey (1990) examine bank security returns surrounding Brazil's debt moratorium announcement using regression analysis and standard event-study methods. Individual bank returns and excess bank returns are regressed against exposure data for the Brazilian default announcement. However, they use a narrow prediction period of 3 days before and 3 days after the event. They acknowledge that their tests do not capture any adjustments outside their prediction window. They also use only 25

banks in their sample : 10 money-center banks and 15 regional banks. Their study concludes that the market reacted negatively to the moratorium announcement by Brazil, but does not find any evidence of mispricing or investor contagion. The authors conclude that the market was informationally efficient.

2. Summary of Default Announcement Effects Literature.

The conclusions of the various studies are mixed. While Cornell and Shapiro do not find any new information effects, Bruner and Simms and Smirlock and Kaufold find that the Mexican default announcement did convey new information to the market. Lamy, Marr and Thompson and Smirlock and Kaufold conclude that the market was informationally efficient, while Bruner and Simms and Schoder and Vankudre find that there was a contagion effect in the market immediately following the announcement. Cornell and Shapiro suggest that there might have been information leakage prior to the announcement, but do not test for it formally. The only study on the Brazilian default announcement finds the market to be informationally efficient using a selected sample of banks.[37]

The above studies have several limitations. First, the focus of most of these studies is limited to one event (the

---

[37] Musumeci and Sinkey do not conduct any tests on the security returns of bank portfolios, similar to the ones by Bruner and Simms, and Lamy, Marr and Thompson.

Mexican or the Brazilian default announcement) or, at the most, a few specific sub-events. None of them rigorously analyze the two major events sequentially and draw inferences based on this analysis. Second, none of them test for market adjustments to related events (sub-events) during the time period between the two events. During this five year period, the market had been continuously receiving information about the economic and financial conditions of the borrowers and the lenders. New Securities and Exchange Commission regulations in 1982 required banks to publish more information about their significant loan exposures to foreign borrowers. The print and news media were more active in reporting events that might have had an effect on the value of U.S. banks' loan assets. Third, most of the studies use a small number of banks in their samples. By selecting a relatively small sample, they may not be capturing all the effects that took place. Further, none of them group the banks according to their size, exchange membership (NYSE, AMEX or OTC), or ownership status (Bank-Holding Company or non-Bank-Holding Company), and analyze the market adjustments for specific groups individually.

This study will start by using a large sample of banks to analyze the market adjustments in various sub-groups of banks for the Mexican announcement. This will be used to validate the conclusions of Bruner and Simms, Cornell and Shapiro, Schoder and Vankudre, Smirlock and Kaufold, and,

Lamy, Marr and Thompson. In addition to the default announcement, several other events leading up to it will also be analyzed.

Similar tests will be conducted on a large sample of banks for the Brazilian default announcement. The two sets of tests will be used to analyze the changes in the market reaction over time. Other sub-events during the period between the two defaults will be identified, and each one will be analyzed to identify any learning in the market from one default to another.

CHAPTER V

HYPOTHESES AND DATA

This chapter is divided into two sections. The first section details the various hypotheses that will be tested in this study. Some of these have been used in connection with the Mexican default announcement in the related studies reviewed in the previous chapter. The expected results under alternative cases are also described. The second section describes the data that will be used in this study, the data sources, and the time periods of data analysis.

1. Statement of Hypotheses.

This study attempts to compare the market efficiency and contagion effects of the response to the Mexican moratorium announcement in 1982 with that of the Brazilian moratorium announcement in 1987. Both announcements were adverse signals to the market, but the informational and market settings for the two events were different. The Mexican moratorium was the first of its kind that the U.S. market encountered. Prior to this event, there were no major debt defaults that had the potential to adversely affect the U.S. banking industry. The magnitude of the effects of the Mexican crisis on the U.S. banking industry was unanticipated by the U.S. market. All banks had to revise their estimates of the riskiness of their asset

portfolio. Many of them had to restructure their capital to account for losses due to bad debts.

The Mexican crisis has served as a forerunner for other similar events. Since the Mexican crisis, other Latin American borrowers have taken the cue from it, and have stressed their inability to meet some or all of their debt obligations to U.S. banks. Peru, Chile, Argentina and other borrowers have arranged for debt reschedulings with their creditors. In 1984 Peru declared an outright moratorium on its external debt, similar to the one by Mexico, but the adverse effects of this action on the U.S. banking industry were minimal, as Peruvian loans form a very small portion of the banks' asset portfolio. The next major debt moratorium was announced by Brazil in 1987. The U.S. banks were heavily exposed to Brazilian loans at the time of the moratorium announcement. Between the two moratoria, the Mexican and the Brazilian, an efficient market should have become increasingly aware of the likelihood of Latin American borrower defaults, and should have impounded the learning that occurs in the form of anticipations. These anticipations would have been reflected in the market's ability to deal more effectively with the latter event, other things being equal. The anticipations should have been translated into downgrades of the affected bank stocks. The purpose of comparing the effects of the two events is to draw inferences about market equilibrium, and the market's

ability to learn from prior events. Two sets of hypotheses will be tested for each of the two events - debt moratoria announcements by Mexico in 1982 and by Brazil in 1987.

During the five year period between the two events, several institutional changes took place. The Depository Institutions Deregulation and Monetary Control Act of 1980 and the Garn-St.Germain Act of 1982 influenced the operations of depository institutions. With the deregulation of the banking industry, depository institutions altered their asset base. During the same period, the risk faced by an average bank increased. Several banks increased their loan-loss reserves, acknowledging the poor quality of their assets. A large portion of the banks' assets had to be written off. This changed the capital structure of the banks. Other institutional changes during that period include an increase in the number of mergers among depository institutions, a rapid growth in the size of the institutions, and an increase in the number of bank-holding companies. In view of these changes, it would be difficult to explain differences in stock price reaction to two similar sequential events without introducing a bias. To minimize the bias, the banks are classified into different groups based on a number of criteria. A distinction is made between banks with varying amounts of loans outstanding to the defaulting country. They are also grouped according to

their asset size, trading exchange membership, and status regarding bank-holding company or unit bank. By comparing the market reaction to the two events for each of these groups individually, effects due to institutional changes over the five year time period are controlled.

During the five year period, the market was continuously receiving information about the financial operations of the various banks and economic activities of the borrowers. This information, and other macroeconomic events such as the recession in the world economy, could have acted as signals about the quality of assets held by banks to the market. To analyze the learning effects in the market due to the larger information set and knowledge from past experiences, a third set of hypotheses will be tested over the entire five year period for a sample of banks.

A. Tests of Announcement Effects.

The first set of two hypotheses tests whether the market recognizes the adverse information generated by the event, the public announcement of a moratorium on the debt payments by the borrower, and incorporates it into the market valuation of bank equities. It also tests the market efficiency in anticipating the events, and attempts to determine when the market impounds the information conveyed by the event by adjusting the market value of the stocks of the affected banks with exposure to Latin America.

H_{01} : New information hypothesis. The moratorium announcement conveyed a negative signal about the quality of assets held by the creditor banks, causing a downward adjustment of share prices of affected banks

H_{02} : Information leakage hypothesis. The market had information about the deterioration of the quality of bank assets even before the default announcement, and had made prior adjustments

The first hypothesis, the new information hypothesis, states that as a result of the moratorium announcement by the borrower, the inferior quality of the loan assets held by banks is revealed. The market recognizes that it has been overpricing bank equities, and will adjust bank stock prices to reflect the lower true market value. The alternative to the new information hypothesis is that the announcement did not convey a new negative signal about the quality of assets held by the creditor banks. Consequently, the share prices of bank equities were not affected by the announcement. The second hypothesis, the information leakage hypothesis (Cornell and Shapiro (1986) call this the "dribs and drabs" hypothesis), implies that the market has anticipated the deterioration in the quality of loan assets and has already impounded the information in the stock prices of the

affected banks prior to the announcement. The alternative to the information leakage hypothesis is that the market did not have any information about the deterioration of the quality of bank assets prior to the default announcement. Consequently, the market did not make any related adjustments to bank share prices prior to the announcement.

If the market for U.S. bank equities is (semi-strong form) efficient, then either the new information hypothesis or the information leakage hypothesis, or both, should hold. If the new information hypothesis holds, it implies that the average abnormal returns across the sample of banks, represented by the cross-sectional average residuals for the two-day event period are significantly negative. The abnormal return should be negative because the announcement conveys an adverse signal which the market recognizes. The market revises downward its evaluation of the bank equities based on this signal. Prior to the Mexican default announcement, the market had very little information about the magnitude of the financial problems related to external lending. The market did not anticipate the event, and thus the effect on the stock returns on the event day should be highly statistically significant. This does not rule out the information leakage hypothesis as adjustments prior to the event can still occur. The market may have been analyzing the economic and financial performance of the borrower and lenders, and may have anticipated the default.

In other words, the two hypotheses are not mutually exclusive. If both the hypotheses hold, it means that the market did adjust prior to the event, but further adjustments were made following the event.[38] If H_{02} holds while H_{01} is not supported, then the market had completely anticipated the default announcement and had made adjustments prior to the event. Hence, the announcement did not convey any new information to the market.

All the studies reviewed in Chapter IV test the new information hypothesis for the Mexican default. With the exception of Cornell and Shapiro (1986), all of them conclude that the announcement did convey new information about the quality of the banks' loan portfolio. Only Cornell and Shapiro explicitly test the information leakage hypothesis. They conclude that the market did adjust bank share prices prior to the event.

Since the Mexican crisis, the market has been continually receiving information about the financial

---

[38] This can occur under two different situations. In the first case, the market is made up of two segments. One segment of the market is aware of the events leading up to the default. Consequently, this market segment adjusts to the information conveyed by the signals. The other segment of the market is unaware of the impending default. Hence, these market participants adjust to the information only after the default. In the second case, all market participants are aware of the impending default. However, the market initially misestimates the effect of the default. Consequently, market adjustments occur both before and after the default announcement. The adjustments prior to the event are in response to the anticipated default announcement. The adjustments following the event are in response to errors made in the adjustments prior to the default.

problems of the debtor nations and the lending practices of the creditor banks. Given some awareness of the weak financial position of the Latin American borrowers, the Brazilian default announcement might not have been completely unanticipated. Hence the effect of the Brazilian default announcement on the bank stock returns should not be as strong as the earlier effect. The time-series diffusion of information about borrower defaults is likely to lead to an increased level of learning on the part of the market participants. This would imply that the market is becoming increasingly efficient in anticipating debt defaults by major third world borrowers from one crisis to the next. Eventually, other things being equal, the market should be able to better anticipate the actions of the debtor nations, thus diminishing the danger of an unanticipated crisis.

B. Tests of Contagion Effects.

The second set of hypotheses is related to the size of the stock price reaction to the moratorium announcement. It tests to detect any contagion effect in the market following the Mexican default. If there exists a contagion effect, the effects of the moratorium on the involved banks should spill over to other non-involved banks and affect them adversely.

H_{03} : Rational pricing hypothesis. The size of the share price response is related to the actual exposure of the bank to the borrower

H_{04} : Investor contagion hypothesis. The size of the share price response is not related to the actual exposure of the bank

The first hypothesis, the rational pricing hypothesis, states that the size of the share price response is related to the actual exposure of the bank to external loans. It assumes that the market is efficient and rational in impounding the information and applying it to the appropriate bank equity valuation. Banks with high exposure should experience a larger drop in share prices than banks with low exposure. The second hypothesis, the investor contagion hypothesis, states that the market reacts to the event by adjusting the stock prices of banks, but the size of the response does not reflect, in direct proportion, the exposure level of the bank. There is a contagion effect which results in the market penalizing all banks, indiscriminately, regardless of their degree of exposure.

If the rational pricing hypothesis holds, then the cumulative excess returns should be negatively related to the exposures, with the high exposure banks showing more return sensitivity compared to low exposure banks. However,

if the investor contagion hypothesis holds, the market should not behave rationally in its reaction to the adverse event. The market should penalize the bank stocks regardless of their exposure levels.[39]

While Smirlock and Kaufold (1986) find the market to be rational in repricing bank equities, Schoder and Vankudre (1987) detect the presence of contagion effects in the market for bank stocks in 1982. Bruner and Simms test explicitly and find support for the investor contagion hypothesis immediately following the event. Subsequently, the market reverts back to rational behavior and the contagion effect wears off. The market corrects this irrational behavior by adjusting the size of the stock price response to reflect the degree of exposure.

The cross-sectional diffusion of information regarding the actual levels of exposure of individual banks should move the market in the direction of increased efficiency. It should be expected that the speed with which the market overcomes the contagion effect and moves towards efficiency increases from one crisis to the next. Here again, there is

---

[39] Under certain circumstances, the two hypotheses are not mutually exclusive. If both the rational pricing hypothesis and the investor contagion hypothesis hold, then there should be both a rational pricing reaction and an investor contagion effect in the market. The contagion effect component is an adjustment in bank equity prices due to changes that affect the banking industry as a whole. All banks face a higher level of risk due to the announcement. The rational pricing component is a larger adjustment for those banks that are more exposed to the defaulting borrower.

a learning process taking place in the market. The higher levels of learning with each crisis should result in the market's being better informed and more efficient. The time period during which the market exhibits a contagion effect should be much shorter for the Brazilian debt crisis than for the Mexican debt crisis. Eventually, the potential for an event such as the debt default announcement causing loss of capital and uncertainty for an extended period of time in the banking industry will likely be diminished due to increasing market efficiencies.

C. Tests of Learning Effects.

The third set of hypotheses tests for learning effects in the market from 1982 to 1987. In August, 1982, Mexico defaulted on its debt service payments to U.S. creditor banks. In February, 1987, Brazil became the latest large Latin American borrower to default on its external loans. During the intervening period several other borrowers had defaulted on their loans to U.S. creditor banks. In addition to these events, the U.S. banking industry experienced institutional changes , partly in response to the troubles and subsequent losses generated by Third World borrower defaults. Most of the banks were forced to write-off a part of their loans or restructure them to prevent an outright default by the borrowers. To reduce their exposure to foreign loans, some of the banks sold their foreign loan

assets in the secondary loan market at a deep discount. Others increased their loan-loss reserves associated with foreign loans, recognizing the increased riskiness of such assets. During this period, the market was becoming increasingly aware of the nature and quality of assets held by the banks. The market was also receiving more information about the economic conditions in the borrower nations.

Given the larger information set available to the market participants and the knowledge about past problems faced by borrowers in servicing their debt, the following hypotheses test for any learning effects in the market as reflected by the stock market reaction to a set of events spread over a six-year period, starting from 1981 to 1987.

H_{05} : Market learning hypothesis. The size of the share price response to events related to default on debt service obligations on the part of the Third World borrowers reflects an increased level of learning by the market from one event to the next.

H_{06} : Market 'No-learning' hypothesis. The size of the share price response to events related to the default on debt service obligations on the part of the Third World borrowers does

not reflect an increased level of learning by the market from one event to the next.

The first hypothesis, the market learning hypothesis, holds that the market as a whole is changing its response to similar market events over the time period tested. With each event, the market's response is quicker. In some cases, the market is able to anticipate the event from past related events. The alternative, the 'no-learning' hypothesis, states that the market reaction to the similar events over the test period do not reflect any pattern to suggest that it has knowledge about past events. The market reaction to one or more of the events is not related to the preceding event.

2. Data and Time Periods.

The day on which a specific debtor nation announced that it will stop principal and debt service payments on its external debt is used as the event date. The Wall Street Journal reported that the Mexican announcement was made on August 19, 1982 (Thursday)[40], and the Brazilian announcement on February 20, 1987 (Friday).[41] These two days are used as the event dates for the two event studies.

---

[40] Wall Street Journal, August 20, 1982 (Friday), "Mexico Seeks to Stop Debt Principal".

[41] Wall Street Journal, February 23, 1987 (Monday), "Brazil's Debt Move Hurts Big Bank Stocks".

However, not all investors became immediately aware of events as they occurred and news about them arrive on the wire. Many investors become informed about the events only when they read about them in the print media the following day. Hence, the event period will focus on two trading days - the day of the announcement and the following trading day. Figure 1 shows the time periods for the two events. Different estimation periods and estimation intervals are used to eliminate any time-related bias in the parameter estimation process.

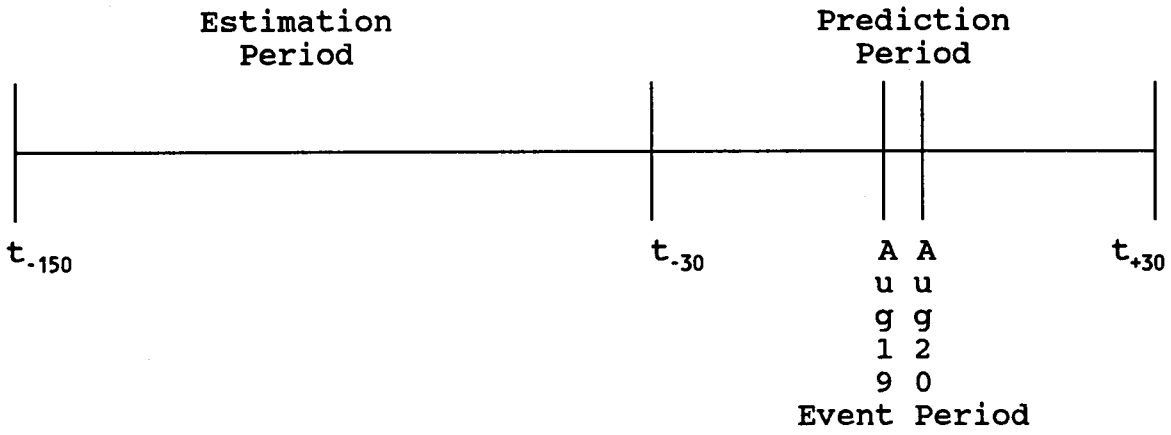
This study uses all the banking organizations listed in the Center for Research in Security Prices (CRSP) tape that are traded in the New York Stock Exchange (NYSE), the American Stock Exchange (ASE), and the Over-the-Counter (OTC) markets for which data are available. The data are screened to eliminate from the sample banks whose returns might have been affected by other contaminating events (such as acquisitions or operational irregularities) during the parameter estimation period or during the event period. The daily returns for individual bank stocks and market returns are obtained from the CRSP tapes. Estimates of loan exposures to third world borrowers are obtained from various sources including bank Securities and Exchange Commission (SEC) filings (10-K reports), Federal Deposit Insurance Corporation (FDIC) Call and Income reports, bank annual reports and the Freedom of Information Office (of the

Mexican Moratorium Announcement :

Event Date : August 19, 1982

Estimation Period : t_{-150} to t_{-30} (January 15 - July 7)

Prediction Period : t_{-30} to t_{+30} (July 8 - October 1)



Brazilian Moratorium Announcement

Event Date : February 20, 1987

Estimation Period : t_{-620} to t_{-500} (July 15 - January 2)

Prediction Period : t_{-500} to t_{+80} (January 5 - March 31)

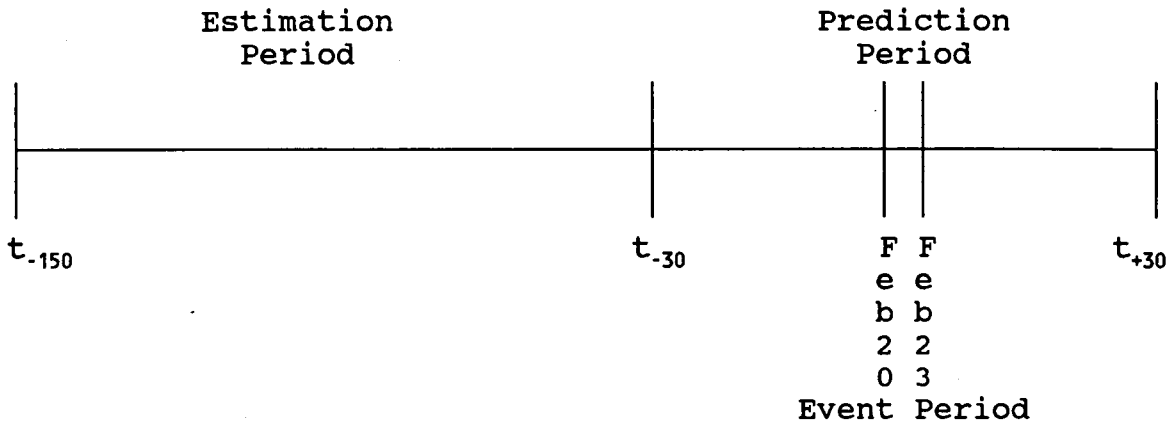


Figure 1. Estimation, Prediction and Event Periods for the Mexican and Brazilian Default Announcements

Federal Reserve Board of Governors), and checked for accuracy and consistency. Three different measures of exposure are used. The first measure of exposure of a bank to a particular country is the ratio of the external loans outstanding to that country to the total assets of the bank. The second measure of exposure of a bank to a particular country is the ratio of external loans outstanding to that country to the sum of the book value of stockholder equity and loan loss reserves of the bank. The third measure of exposure of a bank to a particular country is the ratio of external loans outstanding to that country to the market value of stockholder equity of the bank.

Tables 9 and 10 show the list of banks and their exposures to Mexico in 1982 and to Brazil in 1987, respectively. The banks are screened for inconsistent and missing return data. The sample of banking organizations used to analyze the effects of the Mexican default announcement consists of 94 banks.[42] The sample of banks used to analyze the effects of the Brazilian default announcement consists of 87 banks.[43] Initially, the entire sample of banks is used to test the various hypotheses developed in this chapter. To identify any size-related effects, the sample is divided into small, medium and large

---

[42] The sample of 94 banks consists of 54 exposed and 40 non-exposed banks.

[43] The sample of 87 banks consists of 48 exposed and 39 non-exposed banks.

TABLE 9. Selected Measures of Exposure and Balance Sheet Items of Banks in 1982 (Loans, Assets and Capital are $ million)

Bank	Mexican Loans $	Total Assets $	Total Capital $	Mex Exp[1] %	Mex Exp[2] %
Citicorp	3269.99	129997.00	5535.00	2.52	59.08
Bank of America	2500.28	122221.00	5246.89	2.05	47.65
Chase Manhattan	1688.40	80862.88	4212.81	2.09	40.08
Morgan Guaranty	1081.24	58597.02	3365.00	1.85	32.13
Manu. Hanover	1728.86	64040.52	3019.27	2.70	57.26
Chemical NY	1499.40	48274.81	2596.07	3.11	57.76
Continental Ill	694.33	42899.41	2279.12	1.62	30.46
Banker's Trust	875.49	40427.11	2023.16	2.17	43.27
Security Pacific	525.41	36999.01	1786.95	1.42	29.40
Wells Fargo	612.51	24814.00	1322.51	2.47	46.31
Marine Midland	303.94	20238.81	1144.45	1.50	26.56
Mellon	420.86	20294.40	1233.07	2.07	34.13
Irving Trust	339.64	19514.31	906.50	1.74	37.47
First Nat Boston	224.80	18267.40	1003.45	1.23	22.40
Wachovia Corp	70.59	6916.36	476.80	1.02	14.80
Texas Commerce	321.02	18217.00	987.00	1.76	32.52
Southeast Banking	90.98	7274.33	472.12	1.25	19.27
Republic of Tx	355.62	17218.31	1011.45	2.07	35.16
NBD	200.00	12406.90	826.42	1.61	24.20
Mercantile Texas	63.15	5691.33	363.00	1.11	17.40
First Int Bancorp	677.02	40884.31	2064.59	1.66	32.79
First Chicago	995.43	35876.41	1794.48	2.77	55.47
Equimark	25.04	3215.01	133.94	0.78	18.69
Bank of NY	251.75	12723.60	575.82	1.98	43.72
Republic of NY	263.64	9280.17	515.44	2.84	51.15
First PA	130.00	5432.84	283.65	2.39	45.83
Southwest Banc	6.27	247.62	15.41	2.53	40.69
First Wisconsin	91.83	4836.18	285.96	1.90	32.11
First City TX	187.12	16567.10	1007.38	1.13	18.57
Amsouth	45.02	3255.46	267.56	1.38	16.83
Virginia Comm	85.78	9471.49	606.80	0.91	14.14
NCNB	80.35	11559.50	597.05	0.70	13.46
Northern Trust	136.00	6252.73	373.27	2.18	36.43
Shawmut	57.00	5375.53	311.69	1.06	18.29
Fidelcor	19.78	4119.51	281.68	0.48	7.02
Comerica	109.00	7378.33	416.02	1.48	26.20
Centerre Bancorp	52.15	5122.50	320.78	1.02	16.26
Bancorp Hawaii	21.60	2971.29	208.39	0.73	10.37
Ameritrust	116.00	5753.47	641.85	2.02	18.07
Cullen Frost	56.74	3013.11	199.57	1.88	28.43
Fleet Financial	64.40	4535.57	266.76	1.42	24.14
First Union	55.25	6167.98	338.40	0.90	16.33
Corestates	95.00	6301.25	451.89	1.51	21.02

TABLE 9 (Continued)

Bank	Mexican Loans $	Total Assets $	Total Capital $	Mex Exp[1] %	Mex Exp[2] %
Bank of NE	63.00	5065.35	286.72	1.24	21.97
Hartford National	34.20	4127.90	217.25	0.83	15.74
Marine Corp	24.00	2340.87	140.51	1.03	17.08
Merchants Nat	25.00	1981.32	127.01	1.26	19.68
Nat City Corp	83.00	6823.42	436.09	1.22	19.03
Rainier	99.80	5864.65	403.92	1.70	24.71
PNC	193.03	7622.02	475.92	2.53	40.56
Norwest	170.00	17584.70	1162.99	0.97	14.62
Barnett Banks	0.00	6932.13	432.33	0.00	0.00
Citizens First	0.00	1655.31	129.61	0.00	0.00
Aff Bancsh-Colo	0.00	2058.18	163.26	0.00	0.00
BSD Bancorp	0.00	200.14	16.92	0.00	0.00
Banc One	0.00	5028.93	391.39	0.00	0.00
Banks of Iowa	0.00	1607.85	118.09	0.00	0.00
Central Bancorp	0.00	2838.20	190.76	0.00	0.00
Crestar	0.00	4847.71	333.71	0.00	0.00
Equitable	0.00	2457.50	168.94	0.00	0.00
First Third	0.00	1720.87	173.41	0.00	0.00
First Virginia	0.00	2016.10	163.07	0.00	0.00
Landmark Bancsh	0.00	589.12	30.25	0.00	0.00
Norstar	0.00	3652.95	316.22	0.00	0.00
Southwest	0.00	247.62	15.41	0.00	0.00
Suntrust	0.00	5004.14	333.35	0.00	0.00
La Jolla Ban	0.00	183.32	13.82	0.00	0.00
First Wyoming	0.00	644.84	59.74	0.00	0.00
James Madison	0.00	212.37	19.60	0.00	0.00
Key Corp	0.00	2794.72	222.56	0.00	0.00
Sterling	0.00	586.83	46.64	0.00	0.00
United Jersey	0.00	3232.13	168.19	0.00	0.00
Worthen Banking	0.00	1101.39	69.27	0.00	0.00
First Empire St	0.00	1944.89	155.64	0.00	0.00
First Security	0.00	4608.98	363.03	0.00	0.00
Southtrust	0.00	2441.45	165.32	0.00	0.00
Trustcorp	0.00	1708.68	173.52	0.00	0.00
Allied Bancshares	0.00	6010.63	436.34	0.00	0.00
Bancoklahoma	0.00	1526.60	97.30	0.00	0.00
Boatmen's Bancsh	0.00	2757.87	175.02	0.00	0.00
Central Bancsh	0.00	2657.52	164.65	0.00	0.00
Central Fidelty	0.00	2532.76	157.68	0.00	0.00
City National	0.00	1859.19	119.04	0.00	0.00
Colorado National	0.00	2406.37	153.66	0.00	0.00
First Alabama	0.00	3123.89	283.83	0.00	0.00
First Jersey	0.00	1440.95	92.73	0.00	0.00
First National Ci	0.00	2238.89	201.98	0.00	0.00
First Tennessee	0.00	3392.12	236.34	0.00	0.00

TABLE 9 (Continued)

Bank	Mexican Loans $	Total Assets $	Total Capital $	Mex Exp[1] %	Mex Exp[2] %
Florida National	0.00	3498.50	283.47	0.00	0.00
Huntington Bancsh	0.00	5244.86	244.53	0.00	0.00
Intrawest	0.00	3314.07	209.84	0.00	0.00
Marshall & Isley	0.00	2871.64	205.24	0.00	0.00
Meridian	0.00	2471.19	202.84	0.00	0.00
Michigan National	0.00	6504.13	391.03	0.00	0.00
Moore Financial	0.00	2361.43	179.34	0.00	0.00
Sunwest	0.00	1774.02	118.42	0.00	0.00
Texas American	0.00	4717.15	316.98	0.00	0.00
United Missouri	0.00	2718.80	184.32	0.00	0.00

[1] Exp is the ratio of Mexican $ Loans to Total Assets
[2] Exp is the ratio of Mexican $ Loans to Total Equity; Total Equity is the sum of stockholders equity and loss reserves.

Source: Various annual reports, SEC 10-K filings, Compustat and Federal Reserve Board of Governors Freedom of Information Office.

TABLE 10. Selected Measures of Exposure and Balance Sheet Items of Banks in 1986 (Loans, Assets and Capital are $ million)

Bank	Brazilian Loans $	Total Assets $	Total Capital $	Brz Exp[1] %	Brz Exp[2] %
Interfirst Dallas	94.00	17986.00	844.00	0.52	11.14
Texas Commerce	111.00	19192.00	1528.00	0.58	7.26
Republic of Texas	232.00	20944.31	1530.27	1.11	15.16
First Wisconsin	44.60	7090.20	523.08	0.63	8.53
First PA	155.80	5887.59	545.17	2.65	28.58
Mellon	267.00	34499.41	2673.10	0.77	9.99
Banco Central	33.00	19572.90	1583.39	0.17	2.08
Chase Man	2685.00	94765.81	7310.03	2.83	36.73
Citicorp	4560.00	196124.00	13446.00	2.33	33.91
Manu Hanover	2318.00	74397.38	5396.26	3.12	42.96
Bankers' Trust	849.00	56419.91	3548.45	1.50	23.93
Irving	398.00	24232.50	1476.77	1.64	26.95
Morgan Guaranty	1924.00	76039.00	6454.00	2.53	29.81
Chemical NY	1443.00	60564.12	4863.68	2.38	29.67
Marine Midland	652.00	24789.61	1846.73	2.63	35.31
Republic NY	186.00	17464.90	1243.15	1.06	14.96
Allied Bancsh	6.00	9547.06	657.58	0.06	0.91
Bank of NY	250.00	20708.91	1269.52	1.21	19.69
Southeast Bkg	144.00	12469.00	766.67	1.15	18.78
BankAmerica	2570.00	104189.00	6210.00	2.47	41.38
Security Pacific	605.00	62606.02	4132.00	0.97	14.64
Wells Fargo	543.00	44577.11	3076.70	1.22	17.65
First Int Bancorp	503.00	55421.71	3295.56	0.91	15.26
Merchants Nat	29.00	3902.35	321.68	0.74	9.02
Continental Ill	474.00	32809.01	2587.00	1.44	18.32
Northern Trust	83.00	9090.11	572.11	0.91	14.51
Mercantile Bank	99.05	6586.00	459.00	1.50	21.58
Bank of NE	82.00	22473.00	1356.00	0.36	6.05
First Nat Boston	289.80	34045.41	2153.96	0.85	13.45
National City	56.50	14107.30	1109.95	0.40	5.09
Ameritrust	64.25	11068.10	911.63	0.58	7.05
Commerce Union	28.80	3874.73	308.87	0.74	9.32
NBD	29.60	21176.00	1407.51	0.14	2.10
Norwest	186.20	21539.41	1720.20	0.86	10.82
NCNB	77.90	27472.41	1545.33	0.28	5.04
First Chicago	733.00	39148.01	3480.89	1.87	21.06
First City Tx	44.80	13681.20	852.93	0.33	5.25
Virginia Comm	50.00	9471.49	606.80	0.53	8.24
Comerica	0.01	9982.51	710.49	0.00	0.00
Corestates	0.01	14595.40	1135.79	0.00	0.00
First Union	0.01	26820.21	1846.93	0.00	0.00
Shawmut	0.00	10697.40	712.92	0.00	0.00
Huntington	0.00	7717.91	528.53	0.00	0.00

TABLE 10 (Continued)

Bank	Brazilian Loans $	Total Assets $	Total Capital $	Brz Exp[1] %	Brz Exp[2] %
Centerre	10.27	5664.52	390.35	0.18	2.63
Suntrust	20.30	26165.51	1785.03	0.08	1.14
Hartford	8.83	13879.30	859.61	0.06	1.03
Fleet Financial	0.00	11690.30	1012.83	0.00	0.00
First TN	0.00	5555.70	349.29	0.00	0.00
Equimark	0.00	2480.72	158.28	0.00	0.00
Cullen Frost	0.00	3409.65	197.19	0.00	0.00
Bancorp Hawaii	0.00	5060.02	356.68	0.00	0.00
Marine Corp	0.00	4129.78	266.54	0.00	0.00
Fidelcor	0.01	11391.70	797.48	0.00	0.00
Barnett	0.00	20228.90	1345.22	0.00	0.00
BancOne	0.00	17371.90	1456.65	0.00	0.00
Sterling	0.01	593.45	65.56	0.00	0.02
BSD	0.00	369.99	22.13	0.00	0.00
BancTexas	0.00	1028.52	16.96	0.00	0.00
Amsouth	0.00	5942.70	438.33	0.00	0.00
Valley Nat AZ	0.00	10715.50	694.27	0.00	0.00
Riggs National	0.00	6253.38	485.21	0.00	0.00
Rainier Bancorp	0.00	9216.09	636.32	0.00	0.00
Michigan National	0.00	7672.21	546.59	0.00	0.00
Texas American	0.00	5985.74	380.05	0.00	0.00
First Security	0.00	5079.57	458.20	0.00	0.00
Norstar	0.00	11132.00	944.55	0.00	0.00
Intrawest	0.00	1201.97	95.03	0.00	0.00
First Alabama	0.00	4396.63	426.47	0.00	0.00
Marshall Isley	0.00	6000.93	398.19	0.00	0.00
Central Bancsh	0.00	3777.07	256.46	0.00	0.00
Key Corp	0.00	9072.75	688.32	0.00	0.00
Boatman's Bancsh	0.00	9919.00	687.94	0.00	0.00
United Missouri	0.00	3202.60	276.10	0.00	0.00
Central Bancorp	0.00	4509.65	307.34	0.00	0.00
Central Fidelty	0.00	4137.01	320.93	0.00	0.00
Equitable	0.00	4253.99	272.99	0.00	0.00
Southtrust	0.00	5101.07	389.22	0.00	0.00
Aff Bancsh-Colo	0.00	2620.12	203.34	0.00	0.00
City National	0.00	3141.55	184.11	0.00	0.00
Sunwest	0.00	2588.64	197.50	0.00	0.00
Trustcorp	0.00	4226.97	395.04	0.00	0.00
Citizen's First	0.00	2009.33	132.40	0.00	0.00
Bancoklahoma	0.00	2674.17	125.81	0.00	0.00
First Jersey	0.00	4365.60	332.80	0.00	0.00
Landmark Bancsh	0.00	1398.87	91.26	0.00	0.00
Southwest Banc	0.00	396.37	22.60	0.00	0.00

TABLE 10 (Continued)

Bank	Brazilian Loans $	Total Assets $	Total Capital $	Brz Exp[1] %	Brz Exp[2] %
LaJolla Bancorp	0.00	333.45	25.49	0.00	0.00

[1] Exp is the ratio of Brazilian $ Loans to Total Assets
[2] Exp is the ratio of Brazilian $ Loans to Total Equity; Total Equity is the sum of stockholders equity and loss reserves.

Source: Various annual reports, SEC 10-K filings, Compustat and Federal Reserve Board of Governors Freedom of Information Office.

banks according to the size of their total assets. To identify any exposure-related effects, the sample is grouped into different portfolios of varying degrees of exposure, from no exposure to high exposure. The banks are also grouped by the stock exchange in which they are listed. Since the number of banks in the sample that are listed in the American Stock Exchange is less than five percent of the entire sample, these banks are grouped together with those listed in the New York Stock Exchange. Finally, they are also classified either as a unit of a bank-holding company or as a unit bank.

Chapter VI develops the methodology used to test the hypotheses tested in Section 1 of this chapter. This methodology is applied to each of the above sub-groups of banks to test the announcement effects, the contagion effects and the learning effects in the market.

CHAPTER VI

METHODOLOGY

1. Introduction.

This study will use the standard event study methodology originally developed by Fama, Fischer, Jensen and Roll (1969) and later modified by Fama (1976). The two sets of hypotheses developed in the previous chapter will be tested for both the Mexican and Brazilian moratoria announcements. The banks listed in Tables 9 and 10 will be grouped into portfolios based on different criteria and abnormal returns will be computed. This study will use daily stock returns of banks.

An event study is an analysis of the market response to the occurrence of a specific event through examination of security price performance around the time of the event. The event may coincide with the release of new information in the financial press which act as signals (good or bad) to the market. The event may also be a shift or change in one or more fundamental factors such as corporate structure, policy and management action, which act as a signal to the market. Events that affect the shareholder wealth and security price performance can range from minor events that impact a single firm's securities to major events that impact all firms in an economy.

In the spectrum of events, at the lowest level are minor events such as firm earnings and dividend

announcements, and introduction of new product lines. All firms that are publicly traded experience these events frequently. The market anticipates these events to occur on a timely basis. Investors assume positions in the market based on their expectations of the direction and magnitude of the event.[44] When the event does occur, the market adjusts and investors experience an increase or decrease in wealth depending on their position. These events affect the security prices of only the firm which is directly related to the information conveyed by the events. In some instances, they may also affect the security prices of the firm's close substitutes and complements.

A second level of events that occur less frequently are events such as mergers, takeovers and corporate restructuring. Such events affect not only the firm in question, but may also affect other firms in the industry as they change the market competition within the industry. Even though they do not occur at specific times, the market does expect such events based on past financial and business operations of the firm(s). In this case also, investors assume positions in the market based on their expectations

---

[44] This can be observed by examining the stock market data. Investors expecting a downward revision in stock prices will assume a short position, while investors expecting the prices to rise will try to lock in to the current prices.

of the magnitude of the event.[45] The market adjusts following the event and investors, again, experience an increase or decrease in their wealth depending on their position in the market.

At the highest level are events that are mostly unanticipated, unthinkable and atypical, which tend to have a significant impact on a large sector of the economy, with the potential to affect the whole economy. Examples of such events are the OPEC oil price increase in 1973 and the stock market decline of 1987. The oil price increase affected all sectors of the economy through higher energy prices. The stock market decline resulted in the lowering of most equity values and affected capital accessibility for many firms. The Latin American debt crises resulting from the moratoria announcements by borrowers can also be classified in this group of events due to the magnitude of their effect and their potential for seriously affecting the banking industry.

The objective of an event study is to examine whether there are any excess or abnormal returns earned by shareholders accompanying the event. The abnormal return is the difference between the observed return and normal return generated by the model employed. The event study is a direct test of market efficiency. In an efficient market,

---

[45] The disclosure rules make it possible for the market to identify acquirers and takeover candidates before the consolidation of the firms.

stock prices adjust quickly and rationally to reflect fully any new information. Systematic non-zero abnormal returns which persist for an extended period of time following the event are inconsistent with the principle of market efficiency as it implies that the market does not rapidly react to the information.

In this event study, the abnormal returns to shareholders around the time of the Mexican and Brazilian moratoria announcements are analyzed to identify and measure the announcement effects. The exact time period during which the market adjusts to the announcement, that is, during the time period when the effects of the event continue to persist, is also analyzed to support (or reject) the various hypotheses that are tested. One problem with this and many other event studies is the specification of the event date. It is difficult to identify a certain point in time or a certain occurrence as the one single 'event' that affects the normal security returns of firms. Information related to the affected firms and the event are continually arriving in the market. For example, in the case of the Mexican default announcement of August 19, 1982, several things happened in the two months prior to the default which indicated Mexico's problems in repaying the loans. Mexico was trying to arrange a special loan through the IMF to meet its budget shortfall. The Mexican economy was not in a position to handle the huge budget deficits,

and the loan was necessary to stimulate the economy. Also, the Mexican foreign exchange markets were closed for an extended period of time following the devaluation of the Mexican peso. All these individual instances may have conveyed the information about the quality of bank loan assets and may have impacted the bank security returns. Any one of these may also be considered as 'the event'. However, in this study, the actual day on which the borrower announced the default is used as the event date. Prior and post time periods are analyzed to detect leakage of information through these minor events around the announcement.

An important aspect of the event study methodology is the computation of abnormal returns for a portfolio of stocks that are affected by the event and comparison of them with the abnormal returns of another portfolio of similar stocks, called the 'control group'. Ideally, the stocks in the control group should have the same risk as the stocks in the test portfolio, and should not be affected by the event. In the current event study, it is difficult to form such a control group. The securities of over 150 banks are traded in the NYSE, ASE and OTC markets. The size of these banks (Total Assets) range from a few million dollars in the case of small regional banks, to a few billion in the case of large money center banks (Tables 9 and 10). Almost all of the larger banks were affected by the moratoria as they were

actively involved in lending to LDCs. Many of the smaller banks were also exposed to LDCs through indirect lending in the form of syndicates, consortia and deposits in large banks.[9] Given the large range in the size of the banks and the smallness of the few banks that were not involved in international lending, it is impossible to form a 'true' control group that has characteristics similar to the group of exposed banks. Due to the lack of a better alternative, this study will use a control group made of banks without exposure to foreign loans, even though the problem of size remains.

2. Model.

A. Background.

In order to measure the abnormal returns of a security, the model generating the normal returns has to be specified. This model will be used to generate the ex ante expected returns during the event test period. The abnormal return (e_{it}) of a security i for a time period t is the difference between the observed ex post return (r_{it}) at time t and the ex ante expected return (r_{it}) generated by the model,

$$e_{it} = r_{it} - E(r_{it}) \qquad (1)$$

Standard event studies use one of the three different models described below to generate the ex ante expected returns [Brown and Warner (1980)].

(i) Mean Adjusted Returns.[46]

This model assumes that the ex ante expected return for a security i is a constant K_i, which varies across securities.

$$E(r_{it}) = K_i \qquad (2)$$

The model does not account for shifts in market factors and the sensitivity of the individual security's returns to the market return.

(ii) Market Adjusted Returns.[47]

This model holds that the ex ante expected returns are equal across securities, but not necessarily constant over time.

$$E(r_{it}) = E(r_{mt}) = K_t \qquad (3)$$

for any security i during time period t; where $E(r_{mt})$ is the expected return on the market at time t. In this return generating model, the abnormal return is expressed as

$$e_{it} = r_{it} - E(r_{mt}) \qquad (4)$$

The market adjusted returns model accounts for market wide movements that occur during the test period. These market wide movements affect the prices of all securities, including the stocks that are tested in the event study.

(iii) Market and Risk Adjusted Returns.[48]

This return generating model accounts for shifts in

---

[46] Brown and Warner (1980), p.207.

[47] Ibid, p.208.

[48] Ibid, p.208 and Black (1972)

both the market wide factors and the systematic risk of individual securities. The formulation of this model is similar to the Capital Asset Pricing Model:

$$E(r_{it}) = E(r_{pt}) + \beta[E(r_{mt}) - E(r_{pt})] = K_{it} \quad (5)$$

where β is a measure of the systematic risk of security i, $E(r_{pt})$ is the expected return on a minimum variance portfolio of risky assets, and $E(r_{pt})$ and $E(r_{mt})$ are uncorrelated.

Brown and Warner(1985) suggest that there is little difference in the explanatory power of the three alternative returns generating model.[49] In event studies, the market and risk-adjusted returns generating model is commonly used. By accounting for the individual security's systematic risk as well as shifts in the market wide factors, the explanatory power of the tests using this model are slightly higher than the first two. Hence, a version of this return generating model is used in this study.

B. The Market Model.

The market model, which is described in Fama (1976), is used in this study. This form of the market and risk adjusted returns generating model can be expressed as

$$E(r_{it}) = \alpha_i + \beta_i E(r_{mt}) + \epsilon_{it} \quad (6)$$

where r_{it} is the return for security i on day t,

[49] Brown and Warner (1985) show that the increase in power of the tests using the market and risk adjusted returns generating model is not statistically significant.

r_{mt} is the return for the market on day t,

α_i and β_i are firm specific parameters,

ϵ_{it} is the white noise disturbance term, and

the joint distribution of r_{it} and r_{mt} is bivariate normal.

This implies that under Ordinary Least Squares Estimation, the following conditions hold:

(i) ϵ_{it} is normally distributed

(ii) ϵ_{it} has a mean value of zero, $E(\epsilon_{it})=0$

(iii) $Var(\epsilon_{it})=\sigma^2(\epsilon_{it})$

(iv) The disturbance terms are cross-sectionally independent, $Cov(\epsilon_{it},\epsilon_{jt})=0$

(v) r_{mt} is non-stochastic, $Cov(\epsilon_{it},r_{mt})=0$

The slope coefficient β_i is the risk of security i measured relative to the risk of the market portfolio. The effects of shifts in market wide factors on individual securities are captured by β_i, while the effects of firm specific information shows up in the disturbance term ϵ_{it}. By analyzing both ϵ_{it} and β_i, this model separates the effects of firm specific events on security prices from the effects of market wide factors that impact all securities.

The estimated form of equation (6) that is used in empirical studies is

$$r_{it} = a_i + b_i r_{mt} + e_{it} \qquad (7)$$

where a_i and b_i are unbiased regression coefficient estimators of α_i and β_i.

An alternative version of the market model incorporates the risk-free rate of return, r_{ft}. Instead of regressing raw security and market returns, the security returns adjusted for the prevailing risk-free rate are regressed against the excess market return (the difference between the market and risk-free returns).

$$(r_{it} - r_{ft}) = a_i + b_i(r_{mt} - r_{ft}) + e_{it} \quad (8)$$

The raw-returns market model given by equation (7) is used more commonly in event studies than the excess-returns market model in equation (8). Cornell and Shapiro (1986) obtain similar results using both versions of the model. Hence, this study will use the raw-retuns market model to test the hypotheses.

C. The Event Study.

The abnormal returns around the time of an event are computed using a three stage process.

(i) Parameter Estimation.

In the first stage, the raw-returns market model in equation (7) is used to estimate the parameters a_i and b_i over a prior period. It involves the selection of a sufficiently large prior period during which no major events have occurred that could bias the estimates of the parameters. The period should also be sufficiently near the event period so that there is no major change in the nature

of the systematic risk of the bank. This study will use at first an estimation period of 120 days, beginning 150 days before the announcement date and ending 30 days before the announcement date.

Blume (1968) and Fischer (1970), among others, have found that over long time periods, the parameters of a returns generating model tend to shift. While there are no standard estimation periods, this study uses two additional estimation intervals to eliminate any time related bias. A second estimation period of 120 days starting from 270 days before the event to 150 days before the event, and a third estimation period of 240 days starting from 270 days before the event to 30 days before the event are also used.

Holthausen and Leftwich (1986) use an estimation period that follows the event. In their study of stock price reaction to bond rating changes, they use a 300-day estimation period, starting 60 days after the event. Parameters estimated using an estimation period after the event would not be appropriate for testing the information content of the event in our study, as they would reflect information impounded by the market at the time of the event. Such parameters are misspecified when capital structure changes are involved, causing the systematic risk of the firms to change, and tests based on them may lead to erroneous conclusions.

A possible source of misspecification in the estimation

of the parameters a_i and b_i using daily security prices is the non-synchronous trading of the securities during the estimation period. Non-synchronous trading is a serious problem in thinly traded stocks, especially those securities listed in the OTC markets. It refers to the problem of securities not being traded continuously. The reported closing prices of securities may not be the actual closing prices on a trading day. In such cases, the return data for stocks are inaccurate. This results in the violation of the normality assumption. The OLS estimators of the slope coefficients are biased and inconsistent. The bias is downward, and tests using these parameters are of relatively less power when the estimators are imprecise [Brown and Warner (1985), Scholes and Williams (1977) and Dimson (1979)]. Non-synchronous trading is not a problem when the stock is actively traded in the market.

Dimson (1979) describes a technique that corrects the misspecification of the parameters due to non-synchronous trading. The Dimson Aggregated Coefficients method for estimating the parameters involves regressing the security returns against lagged, coincident and leading market terms, and aggregating the coefficients obtained from the regressions. The resulting parameter estimators are unbiased and consistent.

A different procedure for correcting the non-synchronous trading problem has been provided by Scholes and

Williams (1977). They suggest regressing the daily stock returns against coincident, leading and lagging market returns separately. The resulting slope coefficients are averaged and divided by a function of the autocorrelation between the market returns to obtain a consistent estimator of the slope coefficient.

Non-synchronous trading was not a severe problem with the bank stocks listed in Tables 9 and 10. The volume of trade and and closing prices of the bank stocks were observed on several randomly selected consecutive days during the estimation period. Most bank stocks were widely held and actively traded. Hence, the correction procedures described above were not used in this study.

(ii) Prediction.

The second step in the process of computing abnormal returns is estimating the normal returns during the prediction period and comparing them with the observed returns. The parameter estimates extracted from the models in equations (7) and (8) during the estimation period are used to predict the normal returns during the prediction period. It is assumed that the parameters do not change significantly from the estimation period to the prediction period.

The prediction period is the time around the announcement or event date, when the event is expected to

affect security price performance. The prediction interval should be large enough to capture all the effects. In this study, the conventional 60-day prediction period is used -- 30 days before and 30 days after the event. It is hypothesized that all the effects occur during this prediction period.

The event day is the focal point of the prediction period. The release of new information on the event day causes the security price performance to vary from that predicted by the return generating model. Deshpande and Philippatos (1988) suggest that a two-day event period is a more accurate measure of the information content of an event than a single day event period (the announcement day). While institutional investors are aware of almost all events as they occur, outside investors are likely to receive the information only with a lag, and are unable to act on it until the following day, when it is published in the financial press. Hence, to capture the complete impact of the event, a two day event period $[t^0,t^1]$ is also used.

Figure 1 shows the estimation, prediction and event periods for the two events that are analyzed in this study.

The normal or expected ex ante daily returns for the prediction period are computed by substituting the parameter estimates a_i and b_i in equations (7) and (8). From equations (1), (7) and (8), the abnormal or excess returns (the difference between the ex ante expected return and the

ex post observed return) are expressed as

$$e_{it} = R_{it} - (a_i + b_i r_{mt}) \qquad (9)$$

$$e_{it} = (R_{it} - r_{ft}) - [a_i + b_i(r_{mt} - r_{ft})] \qquad (10)$$

To test the announcement and contagion effects, the daily excess returns are cross-sectionally averaged over the whole sample and the various subsamples. The average residual for day t is the arithmetic mean of the excess returns of the securities in the subgroup, and is computed by equation (11).

$$AR_t = [1/N] \sum_{i=1}^{N} e_{it} \; ; \qquad (11)$$

where N is the size of the sample (or subgroup). Tests of significance are conducted on the average residuals for each day around the event date to detect any significant market reaction to the event. The cumulative average residuals over different time intervals are also computed and tested for significant market reaction. The pre-announcement prediction period spans over the 30 days prior to the announcement date, and the post-announcement period over the 30 days following the announcement. Various intervals of different lengths, beginning on each day of the pre and post-announcement periods, are formed. The average residuals for each day of the interval are cumulated to obtain the cumulative average residual for that interval.

$$CAR_{pq} = \sum_{t} AR_t \; ; \qquad (12)$$

where CAR is the cumulative average residuals, and , p and q are the beginning and end of the interval.

In addition to the above tests of residuals, a test to measure the market's ability to discriminate among banks by the degree of exposure is also used. Individual bank raw returns and cumulative raw returns are regressed against the bank's exposure to the defaulting borrower. This test confirms the presence of a contagion effect in the market following the announcement. By running a series of regressions, the exact time when the market reverts back to pricing securities rationally is determined.

Each individual bank's raw returns and cumulative raw returns are regressed against the bank's exposure to the borrower. This is repeated for different time intervals during the post-announcement period. Thirty time intervals, each starting on the announcement day, are formed, and the returns are cumulated by

$$CR_{im} = \sum_{t=0}^{m} R_{it} \; ; \qquad (12)$$

where CR_{im} is the cumulative returns for the interval from the announcement day to day m. The series of 30 regressions in equation (13) are applied to each subgroup of exposed banks.

$$CR_{im} = a^1 + b^1(EXP_i); \qquad (13)$$

$$m = 1,...30,$$

$$i = 1,...n,$$

where EXP_i is the exposure of the bank to the borrower, and n is the number of banks in the subgroup.

(iii) Significance Testing.

The tests of average residuals and exposure regression coefficients are first conducted on all the banks in Tables 9 and 10. The banks are then disaggregated into exposed and non-exposed banks, and the tests are repeated for the subgroups. The exposed banks are disaggregated into two groups (of high and low exposure) above and below the median exposure value. Again, the tests are repeated for these subgroups. The above procedure is followed for the Mexican and Brazilian default event studies individually and the results are reported.

(a) Market Index.

The estimation and prediction models use r_{mt}, the market return on day t. The market return is the return on a well-diversified portfolio of securities. This study will use the CRSP value-weighted index to compute the return on the market for each trading day. The value-weighted index was selected over the equally-weighted index as the market value of the banks included in the sample had a wide range. While the equally-weighted index is constructed under the assumption that all firms have an equal contribution to the market portfolio, the value-weighted index is constructed under the assumption that each firm's contribution to the market portfolio is proportional to its market value. Further, Brown and Warner (1980) find that the equally-

weighted index is only slightly better than the value-weighted index in detecting abnormal performance.

(b) Missing Data.

In many instances, the security return data for one or more trading days are missing. There are three different approaches that have been used extensively in the event study literature to deal with this problem. The naive approach is to remove from the sample securities whose returns are missing. A more sophisticated approach is to assume that the security prices do not change on the days when the return data are missing. Hence, the return on these days are assumed to be zero. An alternative approach is to average the succeeding period return over the missing and succeeding period. In this study, when missing return data are encountered for only short periods of time, the succeeding period return is averaged over the missing and succeeding periods. However, if the return data are missing for longer periods (more than four consecutive trading days), the bank is removed from the sample.

(c) Clustering Effects.

The standard tests of significance cannot be applied to this event study due to the problem of clustering, that is, the simultaneous or close spacing of events. Clustering of event dates occurs when a single event causes a simultaneous

impact on several stock returns, or when the events take place close to one another in calendar time. In this study, a single event (the moratorium announcement by the borrower) is hypothesized to have a simultaneous effect on many or all the bank securities in the sample. Hence, the events are clustered in calendar time.

Clustering results in the violation of the cross-sectional independence assumption about the error term in the market model. A direct result of this is the lowering of the power of the t-tests as the variance of the excess returns is higher due to the correlation across the securities. It has a tendency to find significant abnormal returns even when there are none. Brown and Warner (1985) find that cross-sectional dependence accounts for a substantial portion of the rejection of the null hypothesis. They suggest a technique that incorporates the cross-sectional dependence to correct the errors caused by the clustering effect.

The Crude Dependence Adjustment accounts for the cross-sectional correlation by using a prior period to estimate the standard deviation of the performance measures on the event date and the days around the event for which the tests are conducted.[50] The test statistic for measuring the

---

[50] An alternative procedure used to correct the clustering problem is the Jaffe-Mandelker portfolio approach. Portfolios of securities affected by the event during a particular period in calendar time are formed. The performance measures of each portfolio are estimated. The

performance on day t is given by

$$\frac{AR_t}{[(q-p)^{-1}\{\sum_{i=1}^{N}(N^{-1}\Sigma e_{it} - e)^2\}]^{1/2}} \quad ; \qquad (14)$$

$$e = N^{-1}(q-p)^{-1}[\sum_{t=p}^{q}\sum_{i=1}^{N} e_{it}]$$

where, the numerator is equal to the average residuals or average excess returns for the N securities in the sample on day t; and, [p,q] is the prior period during which the standard deviation is estimated. To test the performance of the cumulative average residuals, the numerator of the test statistic is replaced by the cumulative of the average excess returns, and the denominator is divided by the square root of the number of days over which the numerator is cumulated. This is given by

$$\frac{CAR_{t-s}}{(s-t)^{1/2}[(q-p)^{-1}\{\sum_{i=1}^{N}(N^{-1}\Sigma e_{it} - e)^2\}]^{1/2}} \quad ; \quad (15)$$

$$e = N^{-1}(q-p)^{-1}[\sum_{t=p}^{q}\sum_{i=1}^{N} e_{it}]$$

3. Alternative Models.

Kalay and Loewenstein (1985), DeJong and Collins (1985), and Fischer and Kamin (1985), among others, have suggested that there is a tendency for the beta to change

---

residuals (the average of the residuals in each portfolio) are standardized to have the same variance.

around the event period due to the increased volatility associated with the event. Larker, Gordon and Pinches (1980), argue that the cumulative average residuals methodology may not be appropriate due to the bias resulting from the changes in beta and violation of the non-autocorrelation assumption. They show that using Intervention Analysis would rectify the problem by separating risk changes from information content. Alternatively, Fischer and Kamin (1985) propose the use of a specific form of Kalman filters that take care of both the random changes in beta and the heteroskedasticity of the residuals. The Intervention Analysis described below will be used to determine if there is any bias in computing the abnormal returns.

A. Intervention Analysis.

The Cumulative Average Residuals methodology described in the previous section estimates the parameters of the market model for a prior time period, and uses these estimates to compute the residuals during the event period. DeJong and Collins (1985), Hays and Upton (1985) and Bar-Yosef and Brown (1977) find that the systematic risk of a firm changes during the event period. Kalay and Loewenstein (1985) find that the volatility of returns and risk characteristics of a firm increase dramatically around any event affecting the firm. They find this to be true for

both anticipated and unanticipated events, regardless of whether the event affects the firm adversely or favorably. They argue that the traditionally measured excess returns over an event period could be merely the higher compensation that risk averse investors demand to hold the asset over the risky event period, and do not necessarily represent economic profits. When the systematic risk of a firm changes over the event period, the cumulative average residual methodology will yield biased results. Drawing inferences about market efficiency based on these biased results may not be appropriate. Born and Anderson (1986) find that shifts in the systematic risk for the banking industry did occur in 1982, and that the shifts were centered around the Mexican default announcement. Hence, computation of abnormal returns using residual analysis introduces a bias.

Larker, Gordon and Pinches (1980) have developed a model based on the work by Box and Tiao (1975), which separates risk changes from the information content of an event. This model, also known as Intervention Analysis or dummy variable regression, improves the estimates of the parameters by removing the autocorrelation of the residuals. Chen and Sanger (1985) suggest that intervention analysis is appropriate when there is reason to believe that the economic event may have caused or is accompanied by a change in the stochastic process that generates the security

returns. The model uses a series of dummy variables that capture shifts in both the intercept and slope coefficients. The model can be expressed as

$$R_{it} = a_1 + b_1R_{mt}E[t^e,t^-] + b_2R_{mt}E[t^-,t^o] + b_3R_{mt}E[t^o,t^+] + c_1E[t^-,t^o] + c_2E[t^o,t^+] + u_{it};$$

where R_{it} = return on a security i for time period t;

R_{mt} = return on a market portfolio for time period t;

a_1 = a constant;

b_1 = systematic risk of the firm during a prior time period;

b_2 = systematic risk of the firm during the pre-announcement period;

b_3 = systematic risk of the firm during the post-announcement period;

c_1 = coefficient specifying the information content during the pre-announcement period;

c_2 = coefficient specifying the information content during the post-announcement period;

u_{it} = noise component;

t^o = is the event time;

$[t^e,t^-]$ is the estimation period;

$[t^-,t^o]$ is the pre-announcement period;

$[t^o,t^+]$ is the post-announcement period; and

E is the intervention variable. Here,

$E[t^e,t^-] = \{ 1 \text{ if } t^e<t<t^- \text{ ; } 0 \text{ otherwise } \}$;

$E[t^-,t^o]$ = { 1 if $t^- < t < t^o$; 0 otherwise } ; and

$E[t^o,t^+]$ = { 1 if $t^o < t < t^+$; 0 otherwise } .

The noise component u_{it} can be modeled to remove any auto-correlation of the residuals.

In this model, the coefficients b_1, b_2 and b_3 are associated solely with the changes in the systematic risk while the coefficients c_1 and c_2 are associated solely with the information content of the event. The coefficients can be tested for statistical significance. Since we suspect that the systematic risk of a firm may not be stationary during an event, we should find that the coefficients b_1, b_2 and b_3 are not the same. If the new information hypothesis holds, then we should find that c_1 is equal to zero and c_2 is negative. If the information leakage hypothesis holds, then c_1 should be negative and c_2 equal to zero. If both c_1 and c_2 are equal to zero, then the announcement is a non-event. If both c_1 and c_2 are negative and statistically significant, then there is support for both hypotheses.

The results from the Intervention Analysis can be used to verify the conclusions from the cumulative average residuals methodology. If the results are different, the cumulative average residuals methodology will have to be modified to make them consistent with the results of the Intervention Analysis.

4. Research Design.

A. Test for Announcement and Contagion Effects.

As described in Section 2.C.ii above, the daily excess returns are cross-sectionally averaged over the entire sample of banks and sub-groups of the sample. The cumulative average residuals over different time intervals around the events are also computed. Tests of significance are conducted on both the daily excess returns and cumulative average residuals. The sign, size and significance of the excess returns are analyzed to detect any announcement and contagion effects associated with the event.

If the new information hypothesis holds, then the average residuals of the excess returns for the event day and the cumulative average residuals for the interval starting on the event day should be significant. If there are no significant excess returns on or after the event day, we would infer that the market had already anticipated the deterioration of the quality of the loan assets and the market prices of the bank stocks reflect this information. Hence, the cumulative average residuals for the intervals prior to the event period will be significant, indicating that the information leakage hypothesis holds in this case.

B. Test of Differences in Stock Returns for Exposed versus Non-exposed Banks.

To test for differences in stock returns of exposed and non-exposed banks, the individual bank returns are regressed against the market return and exposure of the banks to the defaulting country around the default announcements. The exposure variable is expressed both in terms of the actual exposure and a binary variable for exposed and non-exposed banks. The model used for this regression analysis is expressed as

$$R_{it} = a + bR_{mt} + cEXP_i$$

$$R_{it} = a + bR_{mt} + cDEXP_i$$

where R_{it} is the return on stock i on day t,

R_{mt} is the return on the value-weighted index on day t,

EXP_i is the exposure of bank i to the defaulting country,

$DEXP_i$ is a binary variable equal to 1 if bank i has exposure to the defaulting country and 0 if otherwise, and,

a, b and c are regression coefficients.

If the market is able to distinguish between exposed and non-exposed banks, the exposure coefficient c should be significantly negative on any day when events having an adverse effect on the exposed group of banks occur. If the coefficient is significantly positive on those days, we

would conclude that the market is irrational in assimilating information concerning exposed and non-exposed banks. If the coefficient is not different from zero, we would conclude that the market did not distinguish between exposed and non-exposed banks.

The regression tests are conducted using both the market and book values of equity while measuring exposure.

Finally, to test for exposure versus non-exposure effects, the following regression model is tested over different time-periods following the default announcement.

$$CR_{im} = a + b(EXP_{i}) \ ;$$

where CR_{im} is the cumulative returns for bank i over the time interval from day 0 to day m following the default announcement. This study analyzes cumulative returns for up to 30 days following the default.

If the investor contagion hypothesis holds, then the market will not be able to price the securities correctly based on the degree of exposure of the bank. If this is true, the coefficient of the exposure variable in the above equation, b, will not be significant. If the rational pricing hypothesis holds, then b will be negative and significant, with large exposure-banks showing more return sensitivity than small and no-exposure banks.

C. Methodology for Analysis of Sub-Events.

The default announcements by Mexico in 1982 and Brazil in 1987 were preceded by several other minor events that indicated the problems faced by Mexico and Brazil in servicing their debts to foreign lenders. One or more of these sub-events may have affected the valuation of bank equities prior to the default announcements. To identify any such anticipations, the abnormal returns of the sample of all banks and different subsamples of banks for a prediction period of 500 days before the event and 80 days following the event are computed. The standard residual methodology discussed in Section 2.B is used to compute the excess returns of the various groups of banks.

The dates on which any report about the quality of the external loan assets held by U.S. banks were published in the Wall Street Journal during the 580-day prediction periods are identified using the Wall Street Journal Index. These dates are cross-matched with the excess returns for the different sub-groups of banks to isolate those days during which both reports about the deteriorating quality of bank loans to Third World countries were published in the Wall Street Journal, and one or more bank groups experienced statistically significant excess returns.

A multivariate regression model of the following form is used to analyze the effect of these events on the bank returns.

$$R_{it} = a_i + b_i R_{mt} + c_{ik} D_{kt} \ ;$$

where R_{it} is the return on bank i on day t,

R_{mt} is the market return on day t,

D_{kt} is a series of binary indicator variables, and

a, b and c are regression coefficients.

Each sub-event is represented by an indicator variable with a value of 1 for the day of the sub-event and 0 for the remaining days. The multivariate regression model is run for each sub-group of banks.

Intervention Analysis, described in Section 3.A, is also used to test the reaction of the various sub-groups of banks to these sub-events.

D. Methodology for Comparison of Events.

(i) Excess Returns.

To juxtapose the market reaction to the default announcement by Mexico in 1982 with the default announcement by Brazil in 1987, the excess returns for the various sub-groups of banks are directly compared. The event period (t^0, t^{+1}) excess returns for the two events are compared to identify any differences in the market response to the two similar events. The cumulative returns over different time intervals before and after the two events are also compared.

(ii) Matched Pairs Design.

To eliminate any bias due to differences in sample sizes for the two events and different banks being included in the samples used to analyze the two events, a sub-set of banks that is common to both event periods is formed. Excess returns for this group of banks as well as sub-groups based on loan exposure, exchange membership and size are computed and compared for the two events.

E. Test for Learning in the Market from the Mexican Default of 1982 to the Brazilian Default of 1987.

Since August of 1982, when Mexico became the first major borrower to default on its borrowing from U.S. creditor banks, the market has been continuously monitoring the activities of both the Third world borrowers and the creditor banks. By the time of the Brazilian debt default of 1987, many other Third World borrowers had either defaulted or restructured their debts to creditor banks. In the intervening period several new initiatives were undertaken by the lenders, the borrowers and the international monetary authorities to solve the problems posed by the Third World debt crisis. The financial press started reporting more frequently about the difficulties faced by the borrowers in servicing their external debt and the deteriorating quality of the loan assets held by the creditor banks. In the meantime, a secondary-loan market in

which banks and other investors traded external loans at a discount also developed.

To test for learning in the market from 1981 to 1987 with respect to the quality of loan assets held by U.S. banks and its consequences for capital adequacy on the part of the banks, several major economic events during the six year period are identified. These are events that are directly related to the default announcements by borrowers and announcements by one or more affected groups regarding steps taken to lessen the debt problem. A sub-set of banks common to all the events is selected. All banks for which returns are available during the entire six-year period are included in this group of banks. The excess returns for the event day and two-day event period are computed for each event. A 120-day estimation period starting 150 days before the event and ending 30 days before the event is used. The excess returns are computed as described in Section 2.B. The sign, size and significance of the excess returns for the series of events are analyzed to find out if the market reacts in a similar way for each of the events over the six year period.

If the market reacts in a similar way to each of the series of events, it implies that the market does not appear to learn from related events in the past. On the other hand, if the market reaction to the events changes over time, and, the market becomes increasingly aware of the

quality of loan assets held by creditor banks and is able to anticipate adverse events, it implies that there is evidence of learning in the market.

A multivariate regression model of the form

$$R_{it} = a + b\ R_{mt} + c\ D_{ik}$$

is also used to estimate the regression coefficients associated with each of the events. The sign, size and significance of the regression coefficients for the series of events are analyzed, and their consistency with the results from the standard residual analysis is checked.

5. Summary.

This chapter described the methodology used to test the hypotheses in Chapter V. The standard event study methodology is used to measure abnormal returns for bank stocks. The basis for this methodology, as described in the Finance literature, is reviewed. An alternative methodology, Intervention Analysis, used to confirm the results from standard residual methodology, is also described. Finally, the specific research design used to test the various hypotheses is explained. The empirical findings of these tests are detailed in the next chapter.

CHAPTER VII

EMPIRICAL FINDINGS

In this chapter, the empirical findings of the regression analysis and average residuals tests on the population of banks shown in Tables 9 and 10 are reported. The announcement and contagion effects of the Mexican and Brazilian moratoria announcements are analyzed through tests of the new information hypothesis and the rational pricing hypothesis (and their alternatives). First, the two events are analyzed individually. The market reaction to the two announcements around the time of the event are determined separately. Regression tests are also conducted to test the relationship between bank stock returns and bank exposure to the borrower. The announcement effects and the market response to the two events are also compared and contrasted. Regression analysis is used to analyze several sub-events leading up to the default announcements by Mexico and Brazil. The two similar, sequential events are separated by a five year period. In the intra-event period, several other smaller borrowers had faced difficulties in servicing their debt to U.S. banks. In this period, the market could have experienced an increased level of learning and its response to the latter event could have been different from the former. Several sub-events during the five years between the two events are also analyzed.

I. Mexican Moratorium Announcement.

A. Bank Characteristics.

The population of banks for which all the relevant data are available is used to analyze the reaction of banks stock prices to the Mexican moratorium announcement and events leading up to and following it. Table 11 shows the characteristics of the banks that are used for analyzing the Mexican default announcement. The initial sample consists of 94 banks, 45 of which are listed in the NYSE/AMEX and 49 in the NASDAQ. The banks vary in total asset size from $247.62 million to $129.99 billion. The average size of the total asset was $13.04 billion and average equity was $698.82 million. The 45 NYSE/AMEX banks had an average size of $23.34 billion in total assets and $1,195.99 million in equity. The corresponding numbers for the 49 NASDAQ banks are $3.58 billion and $242.23 million. No distinction is made between NYSE and AMEX bank stocks as the number of banks in the sample that are listed in AMEX is too small to make any meaningful inferences. 54 of the banks in the initial sample had loans outstanding to Mexico at the time of the default. The remaining 40 banks were mostly regional banks without any direct exposure to Mexico. The exposed banks had an average total asset of $19.92 billion and equity of $1,034.75 million, while the non-exposed banks had an average total asset of $2.9 billion and equity of $203.75

Table 11. Characteristics of Banks in the Sample Used for the Mexican Event (Minimum, Maximum and Average Values are in $ million)

Sub-Group	Number of Banks	Minimum Value	Maximum Value	Average Value
		Total Assets		
All Banks	94	247.62	129997.00	13040.26
Exposed Banks	54	247.62	129997.00	19920.90
Non-Exp Banks	40	586.83	6932.13	2900.38
NYSE Banks	45	586.83	129997.00	23342.86
OTC Banks	49	247.62	7622.02	3578.69
BHC Banks	56	586.83	129997.00	16413.00
Non-BHC Banks	38	247.62	19514.31	6588.98
Small Banks	47	247.62	4847.71	2598.91
Medium Banks	21	5004.14	9471.49	6412.94
Large Banks	26	10028.45	129997.00	38196.93
		Equity		
All Banks	94	15.41	5535.00	698.82
Exposed Banks	54	15.41	5535.00	1034.75
Non-Exp Banks	40	30.25	436.34	203.75
NYSE Banks	45	46.64	5535.00	1195.99
OTC Banks	49	15.41	641.85	242.23
BHC Banks	56	30.25	5535.00	854.40
Non-BHC Banks	38	15.41	1162.99	408.86
Small Banks	47	15.41	333.71	178.81
Medium Banks	21	244.53	606.80	407.72
Large Banks	26	457.70	5535.00	1914.27

million. The exposed banks had a mean exposure of 30.01 percent of the banks' capital. The 54 exposed banks were divided into two groups of (26) high exposure and (28) low exposure banks along the mean exposure level. A distinction was also made between bank-holding companies (BHCs) and non-bank-holding companies (non-BHCs). The sample of 94 banks contained 56 BHCs and 38 non-BHCs. The BHCs had an average total asset size of $16.41 billion and average equity of $854.40 million. The corresponding numbers for the non-BHCs are $6.59 billion and $408.86 million.

B. Regression Analysis.

In order to test for differences in stock returns of exposed and non-exposed banks, the individual bank returns are regressed against the market return and exposure of the banks to Mexico.[51] The exposure variable is expressed both in terms of the actual exposure and a binary variable for exposed and non-exposed banks. Table 12 uses a binary variable for exposure, where the exposure variable is equal to 1 for exposed banks and 0 for non-exposed banks. The regression coefficients for ten days before and after the Mexican moratorium announcement are shown in the table. The

[51] In this study we report the results using only one measure of exposure -- dollar amount of loans outstanding to the borrower as a fraction of the book value of equity. The results using other measures of exposure are similar to the reported results.

Table 12. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Mexican Moratorium Announcement Using Binary Exposure Variables

Time Relative to Event Day	Intercept	Market Return	D[a]
t-10	-0.0117 (-0.66)	-0.7777 (-0.37)	0.0017 (0.61)
t-9	0.0200 (0.65)	2.4434 (0.85)	-0.0021 (-0.47)
t-8	-0.0170* (-2.20)	-0.6023 (-1.04)	0.0051 (1.18)
t-7	-0.0067* (-2.01)	-4.6998* (-1.66)	-0.0010 (-0.37)
t-6	-0.0118 (-0.90)	-3.0614 (-0.85)	-0.0016 (-0.52)
t-5	-0.0096 (-1.49)	-1.6614 (-1.45)	0.0003 (0.07)
t-4	0.0008 (0.32)	0.3981* (1.89)	-0.0003 (-0.09)
t-3	0.0448** (3.21)	-7.4897** (-2.61)	-0.0008 (-0.20)
t-2	-0.0083 (-1.57)	0.8470* (4.85)	0.0061 (1.31)
t-1	0.0155** (2.97)	0.2719 (0.93)	-0.0053 (-1.04)
t0	-0.0009 (-0.26)	-3.7722** (-2.67)	-0.0020 (-0.44)
t+1	-0.0054 (-0.99)	0.4213* (1.77)	0.0071 (1.48)
t+2	-0.0158 (-1.19)	1.2710* (2.06)	-0.0030 (-0.63)
t+3	-0.0041 (-0.88)	1.0391** (2.51)	0.0070 (1.30)

Table 12 (Continued)

Time Relative to Event Day	Intercept	Market Return	D[a]
t+4	-0.0120 (-0.45)	1.2767 (0.88)	-0.0068 (-1.37)
t+5	0.0212 (1.56)	-0.7711 (-0.88)	-0.0017 (-0.30)
t+6	0.0058 (1.39)	0.5169 (0.92)	-0.0024 (-0.57)
t+7	0.0012 (0.53)	-0.5575 (-0.98)	0.0006 (0.18)
t+8	-0.0042 (-0.41)	1.3594 (1.58)	-0.0006 (-0.14)
t+9	0.0046 (1.06)	1.2318* (1.71)	0.0004 (0.09)
t+10	0.0140 (0.40)	-0.4771 (-0.19)	-0.0050 (-1.40)

[a] D is a binary variable with a value of 1 for exposed banks and 0 for non-exposed banks

** significant at the 0.99 level

* significant at the 0.95 level

exposure coefficient is predominantly negative, showing that exposed banks had lower returns on the average compared to non-exposed banks. However, none of the exposure coefficients is significant for any of the days reported. This implies that there appears to be no difference between the returns of exposed and non-exposed banks. If the market was able to distinguish between exposed and non-exposed banks, the exposure coefficient should have been significantly negative following the event day (day 0), showing that exposed banks suffered a larger decline in equity values due to the deterioration of the quality of loan assets held by them.

In Table 13 the exposure variable is replaced by the actual exposure of banks. Individual bank returns are regressed against market return and exposure. The exposure variable is significant on only two days - t_{-8} and t_{-2}. However, the sign of the exposure coefficient is positive, implying that the returns of banks with larger exposures were higher than the returns of banks with smaller exposures on these two days. This could mean that either the market was not aware of the actual exposure of banks to Mexico prior to the default, or the market was aware but did not expect to have to discount the market value of banks with exposure to Mexico. The exposure coefficient is not significant for any of the remaining days reported, including the event day. Again, there appears to be no

Table 13. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Mexican Moratorium Announcement Using Absolute Exposure Variables

Time Relative to Event Day	Intercept	Market Return	EXP[a]
t-10	-0.0086 (-0.46)	-0.4714 (-0.21)	0.0000 (0.19)
t-9	0.0119 (0.37)	1.6267 (0.54)	-0.0001 (-0.93)
t-8	-0.0226** (-2.90)	-0.9713* (-1.63)	0.0003* (2.20)
t-7	-0.0069* (-2.05)	-4.6596 (-1.57)	-0.0001 (-0.26)
t-6	-0.0103 (-0.75)	-2.6308 (-0.70)	-0.0000 (-0.63)
t-5	-0.0107 (-1.62)	-1.8168 (-1.51)	0.0000 (0.32)
t-4	0.0013 (0.57)	0.4401* (1.99)	-0.0001 (-0.46)
t-3	0.0520** (3.58)	-8.7516** (-2.92)	-0.0001 (-1.02)
t-2	-0.0067 (-1.29)	0.7219** (4.03)	0.0003** (2.47)
t-1	0.0168** (3.28)	0.1838 (0.60)	-0.0001 (-1.41)
t0	-0.0005 (-0.17)	-3.3468* (-2.26)	-0.0001 (-0.93)
t+1	-0.0038 (-0.70)	0.3439 (1.38)	0.0002* (1.79)
t+2	-0.0205 (-1.49)	1.5439** (2.40)	-0.0002 (-1.37)
t+3	-0.0033 (-0.73)	1.0705** (2.45)	0.0002 (1.15)

Table 13 (Continued)

Time Relative to Event Day	Intercept	Market Return	EXP[a]
t+4	-0.0095	1.0285	-0.0001
	(-0.34)	(0.67)	(-0.72)
t+5	0.0241*	-0.9345	-0.0001
	(1.71)	(-1.02)	(-0.60)
t+6	0.0054	0.5321	-0.0001
	(1.31)	(0.90)	(-0.39)
t+7	0.0008	-0.6818	0.0001
	(0.40)	(-1.14)	(0.57)
t+8	-0.0035	1.2494	0.0000
	(-0.34)	(1.38)	(-0.14)
t+9	0.0045	1.4642*	0.0001
	(1.07)	(1.94)	(0.71)
t+10	0.0085	-0.1102	-0.0001
	(0.23)	(-0.04)	(-1.36)

[a] EXP is the exposure measured as the ratio of dollar loans of banks to Mexico to bank capital

** significant at the 0.99 level

* significant at the 0.95 level

difference between the returns of exposed and non-exposed banks, as indicated by the insignificant exposure coefficients.

In a similar test Schoder and Vankudre (1986) find that the exposure effect is negative, but insignificant on the event day, August 19, 1982. They conclude that the bank-stock prices did not reflect correctly the exposure of individual banks to Mexico. It implies that either the market was inefficient in not impounding the bank exposure information that was available, or there was a contagion effect in the market.

The regression tests used in this study appear to support the results of the Schoder-Vankudre study. In both Tables 12 and 13, the market return coefficients on the event day are negative and significant (-3.7722 and -3.3468 respectively) while the exposure coefficients are not significant.

Since the number of banks used in the individual exposed and non-exposed samples are relatively large and similar (54 and 40 banks respectively), the sample size should not contribute to any bias in these results. However, the difference in the average (total asset) size of the banks in the exposed and non-exposed samples of banks might bias the results. Further, most of the exposed banks are listed in the NYSE/AMEX exchanges and are actively traded. A majority of the banks in the non-exposed sample

is listed in the NASDAQ exchange, which is not a perfect auction market. Some of the stocks in this market are not actively and continuously traded. This could have also biased the results.

In Tables 14 and 15 the cumulative returns of banks are regressed against the exposure of banks. The individual bank returns are cumulated over intervals of 1 to 30 days. With the exception of one (day 0 exposure coefficients using all banks in the sample), the exposure coefficients are all insignificant. At the same time, the intercept coefficient is significant for most of the time intervals shown. This implies that the market assigns an arbitrary mean value of exposure to all banks and does not distinguish between banks with varying levels of exposure. If the market was able to differentiate between exposed and non-exposed banks, and if banks with more risky assets were penalized, then the exposure coefficient would have been negative and significant. In Table 14 the exposure coefficient does become negative after 4 days, but the coefficients are not significant. This suggests the presence of a contagion effect in the market where exposed and non-exposed banks were treated equally.

Bruner and Simms (1987) use a sample of 40 exposed banks (predominantly NYSE/AMEX banks) to examine if the market was rational in pricing securities proportionate to their exposure following the Mexican default. They cumulate

Table 14. Estimated Cumulative Regression Coefficients of Exposed and Non-Exposed Banks following the Mexican Event[a]

Time Period	Coefficient a	t	Coefficient b	t
0	-0.0026	-0.91	-0.0003	-2.27*
0 - 1	-0.0002	-0.04	0.0001	0.48
0 - 2	0.0115**	2.48	0.0001	0.25
0 - 3	0.0154**	2.61	0.0000	0.18
0 - 4	0.0246**	3.28	-0.0000	-0.05
0 - 5	0.0347**	4.45	-0.0000	-0.11
0 - 6	0.0373**	4.65	-0.0001	-0.42
0 - 7	0.0380**	4.63	-0.0001	-0.41
0 - 8	0.0484**	5.50	-0.0000	-0.07
0 - 9	0.0469**	5.60	-0.0001	-0.17
0 - 10	0.5379**	6.30	-0.0002	-0.58
0 - 20	0.0966**	9.72	-0.0003	-0.78
0 - 30	0.1255**	11.96	-0.0003	-0.68

[a] Exposure is measured as the ratio of the dollar loans of bank to Mexico to the bank capital.

** significant at the 0.99 level

* significant at the 0.95 level

Table 15. Estimated Cumulative Regression Coefficients of Exposed Banks following the Mexican Event[a]

Time Period	Coefficient a	t	Coefficient b	t
0	0.0002	0.03	-0.0003	-1.45
0 - 1	0.0034	0.34	-0.0000	-0.08
0 - 2	0.0193*	1.66	-0.0002	-0.48
0 - 3	0.0278*	2.21	-0.0003	-0.79
0 - 4	0.0286	1.62	-0.0001	-0.24
0 - 5	0.0406*	2.10	-0.0002	-0.33
0 - 6	0.0408*	2.04	-0.0002	-0.38
0 - 7	0.0397*	1.93	-0.0002	-0.29
0 - 8	0.0476*	2.16	-0.0000	-0.01
0 - 9	0.0419*	2.12	0.0001	0.14
0 - 10	0.0462*	2.25	0.0000	0.02
0 - 20	0.0958**	4.23	-0.0003	-0.42
0 - 30	0.1353**	5.40	-0.0006	-0.73

[a] Exposure is measured as the ratio of the dollar loans of bank to Mexico to the bank capital.

** significant at the 0.99 level

* significant at the 0.95 level

the daily returns for different time periods and try to relate these returns to the exposure of the banks. The exposure coefficient is significant and negative starting on day 5. They conclude that the market was irrational in not penalizing banks with large exposures for a period of four days following the event. However, starting on day 5, the market began to price securities rationally. Banks with larger exposure experienced a larger decline in equity values. One explanation for the difference in the results between the Bruner-Simms study and this study is the larger and more comprehensive sample used in this study vis-a-vis the Bruner-Simms study. By using only large banks in the sample, the Bruner-Simms study might have ignored size effects. Further, they do not include any of the OTC banks in their sample.

C. Analysis of Excess Returns.

The daily average excess returns and the cumulative average excess returns for the different sub-samples of banks are presented in Tables 16 - 23. These tables are based on a 120-day estimation period ranging from 150 days before the event to 30 days before the event. The test period ranges from 30 days before the event to 30 days after the event.

Table 16 presents the announcement effect results for all the banks, as well as exposed and non-exposed banks.

Table 16. Daily Average Excess Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Mexican Event[a]

Time Relative to Event	All Banks (N=94)	Exposed Banks (N=54)	Non-Exposed Banks (N=40)
t-30	-0.6034*	-0.8584*	-0.2591
t-29	0.2048	0.3711	-0.0197
t-28	0.6445*	0.6515*	0.6350*
t-27	-0.0729	-0.3739	0.3334
t-26	-0.5408*	-1.0416**	0.1352
t-25	0.2488	0.3947	0.0519
t-24	-0.2614	-0.2593	-0.2641
t-23	0.0947	0.2899	-0.1689
t-22	0.2556	0.5118	-0.0902
t-21	0.4968*	0.6645*	0.2705
t-20	0.3724	0.4204	0.3077
t-19	-0.0919	-0.1752	0.0205
t-18	-0.0342	-0.0833	0.0321
t-17	0.3689	0.3965	0.3317
t-16	-0.1452	-0.2571	0.0059
t-15	-0.0349	0.1308	-0.2586
t-14	0.1156	0.3483	-0.1987
t-13	0.1892	0.2475	0.1104
t-12	0.7065**	0.9291**	0.4060
t-11	0.0412	0.1428	-0.0959
t-10	0.0285	0.1411	-0.1234
t-9	-0.1596	-0.2126	-0.0879
t-8	-0.1767	-0.0161	-0.3936
t-7	-0.0373	0.0294	-0.1273
t-6	-0.0081	-0.0903	0.1030
t-5	0.0488	-0.0189	0.1403
t-4	0.0183	-0.0335	0.0883
t-3	0.9274**	1.0698**	0.7353**
t-2	0.4457	0.6901*	0.1157
t-1	1.1215**	0.9324**	1.3767**
t0	-0.7391**	-1.0415**	-0.3309
t+1	-0.3845	-0.2357	-0.5853*
t+2	-0.0443	-0.1935	0.1571
t+3	0.2832	0.4654	0.0373
t+4	-0.1348	-0.4775	0.3279
t+5	0.3545	0.3568	0.3513
t+6	0.5339*	0.4932	0.5888*
t+7	0.0289	-0.0380	0.1192
t+8	0.6125*	0.6050	0.6225*
t+9	0.1733	0.1694	0.1786
t+10	-0.2977	-0.6087	0.1221
t+11	-0.5897*	-0.8198*	-0.2790

Table 16 (Continued)

Time Relative to Event	All Banks (N=94)	Exposed Banks (N=54)	Non-Exposed Banks (N=40)
t+12	-0.0506	-0.1465	0.0788
t+13	0.0280	0.1025	-0.0725
t+14	0.3716	0.3013	0.4664*
t+15	0.0434	0.0966	-0.0284
t+16	0.2997	0.3873	0.1813
t+17	0.5038*	0.7199*	0.2120
t+18	1.0029**	1.0439**	0.9475**
t+19	1.0657**	0.9582**	1.2108**
t+20	0.4034	0.5722	0.1714
t+21	0.0282	-0.1386	0.2535
t+22	-0.0243	-0.0086	-0.0456
t+23	0.9001**	1.0760**	0.6626**
t+24	0.2961	0.1807	0.4518
t+25	0.5057*	0.7163*	0.2213
t+26	0.3286	0.3927	0.2420
t+27	0.7685**	0.8991**	0.5923*
t+28	0.5938*	0.7277*	0.4131
t+29	0.3419	0.4974	0.1319
t+30	0.4577	0.4983	0.4029

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

Table 17. Cumulative Abnormal Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Mexican Event[a]

Time Period Relative to Event	All Banks (N=94)	Exposed Banks (N=54)	Non-Exposed Banks (N=40)
-30,-1	4.1629	4.9413	3.1121
-29,-1	4.7663	5.7997	3.3712
-28,-1	4.5614	5.4286	3.3910
-27,-1	3.9171	4.7772	2.7559
-26,-1	3.9900	5.1511	2.4225
-25,-1	4.5308	6.1926	2.2873
-24,-1	4.2820	5.7979	2.2354
-23,-1	4.5434	6.0573	2.4995
-22,-1	4.4487	5.7674	2.6684
-21,-1	4.1931	5.2557	2.7586
-20,-1	3.6963	4.5912	2.4881
-19,-1	3.3238	4.1708	2.1805
-18,-1	3.4158	4.3460	2.1600
-17,-1	3.4500	4.4293	2.1279
-16,-1	3.0811	4.0328	1.7962
-15,-1	3.2262	4.2899	1.7903
-14,-1	3.2611	4.1591	2.0488
-13,-1	3.1455	3.8107	2.2475
-12,-1	2.9564	3.5632	2.1371
-11,-1	2.2499	2.6341	1.7311
-10,-1	2.2087	2.4913	1.8270
-9,-1	2.1801	2.3502	1.9505
-8,-1	2.3397	2.5629	2.0384
-7,-1	2.5164	2.5790	2.4319
-6,-1	2.5537	2.5495	2.5592
-5,-1	2.5617	2.6399	2.4562
-4,-1	2.5129	2.6588	2.3159
-3,-1	2.4946	2.6923	2.2277
-2,-1	1.5672	1.6226	1.4924
-1	1.1215	0.9324	1.3767
0	-0.7391	-1.0415	-0.3309
0,1	-1.1236	-1.2772	-0.9162
0,2	-1.1679	-1.4707	-0.7591
0,3	-0.8847	-1.0052	-0.7219
0,4	-1.0194	-1.4828	-0.3939
0,5	-0.6650	-1.1260	-0.0426
0,6	-0.1311	-0.6327	0.5461
0,7	-0.1022	-0.6708	0.6653
0,8	0.5102	-0.0658	1.2878
0,9	0.6835	0.1036	1.4664
0,10	0.3858	-0.5051	1.5884
0,11	-0.2039	-1.3249	1.3094
0,12	-0.2546	-1.4714	1.3882

Table 17 (Continued)

Time Period Relative to Event	All Banks (N=94)	Exposed Banks (N=54)	Non-Exposed Banks (N=40)
0,13	-0.2265	-1.3689	1.3157
0,14	0.1450	-1.0676	1.7821
0,15	0.1884	-0.9710	1.7537
0,16	0.4881	-0.5837	1.9350
0,17	0.9919	0.1362	2.1470
0,18	1.9948	1.1802	3.0945
0,19	3.0605	2.1384	4.3052
0,20	3.4638	2.7136	4.4766
0,21	3.4920	2.5750	4.7300
0,22	3.4677	2.5664	4.6845
0,23	4.3678	3.6424	5.3471
0,24	4.6639	3.8231	5.7989
0,25	5.1695	4.5394	6.0202
0,26	5.4981	4.9321	6.2622
0,27	6.2666	5.8312	6.8544
0,28	6.8604	6.5589	7.2675
0,29	7.2023	7.0563	7.3994
0,30	7.6599	7.5545	7.8023

[a] Estimation period starting from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 18. Daily Average Excess Returns of High and Low Exposure Banks During the Mexican Event[a]

Time Relative to Event	High Exposure Banks[b] (N=26)	Low Exposure Banks[b] (N=28)
t-30	-0.9896*	-0.7365*
t-29	0.5502	0.2047
t-28	0.6473	0.6554*
t-27	-0.5519	-0.2086
t-26	-1.2001*	-0.8944**
t-25	0.3570	0.4297
t-24	-0.9479*	0.3801
t-23	0.6335	-0.0292
t-22	0.3386	0.6726*
t-21	0.8992*	0.4466
t-20	0.5564	0.2942
t-19	-0.4815	0.1091
t-18	-0.2137	0.0378
t-17	0.5185	0.2832
t-16	-0.6265	0.0859
t-15	0.3275	-0.0517
t-14	0.5781	0.1350
t-13	0.3355	0.1658
t-12	1.1373*	0.7358*
t-11	0.1562	0.1303
t-10	0.0133	0.2597
t-9	-0.5943	0.1419
t-8	0.2281	-0.2429
t-7	0.3488	-0.2671
t-6	-0.1390	-0.0452
t-5	0.1330	-0.1600
t-4	-0.0445	-0.0234
t-3	1.1685*	0.9781**
t-2	1.1243*	0.2871
t-1	0.9572*	0.9094**
t0	-1.6918**	-0.4376
t+1	-0.2383	-0.2332
t+2	-0.4804	0.0729
t+3	0.3269	0.5941*
t+4	-0.7480	-0.2263
t+5	0.4533	0.2672
t+6	0.6379	0.3589
t+7	-0.2348	0.1447
t+8	0.8435	0.3835
t+9	0.2999	0.0482
t+10	-0.7233	-0.4568
t+11	-1.1920*	-0.4742
t+12	-0.7099	0.3766
t+13	0.1068	0.0985

Table 18 (Continued)

Time Relative to Event	High Exposure Banks[b] (N=26)	Low Exposure Banks[b] (N=28)
t+14	0.1071	0.4817
t+15	0.0980	0.0953
t+16	0.3168	0.4529
t+17	1.0815*	0.3842
t+18	0.9547*	1.1267**
t+19	1.6714**	0.2960
t+20	0.9684*	0.2102
t+21	-0.2568	-0.0289
t+22	0.1876	-0.1908
t+23	1.2021*	0.9588**
t+24	-0.1538	0.4914
t+25	0.7088	0.7233*
t+26	0.5968	0.2032
t+27	1.3276**	0.5012
t+28	0.7046	0.7491*
t+29	0.6724	0.3349
t+30	0.4007	0.5888*

[a] Estimation period ranges from 150 days before the event to 30 days before the event

[b] The banks are divided into high and low exposure banks along the mean exposure value of 30.01% of capital

* significant at the 0.95 level

** significant at the 0.99 level

Table 19. Cumulative Abnormal Returns of High and Low Exposure Banks During the Mexican Event[a]

Time Period Relative to Event	High Exposure Banks[b] (N=26)	Low Exposure Banks[b] (N=28)
-30,-1	5.2193	4.6832
-29,-1	6.2090	5.4197
-28,-1	5.6588	5.2150
-27,-1	5.0115	4.5595
-26,-1	5.5634	4.7681
-25,-1	6.7635	5.6625
-24,-1	6.4065	5.2329
-23,-1	7.3544	4.8528
-22,-1	6.7209	4.8820
-21,-1	6.3824	4.2094
-20,-1	5.4832	3.7629
-19,-1	4.9268	3.4687
-18,-1	5.4083	3.3596
-17,-1	5.6220	3.3218
-16,-1	5.1035	3.0386
-15,-1	5.7300	2.9527
-14,-1	5.4025	3.0045
-13,-1	4.8244	2.8695
-12,-1	4.4889	2.7937
-11,-1	3.3516	1.9679
-10,-1	3.1953	1.8376
-9,-1	3.1820	1.5779
-8,-1	3.7764	1.4360
-7,-1	3.5482	1.6789
-6,-1	3.1995	1.9460
-5,-1	3.3385	1.9911
-4,-1	3.2055	2.1512
-3,-1	3.2500	2.1745
-2,-1	2.0815	1.1964
-1	0.9572	0.9094
0	-1.6918	-0.4376
0,1	-1.9301	-0.6709
0,2	-2.4105	-0.5980
0,3	-2.0836	-0.0039
0,4	-2.8316	-0.2302
0,5	-2.3784	0.0370
0,6	-1.7405	0.3959
0,7	-1.9753	0.5406
0,8	-1.1318	0.9241
0,9	-0.8319	0.9723
0,10	-1.6041	0.5154
0,11	-2.7961	0.0412
0,12	-3.5060	0.4178
0,13	-3.3991	0.5163

Table 19 (Continued)

Time Period Relative to Event	High Exposure Banks[b] (N=26)	Low Exposure Banks[b] (N=28)
0,14	-3.2920	0.9980
0,15	-3.1941	1.0933
0,16	-2.8773	1.5462
0,17	-1.7958	1.9301
0,18	-0.8411	3.0570
0,19	0.8303	3.3531
0,20	1.7987	3.5632
0,21	1.5419	3.5344
0,22	1.7295	3.3436
0,23	2.9316	4.3024
0,24	2.7778	4.7938
0,25	3.4866	5.5171
0,26	4.0834	5.7203
0,27	5.4109	6.2215
0,28	6.1155	6.9706
0,29	6.7879	7.3005
0,30	7.1887	7.8943

[a] Estimation period starting from 150 days before the event to 30 days before the event

[b] The banks are divided into high and low exposure banks along the mean exposure value of 30.01% of capital

* significant at the 0.95 level

** significant at the 0.99 level

Table 20. Daily Average Excess Returns of NYSE/ASE and OTC Banks During the Mexican Event[a]

Time Relative to Event	NYSE/ASE Banks (N=45)	OTC Banks (N=49)
t-30	-0.7842*	-0.4374*
t-29	0.1613	0.2447
t-28	0.8320*	0.4723*
t-27	-0.2574	0.0965
t-26	-1.0870**	-0.0392
t-25	0.6562	-0.1253
t-24	-0.7026	0.1439
t-23	0.1148	0.0762
t-22	0.4747	0.0544
t-21	1.0309*	0.0064
t-20	0.6638	0.1048
t-19	-0.2423	0.0461
t-18	-0.0733	0.0016
t-17	0.6008	0.1560
t-16	-0.3816	0.0719
t-15	0.0412	-0.1047
t-14	0.1944	0.0432
t-13	0.3593	0.0329
t-12	1.1161**	0.3304
t-11	0.0685	0.0161
t-10	0.0607	-0.0010
t-9	-0.2495	-0.0769
t-8	-0.4094	0.0370
t-7	0.2304	-0.2831
t-6	-0.1506	0.1228
t-5	-0.2759	0.3471
t-4	-0.1058	0.1323
t-3	1.4754**	0.4242*
t-2	0.8316*	0.0913
t-1	1.2180**	1.0328**
t0	-1.4670**	-0.0706
t+1	-0.4805	-0.2962
t+2	0.0665	-0.1461
t+3	0.0938	0.4572*
t+4	-0.2384	-0.0396
t+5	0.6851	0.0508
t+6	0.5709	0.4998*
t+7	-0.2568	0.2912
t+8	0.7763*	0.4620*
t+9	0.0232	0.3112
t+10	-0.5468	-0.0691
t+11	-1.2474**	0.0143
t+12	-0.3304	0.2063
t+13	0.0243	0.0314
t+14	0.5098	0.2446

Table 20 (Continued)

Time Relative to Event	NYSE/ASE Banks (N=45)	OTC Banks (N=49)
t+15	-0.1276	0.2005
t+16	0.4390	0.1717
t+17	1.0322*	0.0186
t+18	1.3461**	0.6877**
t+19	1.4525**	0.7105**
t+20	0.3112	0.4880*
t+21	-0.0069	0.0605
t+22	0.1382	-0.1735
t+23	1.1592**	0.6621**
t+24	0.0546	0.5179*
t+25	0.7162	0.3123
t+26	0.4958	0.1750
t+27	1.3780**	0.2088
t+28	0.8239*	0.3825
t+29	0.4963	0.2001
t+30	0.7494*	0.1898

[a] Estimation period ranges from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 21. Cumulative Abnormal Returns of NYSE/ASE and OTC Banks During the Mexican Event[a]

Time Period Relative to Event	NYSE/ASE Banks (N=45)	OTC Banks (N=49)
-30,-1	5.4104	3.0173
-29,-1	6.1945	3.4547
-28,-1	6.0332	3.2100
-27,-1	5.2012	2.7377
-26,-1	5.4586	2.6413
-25,-1	6.5456	2.6804
-24,-1	5.8894	2.8057
-23,-1	6.5921	2.6619
-22,-1	6.4773	2.5857
-21,-1	6.0026	2.5313
-20,-1	4.9717	2.5249
-19,-1	4.3079	2.4201
-18,-1	4.5502	2.3740
-17,-1	4.6234	2.3724
-16,-1	4.0226	2.2164
-15,-1	4.4042	2.1444
-14,-1	4.3630	2.2491
-13,-1	4.1687	2.2059
-12,-1	3.8094	2.1730
-11,-1	2.6933	1.8426
-10,-1	2.6248	1.8265
-9,-1	2.5641	1.8275
-8,-1	2.8136	1.9044
-7,-1	3.2231	1.8674
-6,-1	2.9927	2.1505
-5,-1	3.1432	2.0277
-4,-1	3.4192	1.6806
-3,-1	3.5250	1.5483
-2,-1	2.0496	1.1241
-1	1.2180	1.0328
0	-1.4670	-0.0706
0,1	-1.9476	-0.3669
0,2	-1.8810	-0.5130
0,3	-1.7872	-0.0558
0,4	-2.0256	-0.0954
0,5	-1.3405	-0.0446
0,6	-0.7696	0.4553
0,7	-1.0264	0.7465
0,8	-0.2501	1.2084
0,9	-0.2269	1.5196
0,10	-0.7736	1.4505
0,11	-2.0210	1.4648
0,12	-2.3514	1.6712
0,13	-2.3271	1.7026

Table 21 (Continued)

Time Period Relative to Event	NYSE/ASE Banks (N=45)	OTC Banks (N=49)
0,14	-1.8173	1.9472
0,15	-1.9449	2.1477
0,16	-1.5060	2.3194
0,17	-0.4738	2.3380
0,18	0.8722	3.0256
0,19	2.3248	3.7361
0,20	2.6360	4.2241
0,21	2.6291	4.2846
0,22	2.7672	4.1110
0,23	3.9264	4.7731
0,24	3.9810	5.2911
0,25	4.6971	5.6034
0,26	5.1929	5.7784
0,27	6.5709	5.9872
0,28	7.3947	6.3697
0,29	7.8910	6.5698
0,30	8.6404	6.7595

[a] Estimation period starting from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 22. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Mexican Event[a]

Time Relative to Event	Bank-Holding Cos. (N=56)	Non-Bank Holding Cos. (N=38)
t-30	-0.8584**	-0.2277
t-29	0.4003	-0.0834
t-28	0.5864*	0.7301*
t-27	-0.1412	0.0276
t-26	-0.2612	-0.9529*
t-25	0.0699	0.5123
t-24	0.1316	-0.8404*
t-23	-0.0007	0.2353
t-22	0.0780	0.5173
t-21	0.2286	0.8921*
t-20	0.4156	0.3088
t-19	-0.1308	-0.0346
t-18	-0.1804	0.1811
t-17	0.2846	0.4932
t-16	0.0075	-0.3702
t-15	-0.2289	0.2510
t-14	-0.1544	0.5135
t-13	0.1453	0.2538
t-12	0.5046*	1.0040**
t-11	-0.0722	0.2082
t-10	-0.1824	0.3394
t-9	-0.1038	-0.2418
t-8	-0.0493	-0.3645
t-7	-0.0860	0.0345
t-6	0.1555	-0.2492
t-5	0.2474	-0.2438
t-4	-0.0649	0.1409
t-3	0.7672**	1.1635**
t-2	0.1777	0.8405*
t-1	1.4665**	0.6130
t0	-0.6505*	-0.8697*
t+1	-0.1463	-0.7355*
t+2	-0.3797	0.4500
t+3	0.3726	0.1516
t+4	0.1310	-0.5265
t+5	0.3911	0.3005
t+6	0.6980**	0.2920
t+7	0.3055	-0.3788
t+8	0.6770*	0.5173
t+9	0.3253	-0.0508
t+10	-0.1193	-0.5607
t+11	-0.1984	-1.1664**
t+12	0.0529	-0.2032
t+13	-0.0089	0.0824

Table 22 (COntinued)

Time Relative to Event	Bank-Holding Cos. (N=56)	Non-Bank Holding Cos. (N=38)
t+14	0.3697	0.3743
t+15	-0.0944	0.2464
t+16	0.1460	0.5260
t+17	0.3815	0.6839*
t+18	1.0801**	0.8890*
t+19	0.9205**	1.2795**
t+20	0.3095	0.5416
t+21	-0.0256	0.1073
t+22	-0.3369	0.4363
t+23	0.9261**	0.8617*
t+24	0.4862*	0.0160
t+25	0.3680	0.7086*
t+26	0.1442	0.6002
t+27	0.5374*	1.1091
t+28	0.5238*	0.6969*
t+29	0.2457	0.4836
t+30	0.4583	0.4568

[a] Estimation period ranges from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 23. Daily Average Excess Returns of Small, Medium and Large Banks During the Mexican Event[a]

Time Relative to Event	Small Banks (N=47)	Medium Banks (N=21)	Large Banks (N=26)
t-30	-0.5791*	-0.7315*	-0.5439
t-29	-0.1909	0.6657*	0.5477
t-28	0.2792	0.9534**	1.0553*
t-27	-0.2210	0.5490	-0.3076
t-26	-0.3307	-0.2139	-1.1848*
t-25	0.1437	0.7761*	0.0129
t-24	-0.0443	-0.5117	-0.4517
t-23	0.1475	0.4927	-0.3223
t-22	0.2304	-0.3715	0.8077
t-21	0.1883	-0.1920	1.6109**
t-20	0.0577	0.4216	0.9016
t-19	0.0075	-0.0611	-0.2967
t-18	0.0292	-0.1268	-0.0741
t-17	-0.0903	0.5023	1.0913*
t-16	-0.0832	-0.2202	-0.1967
t-15	-0.1288	-0.3628	0.3999
t-14	0.1390	-0.0406	0.1994
t-13	-0.0539	0.0328	0.7549
t-12	0.4474	0.9850**	0.9499*
t-11	0.1147	-0.0887	0.0133
t-10	0.0874	0.0847	-0.1232
t-9	0.0013	-0.2540	-0.3740
t-8	-0.5263*	0.2110	0.1419
t-7	-0.2874	0.1259	0.2832
t-6	-0.0736	-0.1679	0.2394
t-5	0.3446	0.4689	-0.8251
t-4	0.1219	-0.2285	0.0304
t-3	0.5235*	0.8206*	1.7439**
t-2	-0.1281	0.6489*	1.3189*
t-1	0.8974**	1.3691**	1.3266*
t0	-0.2300	0.3355	-2.5274**
t+1	0.0886	-0.8784*	-0.8406
t+2	-0.3400	0.4806	0.0663
t+3	0.4844*	0.4182	-0.1895
t+4	-0.0610	0.6222*	-0.8795
t+5	0.2060	0.6423*	0.3903
t+6	0.7755**	-0.3504	0.8113
t+7	0.1623	0.1012	-0.2708
t+8	0.2371	0.4261	1.4415**
t+9	0.1812	0.6971*	-0.2641
t+10	-0.1892	-0.2668	-0.5189
t+11	0.0223	-0.1188	-2.0763**
t+12	0.2458	0.2380	-0.8197
t+13	-0.0937	-0.4387	0.6250
t+14	0.3616	0.6060	0.2003

Table 23 (Continued)

Time Relative to Event	Small Banks (N=47)	Medium Banks (N=21)	Large Banks (N=26)
t+15	0.1723	-0.2599	0.0553
t+16	0.4002	-0.2202	0.5377
t+17	0.1354	0.2003	1.4148**
t+18	0.6497**	0.7968*	1.8077**
t+19	0.9621**	0.6465*	1.5915**
t+20	0.6320*	0.2676	0.0998
t+21	0.1565	0.0993	-0.2611
t+22	-0.3866	-0.1787	0.7552
t+23	1.0846**	0.5757	0.8285
t+24	0.5354*	0.2834	-0.1262
t+25	0.4610*	0.3228	0.7341
t+26	0.0116	-0.0127	1.1773*
t+27	0.6068*	0.5948	1.2012*
t+28	0.5525*	0.4680	0.7701
t+29	0.1056	0.3893	0.7306
t+30	0.4404	-0.1650	0.9924*

[a] Estimation period ranges from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

The announcement day returns for all banks is -0.74 percent (and significant), which is followed by continuing downward adjustments, none of which is significant. This result is consistent with the new information hypothesis, which holds that the moratorium announcement conveyed new information about the quality of assets held by U.S. banks, and the market reacted to the event by impounding this information quickly in the share prices of banks.

The abnormal returns of the exposed banks show a similar trend where the announcement caused a downward revision (of -1.04 percent) in the valuation of the exposed bank equities. In the case of the non-exposed banks, most of the adjustment (-0.59 percent and significant) occurred on the day after the event, that is, the day when the Wall Street Journal reported the Mexican default. This was followed by positive adjustments to bank equity prices.

Comparing the excess returns of exposed and non-exposed banks on days t_0, t_{+1} and t_{+2}, the exposed banks had negative excess returns on all three days. The non-exposed banks had negative returns on days t_0 and t_{+1}. This implies that during these two days there was a contagion effect when both exposed and non-exposed banks were adversely affected. By the third day, the market had corrected its error and only exposed banks experienced downward adjustments.

For the three days before the Mexican default, the abnormal returns of all three groups of banks were positive

and mostly significant. For the remainder of the test period before the event, the abnormal returns were approximately evenly split between positive and negative.

The other significant excess returns in Table 16 reflect related and unrelated announcements during the 60-day event window. For example, the significant positive excess returns of 0.71 percent on day t_{-12} is associated with the Mexican government raising domestic prices of goods which was an austerity measure imposed by the IMF, the significant positive excess returns (of 0.93 percent and 1.12 percent) on days t_{-3} and t_{-1} are associated with the Federal Reserve lowering discount rates, and the significant positive excess returns on days t_{+17}, t_{+18} and t_{+19} are associated with reports about steps taken by international bankers to restore faith in the international financial markets.

Table 17 shows the cumulative abnormal returns of the above three sub-samples of banks for different time intervals. Both the CARs and the abnormal returns for the above three groups are predominantly positive. This is consistent with the upward trend in the stock market beginning in July of 1982. From July to December of 1982, the stock market moved up by about 20%. In light of this positive trend, the negative abnormal returns and CARs following the Mexican announcement are even more significant. The CARs remain negative for up to seven days

after the event for all banks, eight days for exposed banks, and six days for non-exposed banks. While the market was rational in penalizing banks with exposure to Mexico, whose asset quality had deteriorated, the effect spilled over into banks without any exposure to Mexico. However, the market started pricing non-exposed bank equities rationally from day 3 when the abnormal returns of the non-exposed banks become positive. The CARs become positive after six days, consistent with the upward trend in the stock market. This result suggests that initially the market was irrational in penalizing banks without exposure along with the exposed banks. The market was initially irrational, and there appears to be an investor contagion effect, when the market was not able to distinguish between exposed and non-exposed banks. But, after a short time lag, the investor contagion effect wears off and investors seem to be pricing securities rationally.

Tables 18 and 19 show the abnormal returns and CARs of high and low exposure banks. The sample contained 26 high exposure banks with exposure greater than 30.01% of the capital, and 28 low exposure banks (with exposure below 30.01% of the capital). While the high exposure banks suffered a significant reduction in value on the event day (-1.69 percent), the low exposure banks suffered only an insignificant reduction in value (-0.44 percent). In the trading days following the Mexican default, the low exposure

banks quickly reversed the negative trend, while high exposure banks took a longer time to reverse the trend. Table 19 indicates that the CARs of high exposure banks, while being positive prior to the event, remain negative for eighteen days after the event. This implies that most of the negative reaction to the announcement was related to high exposure banks. The reaction of low exposure banks was similar to that of non-exposed banks. They become positive after five days. The market appears to be unable to distinguish clearly between low and high exposure banks for a very short time period. After this short lag, the market is able to differentiate between the two, and most of the adverse movement in the stock prices of exposed banks is associated with high exposure banks.

To identify any listed exchange-specific effects, the banks were grouped into NYSE/AMEX and OTC banks. The abnormal returns and CARs for these sub-groups are presented in Tables 20 and 21. Most of the banks affected by the announcement appear to be NYSE/AMEX banks. The CARs of this group of banks are negative for 17 days after the event, while the CARs of OTC banks are negative for only 6 days following the event. This is consistent with Tables 15 and 16. A majority (36) of the NYSE/AMEX banks were exposed to Mexico, while less than half (18) of the OTC banks had loans outstanding to Mexico at the time of the default.

The NYSE/AMEX experienced an average decline of 1.47%

on the event day and 0.48% on the following day, for a two-day decline of 1.95%. The OTC banks experienced declines of 0.07%, 0.30% and 0.15% on the event day and the following two days, none of them significant. Again, most of the downward adjustment following the Mexican default is associated with NYSE/AMEX banks.

The initial sample of 94 banks is also grouped into 56 BHCs and 38 non-BHCs.[52] Our a priori expectation is that the adverse reaction associated with a negative event tends to be smaller and less significant for BHCs which are more diversified compared to non-BHCs.[53] BHCs operate several banks and other financial institutions which helps in diversifying the risk of the banking organization, while non-BHCs have relatively higher risk as they do not diversify all of the unsystematic risk. Also, with BHCs, the asset base and equity base to back the firm's liabilities and financial obligations tend to be larger, reducing the potential risk to the bank's creditors and investors.

Table 22 shows the abnormal returns of BHCs and non-BHCs during the test period. The average announcement day return for BHCs is -0.65% and significant. On the following two days the returns are negative but insignificant (-0.15%

---

[52] A majority of the 56 BHCs operate several banks. This study does not distinguish between one-BHCs and multiple-BHCs.

[53] Mishkin (1989).

and -0.38% respectively). The adverse reaction for the banks in the non-BHC group is spread over the event day and the following day. On an average, a bank from this group experienced declines of 0.87% and 0.74%, both significant. For the two day period (0,1), BHCs suffered a decline of 0.80%, while non-BHCs dropped by 1.61%. This result coincides with our a priori expectation that non-BHCs, due to their risk nature, should experience a larger impact from the default announcement. While BHCs are able to diversify their risk over their various operations, non-BHCs are not able to do so as their operations are limited to a single bank.

The sample of 94 banks range in size from $247.62 million to $129.99 billion in total assets. Such a large dispersion in asset size could affect banks with varying sizes differently. To identify any size effects the 94 banks are grouped into small, medium and large banks. Small banks have total assets under $5 billion. Medium banks have total assets between $5 billion and $10 billion. Banks with assets over $10 billion are classified as large banks. This grouping criteria resulted in 47 small banks, 21 medium banks and 26 large banks. The average size of the total assets for the three groups are $2.60 billion, $6.41 billion and $38.20 billion, respectively. The abnormal returns for these sub-groups are reported in Table 23.

The announcement day returns are negative and

significant only in the case of large banks. On an average, large banks experienced a decline 2.53% on the event day and 0.84% on the following day. Medium size banks did not experience any downward adjustments on the event day. However, they experienced a decline of 0.88% on the following day. The group of small banks did not experience any significant adjustments on the event day or the following day. For the two day period (0,1) only the group of large banks had a significant decline of 3.37%. This implies that most of the stock price adjustment following the Mexican default announcement was due to the adjustment in the market values of the large bank equities. Small banks are not affected as much as large banks.

The conclusions from the above analysis of the announcement effects of the Mexican default are consistent with the conclusions of the Bruner-Simms and Lamy-Marr-Thompson studies. The announcement did convey a negative signal to the market about the quality of assets held by exposed banks. The market reacted by quickly adjusting the share prices of banks. However, the adverse reaction was not limited to banks with loans outstanding to Mexico. Non-exposed banks experienced a similar decline in equity prices, suggesting a contagion effect in the market for bank equities.

Bruner and Simms find that banks with low exposure experience significant negative CARs for five days following

the event. This study does not support this conclusion. The CARs for low exposure banks are negative following the event, but are not significant.

At the same time, the results of this study with respect to the market's ability to distinguish between exposed and non-exposed banks is similar to that of the Lamy-Marr-Thompson study. The analysis shows that the market was able to differentiate between exposed and non-exposed banks, as the CARs indicate.[54] Further evidence on this conclusion is provided by the market penalizing NYSE/AMEX banks for a longer period of time compared to OTC banks. Most of the NYSE/AMEX banks were exposed to Mexico, while less than half of the OTC banks in the sample had loans outstanding to Mexico at the time of the default.

Since the beginning of 1980, the market had been concerned about the unprecedented growth in international lending, especially to Latin American nations. Several unfavorable reports about the borrowers and their ability to meet the debt obligations were published in the financial press. Some or all of the market participants might have been monitoring these reports and might have anticipated the

---

[54] This result is interesting because prior to October, 1982, banks were not required to disclose their loan exposure to individual sovereign borrowers. Despite the non-availability of this information, the market was able to distinguish between Mexican loan-exposed and non-exposed banks. A possible explanation for this result is that even though banks did not disclose their exposures to individual countries, market analysts were aware of the approximate exposure levels of banks.

Mexican default prior to August 19, 1982. To capture these effects, if any, a larger event period is used. The abnormal returns are computed using an estimation period starting 620 days before the event and ending 500 days before the event. The abnormal returns for the 500 days before the event and 500 days after the event are analyzed. Due to the larger time interval, eight of the banks used in the initial sample could not be used for lack of all relevant data. The abnormal returns for thirty days surrounding the event for the various sub-samples are shown in Tables 24 to 28.

An analysis of the abnormal returns of banks for the thirty days before and after the event using a different estimation period yield results similar to those discussed above. Table 24 shows the abnormal returns of the sample of 86 banks and the dis-aggregated samples of 49 exposed and 37 non-exposed banks for the event period. The sample of all 86 banks experienced an average decline of 0.84 percent on the event day, followed by insignificant downward revisions. The group of exposed banks experienced similar downward adjustments (-1.20 %), while most of the adjustment in non-exposed banks was on the following day (-0.80%). The two-day abnormal returns negative and significant for the whole sample of 86 banks and the group of exposed banks (1.48% and 1.72% respectively), while the two-day abnormal return for the non-exposed group of banks is negative, but not

Table 24. Daily Average Excess Returns of All, Exposed and Non-Exposed Banks During the Mexican Event (Using a Longer Estimation Period)[a]

Time Relative to Event	All Banks (N=86)	Exposed Banks (N=49)	Non-Exposed Banks (N=37)
t-32	-0.8905*	-1.1935**	-0.4891
t-31	-1.3293**	-1.7238**	-0.8069*
t-30	-0.6386	-0.9349*	-0.2462
t-29	0.1405	0.3949	-0.1963
t-28	0.4893	0.4607	0.5272
t-27	-0.0992	-0.3184	0.1911
t-26	-0.5971	-1.1125*	0.1025
t-25	0.0865	0.2464	-0.1252
t-24	-0.4509	-0.4695	-0.4263
t-23	-0.0765	0.1023	-0.3134
t-22	0.1204	0.3663	-0.2053
t-21	0.4222	0.6335	0.1424
t-20	0.1917	0.1901	0.1937
t-19	-0.2610	-0.3627	-0.1262
t-18	-0.1756	-0.2723	-0.0476
t-17	0.3053	0.2668	0.3536
t-16	-0.1893	-0.3943	0.0822
t-15	-0.0617	0.0034	-0.1479
t-14	0.0824	0.3600	-0.2853
t-13	0.0990	0.2450	-0.0944
t-12	0.6228	0.8145*	0.3688
t-11	-0.0754	-0.0351	-0.1288
t-10	-0.0795	0.0017	-0.1868
t-9	-0.3286	-0.4715	-0.1394
t-8	-0.2216	-0.1745	-0.2839
t-7	-0.1122	-0.0682	-0.1705
t-6	-0.1789	-0.3333	0.0257
t-5	-0.0903	-0.2173	0.0779
t-4	-0.0792	-0.1807	0.0554
t-3	0.8240*	1.0106*	0.5767
t-2	0.3569	0.6937	-0.0893
t-1	0.8703*	0.7203	1.0690**
t0	-0.8419*	-1.2030**	-0.3636
t+1	-0.6387	-0.5177	-0.7989*
t+2	-0.2572	-0.3137	-0.1825
t+3	0.0991	0.2941	-0.1591
t+4	-0.3898	-0.7186	0.0457
t+5	0.1012	0.1658	0.0156
t+6	0.4454	0.3454	0.5779
t+7	-0.1540	-0.2545	-0.0210
t+8	0.4952	0.5777	0.3860
t+9	0.0502	0.0126	0.1001
t+10	-0.4546	-0.6324	-0.2192
t+11	-0.8592*	-1.0075*	-0.6627*

Table 24 (Continued)

Time Relative to Event	All Banks (N=86)	Exposed Banks (N=49)	Non-Exposed Banks (N=37)
t+12	-0.2436	-0.4469	0.0257
t+13	0.0699	-0.0092	-0.1504
t+14	0.1512	0.0686	0.2606
t+15	-0.0578	-0.0149	-0.1147
t+16	0.1857	0.2458	0.1060
t+17	0.3517	0.5831	0.0458
t+18	0.8859*	1.0144*	0.7157*
t+19	0.8979*	0.7702	1.0670**
t+20	0.1712	0.2895	0.0144
t+21	-0.0256	-0.2074	0.2151
t+22	-0.0708	-0.0145	-0.1454
t+23	0.7322*	0.8659*	0.5552
t+24	0.2186	0.0364	0.4600
t+25	0.3724	0.5747	0.1044
t+26	0.2992	0.3615	0.2168
t+27	0.5935	0.7342	0.4072
t+28	0.4447	0.5206	0.3442
t+29	0.2370	0.3943	0.0288
t+30	0.2581	0.2648	0.2492

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 25. Daily Average Excess Returns of High and Low Exposure Banks During the Mexican Event (Using a Longer Estimation Period)[a]

Time Relative to Event	High Exposure Banks (N=24)	Low Exposure Banks (N=25)
t-32	-1.8977**	-0.5175
t-31	-1.8791**	-1.5746**
t-30	-1.2019*	-0.6786
t-29	0.4343	0.3570
t-28	0.5554	0.3697
t-27	-0.1587	-0.4718
t-26	-1.3689*	-0.8915*
t-25	0.2329	0.2594
t-24	-1.0942*	0.1302
t-23	0.2706	-0.0592
t-22	0.0069	0.7112
t-21	0.8729	0.4038
t-20	0.3037	0.0811
t-19	-0.6705	-0.0672
t-18	-0.4576	-0.0944
t-17	0.2889	0.2494
t-16	-0.7640	-0.0393
t-15	0.0735	-0.0640
t-14	0.4418	0.2815
t-13	0.1445	0.3414
t-12	0.9653	0.6698
t-11	-0.1032	0.0302
t-10	-0.2090	0.2040
t-9	-0.7677	-0.1871
t-8	-0.0073	-0.3350
t-7	0.1340	-0.2622
t-6	-0.3655	-0.3025
t-5	-0.1525	-0.2794
t-4	-0.1829	-0.1786
t-3	1.2042*	0.8247*
t-2	1.3074*	0.1046
t-1	0.6377	0.7996*
t0	-1.9703**	-0.4663
t+1	-0.4709	-0.5627
t+2	-0.6210	-0.0187
t+3	-0.0060	0.5822
t+4	-1.1103*	-0.3425
t+5	0.2649	0.0708
t+6	0.4526	0.2424
t+7	-0.5840	0.0619
t+8	0.8508	0.3156
t+9	0.1089	-0.0800
t+10	-0.7937	-0.4776
t+11	-1.3540*	-0.6747

Table 25 (Continued)

Time Relative to Event	High Exposure Banks (N=24)	Low Exposure Banks (N=25)
t+12	-1.0170	0.1003
t+13	-0.0771	0.0503
t+14	0.0066	0.1282
t+15	-0.2020	0.1647
t+16	0.2191	0.2715
t+17	1.0431	0.1415
t+18	0.9035	1.1209**
t+19	1.4039*	0.1618
t+20	0.5250	0.0634
t+21	-0.3639	-0.0571
t+22	0.2957	-0.3123
t+23	0.9491	0.7860
t+24	-0.3798	0.4359
t+25	0.5707	0.5786
t+26	0.4170	0.3083
t+27	1.2156*	0.2720
t+28	0.3880	0.6480
t+29	0.6464	0.1522
t+30	0.2680	0.2618

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 26. Daily Average Excess Returns of NYSE/ASE and OTC Banks During the Mexican Event (Using a Longer Estimation Period)[a]

Time Relative to Event	NYSE/ASE Banks (N=39)	OTC Banks (N=47)
t-32	-1.5597**	-0.3351
t-31	-1.7617**	-0.9706**
t-30	-0.8326	-0.4776
t-29	0.1570	0.1269
t-28	0.6192	0.3815
t-27	-0.2109	-0.0066
t-26	-1.2086*	-0.0897
t-25	0.4935	-0.2511
t-24	-1.0595*	0.0541
t-23	-0.1465	-0.0185
t-22	0.3380	-0.0602
t-21	1.0514*	-0.0998
t-20	0.4131	0.0079
t-19	-0.5014	-0.0615
t-18	-0.3213	-0.0548
t-17	0.5264	0.1218
t-16	-0.5237	0.0882
t-15	0.0171	-0.1272
t-14	0.2256	-0.0364
t-13	0.3368	-0.0984
t-12	1.0119*	0.2999
t-11	-0.1581	-0.0068
t-10	-0.1427	-0.0270
t-9	-0.6330	-0.0760
t-8	-0.6315	0.1186
t-7	0.1345	-0.3169
t-6	-0.4675	0.0607
t-5	-0.5175	0.2642
t-4	-0.2807	0.0881
t-3	1.4224*	0.3274
t-2	0.9196	-0.1101
t-1	0.8914	0.8528**
t0	-1.7565**	-0.0829
t+1	-0.8505	-0.4630
t+2	-0.0918	-0.3945
t+3	-0.1654	0.3186
t+4	-0.5886	-0.2248
t+5	0.4293	-0.1710
t+6	0.4250	0.4623
t+7	-0.6076	0.2224
t+8	0.7027	0.3231
t+9	-0.2106	0.2661
t+10	-0.6355	-0.3045
t+11	-1.6301**	-0.2194

Table 26 (Continued)

Time Relative to Event	NYSE/ASE Banks (N=39)	OTC Banks (N=47)
t+12	-0.7501	0.1767
t+13	-0.0572	-0.0805
t+14	0.2380	0.0792
t+15	-0.2836	0.1296
t+16	0.2922	0.0973
t+17	0.9205	-0.1203
t+18	1.3054*	0.5378
t+19	1.2512*	0.6047*
t+20	-0.0471	0.3522
t+21	-0.0905	0.0282
t+22	0.2048	-0.2995
t+23	0.9086	0.5859
t+24	-0.1243	0.5032
t+25	0.5384	0.2346
t+26	0.4830	0.1468
t+27	1.1836*	0.1038
t+28	0.5896	0.3245
t+29	0.3628	0.1327
t+30	0.5060	0.0524

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 27. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Mexican Event (Using a Longer Estimation Period)[a]

Time Relative to Event	Bank Holding Cos. (N=49)	Non-Bank Holding Cos. (N=37)
t-32	-0.4510	-1.4724**
t-31	-1.3000**	-1.3681**
t-30	-0.8561*	-0.3506
t-29	0.3760	-0.1713
t-28	0.3769	0.6381
t-27	-0.0686	-0.1397
t-26	-0.2557	-1.0492*
t-25	-0.1065	0.3421
t-24	-0.0498	-0.9822*
t-23	-0.1822	0.0634
t-22	-0.0935	0.4036
t-21	0.1638	0.7645
t-20	0.2063	0.1723
t-19	-0.3138	-0.1911
t-18	-0.3165	0.0109
t-17	0.2902	0.3252
t-16	0.1069	-0.5815
t-15	-0.2293	0.1602
t-14	-0.1180	0.3478
t-13	0.0310	0.1890
t-12	0.4427	0.8612*
t-11	-0.1346	0.0030
t-10	-0.2759	0.1807
t-9	-0.2643	-0.4137
t-8	-0.0611	-0.4340
t-7	-0.1613	-0.0472
t-6	0.0042	-0.4213
t-5	0.1919	-0.4639
t-4	-0.2080	0.0915
t-3	0.6320	1.0781*
t-2	-0.0818	0.9378*
t-1	1.2072**	0.4242
t0	-0.7707*	-0.9361*
t+1	-0.5953	-0.6961
t+2	-0.7423*	0.3852
t+3	0.1838	-0.0130
t+4	-0.2454	-0.5809
t+5	0.0530	0.1650
t+6	0.7073*	0.0986
t+7	0.1288	-0.5286
t+8	0.5319	0.4466
t+9	0.2713	-0.2425
t+10	-0.2440	-0.7336

Table 27 (Continued)

Time Relative to Event	Bank Holding Cos. (N=49)	Non-Bank Holding Cos. (N=37)
t+11	-0.5206	1.3075**
t+12	-0.1285	-0.3961
t+13	-0.1019	-0.0275
t+14	0.1041	0.2137
t+15	-0.1417	0.0532
t+16	-0.0218	0.4604
t+17	0.1712	0.5907
t+18	0.9893**	0.7490
t+19	0.7417*	1.1047*
t+20	0.1219	0.2360
t+21	-0.0494	0.0059
t+22	-0.4314	0.4067
t+23	0.7561*	0.7006
t+24	0.4822	-0.1304
t+25	0.2441	0.5423
t+26	0.1137	0.5449
t+27	0.3220	0.9531*
t+28	0.4178	0.4804
t+29	0.1745	0.3199
t+30	0.1790	0.3629

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 28. Daily Average Excess Returns of Small, Medium and Large Banks During the Mexican Event (Using a Longer Estimation Period)[a]

Time Relative to Event	Small Banks (N=41)	Medium Banks (N=20)	Large Banks (N=25)
t-32	-0.0015	-1.1066*	-2.1755**
t-31	-0.5568	-1.2619*	-2.6502**
t-30	-0.4875	-0.8091	-0.7500
t-29	-0.2394	0.4431	0.5216
t-28	0.0893	0.7906	0.9041
t-27	-0.0612	0.4308	-0.5856
t-26	-0.2174	-0.3932	-1.3830*
t-25	0.0068	0.6566	-0.2387
t-24	-0.2079	-0.7322	-0.6244
t-23	-0.0213	0.4184	-0.5630
t-22	0.0606	-0.4842	0.7020
t-21	0.1913	-0.3208	1.3954*
t-20	-0.1126	0.3181	0.5895
t-19	-0.0585	-0.1619	-0.6722
t-18	-0.0060	-0.1886	-0.4435
t-17	-0.1239	0.5917	0.7799
t-16	0.0776	-0.0929	-0.7041
t-15	-0.1403	-0.2111	0.1866
t-14	0.2340	-0.0377	-0.0701
t-13	-0.2217	-0.3382	0.9746
t-12	0.4283	0.9899*	0.6481
t-11	0.1190	-0.0402	-0.4223
t-10	0.0537	0.0046	-0.3651
t-9	0.0432	-0.3545	-0.9177
t-8	-0.4396	0.2198	-0.2169
t-7	-0.2630	0.0327	0.0192
t-6	-0.1852	-0.2616	-0.1023
t-5	0.2305	0.4868	-1.0780
t-4	0.0737	-0.4865	-0.0039
t-3	0.4866	0.5905	1.5640*
t-2	-0.3937	0.1619	1.7437**
t-1	0.6469*	1.1394*	1.0215
t0	-0.1717	0.2154	-2.2787**
t+1	-0.3285	-1.3510*	-0.5776
t+2	-0.6623*	0.0437	0.1664
t+3	0.3307	0.4080	-0.5279
t+4	-0.4254	0.2048	-0.8070
t+5	-0.0412	0.3490	0.1366
t+6	0.8443*	-0.3195	0.4031
t+7	-0.0138	-0.1498	-0.3872
t+8	0.0700	0.0233	1.5703*
t+9	0.1343	0.6906	-0.6000
t+10	-0.3633	-0.6406	-0.4556
t+11	-0.2096	-0.5405	-2.1794**

Table 28 (Continued)

Time Relative to Event	Small Banks (N=41)	Medium Banks (N=20)	Large Banks (N=25)
t+12	0.1950	0.2224	-1.3358*
t+13	-0.1847	-0.5033	0.4649
t+14	0.1660	0.5182	-0.1666
t+15	0.1507	-0.2543	-0.2427
t+16	0.3491	-0.4201	0.4022
t+17	-0.0474	0.0174	1.2736*
t+18	0.5332	0.5089	1.7660**
t+19	0.8206*	0.4760	1.3620*
t+20	0.3472	0.3405	-0.2530
t+21	0.2407	-0.0338	-0.4588
t+22	-0.4843	-0.3894	0.8621
t+23	0.9176**	0.5281	0.5915
t+24	0.5747	0.2354	-0.3787
t+25	0.3805	0.2469	0.4595
t+26	0.0805	-0.1416	1.0107
t+27	0.5133	0.3903	0.8876
t+28	0.4900	0.5152	0.3141
t+29	0.1004	0.3694	0.3553
t+30	0.1759	-0.4147	0.9313

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

significant (1.16%). This implies that the Mexican moratorium announcement conveyed new information to the market which was reflected in the market adjusting the bank equity values over the two-day period.

The 49 exposed banks are dis-aggregated into 24 high exposure and 25 low exposure banks. Table 25 shows the abnormal returns of these two groups of banks. While the low exposure banks did experience negative returns on and following the event day, none of them are significant (0.47%, 0.56% and 0.02%). The exposed group of banks suffered significant declines on day zero (1.97%) and on day 4 (1.11%). The returns of the exposed banks in the intervening period are negative, but not significant. High exposure banks accounted for most of the negative reaction associated with the exposed banks. The decline suffered by low exposure banks was insignificant.

Table 26 presents the abnormal returns of the 39 NYSE/AMEX and 47 OTC banks. NYSE/AMEX banks accounted for most of the decline in bank equity values following the Mexican announcement. The OTC banks were not significantly affected by the announcement. NYSE/AMEX bank equities dropped by 1.76% on the event day. This was followed by 4 days of downward adjustments. While OTC bank equities do decline in value following the announcement, none of these decreases is significant.

The abnormal returns for the 49 BHCs and 37 non-BHCs

are shown in Table 27. The announcement day returns are negative for both groups (-0.77% and -0.94%), but is significant only for the non-BHCs. While BHCs experience a two-day decline of 1.37%, the non-BHCs drop by 1.64%. A bank-holding company tends to have lower risk than an otherwise equal non-BHC due to diversification and spreading of the unsystematic portion of the firm's risk. The above results show that non-BHCs were affected more by the announcement compared to BHCs.

The 86 banks were also disaggregated into subgroups by size. The sample contained 41 banks with total assets under $5 billion (small banks), 20 banks with total assets between $5 billion and $10 billion (medium banks), and the remaining 25 banks had total assets above $10 billion (large banks). The abnormal returns for these subgroups are shown in Table 28. The larger banks account for most of the drop in bank equity prices (-2.28%) on the announcement day. The medium-size banks did not experience any decline in equity prices on the event day. However, on the following day, their equity prices fell by 1.35%. The smaller banks experienced stock price declines on the announcement day and the following two days, but it was significant only on the second day after the event (-0.66% on t_{+2}). For the two-day event period (0,1), the equity value adjustments are significant only in the case of large banks (-2.86%).

The above analysis using an estimation period of 120

days starting 620 days before the event and ending 500 days before the event shows that the results using the two different estimation intervals are similar. In both cases, it can be concluded that the announcement conveyed new information to the market which was quickly impounded in the bank share prices. Non-exposed banks, which should not have experienced any decline in share prices due to the Mexican default, were also affected by the announcement, though to a lesser extent compared to exposed banks. Both analyses show that most of the adverse movement in equity prices of the exposed group of banks was due to the impact on the high-exposure banks. The market was rational in penalizing high exposure banks by a larger amount compared to low exposure banks.

A majority of the banks listed in the NYSE/AMEX had loans outstanding to Mexico in 1982, while less than half of the banks listed in the NASDAQ were exposed to Mexico. Consequently, the NYSE/AMEX banks accounted for most of the decline in bank share prices. Also, the large-bank shares experienced larger losses in equity prices compared to small- and medium-bank shares. Finally, BHCs were not affected as much as non-BHCs, reflecting the higher risk faced by investors in non-BHCs.

The difference between the two analyses is noticeable in the pre-announcement test period. When an estimation period closer to the event is used (that is, the first

analysis), the pre-announcement abnormal returns for all subgroups are approximately evenly split between positive and negative. When the estimation period is further away from the event period (that is, the second analysis), the abnormal returns during the pre-announcement period for all the sub-groups are predominantly negative. This implies that while the different estimation periods did not affect the tests of announcement effects, tests on market anticipations prior to the event may be sensitive to the estimation interval.

D. Analysis of Sub-Events.

Table 29 lists several Wall Street Journal write-ups related to the Third World debt, and specifically, the Mexican debt, during 1980-83. One or more of these reports may have affected the valuation of bank equities prior to the Mexican default. To identify any such anticipations, the abnormal returns of the different sub-groups for a 580-day event window are computed. This event window consists of 500 days before the announcement and 80 days after the announcement. The abnormal returns of all sub-groups of banks for those days on which any one of the subsamples had significant abnormal returns are computed.

Table 29 and the significant abnormal returns were cross-matched to isolate those days during which both reports about the deteriorating quality of bank loans to

Table 29. Sub-Events Related to the Mexican Moratorium Announcement as reported in the Wall Street Journal (Dates shown are publication dates)

Date	Report
02/14/80	Direct private foreign investment in Mexico should reach a record of at least $1.2 billion in 1980
03/28/80	World Bank approves a new loan to Mexico
04/14/80	Mexico's exports in the first two months rise by 64%
04/15/80	Mexico to register a mutual fund with the SEC; foreigners are to be allowed to buy any stock listed in the Mexican exchange
05/16/80	Mexico increases oil price by $1.50 a barrel
05/23/80	Mexico receives a small loan from a West German banking group
05/29/80	Mexico and Canada sign a $1 billion financing agreement
06/03/80	World Bank to provide a new loan to Mexico
06/09/80	The IDB approves a new loan to Mexico
07/07/80	Mexico increases the price of oil by $1 per barrel
07/08/80	The IDB approves a new loan to Mexico
07/09/80	A six-bank syndicate approves a new loan of $61.3 million to two Mexican firms
07/11/80	The World Bank authorizes a $325 million loan to Mexico
07/21/80	Mexico suffers drought, bottlenecks; inflation is sky-high and rising, pressing the peso downward
08/08/80	Mexico said that its trade deficit in the first 6 months has narrowed
08/22/80	The CEDC agrees to a new loan of $42.1 million to Mexico

Table 29 (Continued)

Date	Report
08/25/80	Mexican crude oil production reaches a new high
09/10/80	The Export-Import Bank approves a new loan of $178.1 million to Mexico
09/11/80	Poland pledges to meet debt despite strikes
09/15/80	Brazil is among the most heavily indebted nations in the world; $50 billion debt
09/19/80	Bank of America group set $300 million loan to a firm in Mexico
11/03/80	Brazil's debt plight is becoming major worry to its global lenders, particularly U.S. banks
11/07/80	The World Bank approves a $125 million loan to Mexico
11/10/80	The Export-Import Bank approves a loan of $111.4 million to Mexico
11/13/80	Mexico said its trade deficit narrowed in the first nine months
11/14/80	Mitsubishi bank of Tokyo to manage a $100 million loan to Mexico
12/12/80	Mexico's trade deficit for the first ten months widens
12/19/80	Mexico plans to raise its export prices for crude oil by 16% on Jan 1
01/07/81	Warsaw is seeking credit from Bonn for imports and rescheduling of debt
01/07/81	Mexican securities agency ordered that sales to non-residents of Mexican government Treasury certificates be suspended
01/09/81	Top officials of Poland's main Western creditor nations will meet in Paris to consider rescheduling the country's foreign debt

Table 29 (Continued)

Date	Report
01/14/81	Mexico's foreign trade deficit totaled $2.92 billion in 1980
01/21/81	Mexico's central bank governor estimated that the country's international debt this year will grow between $4.5 and $5 billion
01/27/81	World Bank authorized a $280 million loan to Mexico
01/28/81	Third World's Debts, totaling $500 billion, may pose big dangers; defaults and bank failures looming
02/05/81	Poland's western debts soared to $23 billion in 1980 amid a drastic decline in economic performance
03/17/81	Venezuela may seek giant bank loan to bring order to chaotic debt picture
03/19/81	Mexico plans to file with SEC a planned offering in the US of $100 million of seven-year notes
03/25/81	Bankers expect to grant Bolivia a three year delay in paying its existing debts
03/25/81	Canada has agreed to permit Poland to to defer about $21 million in repayments
03/31/81	Mexico received $14 million from the World Bank
04/06/81	Guest column by West German banker : Poland must reschedule $5.7 billion this year of more than $25 billion hard currency foreign debts
04/08/81	Mexico's merchandise trade deficit widened in January
04/16/81	Poland offered a moratorium on some debt
06/09/81	Mexico's trade deficit for the first four months of the year widened

Table 29 (Continued)

Date	Report
06/24/81	Mexico proposed boosting its average oil price by two dollars a barrel
06/25/81	The total external debt of all developing countries increased to $456 billion in 1980 from $393 billion in 1979 and $86 billion in 1971 : OECD
06/26/81	Brazil will need to borrow $10 billion this year to meet repayments and interest charges on overseas debt - a figure far less than previously anticipated : Brazil's ambassador to Britain
07/02/81	Mexico tries to bolster flagging peso; speculation that peso will be sharply devalued
07/22/81	Mexico is striving to rebuild oil exports, offering concessions
07/24/81	Mexico to receive loans for $265 million from the World Bank
08/05/81	Mexico will receive a $700 million loan from a group of 59 international banks
08/05/81	Mexico acknowledges that a price rise was impossible in the face of an oil glut
08/11/81	Mexico has lined up medium-term bank loans of $4.9 million
08/11/81	Mexican bank gets $181.5 million loan from French group
08/13/81	Mexico's boom damped by oil glut
08/26/81	Oil glut has Mexico looking for funds
09/08/81	Mexican President announced an increase in the country's proven oil reserves and that the economy continued to grow more than 8% a year
11/02/81	Mexico's new money markets said to have 'explosive' growth; US firms still pinched for pesos

Table 29 (Continued)

Date	Report
11/03/81	Developing nations' debt expected to rise 15% by end of the year : OECD
11/09/81	Mexican state agency lines up $500 million 8-year loans in dollars and SDRs; stiffens terms for Mexico
11/11/81	Mexico filed with the SEC $100 million of bonds, maturing in 1986
01/07/82	Western bankers are to meet Jan 7 on Polish debt amid uncertainty over interest payment
01/07/82	Editorial: Officials argue US role on Polish debt
01/11/82	Mexico intends to raise the equivalent of $175 million through an international consortium
01/28/82	Mexican officials say the peso will slide 15% to 18% against other currencies this year
02/19/82	Mexican peso plunges 28% against the dollar; nation's economic troubles touch off the decision to let currency float
02/22/82	The Mexican government does not want the peso to fall below 38 to the dollar; government expects inflation to increase up to 60% from 30% last year
02/25/82	Mexico froze prices for 50 items in an effort to curb the inflationary effects of a week-old devaluation of the peso
02/25/82	The IADB approved a $75 million loan to Mexico
03/05/82	Wells Fargo arranges anew loan to Mexico and Argentina
03/09/82	Poland appears to have completed payment of the interest due commercial banks in 1981
03/18/82	US Export-Import bank approved a new loan to Mexico and Peru

Table 29 (Continued)

Date	Report
03/19/82	Mexico is weathering the float of the peso, but problems persist: oil glut and inflation
03/26/82	Mexico may face inflation explosion, second peso devaluation, analysts warn
04/12/82	A Mexican financing agency arranges a short-term credit of $1.2 billion through a consortium of 12 banks
04/21/82	The Mexican government is trying to convert a part of its short-term foreign debt into long-term loans, but many foreign bankers are balking
04/22/82	Mexican austerity measures were imposed for 1982 to shore up the country's troubled economy and stabilize the peso's value
04/22/82	Mexico unveils a plan to narrow budget deficit and limit foreign debt, but analysts are skeptical
05/07/82	Banks seem receptive to Mexican proposal for refinancing debt
05/13/82	President Portillo urged Mexicans to stop buying US dollars
05/18/82	World Bank approves $15.3 million loan to Mexico
05/19/82	Mexico's treasury secretary said the government's net foreign borrowings will drop this year to $11 billion from $18 billion in 1981; Mexico's foreign debt outstanding will be $65 billion at the end of 1982
05/25/82	Mexican government asked a group of lenders to advance it $1 billion of a $2.5 billion loan that currently is being negotiated
05/28/82	Mexico received $60 million loan from the World Bank
06/02/82	Mexico's primary international reserves fell to $3.92 billion as of Monday from $5.04 billion at the end of last year

Table 29 (Continued)

Date	Report
06/14/82	US Export-Import bank approves a new loan to Mexico
06/14/82	Loan to Mexico of $2.5 billion seems delayed; banks concerned about drop in reserves
06/17/82	Election-period nerves plague Mexico, even though outcome isn't in question
06/24/82	Bankers said that they were reassured that Argentina would continue to meet payments on its commercial bank loans
07/02/82	Western bankers plan talks on rescheduling Poland's $4 billion debt
07/02/82	Loan signed for Mexico totaling $2.5 billion
07/06/82	Mexicans elect Hurtado as new president
07/14/82	Chile to help banks cope with bad loans worth $2 billion
07/15/82	Mexico is readying a $100 million Eurodollar bond offering that will carry a record interest rate of 18.5%
07/23/82	Mexico posted a $381 million trade surplus in the first five months of 1982
07/28/82	Bankers convene in US, Germany on Polish debt; sessions are in preparation for meeting in London on 1982 interest payments
07/29/82	Polish debt puts Western banks in bind as they try to work out rescheduling
07/30/82	An IMF delegation left Buenos Aries after two weeks of consultation, reportedly carrying a report that casts doubt on Argentina's ability to repay its foreign debt
08/03/82	Mexico's government raised prices on several items
08/09/82	Argentina's foreign debt has reached a record $39.1 billion

Table 29 (Continued)

Date	Report
08/09/82	Peso devaluation further damages the Mexican economy
08/16/82	Economy of Mexico, already in bad health, may face further ills; bankers say new controls could hurt confidence
08/17/82	The Mexican government closed the foreign exchange markets and announced that all money in foreign currency accounts could only be withdrawn in pesos
08/19/82	Crisis in Mexican economy is triggering a major international rescue operation
08/20/82	Mexico seeks to stop paying debt principal; foreign lenders will meet today on proposal
08/20/82	Treasury bill futures surged after after rumors swept market that one or more major US banks faced problems in their loan exposure in Mexican pesos
08/20/82	Editorial: Bailing out Mexico
08/23/82	International bankers tentatively agreed to let Mexico delay repayment of some debt principal
08/24/82	Banks of International Settlements provides Mexico a short term credit of $1.68 billion
08/25/82	Foreign bankers confused about the rules regarding their loans to Mexico's public and private sectors
08/26/82	Reagan administration is considering proposing the creation of $25 billion international reserve fund to be used to rescue cash-squeezed countries
08/30/82	Bankers satisfied with the interest rates set by Mexico to roll over for 90 days
09/02/82	Mexico nationalized all its banks and instituted a general system of exchange controls

Table 29 (Continued)

Date	Report
09/03/82	Gold soars to 11-month high on rumor that Argentina may repudiate its debt and nationalize its banks; in foreign exchange trading, the dollar again fell against key currencies
09/07/82	Mexico's newly nationalized banks open amid doubts about controls on currency
09/08/82	Mexican financial package delayed due to widening differences between Mexico and the IMF
09/13/82	Mexican government tightened foreign-exchange controls in an effort to prevent Mexicans from removing personal wealth from the country
09/15/82	Lenders' jitters: International bankers take steps to restore faith in their system; many Third World nations unable to repay their loans are applying for relief
09/15/82	Mexico releases further details on peso rules
09/17/82	Phillipine economy worries banks
09/30/82	Venezuela seeks more time to pay $8.8 billion debt
10/04/82	Mexico needs $8.31 billion in new loans
10/11/82	Foreign loans now trouble smaller banks; expansion minded regional bankers worry
10/11/82	Ecuador, stung by lower oil income, has called for a meeting of its major creditors to discuss immediate rescheduling of its foreign debts
10/13/82	Mexico issued rules affecting foreign firms, making it difficult to send dollars home
10/25/82	Mexico and the IMF are moving closer to a loan accord

Table 29 (Continued)

Date	Report
10/27/82	Mexico's President-elect said that the US protectionist trend is making it harder for Mexico to repay its loans
11/05/82	The financial problems of Mexico, Argentina and Poland and other developing countries could cause trouble for their neighbours if banks cut back international lending
11/05/82	Herzog denies another peso devaluation
11/05/82	New SEC rules to throw light on bank foreign loans
11/10/82	Mexico and the IMF agree on a $4.5 billion loan package
11/16/82	At a crossroads: Bank nationalization shifts Mexico to left, increases its instability; foreign investors' risk rises
11/16/82	Mexico requests delay in making debt payments
11/17/82	Mexico's letter of intent to the IMF falls short on specifics, some conditions may prove unpopular
11/19/82	Brazil, plagued with a staggering foreign debt, is preparing to ask the IMF for a $500 million loan
11/22/82	FNB of Chicago is arranging a $450 million loan to Mexico
11/24/82	Foreign bankers threaten to withhold new loans to Mexico until they collect interest from private sector borrowers
11/26/82	Stock prices of money center banks expected to continue to rise despite concern over Mexico
11/29/82	Continental Illinois disclosed that about 11% of its foreign loan portfolio is tied up in the economically troubled countries of Mexico and Argentina

Table 29 (Continued)

Date	Report
11/30/82	Venezuela finds some major international bankers reluctant to renew its short-term loans
12/02/82	Hurtado assumes Mexican Presidency amid economic crisis
12/02/82	Venezuela's public debt has reached $35 billion
12/09/82	Mexico will allow its peso to float in the free market, but fixed rate will continue for certain transactions
12/13/82	Mexico proposes to restructure some of its debt through 1984
12/17/82	The total external debt of developing countries will climb 18% in 1982 to $626 billion from $530 billion in 1981 : OECD
12/17/82	Why Brazil has dire debt problems: This wasn't supposed to happen to a nation to which many international banks still point out as a good example of thoughtfully planned development
12/20/82	Mexico devalues peso
12/21/82	Mexican peso fell 53% against the US dollar
12/23/82	Latest devaluation has analysts taking new look at firms heavily involved in Mexico
12/24/82	IMF granted Mexico a $3.96 billion loan
12/29/82	Mexico expected to sell back to the public 34% of each of Mexico's domestic banks

Third World countries were published in the Wall Street Journal and one or more bank sub-groups suffered significant declines in market value. These are reported in Tables 30 and 31.

Most of the unfavorable reports following the Mexican default were followed by negative bank equity price adjustments, in many cases, significantly. Prior to the Mexican default, unfavorable press reports were followed by both positive and negative price adjustments, indicating that there was some anticipation of the quality of loan assets held by banks.

Table 30 also includes some events that a priori are expected to have a significant effect on the creditor banks, but were not detected by the two step prediction process. In other words, the abnormal returns on the days on which these events occurred were not significant in the initial analysis. However, the nature of these events was such that they should have a tendency to impact the stock returns of banks. Hence, they are included in the list of events in Table 30. These are events 5, 9, 10, 13, 16, 19, 20 and 22. Events 5, 9, 10 and 13 are reports about the deterioration in the value of the Mexican Peso. Since the value of a country's currency is closely tied to the state of the economy in that country, these events are included in the analysis. Event 16 is the day before the Mexican default announcement. This event is included in the analysis due to

Table 30. Selected Sub-Events Related to the Mexican Moratorium Announcement as reported in the Wall Street Journal (Dates Shown are Publication Dates)

Date	Event No	Wall Street Journal Index Description
12/12/80	1	Mexico's trade deficit for the first ten months widens
01/07/81	2	Warsaw is seeking credit from Bonn for imports and rescheduling of debt Mexican securities agency ordered that sales to non-residents of Mexican government Treasury certificates be suspended
03/19/81	3	Mexico plans to file with SEC a planned offering in the US of $100 million of seven-year notes
04/06/81	4	Guest column by West German banker : Poland must reschedule $5.7 billion this year of more than $25 billion hard currency foreign debts
07/02/81	5	Mexico tries to bolster flagging peso; speculation that peso will be sharply devalued
08/05/81	6	Mexico will receive a $700 million loan from a group of 59 international banks Mexico acknowledges that a price rise was impossible in the face of an oil glut
09/08/81	7	Mexican President announced an increase in the country's proven oil reserves and that the economy continued to grow more than 8% a year
01/28/82	8	Mexican officials say that peso will slide 15% to 18% against other currencies this year
02/19/82	9	Mexican peso plunges 28% against the dollar; nation's economic troubles touch off the decision to let currency float
03/26/82	10	Mexico may face inflation explosion, second peso devaluation, analysts warn
07/06/82	11	Mexicans elect Hurtado as new president

Table 30 (Continued)

Date	Event No	Wall Street Journal Index Description
08/03/82	12	Mexico's government raised prices on several items
08/09/82	13	Peso devaluation further damages the Mexican economy
08/16/82	14	Economy of Mexico, already in bad health, may face further ills; bankers say new controls could hurt confidence
08/17/82	15	The Mexican government closed the foreign exchange markets and announced that all money in foreign currency accounts could only be withdrawn in pesos
08/18/82	16	*
08/19/82	17	Crisis in Mexican economy is triggering a major international rescue operation
08/20/82	18	Mexico seeks to stop paying debt principal; foreign lenders will meet today on proposal Treasury bill futures surged after after rumors swept market that one or more major US banks faced problems in their loan exposure in Mexican pesos Editorial: Bailing out Mexico
08/23/82	19	International bankers tentatively agreed to let Mexico delay repayment of some debt principal
08/24/82	20	Banks of International Settlements provides Mexico a short term credit of $1.68 billion
08/25/82	21	Foreign bankers confused about the rules regarding their loans to Mexico's public and private sectors
08/26/82	22	Reagan administration is considering proposing the creation of $25 billion international reserve fund to be used to rescue cash-squeezed countries

Table 30 (Continued)

Date	Event No	Wall Street Journal Index Description
09/02/82	23	Mexico nationalized all its banks and instituted a general system of exchange controls
09/03/82	24	Gold soars to 11-month high on rumour that Argentina may repudiate its debt and nationalize its banks; in foreign exchange trading, the dollar again fell against key currencies
10/13/82	25	Mexico issued rules affecting foreign firms, making it difficult to send dollars home
10/27/82	26	Mexico's President-elect said that the US protectionist trend is making it harder for Mexico to repay its loans
11/16/82	27	At a crossroads: Bank nationalization shifts Mexico to left, increases its instability; foreign investors' risk rises Mexico requests delay in making debt payments
11/26/82	28	Stock prices of money center banks expected to continue to rise despite concern over Mexico
11/29/82	29	Continental Illinois disclosed that about 11% of its foreign loan portfolio is tied up in the economically troubled countries of Mexico and Argentina
12/09/82	30	Mexico will allow its peso to float in the free market, but fixed rate will continue for certain transactions

* The Wall Street Journal did not report any specific event related to Mexico. However, this date is included in the regressions due to the volatile nature of the returns on the days surrounding the default announcement

Table 31. Regression Coefficients of the Indicator Variables for Sub-Events Before and After the Mexican Announcement

Event	All Banks (N=86)	Exposed Banks (N=49)	Non-Exposed Banks (N=37)	NYSE Banks (N=39)	OTC Banks (N=47)	BHC Banks (N=49)	Non-BHC Banks (N=37)	Small Banks (N=41)	Medium Banks (N=20)	Large Banks (N=25)
1	-0.0069**	-0.0070**	-0.0067**	-0.0062*	-0.0074**	-0.0077**	-0.0057*	-0.0073**	-0.0080*	-0.0049
2	0.0038*	0.0022	0.0056*	-0.0022	0.0080**	0.0041*	0.0032	0.0029	0.0037	0.0029
3	0.0050**	0.0071**	0.0023	0.0099**	0.0013	0.0019	0.0091**	0.0037	0.0083*	0.0053
4	0.0009	-0.0033	0.0064**	-0.0036	0.0047**	0.0033	-0.0023	0.0051*	-0.0024	-0.0032
5	-0.0013	-0.0008	-0.0019	-0.0010	-0.0016	-0.0044*	0.0029	0.0009	-0.0051	-0.0022
6	-0.0058**	-0.0073**	-0.0038	-0.0114**	-0.0014	-0.0047*	-0.0071**	-0.0013	-0.0078*	-0.0123**
7	-0.0050**	-0.0088**	-0.0002	-0.0102**	-0.0012	-0.0029	-0.0079**	-0.0028	-0.0079*	-0.0080**
8	-0.0015	-0.0016	-0.0015	-0.0041	0.0002	-0.0009	-0.0023	-0.0041*	0.0007	0.0001
9	-0.0027	-0.0031	-0.0023	-0.0051*	-0.0008	-0.0037*	-0.0014	-0.0009	-0.0044	-0.0046
10	0.0004	-0.0023	0.0040*	0.0015	-0.0003	-0.0027	0.0045*	-0.0018	0.0046	0.0012
11	-0.0089**	-0.0118**	-0.0051*	-0.0154**	-0.0037*	-0.0047*	-0.0146**	-0.0006	-0.0113	-0.0211**
12	0.0061**	0.0080**	0.0035	0.0103**	0.0027	0.0042*	0.0087**	0.0037	0.0094**	0.0075*
13	-0.0023	-0.0014	-0.0037	-0.0061*	0.0004	-0.0010	-0.0040	-0.0056**	0.0012	-0.0012
14	0.0084**	0.0102**	0.0061**	0.0144**	0.0035*	0.0065**	0.0109**	-0.0050*	0.0066*	0.0158**
15	0.0047**	0.0083**	-0.0003	0.0095**	-0.0003	0.0006	0.0100**	-0.0028	0.0049	0.0144**
16	0.0088**	0.0067**	0.0118**	0.0091**	0.0094**	0.0125**	0.0040	0.0073**	0.0127**	0.0106**
17	-0.0083**	-0.0118**	-0.0037	-0.0174**	-0.0009	-0.0076**	-0.0092**	-0.0020	0.0025	-0.0277**
18	-0.0056**	-0.0042*	-0.0075**	-0.0084**	-0.0040*	-0.0049*	-0.0065**	-0.0025	-0.0110**	-0.0079**
19	-0.0019	-0.0026	-0.0009	-0.0007	-0.0030	-0.0064**	0.0041	-0.0055**	0.0030	0.0000
20	0.0010	0.0025	-0.0008	-0.0015	0.0036*	0.0020	-0.0003	0.0037	0.0047	-0.0046
21	-0.0034*	-0.0069**	0.0013	-0.0057*	-0.0014	-0.0016	-0.0057*	-0.0033	0.0043	-0.0093**
22	0.0013	0.0016	0.0011	0.0045	-0.0009	0.0012	0.0016	0.0004	0.0051	0.0010
23	-0.0041**	-0.0061**	-0.0015	-0.0061*	-0.0024	-0.0017	-0.0072**	-0.0029	-0.0046	-0.0054
24	-0.0081**	-0.0097**	-0.0060**	-0.0161**	-0.0015	-0.0044*	-0.0129**	-0.0014	-0.0035	-0.0228**
25	-0.0060**	-0.0058**	-0.0061**	-0.0037	-0.0079**	-0.0072**	-0.0043	-0.0058**	-0.0110**	-0.0021
26	-0.0086**	-0.0093**	-0.0078**	-0.0110**	-0.0071**	-0.0087**	-0.0085**	-0.0093**	-0.0105**	-0.0073*
27	-0.0074**	-0.0096**	-0.0046*	-0.0159**	-0.0008	-0.0038*	-0.0123**	-0.0058**	-0.0021	-0.0160**
28	-0.0028*	-0.0036	-0.0019	-0.0042	-0.0016	-0.0013	-0.0048*	-0.0026	-0.0023	-0.0032
29	-0.0028*	-0.0053*	0.0005	-0.0056*	-0.0003	-0.0010	-0.0051*	-0.0009	-0.0032	-0.0083**
30	-0.0060**	-0.0081**	-0.0033	-0.0130**	-0.0004	-0.0065**	-0.0053*	-0.0024	-0.0080*	-0.0114**

* significant at the level of 0.95
** significant at the level of 0.99

its proximity to the event day and the closing of the foreign exchange markets in Mexico two days prior to the default announcement. Events 19, 20 and 22 are reports about the immediate actions taken by banks and international organizations following the Mexican default. They are included in the analysis to find out how the market reacted to these actions. In all, thirty sub-events were identified (as shown in Table 30). A multivariate regression model of the following form is used to analyze the effect of these events on the bank returns.

$$R_{it} = a_i + b_i R_{mt} + c_{ik} D_{kt}$$

where R_{it} is the return of bank i on day t, R_{mt} is the market return on day t, D_{kt} is a series of binary indicator variables, and a, b and c are regression coefficients.

Each sub-event is represented by an indicator variable with a value of 1 if the event occurred and 0 if otherwise. Separate multivariate regressions are run for each sub-group using the thirty indicator variables. The regression coefficients for these variables are shown in Table 31.

The thirty sub-events had varying impacts on each group of banks. Event 1 is the WSJ report that the Mexican trade deficit widened for the first ten months of 1980. This represented a negative signal about the Mexican economy and its ability to service its external debt. The coefficients associated with this event are all negative and significant

except for the group of large banks (which had a negative coefficient, but insignificant).

The second event is the report about difficulties faced by Poland in repaying its debts to the Western nations. On the same day, the WSJ also reported that Mexico was suspending sales of Mexican Government Treasury certificates to non-residents. Although these represented adverse movements in the respective countries, none of the various groups of banks were adversely affected on the day of the report. Similarly, the third event, Mexico filing with the SEC to borrow directly from investors in the US, and the fourth event, a report about the problems faced by Poland, did not adversely affect the U.S. creditor banks.

Event 5 is the report about the Mexican Peso and its rapidly declining exchange rate. There was speculation that the peso might be devalued to help the Mexican economy. The coefficients associated with this event are negative for all groups of banks, but significant only for one group, BHCs.

On August 5, 1981 (event 6) Mexico ruled out any oil price increases as world oil production was at its highest and excess supply prevented it from increasing the price. This meant that Mexico would face a budget deficit and may not be able to service its debt as previously expected. This adverse event coincided with a sharp drop in stock prices of all sub-groups of banks, most of them significant. The Mexican President's reassurance that the economy was

growing at a stable rate on September 8, 1981 (event 7) did not help as the regression coefficients continue to be negative for all sub-groups.

Events 8, 9 and 10 relate to the problems facing the Mexican Peso. These are indications that the Mexican economy was not strong enough to handle the ambitious development programs and the external debt. The regression coefficients associated with these events are predominantly negative, but mostly insignificant.

On July 6, 1982 Mexico elected Hurtado as the new president (event 11). This event coincided with large significant declines in bank stock prices. In addition to Mexico, several other borrowers were facing problems with servicing their external debt.

On August 3, 1982 Mexico raised the prices of several items (event 12). The price increase coincided with significant positive returns for the various sub-groups.

Events 13, 14, 15 and 16 represent further deterioration of the Mexican economy. However, only event 13 is associated with negative returns. Surprisingly, the stock price adjustments associated with the remaining three events are positive and significant for most of the sub-groups. Included in these events is the closing of the Mexican foreign exchange market on August 17, 1982. This could mean that either the market did not consider these adverse events to be of any significance, or the market had

already anticipated these adverse movements and had impounded them in pricing bank assets and securities.[55]

On August 19, 1982 Mexico announced that it would be defaulting on its debt to U.S. banks. On the same day, the WSJ reported (event 17) that the governments of the industrialized nations were attempting to help Mexico overcome its economic problems. Both August 19 and August 20, the publication date of the Mexican default (event 18), were associated with large significant declines for all groups of banks. (Only medium size banks were not adversely affected on the announcement day.) On August 23 the creditor banks and Mexico came to an agreement to postpone debt service payments by Mexico (event 19). But the market was not impressed by the agreements and continued to adjust downward bank share prices.

Faced with a liquidity crisis, Mexico was trying its best to obtain a short-term credit from its creditors. While commercial banks were unwilling to issue any new loans, the Bank for International Settlements agreed to provide a new loan to Mexico to overcome the liquidity crisis (event 20). On the day when the short-term credit was approved the stock returns for the various sub-groups were non-negative, showing that the market viewed the event favorably. However, there was a lot of confusion about the

---

[55] The Wall Street Journal for these days were checked to detect confounding events that might have contaminated the results. However, no significants contamination was detected.

respective roles of the creditor banks and the monetary authorities in the debt rescheduling process. It was not clear if the public and private sector debts would be treated equally (event 21). Creditor banks had loans outstanding to both the Mexican official institutions and the private sector. Faced with this uncertainty, the banks experienced significant downward adjustments in their stock prices. One of the proposals suggested by the U.S. monetary authorities to meet future liquidity crises faced by the developing countries was to create a reserve fund to handle the short-term needs of the troubled borrower (event 22).

The remaining events in Table 30 represent further deterioration of the Mexican economy and the market received more information about the quality of assets held by banks. On September 2, 1982 Mexico nationalized all its banks (event 23). The government was concerned about the banks' ability to handle the economic crisis faced by Mexico. It also issued new restrictions affecting repatriation of income, making it more difficult for firms to transfer money out of Mexico (event 25). While Mexico was trying to recover from the economic crisis, other Latin American borrowers were faced with similar problems. The WSJ reported on September 3 that Argentina was also a likely candidate to default on all of its external debt (event 24). The quality of the loan assets held by U.S. creditor banks

was further damaged when Mexico reiterated its inability to service its external debt (events 26 and 27).

Beginning in October 1982, the SEC passed new regulations requiring banks to make public information about their exposure to sovereign borrowers. As banks started revealing more information about their exposure to Third World borrowers, the market became more informed (events 28 and 29). On December 9, 1982 Mexico decided to let the peso float in the free markets while maintaining the fixed rate for certain transactions (event 30).

Each of the above events (23 to 30) is associated with negative adjustments to bank share prices for all sub-groups of banks. The coefficients are largest for the group of exposed banks. All the coefficients are significant for the sample of all banks and exposed banks. For the other sub-groups, the coefficients are predominantly negative, but not all of them are significant. The signs of these coefficients are consistent with the results from the two-stage event period abnormal return estimation process.

E. Intervention Analysis Results.

Tables 32 and 33 present the results of tests using the Intervention Analysis for the Mexican event. The entire sample of 87 banks used in the standard event study methodology is used in the Intervention Analysis. The 87 banks are also divided into subgroups based on their

Table 32. Sub-Events Related to the Mexican Moratorium Announcement (as Reported in the Wall Street Journal) Used in the Intervention Analysis (Dates shown are publication dates)

Event No	Date	Report
1	01/28/82	Mexican officials say that peso will slide 15% to 18% against other currencies
2	02/19/82	Mexican peso plunges 28% against the dollar; nation's economic troubles touch off the decision to let currency float
3	03/26/82	Mexico may face inflation explosion; second peso devaluation, analysts warn
4	07/06/82	Mexicans elect Hurtado as new president
5	08/03/82	Mexico's government raised prices on several items
6	08/09/82	Argentina's foreign debt has reached a record $39.1 billion
7	08/16/82	Economy of Mexico, already in bad health, may face further ills; bankers say new controls could hurt confidence
8	08/17/82	The Mexican government closed the foreign exchange markets and announced that all money in foreign currency accounts could only be withdrawn in pesos
9	08/18/82	*
10	08/19/82	Crisis in Mexican economy is triggering a major international rescue operation
11	08/20/82	Mexico seeks to stop paying debt principal; foreign lenders will meet today on proposal T-Bill futures surged after rumours swept market that one or more major US banks faced problems in their loan exposure in Mexican pesos

Table 32 (Continued)

Event No	Date	Report
12	08/23/82	International bankers tentatively agreed to let Mexico delay repayment of some debt principal
13	08/24/82	Bank of International Settlements provides Mexico a short term credit of $1.68 billion
14	08/25/82	Foreign bankers confused about the rules regarding their loans to Mexico's public and private sectors
15	08/26/82	Reagan administration is considering proposing the creation of $25 billion international reserve fund to be used to rescue cash-squeezed countries
16	09/02/82	Mexico nationalized all its banks and instituted a general system of exchange controls
17	09/03/82	Gold soars to a 11-month high on rumour that Argentina may repudiate its debt and nationalize its banks; in foreign exchange trading, the dollar again fell against key currencies

* The Wall Street Journal did not report any news about Mexico on this day. However, it is included in the regressions as it is close to the event day.

Table 33. Indicator Variable Coefficients Using Intervention Analysis for the Mexican Event.

Varaible	All Banks	Exposed Banks	Non-Exp Banks	BHC Banks	Non-BHC Banks	Large Banks	Medium Banks	Small Banks	NYSE Banks	OTC Banks
Int1	0.0035	0.0036	0.0033	0.0033	0.0038	0.0050	0.0018	0.0035	0.0043	0.0028
Int2	-0.0039	-0.0042	-0.0036	-0.0037	-0.0043	-0.0059	-0.0019	-0.0038	-0.0050	-0.0031
Beta1	0.5612*	0.6298*	0.4703*	0.5366*	0.5938*	0.8205*	0.5923*	0.3879*	0.3849*	0.4683*
Beta2	0.5731*	0.6504*	0.4709*	0.5204*	0.6430*	1.1173*	0.5364*	0.2593*	0.7425*	0.4407*
Event1	-0.0013	-0.0022	-0.0001	-0.0001	-0.0029	-0.0018	0.0017	-0.0025	0.0214*	0.0006
Event2	-0.0016	-0.0017	-0.0014	-0.0026	-0.0002	-0.0025	-0.0036	-0.0000	0.0136	0.0000
Event3	0.0018	-0.0005	0.0050	-0.0015	0.0062	0.0039	0.0051	-0.0010	0.0190*	0.0003
Event4	-0.0079	-0.0105	-0.0044	-0.0036	-0.0135	-0.0191*	-0.0104	0.0002	0.0034	-0.0026
Event5	0.0074	0.0097	0.0044	0.0054	0.0102	0.0101	0.0101	0.0045	0.0281*	0.0028
Event6	-0.0015	-0.0000	-0.0033	-0.0001	-0.0032	0.0012	0.0026	-0.0050	0.0120	0.0007
Event7	0.0095	0.0111	0.0073	0.0077	0.0119	0.0169*	0.0072	0.0061	0.0348*	0.0043
Event8	0.0041	0.0064	0.0011	0.0011	0.0081	0.0106	0.0065	-0.0010	0.0384*	0.0005
Event9	0.0106	0.0082	0.0137	0.0139	0.0061	0.0121	0.0123	0.0087	0.0287*	0.0101
Event10	-0.0114	-0.0152	-0.0064	-0.0103	-0.0128	-0.0233*	0.0019	-0.0046	-0.0214*	-0.0029
Event11	-0.0105	-0.0105	-0.0104	-0.0082	-0.0135	-0.0216*	-0.0082	-0.0020	-0.0166	-0.0054
Event12	-0.0059	-0.0080	-0.0031	-0.0090	-0.0017	-0.0154	0.0039	-0.0048	-0.0081	-0.0037
Event13	-0.0010	0.0003	-0.0026	0.0001	-0.0025	-0.0077	0.0018	0.0018	-0.0046	0.0025
Event14	-0.0069	-0.0116	-0.0007	-0.0041	-0.0107	-0.0222*	0.0043	-0.0031	-0.0122	-0.0029
Event15	-0.0014	-0.0020	-0.0006	-0.0009	-0.0020	-0.0076	0.0036	-0.0000	-0.0005	-0.0030
Event16	-0.0074	-0.0104	-0.0036	-0.0042	-0.0118	-0.0163	-0.0050	-0.0033	-0.0120	-0.0037
Event17	-0.0117	-0.0143	-0.0082	-0.0070	-0.0179*	-0.0351*	-0.0032	-0.0016	-0.0223*	-0.0030
Beta1-Beta2	-0.0119	-0.0205	-0.0006	0.0162	-0.0492	-0.2967	0.0560	0.1286	-0.3576	0.0276
t - value	-0.0262	-0.0458	-0.0017	0.0335	-0.1155	-0.6186	0.1198	0.2515	-0.7352	0.1159

* Significant at the level of 0.05
** Significant at the level of 0.01

exposure, size, exchange membership and bank-holding company status. The pre-event period consists of 150 trading days prior to the Mexican default announcement of August 19, 1982. The post-event period consists of thirty trading days after the announcement. Seventeen subevents around the Mexican announcement are identified and tested. Each of these subevents is represented by a dummy variable in the regression model. Table 33 shows the intervention analysis coefficients for the intercept, slopes and dummy variables for each of the seventeen subevents.

The slope coefficients range from 0.259 to 1.117. The pre-event slope coefficient for the entire sample of banks is 0.561. The post-event slope coefficient for the same sample is 0.573. The table also shows the differences in the slope coefficients before and after the event and the corresponding t-values for each of the subgroups. The t-values indicate that the slope differences for the various subgroups are not significantly different from zero. This implies that the systematic risk of the sample of banks did not experience any shifts due to the Mexican announcement. The slope difference for the sample of all banks is -0.012.

For the various subsamples, the slope differences range from -0.357 to 0.129, but none are significantly different from zero. This implies that any abnormal return associated with the Mexican announcement is due to the information content of the events and not due to shifts in the

systematic risks associated with the banks.[56] [57] It also implies that the results obtained using the standard residual methodology are valid and need not be adjusted for

---

[56] The standard error to test the slope differences is computed as

[57] An alternative test for shifts in the parameters of the market model during the estimation and prediction periods is the test of equality between coefficients obtained from different time periods surrounding the event (Chow test). The Chow test computes the unexplained variation using the entire time period and using shorter time periods. The difference in the unexplained variation using the entire time period and the shorter time periods is analyzed to test for shifts in the parameters. To test for the stability of the regression coefficients, the following F-statistic is used:

$$F^* = \frac{[SSE(R)-SSE(1)-SSE(2)]/k}{[SSE(1)+SSE(2)]/(n+m-2k)} ;$$

where SSE(R) is the unexplained variation for the entire time period, SSE(1) is the unexplained variation for the pre-event time period, SSE(2) is the unexplained variation for the post-event time period, n and m are the number of observations for the time periods before and after the event, and, k is the number of restrictions in the regression model.

The F* was computed to be 26.2. The hypothesis that the regression coefficients are stable around the event period is rejected. To find out which of the regression coefficients -- the intercept or the slope -- shift during the test period, the following regression model is tested for the entire test period:

$$R_{it} = a + bR_{mt} + cDR_{mt} ;$$

where, R_{mt} is the market return on day t, R_{it} is the return on stock i on day t, D is a dummy variable equal to 0 for observations before the event and equal to 1 after the event, and, a, b and c are regression coefficients. The above regression model was estimated to be

$$R_{it} = \underset{(2.516)}{0.0003} + \underset{(31.867)}{0.61348}R_{mt} + \underset{(0.643)}{0.01542}DR_{mt} .$$

The t-statistics are shown in parenthesis. The regression coefficient associated with the shift in slope (0.01542) is not significantly different from zero. This implies that the shifts in regression coefficients observed using Chow tests are due to shifts in the intercept and not the slope coefficient.

changes in systematic risk as all of the abnormal return during the prediction period reflects the information content of the announcement. This result contradicts the findings of Born and Anderson (1986), who find that the market did experience shifts in the systematic risk during the Mexican event.[58]

The coefficients associated with the seventeen subevents are predominantly negative for all the subgroups. A comparison of these coefficients with the regression coefficients using indicator variables in Table 31 show that the signs are consistent in the two cases. With the exception of events five, seven, eight, and nine, all the other sub-events have negative regression coefficients,

---

[58] An alternative version of the Intervention Analysis model was also used to detect any shifts in the systematic risk of the banks. The model is expressed as

$R_{it} = a_1 + b_1R_{mt}E[t^e,t^-] + b_2R_{mt}E[t^-,t^o] + b_3R_{mt}E[t^o,t^+] + c_1E[t^-,t^o] + c_2E[t^o,t^+] + u_{it}$; where R_{it} = return on a security i for time period t; R_{mt} = return on a market portfolio for time period t; a_1 = a constant; b_1 = systematic risk of the firm during a prior time period; b_2 = systematic risk of the firm during the pre-announcement period; b_3 = systematic risk of the firm during the post-announcement period; c_1 = coefficient specifying the information content during the pre-announcement period; c_2 = coefficient specifying the information content during the post-announcement period; u_{it} = noise component; t^o = is the event time; $[t^e,t^-]$ is the estimation period; $[t^-,t^o]$ is the pre-announcement period; $[t^o,t^+]$ is the post-announcement period; and E is the intervention variable. Here, $E[t^e,t^-]$ = { 1 if $t^e<t<t^-$; 0 otherwise } ; $E[t^-,t^o]$ = { 1 if $t^-<t<t^o$; 0 otherwise } ; and $E[t^o,t^+]$ = { 1 if $t^o<t<t^+$; 0 otherwise }. The results (not shown here) are similar to the results obtained with the original formulation. The slope coefficients for the announcement period is higher than the slope coefficients before and after the announcement. However, the differences are not statistically significant.

reflecting the adverse information conveyed by these events. However, none of the coefficients for the sample of all banks is statistically significant.

A comparison of the intercepts before and after the event (first two rows of Table 33) show that these have changed from positive to negative for all sub-groups (see footnote 58).

The next section presents the results of similar tests conducted on a sample of banks during the Brazilian default announcement. Tests are conducted using all banks for which data are available. In the subsequent section tests are conducted on a set of banks common to both the Mexican and Brazilian events.

II. Brazilian Moratorium Announcement.

A. Bank Characteristics.

In the case of the tests for Brazilian moratorium announcement, the initial sample of banks consists of 87 banks, 48 of which are listed in the NYSE/AMEX and 39 in the NASDAQ. Table 34 shows the characteristics of the population of banks used to analyze the effects of the Brazilian announcement. The banks vary in size from $333.45 million to $191.12 billion in total assets. The average size of the banks is $19.2 billion in total assets and $1.36 billion in capital. The 49 NYSE/AMEX banks had an average

Table 34. Characteristics of Banks in the Sample Used for the Brazilian Event (Minimum, Maximum and Average Values are in $ million)

Sub-Group	Number of Banks	Minimum Value	Maximum Value	Average Value
		Total Assets		
All Banks	87	333.45	196124.00	19196.45
Exposed Banks	48	593.45	196124.00	31283.16
Non-Exp Banks	39	333.45	20228.90	5635.75
NYSE Banks	48	333.45	196124.00	28671.00
OTC Banks	39	1201.97	26820.21	7535.47
BHC Banks	60	369.99	196124.00	22716.05
Non-BHC Banks	27	333.45	21539.41	9957.52
Small Banks	25	333.45	4509.65	2760.93
Medium Banks	21	5060.02	9982.51	7233.17
Large Banks	41	10697.40	196124.00	35345.65
		Equity		
All Bank	87	16.96	13446.00	1356.80
Exposed Banks	48	65.56	13446.00	2200.11
Non-Exp Banks	39	16.96	1456.65	410.64
NYSE Banks	48	16.96	13446.00	2026.72
OTC Banks	39	95.03	1846.93	532.27
BHC Banks	60	16.96	13446.00	1597.87
Non-BHC Banks	27	22.60	1720.20	723.99
Small Banks	25	16.96	426.47	200.92
Medium Banks	21	349.29	712.92	514.64
Large Banks	41	694.27	13446.00	2492.95

size of $28.67 billion in total assets and $2.03 billion in capital. The corresponding numbers for the 39 OTC banks are $7.54 billion and $532.27 million. Again, no distinction is made between NYSE and AMEX banks as the number of banks in the sample that are listed in the AMEX is too small to make any meaningful comparisons. Of the 87 banks in the initial sample, 48 had loans outstanding to Brazil at the time of the default. The exact Brazilian exposure for seven of these banks was not disclosed as their dollar loans outstanding to Brazil was less than one percent of the total assets of the banks, and consequently, the SEC did not require them to report the exposure. However, the 1986 annual reports of these banks did state that they had loans outstanding to Brazil. The remaining 39 banks from the initial sample did not have any loans outstanding to Brazil at the time of the default. The exposed banks range in size from $593.45 million to $196.12 billion in total assets, with an average value of $31.28 billion. The size of the non-exposed banks ranged from $333.45 million to $20.23 billion in total assets, with an average value of $5.64 billion. While the exposed banks had an average capital of $2.20 billion, the non exposed banks had an average capital of only $410.64 million. The exposed banks were also divided into 20 high exposure and 28 low exposure banks along the mean exposure level. The initial sample consists of 60 bank-holding companies (BHCs) and 27 non-bank-holding

companies (non-BHCs). The BHCs had an average total asset size of $22.72 billion and an average capital of $1.60 billion. The corresponding numbers for the non-BHCs are $9.96 billion and $0.72 billion.

B. Regression Analysis.

In order to test for differences in stock returns of exposed and non-exposed banks, the individual bank returns are regressed against the market return and exposure of the banks to Brazil. The exposure variable is expressed both in terms of the actual exposure and a binary variable for exposed and non-exposed banks. Table 35 uses a binary variable for exposure, where the exposure variable is equal to 1 for exposed banks and 0 for non-exposed banks. The regression coefficients for ten days before and after the Brazilian moratorium announcement are shown in the table. Unlike in the case of the Mexican event, the exposure coefficients are both positive and negative for the 10 days before and after the announcement. The exposure coefficients are significant only on two days -- the sixth and eighth days after the announcement. None of the exposure coefficients are significant for any of the other days reported. This implies that there appears to be no difference between the returns of exposed and non-exposed banks. If the market was able to distinguish between exposed and non-exposed banks, the exposure coefficient

Table 35. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Brazilian Moratorium Announcement Using Binary Exposure Variable

Time Relative to Event Day	Intercept	Market Return	D[a]
t-10	-0.0125	2.4258	0.0008
	(-.468)	(.632)	(.222)
t-9	0.0078	-0.0144	-0.0040
	(1.905)	(-.014)	(-.709)
t-8	0.0056	2.2517*	0.0010
	(.956)	(1.845)	(.233)
t-7	0.0075	1.2665	-0.0042
	(1.252)	(1.661)	(-1.106)
t-6	0.0083	-0.2821	-0.0056
	(.790)	(-.301)	(-1.517)
t-5	0.0003	0.4718	-0.0020
	(.142)	(1.204)	(-.640)
t-4	-0.0151*	1.9031**	0.0025
	(-2.064)	(2.688)	(.715)
t-3	-0.0021	0.3347	0.0073
	(-0.108)	(.258)	(1.350)
t-2	0.0073	3.5168	-0.0062
	(1.301)	(1.485)	(-.975)
t-1	0.0043	3.6404	0.0042
	(.844)	(.633)	(.799)
t 0	0.0038	3.8766	0.0011
	(.648)	(.377)	(.150)
t+1	0.0035	1.0160	-0.0055
	(.262)	(.516)	(-.607)
t+2	-0.0041	1.7492*	0.0008
	(-.785)	(1.744)	(.200)
t+3	-0.0093	1.2866	-0.0025
	(-1.055)	(1.144)	(-.427)

Table 35 (Continued)

Time Relative to Event Day	Intercept	Market Return	D[a]
t+4	-0.0021	0.1450	0.0019
	(-.636)	(.233)	(.436)
t+5	0.0057	-0.3504	0.0035
	(.323)	(-.089)	(.723)
t+6	0.0424	1.4236	-0.0079*
	(1.514)	(1.153)	(1.752)
t+7	0.0008	-0.3052	-0.0013
	(.027)	(-.274)	(-.301)
t+8	0.0029	-0.2047	0.0100*
	(.370)	(-.277)	(2.095)
t+9	-0.0083	1.8483	0.0040
	(-.326)	(.425)	(.856)
t+10	0.0058	-3.2537	-0.0035
	(1.191)	(-.881)	(-.730)

[a] D is a binary variable with a value of 1 for exposed banks and 0 for non-exposed banks

** significant at the 0.99 level

* significant at the 0.95 level

should have been significantly negative following the event day (day 0), showing that exposed banks suffered a larger decline in equity values due to the deterioration of the quality of loan assets held by them.

In Table 36 the exposure variable is replaced by the actual exposure of banks. Individual bank returns are regressed against market return and exposure. Again, the exposure coefficients for the days reported are both positive and negative. The exposure coefficient is significant on five days -- t_{-7}, t_{-2}, t_{-1}, t_{+3} and t_{+8}. Three of these coefficients are negative and the remaining two are positive. The coefficients on the announcement day and the two days following the event are not significant. This implies that the market did not distinguish between exposed and non-exposed banks. This could mean that either the market was not aware of the actual foreign loan exposure of banks prior to the default, or that the market did not find it necessary to penalize banks proportionate to their exposures. If there is a contagion effect in the market following the Brazilian announcement, then the market will not be able to differentiate between exposed and non-exposed banks. However, the market will also not differentiate between the two groups of banks if the event does not convey any new information. This will be addressed in the next section, where the excess returns are analyzed.

Table 36. Estimates of Regression Coefficients for Exposed and Non-Exposed Banks around the Brazilian Moratorium Announcement Using Absolute Exposure Variable

Time Relative to Event Day	Intercept	Market Return	EXP[a]
t-10	-0.0053	1.3540	0.0001
	(-.191)	(.340)	(.753)
t-9	0.0061	0.1410	-0.0001
	(1.872)	(.128)	(-.272)
t-8	0.0048	1.8562	-0.0001
	(.797)	(1.463)	(-.475)
t-7	0.0027	0.5182	-0.0005
	(.470)	(.683)	(-3.035)
t-6	0.0047	-0.1210	-0.0001
	(.440)	(-.123)	(.869)
t-5	0.0000	0.3931	-0.0001
	(.018)	(.967)	(-.931)
t-4	-0.1200	1.5833	0.0002
	(-1.518)	(2.172)	(1.518)
t-3	-0.0017	0.4724	0.0002
	(-.086)	(.348)	(.869)
t-2	0.0111	5.5810	-0.0008
	(2.452)	(2.345)	(-2.633)
t-1	0.0064	-1.5235	0.0006
	(1.340)	(-.264)	(2.569)
t 0	0.0033	5.2729	0.0001
	(.685)	(.441)	(.370)
t+1	0.0022	1.0777	-0.0002
	(.160)	(.526)	(-.427)
t+2	-0.0002	1.1756	-0.0002
	(.051)	(1.133)	(-1.014)
t+3	-0.0029	0.5425	-0.0005
	(-.361)	(.471)	(-1.726)

Table 36 (Continued)

Time Relative to Event Day	Intercept	Market Return	EXP[a]
t+4	-0.0032	0.4762	0.0003
	(-1.274)	(.744)	(1.458)
t+5	0.0057	-0.1613	0.0001
	(.313)	(-.039)	(.683)
t+6	-0.0015	-2.9713	0.0003
	(-.053)	(-.23)	(1.422)
t+7	-0.0011	-0.8397	0.0002
	(-.417)	(-.727)	(.74)
t+8	0.0084	-0.6316	0.0006
	(1.069)	(-.84)	(2.944)
t+9	-0.0310	6.3691	-0.0003
	(-1.177)	(1.422)	(-1.448)
t+10	0.0069	-4.2744	-0.0003
	(1.504)	(-1.117)	(-1.161)

[a] EXP is the exposure measured as the ratio of dollar loans of banks to Mexico to bank capital

** significant at the 0.99 level

* significant at the 0.95 level

C. Analysis of Excess Returns.

The daily average excess returns for the period surrounding the Brazilian default announcement are computed using an estimation period of 120 days starting 150 days before the event and ending 30 days before the event. The test period ranges from 30 days before the event to 30 days after the event.

The daily average excess returns for the different subgroups are presented in Tables 37 - 41. Table 37 shows the announcement effect results for the sample of all banks, as well as exposed and non-exposed banks. On February 20, 1987 (t_0), Brazil announced the unilateral suspension of debt service payments to its creditors. The Wall Street Journal reported this on February 23, 1987 (t_{+1}).[59] The announcement day excess returns for the different sub-groups are positive, though not significant (0.53% for all banks, 0.56% for exposed banks and 0.50% for non-exposed banks). The excess returns on the press day become negative for the sample of all banks (-0.07%) and the sample of exposed banks (-0.32%), but are not significant. The two-day excess returns are positive for all three sub-groups (0.46%, 0.24% and 0.73% respectively). This implies that the announcement did not have any adverse effect on these three sub-groups of

[59] Since the Brazilian default announcement was made on Friday afternoon (February 20), some of the market reaction on the following trading day (Monday, February 23) might have been a result of the so-called "weekend effect" and not necessarily the reaction to the announcement itself.

Table 37. Daily Average Excess Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Brazilian Event[a]

Time Relative to Event	All Banks (N=87)	Exposed Banks (N=48)	Non-Exposed Banks (N=39)
t-30	0.3148	0.4801	0.1113
t-29	0.3967	0.2278	0.6047*
t-28	0.5816*	0.5578	0.6108*
t-27	-0.0727	-0.0253	-0.1309
t-26	-0.3413	-0.1555	-0.5700*
t-25	0.4004	0.8269	-0.1246
t-24	0.1297	0.6580	-0.5206
t-23	-0.5786*	-0.5829	-0.5732*
t-22	0.0447	0.3557	-0.3380
t-21	-0.5074	-0.6930	-0.2789
t-20	-0.9264**	-0.9495*	-0.8978**
t-19	0.0391	0.1357	-0.0798
t-18	-0.5131	-0.7972*	-0.1634
t-17	-0.2348	-0.0823	-0.4223
t-16	-0.1848	-0.1221	-0.2619
t-15	0.1431	0.0901	0.2083
t-14	-0.0269	-0.3789	0.4062
t-13	-0.2662	-0.0231	-0.5654*
t-12	0.1274	0.0658	0.2032
t-11	-0.4469	-0.3325	-0.5878*
t-10	0.0306	0.1053	-0.0615
t-9	0.6073*	0.5057	0.7323*
t-8	-0.0696	-0.1001	-0.0319
t-7	0.1611	-0.0582	0.4310
t-6	-0.4739	-0.6557	-0.2501
t-5	0.0301	-0.0182	0.0894
t-4	-0.0916	0.1343	-0.3697
t-3	-0.4166	-0.1137	-0.7895**
t-2	0.1902	0.0668	0.3420
t-1	0.9446**	1.1960**	0.6353*
t0	0.5341	0.5635	0.4978
t+1	-0.0724	-0.3224	0.2353
t+2	0.0292	-0.0021	0.0677
t+3	-0.7103**	-0.8734*	-0.5096
t+4	-0.0620	0.1025	-0.2644
t+5	0.3243	0.4918	0.1182
t+6	0.9274*	0.6815	1.2300**
t+7	-0.1579	-0.2693	-0.0207
t+8	-0.1699	0.1874	-0.6097*
t+9	0.0968	0.3085	-0.1638
t+10	0.1619	0.1105	0.2253
t+11	0.0322	-0.0066	0.0799
t+12	0.0401	0.1028	-0.0371

Table 37 (Continued)

Time Relative to Event	All Banks (N=87)	Exposed Banks (N=48)	Non-Exposed Banks (N=39)
t+13	-0.1144	-0.4090	0.2483
t+14	0.2045	0.3722	-0.0019
t+15	0.1857	0.1304	0.2536
t+16	-0.0395	-0.2873	0.2656
t+17	-0.3154	-0.2688	-0.3727
t+18	0.2486	0.2473	0.2503
t+19	0.0627	0.1427	-0.0358
t+20	-0.1487	-0.1659	-0.1276
t+21	-0.3751	-0.2383	-0.5434
t+22	-0.0914	-0.2512	0.1053
t+23	0.3001	0.8175*	-0.3366
t+24	-0.1447	-0.2280	-0.0422
t+25	0.4392	0.6777	0.1458
t+26	0.0731	0.1146	0.0221
t+27	-0.2740	-0.1459	-0.4317
t+28	-0.6256*	-0.9134*	-0.2713
t+29	0.0335	0.0305	0.0371
t+30	-0.7187*	-0.8763*	-0.5247

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

Table 38. Daily Average Excess Returns of High and Low Exposure Banks During the Brazilian Event[a]

Time Relative to Event	High Exposure Banks (N=20)	Low Exposure Banks (N=28)
t-30	0.1596	0.7090
t-29	0.1450	0.2869
t-28	0.7140	0.4463
t-27	0.1018	-0.1161
t-26	0.0217	-0.2821
t-25	1.6338*	0.2506
t-24	1.8211**	-0.1727
t-23	-1.3809*	-0.0129
t-22	1.5354*	-0.4870
t-21	-0.5705	-0.7806
t-20	-1.2376*	-0.7438
t-19	-0.2136	0.3852
t-18	-1.0084	-0.6464
t-17	-0.6555	0.3271
t-16	-0.4974	0.1460
t-15	-0.0314	0.1768
t-14	-0.7609	-0.1059
t-13	-0.8441	0.5633
t-12	0.6524	-0.3532
t-11	-0.3162	-0.3442
t-10	0.3285	-0.0541
t-9	0.7953	0.2989
t-8	-0.4972	0.1835
t-7	-0.2436	0.0743
t-6	-0.8447	-0.5208
t-5	0.0127	-0.0402
t-4	0.3873	-0.0465
t-3	-0.1117	-0.1151
t-2	-0.5565	0.5121
t-1	1.8114**	0.7564
t0	0.7515	0.4292
t+1	-0.4434	-0.2360
t+2	-0.2897	0.2033
t+3	-1.3070*	-0.5637
t+4	0.4055	-0.1140
t+5	0.5725	0.4341
t+6	1.6683**	-0.0234
t+7	0.0784	-0.5176
t+8	0.4465	0.0023
t+9	-0.2867	0.7336
t+10	-0.1288	0.2814
t+11	-0.5826	0.4049
t+12	0.6217	-0.2678
t+13	-0.2650	-0.5119
t+14	0.9691	-0.0542

Table 38 (Continued)

Time Relative to Event	High Exposure Banks (N=20)	Low Exposure Banks (N=28)
t+15	0.1966	0.0831
t+16	-0.5263	-0.1165
t+17	0.3055	-0.6790
t+18	-0.5416	0.8108
t+19	0.0994	0.1737
t+20	-0.6027	0.1462
t+21	0.2298	-0.5727
t+22	-0.0488	-0.3957
t+23	1.6830**	0.1993
t+24	-0.1069	-0.3145
t+25	0.6050	0.7297
t+26	0.1385	0.0974
t+27	0.0520	-0.2872
t+28	-1.3503	-0.6013
t+29	0.0493	0.0171
t+30	-0.3219	-1.2723**

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

Table 39. Daily Average Excess Returns of NYSE/ASE Banks and OTC Banks During the Brazilian Event[a]

Time Relative to Event	NYSE/ASE Banks (N=48)	OTC Banks (N=39)
t-30	0.4775	0.1144
t-29	0.2489	0.5787
t-28	0.4414	0.7542*
t-27	-0.2888	0.1933
t-26	-0.0452	-0.7058*
t-25	0.7959	-0.0864
t-24	0.2458	-0.0132
t-23	-0.6152	-0.5335
t-22	0.6262	-0.6710*
t-21	-0.8438*	-0.0934
t-20	-1.4448**	-0.2883
t-19	0.3034	-0.2862
t-18	-0.6512	-0.3432
t-17	-0.4159	-0.0118
t-16	-0.3455	0.0131
t-15	-0.0069	0.3277
t-14	-0.1292	0.0990
t-13	-0.5024	0.0244
t-12	0.2053	0.0315
t-11	-0.5842	-0.2781
t-10	0.1020	-0.0573
t-9	0.7178	0.4712
t-8	-0.2770	0.1858
t-7	-0.0232	0.3879
t-6	-0.4063	-0.5572
t-5	0.0963	-0.0515
t-4	0.1855	-0.4327
t-3	-0.3906	-0.4486
t-2	0.4090	-0.0791
t-1	1.1294*	0.7173*
t0	0.4604	0.6247*
t+1	-0.2180	0.1069
t+2	-0.1463	0.2452
t+3	-0.8895*	-0.4898
t+4	0.1630	-0.3388
t+5	0.4218	0.2044
t+6	1.0050*	0.8318*
t+7	-0.3805	0.1161
t+8	-0.2906	-0.0213
t+9	0.2075	-0.0395
t+10	0.3287	-0.0433
t+11	-0.3624	0.5179
t+12	0.0825	-0.0121
t+13	-0.2107	0.0041
t+14	0.3977	-0.0333

Table 39 (Continued)

Time Relative to Event	NYSE/ASE Banks (N=48)	OTC Banks (N=39)
t+15	0.1090	0.2800
t+16	-0.2206	0.1835
t+17	-0.3533	-0.2686
t+18	-0.1218	0.7046
t+19	-0.0775	0.2353
t+20	-0.1181	-0.1865
t+21	-0.2732	-0.5004
t+22	-0.0588	-0.1315
t+23	0.9235*	-0.4670
t+24	-0.4364	0.2142
t+25	0.7237	0.0892
t+26	0.2579	-0.1543
t+27	-0.2722	-0.2763
t+28	-0.6581	-0.5855*
t+29	-0.1971	0.3171
t+30	-0.8962*	-0.5002

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

Table 40. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Brazilian Event[a]

Time Relative to Event	Bank Holding Cos. (N=59)	Non-Bank Holding Cos. (N=28)
t-30	0.3553	0.2292
t-29	0.5659	0.0403
t-28	0.9704**	-0.2376
t-27	-0.2212	0.2403
t-26	-0.2160	-0.6053
t-25	0.1555	0.9163*
t-24	-0.1730	0.7674*
t-23	-0.4760	-0.7948*
t-22	-0.0701	0.2866
t-21	-0.4918	-0.5402
t-20	-0.7641*	-1.2682**
t-19	-0.1753	0.4908
t-18	-0.4501	-0.6458
t-17	-0.0607	-0.6016
t-16	-0.2121	-0.1272
t-15	0.1273	0.1762
t-14	-0.0972	0.1211
t-13	-0.1681	-0.4730
t-12	0.1402	0.1004
t-11	-0.3476	-0.6562
t-10	0.0725	-0.0578
t-9	0.6640*	0.4878
t-8	-0.2660	0.3443
t-7	0.2156	0.0463
t-6	-0.4126	-0.6032
t-5	0.0545	-0.0214
t-4	-0.1063	-0.0607
t-3	-0.3950	-0.4621
t-2	0.1621	0.2494
t-1	0.8732*	1.0953**
t0	0.6482	0.2936
t+1	0.2016	-0.6498
t+2	0.0779	-0.0735
t+3	-0.5717	-1.0024*
t+4	-0.2277	0.2871
t+5	0.2282	0.5268
t+6	0.9235*	0.9355*
t+7	-0.1772	-0.1171
t+8	-0.0143	-0.4978
t+9	0.1870	-0.0933
t+10	0.3339	-0.0200
t+11	0.2111	-0.3449
t+12	0.2050	-0.3074
t+13	-0.3293	0.3385

Table 40 (Continued)

Time Relative to Event	Bank Holding Cos. (N=59)	Non-Bank Holding Cos. (N=28)
t+14	0.3664	-0.1366
t+15	0.1259	0.3116
t+16	-0.2345	0.3716
t+17	-0.2306	-0.4941
t+18	0.4902	-0.2603
t+19	0.1490	-0.1191
t+20	-0.1064	-0.2378
t+21	-0.0699	-1.0183**
t+22	-0.2116	0.1620
t+23	0.1606	0.5941
t+24	-0.3026	0.1879
t+25	0.5571	0.1909
t+26	0.0320	0.1598
t+27	-0.4250	0.0441
t+28	-0.7361*	-0.3927
t+29	0.0176	0.0668
t+30	-0.3869	-1.4178**

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

Table 41. Daily Average Excess Returns of Small, Medium and Large Banks During the Brazilian Event[a]

Time Relative to Event	Small Banks (N=25)	Medium Banks (N=21)	Large Banks (N=41)
t-30	0.8033	-0.1330	0.2462
t-29	0.3102	0.6835	0.3026
t-28	1.1238*	0.9729*	0.0506
t-27	-0.1478	0.0079	-0.0681
t-26	-0.0252	-0.7197	-0.3403
t-25	0.9153	0.0523	0.2647
t-24	0.3795	-0.6229	0.3628
t-23	0.0344	-0.5156	-0.9846**
t-22	-0.0433	-0.0510	0.1474
t-21	-0.6032	-0.2475	-0.5821
t-20	-0.4736	-1.1209*	-1.1028**
t-19	0.2167	-0.2781	0.0932
t-18	-0.4959	-0.1779	-0.6953*
t-17	0.5282	-0.6715	-0.4763
t-16	-0.1927	-0.0900	-0.2285
t-15	0.2631	0.4331	-0.0787
t-14	-0.0550	0.0441	-0.0462
t-13	-0.1156	0.2117	-0.6028
t-12	0.2910	0.1935	-0.0062
t-11	0.1243	-0.2618	-0.8901*
t-10	-0.2118	0.3725	0.0032
t-9	1.0127*	0.9277*	0.1960
t-8	-0.8230	0.2351	0.2338
t-7	0.6483	-0.0796	-0.0127
t-6	-0.3013	-0.0519	-0.5560
t-5	-0.2856	0.3277	0.0701
t-4	-0.0222	-0.4911	0.0707
t-3	0.7899	-0.9311*	-0.8887*
t-2	-0.1025	-0.0324	0.4827
t-1	0.5973	0.4914	1.3886**
t0	1.2112*	0.7183	0.0268
t+1	1.0688*	0.3617	-0.9906**
t+2	-0.0473	0.2062	-0.0148
t+3	-1.4587**	-0.3792	-0.4236
t+4	0.4016	-0.4099	-0.1664
t+5	0.1441	-0.1183	0.6609*
t+6	1.0867*	0.6275	0.9837**
t+7	-0.7563	0.0200	0.1159
t+8	0.9863	-0.1590	-0.8805*
t+9	0.3397	0.0343	-0.0193
t+10	0.5830	0.0043	-0.0140
t+11	-0.3708	0.6252	-0.0258
t+12	0.5343	-0.5469	0.0395
t+13	0.1720	-0.2143	-0.2378
t+14	0.6541	-0.1414	0.1075

Table 41 (Continued)

Time Relative to Event	Small Banks (N=25)	Medium Banks (N=21)	Large Banks (N=41)
t+15	-0.0532	0.2779	0.2840
t+16	-0.4597	0.1622	0.1135
t+17	0.3212	-0.6516	-0.5313
t+18	0.0082	1.0217*	-0.0007
t+19	0.8581	-0.0008	-0.3898
t+20	-0.5784	0.5927	-0.2664
t+21	0.0363	-0.4707	-0.5769
t+22	0.2181	0.0535	-0.3543
t+23	-0.1441	0.0888	0.6793*
t+24	-0.2242	0.3779	-0.3640
t+25	0.9217	0.5688	0.0788
t+26	-0.3331	0.2817	0.2140
t+27	-0.1886	-0.2058	-0.3610
t+28	-1.0677*	-0.5225	-0.4087
t+29	0.4131	-0.2078	-0.0745
t+30	0.6817	-1.0594*	-1.3981**

[a] Estimation period ranges from 150 days before the event to 30 days before the event.

* significant at the 0.95 level.

** significant at the 0.99 level.

banks. Unlike the case of the Mexican default announcement, there appears to be no negative effect associated with the Brazilian default announcement. This could mean that the announcement, by itself, is a non-event, or that it did not convey any new information to the market about the quality of assets held by creditor banks. It could also mean that the market anticipated the event and had already impounded it in the share prices of banks prior to the announcement. Since the Mexican debt crisis in 1982, the market has been continuously monitoring the activities of the Third World borrowers and the creditor banks. In the intra-event period, other borrowers like Peru and Argentina had defaulted on their loans to the industrialized nations. The market might have anticipated the suspension of debt service payments by Brazil in 1987. This explains the non-negative excess returns for the two-day event period. The weak negative effect for the samples of all banks and exposed banks on the press day may be minor corrections by a small group of market participants that did not previously anticipate correctly the value of bank equities.

The other significant excess returns reflect related and unrelated events during the 60-day event window. For example, the significant positive excess return of 0.95 percent on day t_{-1} is associated with the report about the accord reached between the U.S. and other developed countries to stabilize the dollar.

The excess returns for high and low exposure banks during the test period are shown in Table 38. Again, the announcement period returns are positive on the event day and negative, but insignificant on the press day. The two-day event period returns are 0.31% and 0.19% respectively. The event period returns for the sub-samples of NYSE/AMEX and OTC banks are shown in Table 39. The two-day event period returns for these subgroups of banks are positive and insignificant (0.24% and 0.73%). Table 40 shows the event period excess returns for BHCs and non-BHCs. While the announcement day excess returns are positive for both subgroups (0.65% and 0.29% respectively), the two-day event period excess returns are positive for the BHCs (0.85%) and negative for the non-BHCs (-0.36%). The negative sign on the excess returns of non-BHCs indicates the higher risk faced by investors in non-BHCs vis-a-vis investors in BHCs.

The sample of 87 banks is divided into sub-groups of small, medium and large banks. The group of small banks have less than $5 billion in total assets. Medium banks have total assets ranging from $5 billion to $10 billion. Banks with over $10 billion in total assets are classified as large banks. The sample contained 25 small banks, 21 medium banks and 41 large banks. The average size of the total assets for the three groups is $2.76 billion, $7.23 billion and $35.35 billion respectively. Table 41 presents

the excess returns of these three sub-groups for the test period.

The announcement day excess return for the group of small banks is positive and significant (1.21%). The corresponding returns for medium and large banks are also positive, though not significant (0.72% and 0.03% respectively). The two-day excess returns for the three groups are 2.23% (significant), 1.07% and -0.97%. On the press day, only the excess returns of the group of large banks is negative and significant (-0.99%).

The excess returns of the different sub-groups around the announcement indicate that the share prices of bank equities did not experience any decline immediately following the Brazilian announcement. The excess returns on the announcement day are not significantly negative for any of the sub-groups. The excess returns on the press day is negative and significant only in the case of large banks. This implies that only the share prices of large-bank equities were affected by the Brazilian moratorium announcement. None of the other groups of banks were adversely affected by the announcement. Again, this shows that the announcement did not reveal any new information about the quality of assets held by banks. Either the market had anticipated the deterioration of the quality of bank assets and had previously adjusted for this decline in

value, or the market did not feel that the announcement represented a decline in the value of bank equities.

The excess returns for the various sub-groups during the event period are recomputed using a different estimation period. To identify any changes in the estimation parameters prior to the event, an estimation period farther away from the event is used. A 120 day estimation period starting 620 days before the event and ending 500 days before the event is used. Twelve of the banks from the initial sample could not be used due to the lack of relevant data. The excess returns for the various sub-groups using the new estimation period are shown in Tables 42 - 46. The tables indicate that the announcement results using an estimation period far away from the Brazilian event are similar to the results using an estimation period nearer to the event. The announcement day returns are not negative and significant for any of the subgroups. However, the press day returns for all subgroups except the group of small banks are negative and significant in most cases (ie. all banks, exposed banks, non-exposed banks, low exposure banks, NYSE/AMEX banks, OTC banks, non-BHC banks, medium banks and large banks).

The two-day event period excess returns for the group of all banks is negative, but not significant (-0.49%). The group of 41 exposed banks account for most of this decline (-0.62%), while the group of non-exposed banks experience a

Table 42. Daily Average Excess Returns of All Banks, Exposed Banks and Non-Exposed Banks During the Brazilian Event Using a Longer Estimation Period[a]

Time Relative to Event	All Banks (N=75)	Exposed Banks (N=41)	Non-Exposed Banks (N=34)
t-30	0.3889	0.4363	0.3318
t-29	0.3415	0.1571	0.5638*
t-28	0.6088*	0.4666	0.7802**
t-27	-0.2273	-0.0590	-0.4302
t-26	-0.6191**	-0.4916	-0.7731**
t-25	0.4054	0.7625*	-0.0254
t-24	-0.1265	0.3899	-0.7493**
t-23	-0.8299**	-0.9370**	-0.7008**
t-22	-0.0027	0.4988	-0.6074*
t-21	-0.8199**	-0.9981**	-0.6051*
t-20	-0.8762**	-1.1656**	-0.5272*
t-19	-0.4243	-0.4627	-0.3779
t-18	-0.7352**	-0.9351**	-0.4942*
t-17	-0.2484	-0.2744	-0.2171
t-16	-0.4192	-0.5988*	-0.2026
t-15	-0.1765	-0.3091	-0.0166
t-14	-0.2702	-0.5276	0.0404
t-13	-0.1103	-0.0993	-0.1234
t-12	0.0112	0.0432	-0.0257
t-11	-0.5974*	-0.6488*	-0.5355*
t-10	-0.0189	0.0864	-0.1460
t-9	0.4714*	0.2660	0.7191**
t-8	-0.2465	-0.2077	-0.2933
t-7	-0.1359	-0.1966	-0.0627
t-6	-0.4654*	-0.7584*	-0.1122
t-5	-0.1303	-0.1638	-0.0900
t-4	-0.1849	-0.1303	-0.2508
t-3	-0.4222	-0.4389	-0.4021
t-2	-0.1420	-0.1766	-0.1002
t-1	0.8203**	1.0640**	0.5264*
t0	0.2833	0.3806	0.1660
t+1	-0.7700**	-1.0016**	-0.4908*
t+2	-0.0386	-0.0552	-0.0185
t+3	-0.7999**	-1.0976**	-0.4408*
t+4	-0.2542	-0.0832	-0.4603*
t+5	0.1616	0.2860	0.0116
t+6	0.7103**	0.4205	1.0597**
t+7	-0.2873	-0.4240	-0.1224
t+8	-0.2458	-0.1225	-0.3946
t+9	-0.1173	-0.0990	-0.1393
t+10	-0.2058	-0.4496	0.0883
t+11	-0.1991	-0.1998	-0.1981
t+12	0.0067	0.0759	-0.0767

Table 42 (Continued)

Time Relative to Event	All Banks (N=75)	Exposed Banks (N=41)	Non-Exposed Banks (N=34)
t+13	-0.2588	-0.5874*	0.1375
t+14	0.0550	0.1039	-0.0040
t+15	-0.0313	-0.0973	0.0483
t+16	-0.3541	-0.5973*	-0.0607
t+17	-0.3505	-0.3343	-0.3699
t+18	0.0526	-0.0141	0.1330
t+19	-0.0172	0.0003	-0.0383
t+20	-0.2136	-0.4078	0.0206
t+21	-0.6337**	-0.5502	-0.7343**
t+22	-0.4498*	-0.7690*	-0.0650
t+23	-0.0146	0.4623	-0.5897*
t+24	-0.1065	-0.2122	0.0210
t+25	0.0623	0.2201	-0.1280
t+26	-0.5444*	-0.1699	-0.9960**
t+27	-0.2842	-0.3063	-0.2575
t+28	-0.9638**	-1.3367**	-0.5141
t+29	-0.0085	0.0005	-0.0193
t+30	-0.7763	-1.2202**	-0.2409

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 43. Daily Average Excess Returns of High and Low Exposure Banks During the Brazilian Event Using a Longer Estimation Period[a]

Time Relative to Event	High Exposure Banks (N=18)	Low Exposure Banks (N=23)
t-30	-0.1589	0.9021**
t-29	-0.0904	0.3509
t-28	0.4382	0.4889
t-27	-0.1562	0.0170
t-26	-0.5159	-0.4726
t-25	1.4482**	0.2259
t-24	1.7195**	-0.6506*
t-23	-1.8734**	-0.2041
t-22	1.7621**	-0.4899
t-21	-0.8913	-1.0817**
t-20	-1.6625**	-0.7767*
t-19	-0.2187	-0.6536*
t-18	-1.4698**	-0.5167
t-17	-1.3095*	0.5357
t-16	-0.9925	-0.2907
t-15	-0.3828	-0.2515
t-14	-0.8098	-0.3068
t-13	-1.1107*	0.6921*
t-12	0.4489	-0.2743
t-11	-1.0153*	-0.3620
t-10	-0.0152	0.1659
t-9	0.6878	-0.0642
t-8	-0.4165	-0.0442
t-7	-0.4537	0.0046
t-6	-0.8631	-0.6764*
t-5	0.1323	-0.3956
t-4	-0.1893	-0.0842
t-3	-0.6734	-0.2554
t-2	-0.6549	0.1976
t-1	1.9096**	0.4022
t0	0.6761	0.1495
t+1	-0.7517	-1.1972**
t+2	-0.3257	0.1565
t+3	-1.6845**	-0.6382*
t+4	0.2783	-0.3661
t+5	0.2963	0.2779
t+6	1.3398*	-0.2989
t+7	-0.1993	-0.5999*
t+8	-0.2615	-0.0136
t+9	-0.4406	0.1683
t+10	-0.4164	-0.4756
t+11	-0.7550	0.2346
t+12	0.3878	-0.1682
t+13	-0.4247	-0.7148*

Table 43 (Continued)

Time Relative to Event	High Exposure Banks (N=18)	Low Exposure Banks (N=23)
t+14	0.7356	-0.3905
t+15	-0.1022	-0.0934
t+16	-0.6005	-0.5949*
t+17	-0.1647	-0.4671
t+18	-0.6736	0.5020
t+19	-0.3049	0.2392
t+20	-0.9228	-0.0048
t+21	-0.1592	-0.8563**
t+22	-0.9542	-0.6240*
t+23	1.7364**	-0.5349
t+24	-0.3321	-0.1183
t+25	0.1277	0.2923
t+26	0.3085	-0.5443
t+27	-0.1735	-0.4102
t+28	-1.6405**	-1.0990**
t+29	-0.0677	0.0538
t+30	-0.8987	-1.4718**

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 44. Daily Average Excess Returns of NYSE/ASE Banks and OTC Banks During the Brazilian Event Using a Longer Estimation Period[a]

Time Relative to Event	NYSE/ASE Banks (N=39)	OTC Banks (N=38)
t-30	0.3730	0.4062*
t-29	-0.0613	0.7778**
t-28	0.2917	0.9523**
t-27	-0.4030	-0.0370
t-26	-0.4920	-0.7569**
t-25	0.7339*	0.0494
t-24	0.0973	-0.3689
t-23	-1.0961**	-0.5416*
t-22	0.9968*	-1.0887**
t-21	-1.1595**	-0.4521*
t-20	-1.5902**	-0.1027
t-19	-0.3565	-0.4977*
t-18	-0.7558*	-0.7129**
t-17	-0.4514	-0.0285
t-16	-0.7773*	-0.0312
t-15	-0.3357	-0.0041
t-14	-0.4726	-0.0508
t-13	-0.5153	0.3286
t-12	0.0096	0.0145
t-11	-0.9462*	-0.2197
t-10	0.0562	-0.1004
t-9	0.4691	0.4738*
t-8	-0.3666	-0.1163
t-7	-0.2309	-0.0330
t-6	-0.6056	-0.3136
t-5	-0.1181	-0.1436
t-4	-0.0882	-0.2897
t-3	-0.6291	-0.1981
t-2	0.0989	-0.4030*
t-1	1.0977**	0.5198*
t0	0.3020	0.2631
t+1	-0.8599*	-0.6727**
t+2	-0.3102	0.2556
t+3	-1.1841**	-0.3836*
t+4	-0.1293	-0.3895*
t+5	0.1597	0.1636
t+6	0.8144*	0.5975**
t+7	-0.4115	-0.1528
t+8	-0.5173	0.0483
t+9	-0.2167	-0.0096
t+10	-0.2246	-0.1853
t+11	-0.5719	0.2048
t+12	0.0009	0.0131
t+13	-0.4809	-0.0182

Table 44 (Continued)

Time Relative to Event	NYSE/ASE Banks (N=39)	OTC Banks (N=38)
t+14	0.2524	-0.1589
t+15	-0.1345	0.0806
t+16	-0.5581	-0.1330
t+17	-0.5020	-0.1863
t+18	-0.3958	0.5383*
t+19	-0.2565	0.2421
t+20	-0.2508	-0.1733
t+21	-0.4580	-0.8239**
t+22	-0.5786	-0.3104
t+23	0.6155	-0.6973**
t+24	-0.4140	0.2266
t+25	0.3366	-0.2350
t+26	-0.1037	-1.0218**
t+27	-0.3639	-0.1979
t+28	-1.0258**	-0.8966**
t+29	-0.3934	0.4085*
t+30	-1.2201**	-0.2954

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 45. Daily Average Excess Returns of Bank-Holding Companies and Non-Bank-Holding Companies During the Brazilian Event Using a Longer Estimation Period[a]

Time Relative to Event	Bank Holding Cos. (N=51)	Non-Bank Holding Cos. (N=24)
t-30	0.4676	0.2218
t-29	0.6452*	-0.3040
t-28	0.9414**	-0.0980
t-27	-0.3999	0.1395
t-26	-0.5097*	-0.8519*
t-25	0.2256	0.7874*
t-24	-0.4302	0.5188
t-23	-0.7485**	-1.0030**
t-22	-0.0231	0.0407
t-21	-0.7919**	-0.8796*
t-20	-0.6747*	-1.3044**
t-19	-0.6850*	0.1298
t-18	-0.6441*	-0.9288**
t-17	-0.0830	-0.6000
t-16	-0.4450	-0.3644
t-15	-0.2606	0.0020
t-14	-0.2913	-0.2251
t-13	-0.0228	-0.2961
t-12	0.0635	-0.0977
t-11	-0.4912*	-0.8232*
t-10	-0.0763	0.1029
t-9	0.4825*	0.4477
t-8	-0.4808*	0.2514
t-7	-0.1595	-0.0857
t-6	-0.3223	-0.7696*
t-5	-0.0436	-0.3146
t-4	-0.2061	-0.1400
t-3	-0.3227	-0.6337*
t-2	-0.0542	-0.3286
t-1	0.7207**	1.0319**
t0	0.4632	-0.0989
t+1	-0.4363	-1.4793**
t+2	0.0342	-0.1934
t+3	-0.6845*	-1.0449**
t+4	-0.4705	0.2056
t+5	-0.0158	0.5385
t+6	0.6764*	0.7823*
t+7	-0.3805	-0.0892
t+8	-0.0845	-0.5886
t+9	-0.0054	-0.3551
t+10	-0.1371	-0.3516
t+11	-0.0390	-0.5391
t+12	0.0734	-0.1349

Table 45 (Continued)

Time Relative to Event	Bank Holding Cos. (N=51)	Non-Bank Holding Cos. (N=24)
t+13	-0.4148	0.0727
t+14	0.0967	-0.0337
t+15	-0.0849	0.0828
t+16	-0.6664*	0.3095
t+17	-0.2153	-0.6377*
t+18	0.2577	-0.3832
t+19	0.1523	-0.3774
t+20	-0.2210	-0.1978
t+21	-0.3648	-1.2049**
t+22	-0.6351*	-0.0561
t+23	-0.2685	0.5250
t+24	-0.2348	0.1663
t+25	0.1469	-0.1177
t+26	-0.5627*	-0.5055
t+27	-0.5162*	0.2088
t+28	-1.0445**	-0.7922*
t+29	-0.0118	-0.0014
t+30	-0.4660	-1.4355**

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

Table 46. Daily Average Excess Returns of Small, Medium and Large Banks During the Brazilian Event Using a Longer Estimation Period[a]

Time Relative to Event	Small Banks (N=18)	Medium Banks (N=20)	Large Banks (N=37)
t-30	1.3198**	0.0690	0.1090
t-29	0.4172	0.7010*	0.1103
t-28	1.4818**	0.9536**	-0.0023
t-27	-0.2372	-0.3580	-0.1519
t-26	-0.9749**	-0.5950*	-0.4592
t-25	1.0638**	0.1567	0.2194
t-24	0.3096	-1.1089**	0.1924
t-23	-0.5699	-0.5125	-1.1280**
t-22	0.5818	-0.4887	-0.0243
t-21	-0.8215*	-0.7162*	-0.8753*
t-20	-0.1099	-0.9696**	-1.1985**
t-19	-0.7177*	-0.7092*	-0.1275
t-18	-0.3992	-0.6793*	-0.9289*
t-17	0.9134**	-0.6280*	-0.6085
t-16	-0.8872**	-0.1536	-0.3351
t-15	-0.5881	0.1746	-0.1662
t-14	-0.4985	-0.1056	-0.2480
t-13	0.2179	0.3832	-0.5367
t-12	0.4550	0.0548	-0.2267
t-11	-0.0877	-0.2477	-1.0345**
t-10	-0.1873	0.2941	-0.1062
t-9	1.1474**	0.7957*	-0.0328
t-8	-1.0570**	-0.1258	0.0826
t-7	0.5882	-0.4922	-0.2956
t-6	-0.1221	-0.3790	-0.6792*
t-5	-0.2989	0.1094	-0.1780
t-4	-0.1594	-0.4489	-0.0547
t-3	0.7794*	-0.7178*	-0.8470*
t-2	-0.9493**	-0.3534	0.3650
t-1	0.5614	0.2650	1.2465**
t0	1.2238**	0.1103	-0.0807
t+1	0.3290	-0.6963*	-1.3446**
t+2	-0.1459	0.2419	-0.1380
t+3	-1.8889**	-0.3575	-0.5092
t+4	0.1686	-0.5782	-0.2847
t+5	-0.1824	-0.1394	0.4916
t+6	0.7243*	0.3196	0.9147*
t+7	-0.8672*	-0.2278	-0.0373
t+8	1.0670**	-0.0824	-0.9729**
t+9	-0.1014	-0.0157	-0.1799
t+10	-0.0358	-0.1807	-0.3020
t+11	-0.4568	0.2403	-0.3112
t+12	0.9610**	-0.5761	-0.1425
t+13	-0.0699	-0.3577	-0.2973

Table 46 (Continued)

Time Relative to Event	Small Banks (N=18)	Medium Banks (N=20)	Large Banks (N=37)
t+14	0.7395*	-0.2995	-0.0864
t+15	-0.2840	-0.0416	0.0973
t+16	-1.1996**	-0.1643	-0.0453
t+17	0.4201	-0.5721	-0.6055
t+18	-0.2043	0.8171*	-0.2357
t+19	0.7200*	-0.0512	-0.3574
t+20	-0.7653*	0.6462*	-0.4099
t+21	-0.0568	-0.7365*	-0.8587*
t+22	-0.4240	-0.1991	-0.5980
t+23	-0.0411	-0.1309	0.0611
t+24	-0.3201	0.3151	-0.2305
t+25	0.1646	0.2088	-0.0667
t+26	-1.3288**	-0.6723*	-0.0936
t+27	0.1137	-0.1685	-0.5403
t+28	-1.7808**	-0.8501*	-0.6278
t+29	0.6610	-0.2958	-0.1789
t+30	0.9180**	-0.8302*	-1.5713**

[a] Estimation period ranges from 620 days before the event to 500 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

smaller two-day decline (-0.33%). A major part of the decline experienced by the exposed banks is associated with the decline faced by low exposure banks (-1.05%). The high exposure banks adjust downward by 0.07%. This implies that over the two-days, banks with lower exposure were penalized more than banks with higher exposure to Brazil. While the market was able to distinguish correctly between exposed and non-exposed banks and penalize banks with exposure proportionately, it was not rational in penalizing banks with low exposure more than banks with high exposure. If the market was rational, high exposure banks should have been affected the most by the default announcement. Non-exposed banks should not have been affected by the event, while low exposure banks should have been affected to a lesser extent than high exposure banks. However, the analysis shows that low exposure banks experienced a larger effect relative to high exposure banks.

The two-day excess returns for the NYSE/AMEX and OTC banks do not appear to be different (-0.56% and -0.41%). This means that there were no listed exchange related effects over these two days. At the same time, there appears to be a difference in the market's analysis of BHCs and non-BHCs. While the two-day excess returns for the BHCs is -0.02%, the corresponding two-day excess return for non-BHCs is -1.57% and significant. This is consistent with the higher risk faced by investors in non-BHC equity. Most of

the two-day adverse reaction in bank stock prices is associated with the decline in stock prices of large banks. The group of large banks experienced a two-day decline of 1.42%. During the same time-period, the medium banks suffered a 0.59% decline while small banks experienced an increase of 1.55%.

D. Analysis of Sub-Events.

During the test period there are several days before and after the event when one or more sub-groups of banks experienced significant declines in equity prices. These dates were cross-matched with the Wall Street Journal index to identify any specific write-ups that might have influenced the equity prices of banks. Prior to the February 20, 1987 Brazilian default, the Wall Street Journal had made several reports about Brazil's economic problems and its negotiations with its creditors. The days on which one or more groups of banks experienced significant declines and the Wall Street Journal published a negative report are identified.

The abnormal returns of the different sub-groups for a 580-day event window are computed. This event window consists of 500 days before the announcement and 80 days after the announcement. Abnormal returns were computed and cross-matched to isolate those days during which both reports about the deteriorating quality of bank loans to

Third World countries were published in the Wall Street Journal and one or more bank sub-groups suffered significant declines in market value. Most of the unfavorable reports following the Brazilian default were followed by negative bank equity price adjustments, in many cases, statistically significant. Prior to the Brazilian default, unfavorable press reports were followed by both positive and negative price adjustments, indicating that there was some anticipation of the quality of loan assets held by banks.

Forty-two subevents were identified, as shown in Table 47. A multivariate regression model of the following form is used to analyze the effect of these events on the bank returns.

$$R_{it} = a_i + b_i R_{mt} + c_{ik} D_{kt} ,$$

where R_{it} is the return of bank i on day t, R_{mt} is the market return on day t, D_{kt} is a series of binary indicator variables, and a, b, and c are regression coefficients.

Each subevent is represented by an indicator variable with a value of 1 if the event occurred and 0 if otherwise. Separate multivariate regressions are run for each subgroup using the thirty indicator variables. The regression coefficients for these variables are shown in Table 48.

The forty-two sub-events had varying impacts on each group of banks. Most of the forty-two subevents represented adverse information about the ability of Third World countries, especially Brazil, in servicing their external debts. However, not all of them are associated with

Table 47. Sub-Events Related to the Brazilian Moratorium Announcement Reported in the Wall Street Journal (Dates Shown are Publication Dates)

Date	Event No	Wall Street Journal Index Description
04/01/85	1	Economist Allan Meltzer has proposed a solution to the problem of the billions of dollars in debt run by lesser developed countries; he proposes that debtors pay off the loans by swapping them for real assets
04/17/85	2	Brazil's president-elect, Neves, lingering near death; new government failing to come to grips with Brazil's $100 billion debt
05/14/85	3	FRB Chairman Paul Volcker suggested that the World Bank and IMF consider reshaping their approaches to help debtor countries
05/22/85	4	International rescue efforts have staved off financial disaster among Third World debtor nations, but those efforts still have not addressed the underlying economic problem
06/20/85	5	Fed Vice Chairman Martin urged the consideration of new ways to deal with the international debt crisis, including capping the amount of interest debtor nations pay on their debt
06/28/85	6	A Cure for Debt: Editorial on Latin America's debt problem; a bailout feeding more money into the same old economic structures will be worse than useless; what is needed to solve this problem is economic reforms
07/03/85	7	The World Bank estimated developing countries will have to roll over or amortize two-thirds of their debt outstanding over the next five years, saying the job will be difficult, though not impossible

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
07/23/85	8	Brazilian President Sarney said his government is committed to pursuing a hard line in negotiations over its foreign debt and that it will fight protectionism by richer nations
07/29/85	9	Latin debtor nations are about to press for yet more concession on their $360 billion foreign debt
08/07/85	10	Brazil is determined to resist demands from its foreign creditors and the IMF for strict economic austerity, fearing the austerity programs will force it into a new recession
10/07/85	11	Treasury Secretary Baker, Fed Chairman Volcker and IMF working on a plan to help debtor nations
		Announcement that US will propose a plan for shoring up the global debt situation drew cautious approval and considerable skepticism
		Mexico states that it will have to increase its external financing as a result of recent earthquake disasters
10/08/85	12	In what appears to be a showdown with its creditor banks, Brazil hinted it may seek an agreement with the IMF that would avoid the usual strict economic austerity; such austerity has become a prerequisite for creditor banks to postpone principal payments of debtor nations
		Secretary Baker reveals new initiative calling for all parties in the debt situation to intensify efforts to assist debt ridden nations
11/21/85	13	Brazil's central bank won't honor all debts owed to foreign banks by two major Brazilian banks the government ordered liquidated

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
12/15/85	14	Brazil and creditor banks have scrapped plans for a major restructuring of about half the country's $100 billion debt; instead they are discussing restructuring a smaller amount due in 1985 and 1986
01/23/86	15	"Baker Plan" for easing Third World debt still is encountering ho-hum reception
03/03/86	16	Latin nations seek to reduce debt payments, limit on interest is sought Brazil and its bank advisory committee agree on a package that covers a restructuring of the country's foreign debt that matured in 1985
06/12/86	17	Brazilian Finance Minister Funaro said his country will pay the Paris Club of Western creditor governments only 15% of the $2.6 billion it owes in overdue interest and principal payments
		Dollar dropped on uncertainty about Mexico; traders were still apprehensive about whether it could meet its foreign debt
09/08/86	18	Brazil signed an agreement with its creditor banks calling for the country's 750 lenders to restructure part of its foreign debt
10/07/86	19	Tentative loan agreement between Mexico and foreign lenders gave big US banks some relief in accounting terms, but did not impress the small, but growing market in Third World debt
10/20/86	20	Although Latin debtors made angry noises about reneging on the region's $360 billion foreign debt, they appear set to stick with the parameters laid down in the $12 billion Mexican accord; are willing to add to their debt burdens with more bank loans

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
10/27/86	21	Article discussing the debt-equity swaps as a solution to the Third World debt problem
12/01/86	22	Brazil debt woes echo those of region; austerity measures threaten political stability
01/09/87	23	Brazil will press for concessions won by Mexico as it negotiates with Citicorp and other creditors; Brazil is increasingly seen as a test case for other negotiations between banks and debt-strapped nations
01/14/87	24	Brazil's Finance Minister Funaro said that the country may not be able to meet this year's interest payments on its foreign debts
01/19/87	25	Brazil central bank governor Bracher estimated the country will need new money and savings from debt reschedulings of about $4 billion from foreign creditors to get through 1987; but Brazil doesn't need to go to the IMF for any of that amount
01/23/87	26	As Brazil looks to international banks for new loans following debt accord, its government faces serious internal divisions over economic policy and the specter of hyperinflation
02/11/87	27	Brazil's central bank governor Bracher resigned after conflicts with Finance Minister Funaro over economic policy and what stance Brazil should adopt toward the IMF in debt talks proved irreconcilable
02/18/87	28	Brazil's trade surplus narrowed sharply in January to $129 million from $701 million the year before and $156 million the month before, raising further questions about the country's ability to service its external debt

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
02/19/87	29	Brazil considers central control over foreign currency operations as a means of shoring up its shrinking foreign currency reserves; measures could delay its interest repayments on its foreign debt
02/20/87	30	Brazil, having decided to delay servicing its $108 billion foreign debt, is requesting a short term postponement on payments; US bankers are preparing for the delay
02/23/87	31	Brazil's unilateral suspension of interest payments on its commercial foreign debt presents international banks with one of their biggest challenges since the onset of the global debt crisis in 1982
02/24/87	32	International bankers will ask Brazil to agree on an economic program with the IMF before they lend the nation new money or renegotiate existing loans
		Brazil's debt move hurts big bank stocks, but many analysts expect selloff to be brief
02/25/87	33	Brazil's President Sarney isn't likely to impose austerity needed to get through country's debt crisis
03/02/87	34	Brazil's efforts to win concessions from its creditors has met with a cool reception
		Brazil could face another setback on foreign debt as US bank regulators are scheduled to review its credit rating
03/23/87	35	Brazil's short term financing from foreign banks could soon be cut, damaging trade related businesses; Brazil's central bank governor Gros met with creditors, but there was no indication of any progress

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
04/03/87	36	Brazilian Finance Minister Funaro formally unveils the debt and economic proposals he will present to creditor banks; Bank of Montreal is seeking to convert as much as $100 million of debt it is owed by Brazil into equity investments in the Brazilian economy
04/09/87	37	Brazilian Finance Minister Funaro stepped up his campaign to politicize the international debt problem, rejecting any international supervision of the Brazilian economy
04/21/87	38	Analysts say that if there is no solution before end of year on Brazil's Feb 20 suspension of interest payments on foreign debt, the 20 US banks with biggest Brazilian loans will together suffer an estimated earnings reduction of $900 million
05/20/87	39	Banking Gamble: Citicorp sharply lifts loss reserves, putting its rivals on the spot; move may hurt banks' united front
		Dollar slumps ahead of news of Citicorp's loss; rumours of bank's troubles linked to foreign loans and Third World debt starts drop by currency
05/21/87	40	Big US banks seen dramatically boosting their loan reserves in wake of Citicorp's decision; move could mean higher interest rates and banking fees for consumers
		Bank of England urges US banks, which have lagged behind European banks in loan loss reserves for Third world debt, to increase those reserves
		Brazil won't alter its debt policy as a result of Citicorp's decision, says Finance Minister Funaro

Table 47 (Continued)

Date	Event No	Wall Street Journal Index Description
05/27/87	41	Norwest Banking Corp became first major bank to follow Citicorp in boosting its loan-loss reserves
06/16/87	42	Brazil seeks rapid accord with the IMF; remarks by Finance Minister Pereira sounded conciliatory

Table 48. Regression Coefficients of the Indicator Variables for Sub-Events Before and After the Brazilian Announcement

Event	All Banks (N=75)	Exposed Banks (N=41)	Non-Exp Banks (N=34)	NYSE Banks (N=39)	OTC Banks (N=36)	BHC Banks (N=51)	Non-BHC Banks (N=24)	Small Banks (N=18)	Medium Banks (N=20)	Large Banks (N=37)
1	0.0046	0.0046	0.0046	0.0014	0.0081	0.0049	0.0040	-0.0013	0.0146**	0.0021
2	0.0020	0.0030	0.0010	0.0028	0.0013	0.0024	0.0014	0.0050	0.0006	0.0014
3	-0.0009	-0.0019	0.0003	-0.0030	0.0013	0.0010	-0.0048	-0.0017	-0.0007	-0.0006
4	-0.0077**	-0.0113**	-0.0034	-0.0118*	-0.0034	-0.0075*	-0.0083*	-0.0016	-0.0060	-0.0117**
5	-0.0013	0.0017	-0.0050	-0.0003	-0.0024	-0.0023	0.0008	0.0034	-0.0024	-0.0030
6	0.0052	0.0065	0.0037	0.0073	0.0030	0.0030	0.0098*	0.0120*	0.0058	0.0016
7	0.0053	0.0038	0.0071	0.0024	0.0085*	0.0073	0.0010	0.0078	0.0043	0.0046
8	-0.0082*	-0.0091*	-0.0071	-0.0078*	-0.0087*	-0.0094*	-0.0057	-0.0062	-0.0064	-0.0102*
9	-0.0045	-0.0053	-0.0036	-0.0050	-0.0040	-0.0041	-0.0055	-0.0033	-0.0097*	-0.0023
10	-0.0058	-0.0041	-0.0078	-0.0028	-0.0090	-0.0075*	-0.0021	-0.0045	-0.0079	-0.0053
11	-0.0013	0.0006	-0.0036	0.0000	-0.0027	-0.0030	0.0024	0.0004	-0.0036	-0.0009
12	-0.0010	-0.0010	-0.0009	-0.0016	-0.0003	0.0010	-0.0052	-0.0032	-0.0031	0.0013
13	0.0068	0.0073	0.0062	0.0071	0.0065	0.0070	0.0064	0.0057	0.0015	0.0102*
14	0.0057	0.0071	0.0040	0.0076	0.0037	0.0033	0.0109*	0.0066	0.0065	0.0048
15	-0.0190**	-0.0247**	-0.0121*	-0.0285**	-0.0087*	-0.0173**	-0.0226**	-0.0160**	-0.0150**	-0.0226*
16	0.0072	0.0108*	0.0029	0.0110*	0.0031	0.0038	0.0145*	0.0118*	0.0063	0.0055
17	-0.0014	-0.0020	-0.0008	0.0008	-0.0039	-0.0013	-0.0017	-0.0066	-0.0026	0.0017
18	-0.0124**	-0.0109*	-0.0141**	-0.0112*	-0.0137**	-0.0137**	-0.0095*	-0.0048	-0.0174**	-0.0134*
19	0.0025	0.0040	0.0006	0.0045	0.0002	0.0015	0.0045	0.0032	-0.0045	0.0059
20	-0.0115*	-0.0116*	-0.0113*	-0.0140**	-0.0087*	-0.0121*	-0.0101*	-0.0145**	-0.0087*	-0.0115*
21	-0.0060	-0.0086*	-0.0029	-0.0106*	-0.0010	-0.0071	-0.0037	-0.0147**	-0.0026	-0.0036
22	0.0008	0.0008	0.0008	0.0015	0.0001	0.0002	0.0021	0.0046	-0.0035	0.0012
23	0.0079*	0.0067	0.0093	0.0046	0.0115*	0.0110*	0.0013	0.0069	0.0111*	0.0066
24	0.0001	0.0026	-0.0030	0.0032	-0.0034	0.0011	-0.0020	-0.0064	-0.0008	0.0037
25	-0.0022	-0.0017	-0.0029	-0.0022	-0.0023	-0.0017	-0.0035	-0.0030	-0.0005	-0.0028
26	-0.0095*	-0.0120*	-0.0065	-0.0130*	-0.0057	-0.0115*	-0.0054	-0.0085*	-0.0095*	-0.0100*
27	0.0017	-0.0005	0.0042	0.0011	0.0023	0.0032	-0.0015	0.0028	0.0019	0.0010
28	-0.0014	-0.0014	-0.0014	0.0017	-0.0046	-0.0005	-0.0032	-0.0098*	-0.0033	0.0038
29	0.0092*	0.0119*	0.0059	0.0124*	0.0058	0.0082	0.0112*	0.0060	0.0038	0.0137*
30	0.0033	0.0043	0.0021	0.0033	0.0032	0.0052	-0.0008	0.0126*	0.0020	-0.0006
31	-0.0121*	-0.0158**	-0.0076	-0.0157**	-0.0082	-0.0083*	-0.0201**	0.0018	-0.0092*	-0.0203*
32	0.0018	0.0016	0.0020	-0.0015	0.0053	0.0027	-0.0002	0.0004	0.0050	0.0007
33	-0.0044	-0.0072	-0.0009	-0.0086*	0.0002	-0.0030	-0.0073	-0.0161*	0.0003	-0.0017
34	0.0062	0.0032	0.0098*	0.0069	0.0054	0.0060	0.0067	0.0068	0.0029	0.0077

Table 48. (Continued)

Event	All Banks (N=75)	Exposed Banks (N=41)	Non-Exp Banks (N=34)	NYSE Banks (N=39)	OTC Banks (N=36)	BHC Banks (N=51)	Non-BHC Banks (N=24)	Small Banks (N=18)	Medium Banks (N=20)	Large Banks (N=37)
35	-0.0032	-0.0004	-0.0067	0.0025	-0.0094*	-0.0010	-0.0079	-0.0007	-0.0060	-0.0030
36	0.0038	0.0027	0.0051	0.0050	0.0024	0.0063	-0.0015	0.0140*	-0.0002	0.0009
37	-0.0130**	-0.0156**	-0.0098*	-0.0138**	-0.0121*	-0.0153**	-0.0081*	-0.0196**	-0.0083*	-0.0123*
38	0.0002	0.0021	-0.0022	0.0041	-0.0041	0.0025	-0.0047	0.0016	-0.0059	0.0028
39	-0.0079*	-0.0077*	-0.0082*	-0.0090*	-0.0068	-0.0046	-0.0150*	-0.0118*	-0.0076	-0.0062
40	0.0060	0.0066	0.0054	0.0070	0.0050	0.0039	0.0107*	-0.0048	0.0057	0.0115*
41	-0.0042	-0.0068	-0.0012	-0.0059	-0.0025	-0.0021	-0.0088*	-0.0101*	0.0018	-0.0046
42	-0.0052	-0.0172**	0.0093*	-0.0181**	0.0088*	-0.0081*	0.0010	-0.0331**	0.0038	0.0036

* significant at the level of 0.05
** significant at the level of 0.01

negative regression coefficients, although as Table 48 shows most of the statistically significant regression coefficients are negative. This implies that the market was aware of the problems faced by Brazil in servicing its external debt to creditor banks. The market was also aware of the deteriorating quality of assets held by U.S. creditor banks. Events 4, 8, 15, 18, 20, 21, 26, 29, 31, 33, 37 and 39 are associated with statistically significant regression coefficients for a majority of the sub-groups of banks. An analysis and explanation of these events follows.

Event 4 is a report on May 22, 1985 in the Wall Street Journal that the various efforts to prevent a financial disaster among Third World debtor nations have failed to address the underlying economic problems faced by the debtor nations. With the exception of small, OTC and non-exposed groups of banks, all other groups were associated with statistically significant and negative regression coefficients. Since 1982, the borrowers had been resisting all efforts by the lenders to impose economic austerity programs on them. Resistance by the borrowers could have been construed as a negative signal by the market. Event 8 further reinforced the reluctance on the part of the borrowers, and particularly Brazil, to accept any conditions placed by the lenders for continued lending. Brazilian President Sarney stated that his government would pursue a hard line in negotiating with the lenders. The regression

coefficients in Table 48 associated with this event are negative and statistically significant for all groups of banks.

On January 23, 1986, the Wall Street Journal reported that the 'Baker Plan' to solve the Third World debt problem was not well accepted, three months after it was first revealed (event 15). The market did not react favorably to this news. The regression coefficients are statistically significant, negative and relatively large. Earlier on, when the 'Baker Plan' was first revealed (events 11 and 12), the market had not reacted favorably, either.

On September 8, 1986, Brazil and its creditors signed an agreement that would restructure its foreign debt (event 18). This further indicated that Brazil was facing serious problems in servicing its foreign debts and the market reacted negatively. The problem was becoming too large for the creditor banks to salvage their investments in Third World loans.

Events 20 and 21 showed that the Latin American borrowers had to increase the size of their debt burdens and that none of the existing proposals were helping to solve the debt problem. Event 26 indicated the further deterioration of the Brazilian economy and its increasing dependence on new loans from foreign lenders. The market reacted to these adverse events by adjusting downward the prices of bank stocks.

On February 23, 1987, it was reported that Brazil had formally suspended servicing its external debt (event 31). All sub-groups of banks were adversely affected on that day. (The regression coefficients are statistically significant for all groups of banks except small banks.) Two days later, the Wall Street Journal reported that Brazil was not going to impose the economic austerity needed to solve its debt problem (event 33). On April 9, 1987, Brazil's Finance Minister Funaro reiterated his government's opposition to the austerity programs (event 37). The market reacted negatively to Brazil's unwillingness to accept the conditions placed by its creditors and other international authorities.

Recognizing the seriousness of the problem, Citicorp became the first major lender to increase its Third World loan-loss reserves and write off a part of its assets on May 19, 1987, thereby experiencing an accounting loss (event 39). The market expected other lenders to increase their loan loss reserves and show larger than expected losses for the following quarters. It resulted in the market adjusting the prices of bank stocks downward.

The only subevent when the market reaction is not consistent with the signal conveyed by the event happened on February 19, 1987 (event 29). Brazil took steps to conserve its foreign currency reserves, an indication of its impending suspension of debt servicing, but the market did

not react negatively. In fact, most of the groups of banks experienced price appreciations on that day.

E. Intervention Analysis Results.

Table 49 presents the results of tests using Intervention Analysis for the Brazilian event. The reduced sample of 75 banks used in the standard event study methodology for longer estimation periods is used in the Intervention Analysis. The 75 banks are also divided into subgroups based on their exposure, size, exchange membership and bank-holding company status. The pre-event period consists of 500 trading days prior to the Brazilian default announcement of February 20, 1987. The post-event period consists of 80 trading days after the announcement. Forty-two subevents around the Brazilian announcement are identified and tested. Each of these subevents is represented by a dummy variable in the regression model. Table 49 shows the intervention analysis coefficients for the intercept, slopes and dummy variables for each of the forty-two subevents.

The slope coefficients range from 0.512 to 0.873. The pre-event slope coefficient for the entire sample of banks is 0.759. The post-event slope coefficient for the same sample is 0.715. The table also shows the differences in the slope coefficients before and after the event and the corresponding t-values for each of the subgroups. The t-

Table 49. Indicator Variable Coefficients Using Intervention Analysis for the Brazilian event.

Variable	All Banks	Exposed Banks	Non-Exp Banks	BHC Banks	Non-BHC Banks	Large Banks	Medium Banks	Small Banks	NYSE Banks	OTC Banks
Int1	0.0003	0.0001	0.0005	0.0003	0.0001	0.0000	0.0005	0.0005	0.0001	0.0005
Int2	0.0000	-0.0001	0.0000	-0.0002	0.0003	0.0001	-0.0002	-0.0002	0.0000	-0.0001
Beta1	0.7595*	0.8300*	0.6745*	0.7610*	0.7563*	0.8726*	0.6656*	0.6315*	0.8346*	0.6782*
Beta2	0.7150*	0.7308*	0.6960*	0.7287*	0.6858*	0.8659*	0.6182*	0.5122*	0.7773*	0.6474*
Event1	0.0028	0.0029	0.0027	0.0030	0.0024	0.0003	0.0127	-0.0031	0.0000	0.0059
Event2	0.0004	0.0015	-0.0009	0.0006	0.0000	-0.0001	-0.0012	0.0032	0.0017	-0.0010
Event3	0.0014	0.0009	0.0019	0.0031	-0.0024	0.0024	0.0009	-0.0002	0.0003	0.0026
Event4	-0.0035	-0.0062	-0.0002	-0.0034	-0.0037	-0.0062	-0.0028	0.0013	-0.0060	-0.0008
Event5	0.0002	0.0031	-0.0034	-0.0007	0.0021	-0.0016	-0.0008	0.0049	0.0007	-0.0004
Event6	0.0034	0.0045	0.0022	0.0013	0.0080	-0.0004	0.0042	0.0106	0.0053	0.0015
Event7	0.0066	0.0057	0.0075	0.0084	0.0026	0.0067	0.0048	0.0081	0.0050	0.0082
Event8	-0.0032	-0.0025	-0.0040	-0.0047	0.0001	-0.0031	-0.0031	-0.0034	0.0004	-0.0070
Event9	-0.0047	-0.0057	-0.0036	-0.0042	-0.0058	-0.0027	-0.0098	-0.0033	-0.0056	-0.0038
Event10	-0.0021	-0.0007	-0.0038	-0.0036	0.0011	-0.0017	-0.0041	-0.0006	-0.0003	-0.0040
Event11	0.0045	0.0068	0.0017	0.0028	0.0081	0.0057	0.0015	0.0054	0.0061	0.0028
Event12	0.0015	0.0012	0.0019	0.0037	-0.0031	0.0036	-0.0004	-0.0005	-0.0001	0.0033
Event13	-0.0001	-0.0006	0.0006	0.0003	-0.0008	0.0018	-0.0041	0.0006	-0.0016	0.0016
Event14	0.0054	0.0077	0.0025	0.0026	0.0112	0.0056	0.0052	0.0050	0.0095	0.0009
Event15	-0.0121	-0.0164	-0.0069	-0.0106	-0.0152	-0.0138	-0.0097	-0.0112	-0.0192*	-0.0045
Event16	0.0059	0.0097	0.0012	0.0023	0.0134	0.0044	0.0047	0.0102	0.0104	0.0009
Event17	-0.0024	-0.0029	-0.0019	-0.0023	-0.0026	0.0007	-0.0036	-0.0076	0.0001	-0.0052
Event18	-0.0021	-0.0006	-0.0039	-0.0032	0.0001	-0.0026	-0.0075	0.0049	-0.0021	-0.0021
Event19	0.0046	0.0062	0.0026	0.0036	0.0065	0.0081	-0.0025	0.0051	0.0065	0.0024
Event20	-0.0045	-0.0034	-0.0059	-0.0053	-0.0028	-0.0027	-0.0033	-0.0096	-0.0048	-0.0042
event21	-0.0065	-0.0094	-0.0030	-0.0075	-0.0044	-0.0044	-0.0028	-0.0148	-0.0117	-0.0008
Event22	0.0034	0.0032	0.0037	0.0029	0.0044	0.0037	-0.0007	0.0074	0.0031	0.0037
Event23	0.0034	0.0022	0.0049	0.0064	-0.0029	0.0019	0.0068	0.0027	0.0005	0.0066
Event24	-0.0064	-0.0044	-0.0088	-0.0054	-0.0085	-0.0037	-0.0065	-0.0118	-0.0039	-0.0091
Event25	-0.0082	-0.0086	-0.0076	-0.0075	-0.0097	-0.0102	-0.0053	-0.0074	-0.0099	-0.0063
Event26	-0.0027	-0.0031	-0.0022	-0.0051	0.0024	-0.0005	-0.0050	-0.0046	-0.0021	-0.0034
Event27	-0.0052	-0.0073	-0.0027	-0.0039	-0.0079	-0.0062	-0.0048	-0.0038	-0.0050	-0.0055
Event28	-0.0001	-0.0003	0.0002	0.0009	-0.0021	0.0049	-0.0019	-0.0083	0.0022	-0.0025
Event29	0.0092	0.0119	0.0060	0.0083	0.0112	0.0136	0.0039	0.0062	0.0122	0.0060
Event30	0.0041	0.0051	0.0029	0.0060	0.0000	0.0003	0.0028	0.0134	0.0043	0.0039
Event31	-0.0061	-0.0091	-0.0024	-0.0022	-0.0142	-0.0126	-0.0046	0.0059	-0.0076	-0.0043
Event32	0.0003	0.0006	0.0000	0.0012	-0.0015	-0.0007	0.0033	-0.0008	-0.0018	0.0026

Table 49. (Continued)

Variable	All Banks	Exposed Banks	Non-Exp Banks	BHC Banks	Non-BHC Banks	Large Banks	Medium Banks	Small Banks	NYSE Banks	OTC Banks
Event33	-0.0076	-0.0099	-0.0048	-0.0064	-0.0102	-0.0046	-0.0032	-0.0187*	-0.0104	-0.0045
Event34	0.0086	0.0055	0.0124	0.0085	0.0089	0.0103	0.0053	0.0089	0.0094	0.0079
Event35	-0.0044	-0.0033	-0.0058	-0.0020	-0.0096	-0.0064	-0.0048	0.0000	-0.0030	-0.0060
Event36	-0.0074	-0.0100	-0.0042	-0.0049	-0.0126	-0.0141	-0.0082	0.0072	-0.0101	-0.0044
Event37	-0.0043	-0.0058	-0.0024	-0.0065	0.0005	-0.0009	-0.0018	-0.0138	-0.0019	-0.0068
Event38	-0.0074	-0.0081	-0.0066	-0.0049	-0.0127	-0.0091	-0.0094	-0.0017	-0.0100	-0.0046
Event39	-0.0035	-0.0029	-0.0041	-0.0001	-0.0107	-0.0007	-0.0040	-0.0086	-0.0035	-0.0035
Event40	0.0026	0.0028	0.0024	0.0005	0.0073	0.0069	0.0032	-0.0068	0.0027	0.0026
Event41	-0.0043	-0.0066	-0.0016	-0.0022	-0.0088	-0.0046	0.0015	-0.0102	-0.0051	-0.0035
Event42	-0.0077	-0.0197*	0.0068	-0.0106	-0.0014	0.0004	0.0017	-0.0347*	-0.0205*	0.0063
Beta1-Beta2	0.0446	0.0993	-0.0214	0.0323	0.0706	0.0067	0.0474	0.1193	0.0573	0.0308
t - value	0.1322	0.2664	-0.0766	0.0993	0.1925	0.0222	0.1522	0.2759	0.1764	0.0869

* Significant at the level of 0.05
** Significant at the level of 0.01

values indicate that the slope differences for the various subgroups are not significantly different from zero. This implies that the systematic risk of the sample of banks did not experience any shifts due to the Brazilian announcement. The slope difference for the sample of all banks is 0.045.

For the various subsamples, the slope differences range from -0.021 to 0.119, but none are significantly different from zero. This implies that any abnormal return associated with the Brazilian announcement is due to the information content of the events and not due to shifts in the systematic risks associated with the banks. It also implies that the results obtained using the standard residual methodology are valid and need not be adjusted for changes in systematic risk as all of the abnormal return during the prediction period reflects the information content of the announcement.

The coefficients associated with the forty-two subevents are also shown. A comparison of these coefficients with the regression coefficients using indicator variables in Table 48 show that the signs are consistent in the two cases. Many of the events, especially those close to the Brazilian default announcement have negative regression coefficients, reflecting the adverse information conveyed by these events. However, not all of them are statistically significant.

III. Comparison of Market Reaction to the Two Events.

In Sections I and II the announcement and contagion effects of the default announcements by Mexico and Brazil are reported. In this section the market reaction to the two events are compared and contrasted.

A. Sample Attributes.

The size of the external debt of Mexico at the time of its default in 1982 was $62 billion. This study uses a sample of 94 banks to analyze the announcement and contagion effects. 45 of the banks are listed in the NYSE/AMEX and the remaining 49 in the NASDAQ. The sample contained 54 banks with foreign loan exposure to Mexico and 40 banks had no loans outstanding to Mexico at the time of the default. While 56 of the 94 banking organizations were bank-holding companies, the remaining 38 were non-bank-holding companies.

The size of the external debt of Brazil at the time of its default in 1987 was $100 billion. A sample of 87 banks is used in the analysis, 48 of which are listed in the NYSE/AMEX and the remaining 39 in the NASDAQ. Of the 87 banks, 48 had foreign loan exposure to Brazil in 1987, and 39 of the banks were not exposed to Brazil. The sample contained 60 bank-holding companies and 27 non-bank-holding companies.

A comparison of Tables 11 (page 123) and 34 (page 203) reveals some interesting facts about the samples of banks

used in the analysis of the two events. The proportion of each of the subgroups of banks has remained the same, except for the small and large groups of banks. While the proportion of small banks in the sample dropped from 50% for the Mexican event to 29% for the Brazilian event, the proportion of large banks increased from 28% to 47%. While the average value of the total assets of the group of all banks increased by about 47% between the two events, the corresponding increase in equity was about 95%. This was also the case for the other subgroups of banks.

B. Regression Analysis and Excess Returns.

The results from regressing individual banks returns against the dollar amount of loan exposure of banks during the Mexican default announcement show that even though the exposure coefficients were predominantly negative, they were not statistically significant. The results were similar when the exposure variable was replaced by a binary variable for exposed and non-exposed banks. These results indicate the market did not distinguish between exposed and non-exposed banks. There appears to be a small contagion effect in the market following the Mexican announcement when banks were not penalized proportional to their exposure to Mexico. This was also confirmed by tests using excess returns.

Analysis of excess returns for different subgroups of banks around the Mexican announcement show that the market

reacted to the announcement by adjusting downward the equity prices of a majority of the bank groups. The exposed group of banks and the group of large banks were affected more than the other groups.

The results from the regression tests and analysis of excess returns show that the Mexican default announcement conveyed new information to the market which was quickly incorporated in the market prices of bank equities. However, there was some spill-over of the effect, which resulted in downward adjustments to stock prices of non-exposed as well as exposed banks.

The results from regressing individual bank returns against the exposure of banks during the Brazilian default announcement show that the market did not distinguish between exposed and non-exposed banks. The exposure coefficients are not statistically significant, showing that the market reaction to the event was similar for both exposed and non-exposed banks. The market was not penalizing bank equities proportional to the exposure of individual banks. There appears to be a contagion effect in the market following the announcement as the market did not differentiate between exposed and non-exposed banks. Further analysis shows that this is not the case. The exposure coefficients are predominantly positive. The market does not differentiate between the two groups because the announcement did not convey any new information and

there is no reason for the two groups to react differently. The excess returns for the various groups of banks show that none of them are significant and negative for the two-day event period. Unlike the case of the Mexican default of 1982, the Brazilian default did not result in significant bank equity price adjustments following the announcement.

C. Comparison of Excess Returns Using a Sample of Banks Common to Both Events.

From the sample of 94 banks used in the analysis of the Mexican announcement and the sample of 87 banks used in the analysis of the Brazilian announcement, 76 banks that are common to both samples are identified. The excess returns for this group of banks during the two announcements are computed and reported in Table 50. The excess returns are computed using a 120-day estimation period starting 150 days before the event and ending 30 days before the event. The excess returns are reported for 30 days prior to and 30 days following the events.

The excess returns in Table 50 using a sample of banks common to both events are similar to the excess returns of the independent samples reported in Sections I and II. The excess return for the sample of common banks on the announcement day for the Mexican event is -0.85% and statistically significant. For the two-day event period (announcement day and press day), the banks experienced a

Table 50. Daily Average Excess Returns of Sample of Banks Common to Both the Mexican and Brazilian Events[a]

Time Relative to Event	Mexican Event (N=76)	Brazilian Event (N=76)
t-30	-0.6219*	0.4727
t-29	0.3722*	0.4982
t-28	0.6780*	0.4818
t-27	0.0370	0.0979
t-26	-0.4553	-0.4828
t-25	0.2221	0.2972
t-24	-0.2313	0.1017**
t-23	0.1087	-0.7719**
t-22	0.2619*	-0.0800
t-21	0.6189*	-0.3225**
t-20	0.4481	-0.9435**
t-19	-0.1978	-0.2134
t-18	-0.0936	-0.4896
t-17	0.4514	-0.1888
t-16	-0.0652	-0.1835
t-15	-0.0385	0.0417
t-14	0.1504	-0.0025
t-13	0.2088**	-0.1476
t-12	0.7979**	-0.0050
t-11	0.1303	-0.4757
t-10	-0.0622	0.1022
t-9	-0.2561	0.3841
t-8	-0.1214	0.0050
t-7	-0.0036	0.1994
t-6	0.1157	-0.4678
t-5	0.0534	0.0891
t-4	0.1379**	-0.0128*
t-3	1.0176**	-0.6480*
t-2	0.4924**	0.2332**
t-1	1.1244**	0.8012**
t0	-0.8537*	0.2939
t+1	-0.3887	-0.0612
t+2	-0.0668	0.1229*
t+3	0.3733	-0.5430*
t+4	-0.1180	-0.2952
t+5	0.3095	0.2998**
t+6	0.5147	0.9224**
t+7	0.0438*	0.1391
t+8	0.6179*	-0.2746
t+9	0.0222	-0.0722
t+10	-0.2656*	0.0092
t+11	-0.7016*	0.1540
t+12	-0.0712	0.0037
t+13	0.1799*	0.0331
t+14	0.5562*	0.0689

Table 50 (Continued)

Time Relative to Event	Mexican Event (N=76)	Brazilian Event (N=76)
t+15	-0.0924	0.2891
t+16	0.2378*	0.0647
t+17	0.5570**	-0.4262
t+18	1.0809**	0.3180
t+19	1.1380**	-0.0277
t+20	0.5081	-0.0417
t+21	-0.1182	-0.4327
t+22	0.1160*	-0.2806
t+23	0.7026*	0.3309
t+24	0.2377	0.0401
t+25	0.3926	0.2362
t+26	0.4009*	0.0696
t+27	0.7265*	-0.4407
t+28	0.5563*	-0.4769
t+29	0.4120	0.0635**
t+30	0.4772	-1.1396**

[a] Estimation period ranges from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

downward adjustment of 1.24% (statistically significant). For the Brazilian event, the announcement day excess return is positive (0.29%) but not significant. The excess return for the two-day event period is -0.32% (statistically insignificant). The excess returns on the announcement day and the two-day event period for the other sub-groups of banks using the sample of banks common to both events (not reported here) are similar to the excess returns reported in Sections I and II.

The above results indicate that the inclusion of some banks in the sample used to test the effects following one event but not the other did not bias the results.

D. Comparison of Foreign Exchange Markets During the Two Events.

(i) Foreign Exchange Rate Between the US Dollar and the Mexican Peso.

Table 51 shows the exchange rate between the US Dollar and the Mexican Peso for the sixty day prediction period around the Mexican default announcement. The exchange rate 60 days before the event and 90 days before the event are also shown. The last column in Table 51 shows the percentage change in the Peso/US$ exchange rate on a day-to-day basis.

The exchange rate between the two currencies was Peso 45.86/US$ ninety days before Mexico defaulted on its

Table 51. Exchange Rates Between the US$ and the Mexican Peso During the Mexican Event

Time Relative to event	Calendar Time	US$/Peso	Peso/US$	Percent Change Peso/US$
t-90	820413	0.0218	45.86	--
t-60	820525	0.0215	46.53	--
t-30	820708	0.0207	48.30	--
t-29	820709	0.0207	48.42	0.25
t-28	820712	0.0207	48.41	-0.02
t-27	820713	0.0207	48.41	0.00
t-26	820714	0.0206	48.47	0.12
t-25	820715	0.0206	48.47	0.00
t-24	820716	0.0206	48.60	0.27
t-23	820719	0.0206	48.59	-0.02
t-22	820720	0.0206	48.64	0.10
t-21	820721	0.0205	48.67	0.06
t-20	820722	0.0205	48.71	0.08
t-19	820723	0.0205	48.80	0.18
t-18	820726	0.0205	48.79	-0.02
t-17	820727	0.0205	48.82	0.06
t-16	820728	0.0205	48.88	0.12
t-15	820729	0.0204	48.91	0.06
t-14	820730	0.0204	49.03	0.25
t-13	820802	0.0204	49.00	-0.06
t-12	820803	0.0204	49.05	0.10
t-11	820804	0.0204	49.10	0.10
t-10	820805	0.0204	49.14	0.08
t-9	820806	0.0154	65.00	32.28
t-8	820809	0.0125	80.00	23.08
t-7	820810	0.0123	81.00	1.25
t-6	820811	0.0133	75.00	-7.41
t-5	820812	0.0143	70.00	-6.67
t-4	820813	0.0143	70.00	0.00
t-3	820816	0.0145	69.00	-1.43
t-2	820817	0.0145	69.00	0.00
t-1	820818	0.0145	69.00	0.00
t0	820819	0.0105	95.00	37.68
t+1	820820	0.0111	90.00	-5.26
t+2	820823	0.0111	90.00	0.00
t+3	820824	0.0111	90.00	0.00
t+4	820825	0.0100	100.00	11.11
t+5	820826	0.0083	120.00	20.00
t+6	820827	0.0083	120.00	0.00
t+7	820830	0.0091	110.00	-8.33
t+8	820831	0.0082	122.00	10.91
t+9	820901	0.0083	121.00	-0.82
t+10	820902	0.0083	120.00	-0.83
t+11	820903	0.0083	120.00	0.00

Table 51 (Continued)

Time Relative to event	Calendar Time	US$/Peso	Peso/US$	Percent Change Peso/US$
t+12	820907	0.0111	90.00	-25.00
t+13	820908	0.0087	115.00	27.78
t+14	820909	0.0111	90.00	-21.74
t+15	820910	0.0100	100.00	11.11
t+16	820913	0.0111	90.00	-10.00
t+17	820914	0.0143	70.00	-22.22
t+18	820915	z	z	--
t+19	820916	z	z	--
t+20	820917	z	z	--
t+21	820920	z	z	--
t+22	820921	z	z	--
t+23	820922	z	z	--
t+24	820923	z	z	--
t+25	820924	z	z	--
t+26	820927	z	z	--
t+27	820928	z	z	--
t+28	820929	z	z	--
t+29	820930	z	z	--
t+30	821001	z	z	--

z Exchange rates for these dates were not available

external loans. It increases to Peso 46.53/US$ sixty days before the default; Peso 48.30/US$ thirty days before the default; and Peso 49.14/US$ ten days prior to the default. Starting from August 5, 1982, the exchange rate deteriorated rapidly and reached the level of Peso 95.00/US$ on the event day. The exchange rates between the two countries deteriorated further in the in the days following the announcement and reached as high as Peso 120.00/US$.

Starting from September 15, the official exchange rate between the two currencies were not quoted for a period of time during which Mexico was attempting to reform its economy with help from the IMF and by imposing restrictions to prevent capital flight.

The percentage change in exchange rates indicates that the Peso depreciated by the largest amount on the announcement day, a change of 37.68% compared to the previous day. Days t_{-9} and t_{-8} were also associated with large declines in the value of the Mexican Peso.

The changes in the exchange rates are consistent with the movement of bank stock prices. The depreciation of the Mexican Peso started prior to the actual default announcement by Mexico. The default announcement appears to have had an adverse effect on the Mexican Peso. However, we cannot draw any significant conclusions from the movement of the exchange rates after the default announcement due to the

closure of the foreign exchange markets in Mexico and non-availability of the official foreign exchange rates.

(ii) Foreign Exchange Rate Between the US Dollar and the Brazilian Cruzado.

Table 52 shows the exchange rate between the US dollar and the Brazilian Cruzado for the sixty-day prediction period around the Brazilian default announcement. The exchange rate 60 days before the event and 90 days before the event are also shown. The last column in Table 52 shows the percentage change in the Cr/US$ exchange rate on a day-to-day basis.

The exchange rate between the two currencies ninety days before the Brazilian default announcement was Cr13.77/US$. It remained at Cr13.77/US$ sixty days prior to the announcement and depreciated to Cr14.86/US$ thirty days prior to the announcement. In the thirty day period leading up to the Brazilian default announcement, the Cruzado depreciated to a value of Cr18.83/US$, the largest depreciations occurring on t_{-18}, t_{-4}, t_{-3} and t_0. In the thirty day period following the default announcement, the Cruzado further deteriorated to a value of Cr22.41/US$. The largest change in value occurred on t_{+22} when it depreciated by 5.52%. Over the sixty-day prediction period, the Cruzado depreciated by about 50%, a change in value of Cr7.55/US$. However, this change was gradual and a significant change in

Table 52. Exchange Rates Between the US$ and the Brazilian Cruzado During the Brazilian Event

Time Relative to event	Calendar Time	US$/Cr	Cr/US$	Percent Change Cr/US$
t-90	861013	0.0726	13.77	--
t-60	861124	0.0726	13.77	--
t-30	860108	0.0673	14.86	--
t-29	860109	0.0673	14.86	0.00
t-28	870112	0.0664	15.06	1.35
t-27	870113	0.0664	15.06	0.00
t-26	870114	0.0664	15.06	0.00
t-25	870115	0.0664	15.06	0.00
t-24	870116	0.0654	15.28	1.46
t-23	870119	0.0654	15.28	0.00
t-22	870120	0.0654	15.28	0.00
t-21	870121	0.0654	15.28	0.00
t-20	870122	0.0654	15.28	0.00
t-19	870123	0.0654	15.28	0.00
t-18	870126	0.0625	15.99	4.65
t-17	870127	0.0618	16.18	1.19
t-16	870128	0.0615	16.27	0.56
t-15	870129	0.0611	16.36	0.55
t-14	870130	0.0608	16.45	0.55
t-13	870202	0.0606	16.50	0.30
t-12	870203	0.0600	16.67	1.03
t-11	870204	0.0593	16.85	1.08
t-10	870205	0.0591	16.93	0.47
t-9	870206	0.0591	16.93	0.00
t-8	870209	0.0581	17.20	1.59
t-7	870210	0.0588	17.00	-1.16
t-6	870211	0.0571	17.50	2.94
t-5	870212	0.0590	16.95	-3.14
t-4	870213	0.0570	17.55	3.54
t-3	870217	0.0553	18.07	2.96
t-2	870218	0.0543	18.40	1.83
t-1	870219	0.0542	18.44	0.22
t0	870220	0.0531	18.83	2.11
t+1	870223	0.0526	19.00	0.90
t+2	870224	0.0521	19.20	1.05
t+3	870225	0.0515	19.41	1.09
t+4	870226	0.0515	19.40	-0.05
t+5	820227	0.0508	19.69	1.49
t+6	870302	0.0508	19.70	0.05
t+7	870303	0.0508	19.70	0.00
t+8	870304	0.0508	19.70	0.00
t+9	870305	0.0508	19.70	0.00
t+10	870306	0.0508	19.70	0.00
t+11	870309	0.0502	19.91	1.07

Table 52 (Continued)

Time Relative to event	Calendar Time	US$/Cr	Cr/US$	Percent Change Cr/US$
t+12	870310	0.0493	20.27	1.81
t+13	870311	0.0490	20.40	0.64
t+14	870312	0.0488	20.50	0.49
t+15	870313	0.0485	20.63	0.63
t+16	870316	0.0483	20.70	0.34
t+17	870317	0.0480	20.82	0.58
t+18	870318	0.0478	20.94	0.58
t+19	870319	0.0476	21.00	0.29
t+20	870320	0.0472	21.17	0.81
t+21	870323	0.0493	20.29	-4.16
t+22	870324	0.0467	21.41	5.52
t+23	870325	0.0467	21.41	0.00
t+24	870326	0.0462	21.66	1.17
t+25	870327	0.0470	21.29	-1.71
t+26	870330	0.0457	21.90	2.87
t+27	870331	0.0457	21.90	0.00
t+28	870401	0.0451	22.16	1.19
t+29	870402	0.0449	22.28	0.54
t+30	870403	0.0446	22.41	0.58

the exchange rate was not apparent on any single trading day during the prediction period.

In the case of the Mexican Peso during Mexico's default announcement (Table 51), the Peso depreciated by about 150% in the 45-day period for which foreign exchange rate data is available. Furthermore, the changes in the exchange rate was not gradual. Certain trading days, before and after the default announcement, were associated with significant changes in the value of the Peso.

A comparison of the Peso/US$ and Cr/US$ exchange rates during the sixty-day prediction period corroborates the results from the tests using standard residual methodology. While the Mexican default announcement as well as several sub-events prior to the announcement conveyed negative information about the quality of loan assets held by US banks, and consequently resulted in a downward valuation of their equities, the effects were not apparent in the case of the Brazilian announcement. Either the market had anticipated the event well in advance of the default, or the market did not consider the announcement to be of any significant value as it had already incorporated the information about the quality of loan assets held by banks in their valuation of bank equities.

E. Comparison of Returns from Investing in Bank Stocks and the Market Index During the Two Events.

(i) Investment During Mexican Event.

Table 53 shows the dollar returns and the corresponding percentage returns from investing $100 in three different indices and in various subgroups of banks starting thirty days before the default announcement by Mexico and holding it for various periods over the 60-day prediction period.

The first row in Table 53 indicates that a strategy of investing in any one of the subgroups of banks would have been superior to investing in an index during the thirty days prior to the default. While the NYSE/AMEX VWRET index would have resulted in a profit of $2.069 over the 30 days, investing in a random group of banks would have resulted in a profit of $6.810 over the same period of time. A larger profit would have been made by investing in exposed banks, compared to investing in non-exposed banks. The table also shows that during the fifteen days prior to the default announcement, the profits from the various investment strategies are similar to those from investing over the thirty days.

The third row in Table 53 shows the dollar returns from investments made during the thirty days following the default announcement. The strategy with the largest profit was the investment in one of the indices. Investment in one of the bank groups would have resulted in a smaller profit.

Table 53. Simulated Dollar and Percentage Returns Generated by Different Investment Strategies During the Mexican Event.

Time Period	NYSE/ AMEX VWRET	S&P Index	OTC VWRET	All Banks	Exposed Banks	Non Exposed Banks	BHC Banks	Non BHC Banks	Small Banks	Medium Banks	Large Banks	NYSE Banks	OTC Banks
						Dollar Returns							
t-30-t0	2.069	1.630	-1.233	4.060	4.790	3.060	3.350	5.080	1.350	6.730	6.810	4.730	3.420
t-30-t+1	5.457	5.490	0.061	3.660	4.550	2.460	3.200	4.310	1.440	5.800	5.910	4.230	3.110
t0-t+30	12.889	12.810	14.970	9.020	9.280	8.680	9.100	8.890	8.980	6.510	11.700	10.970	7.260
t+1-t+30	9.501	8.950	13.676	9.420	9.520	9.280	9.250	9.660	8.890	7.440	12.600	11.470	7.570
t-15-t0	1.849	1.440	-1.685	2.560	3.160	1.740	2.120	3.220	1.370	4.440	3.220	2.930	2.210
t-15-t+1	5.237	5.300	-0.391	2.160	2.920	1.140	1.970	2.450	1.460	3.510	2.320	2.430	1.900
t0-t+15	11.747	11.810	11.233	0.950	0.060	2.160	2.450	-1.280	2.250	2.040	-2.440	-0.520	2.300
t+1-t+15	8.359	7.950	9.939	1.350	0.300	2.760	2.600	0.510	2.160	2.970	-1.540	-0.020	2.610
						Percentage Returns							
t-30-t0	2.0659	1.5159	-1.2420	4.0845	4.8315	3.0680	3.3791	5.0917	1.3579	6.7795	6.8470	4.7672	3.4351
t-30-t+1	5.4488	5.1056	0.0614	3.6821	4.5895	2.4664	3.2278	4.3199	1.4484	5.8427	5.9421	4.2633	3.1237
t0-t+30	12.6092	11.7351	15.2683	8.7183	8.9291	8.4436	8.8789	8.4788	8.9114	6.1415	11.0097	10.5532	7.0499
t+1-t+30	8.9966	7.9190	13.7669	9.1050	9.1812	9.0802	9.0385	9.2813	8.8142	7.0810	11.9579	11.0875	7.3731
t-15-t0	1.8422	1.3368	-1.6895	2.5372	3.1359	1.7217	2.1122	3.1684	1.3783	4.3718	3.1247	2.9004	2.1931
t-15-t+1	5.2177	4.9202	-0.3921	2.1407	2.8977	1.1280	1.9627	2.4107	1.4688	3.4561	2.2513	2.3490	1.8855
t0-t+15	11.4920	10.8190	11.4569	0.9182	0.0577	2.1011	2.3905	-1.2208	2.2328	1.9245	-2.2960	-0.5002	2.2334
t+1-t+15	7.9152	7.0342	10.0050	1.3099	0.2893	2.7006	2.5406	-0.4900	2.1416	2.8267	-1.4615	-0.0193	2.5421

If the investment horizon is fixed as the fifteen day period immediately following the default announcement, the differences in profit margins are more significant (row 7). An investment of $100 over the fifteen day period (t_0 - t_{+15}) in the NYSE/AMEX index would have resulted in a profit of $11.747. An investment strategy using NYSE/AMEX banks, large banks or non-BHC banks during the same period would have resulted in losses of $0.52, $2.44 and $1.28 respectively. Investments in any of the other bank groups would yield profits of not more than $2.45.

The bottom half of Table 53 shows the percentage returns from the various investment strategies.

The results from these strategies are consistent with the new information hypothesis. Immediately following the default announcement by Mexico, the market prices of bank stocks did not rise even though the stock market as a whole was rising. Prior to the announcement, the performance of the bank stocks were similar to that of the market.

(ii) Investment During Brazilian Event.

Table 54 shows the dollar returns and the corresponding percentage returns from investing $100 in three different indices and in various subgroups of banks starting thirty days before the default announcement by Brazil and holding it for various periods over the sixty-day prediction period.

The table shows that for any holding period over the

Table 54. Simulated Dollar and Percentage Returns Generated by Different Investment Strategies During the Brazilian Event.

Time Period	NYSE/ AMEX VWRET	S&P Index	OTC VWRET	All Banks	Exposed Banks	Non Exposed Banks	BHC Banks	Non BHC Banks	Small Banks	Medium Banks	Large Banks	NYSE Banks	OTC Banks
						Dollar Returns							
t-30-t0	10.829	28.200	10.450	-0.810	0.370	-2.260	-0.480	-1.530	4.650	-0.710	-3.850	-1.050	-0.550
t-30-t+1	9.810	25.100	9.941	-0.880	0.040	-2.030	-0.280	-2.180	5.770	-0.350	-4.800	-1.270	-0.440
t0-t+30	5.442	14.930	5.406	-0.870	-0.770	-1.000	0.220	-2.960	3.960	0.190	-4.010	-1.570	-0.010
t+1-t+30	6.461	18.030	5.915	-0.800	-0.440	-1.230	0.020	-2.310	2.840	-0.170	-3.060	-1.350	-0.120
t-15-t0	4.819	11.240	7.066	0.810	0.950	0.650	1.020	0.390	2.850	1.630	-0.540	0.960	0.620
t-15-t+1	3.800	8.140	6.557	0.740	0.620	0.880	1.220	-0.260	3.970	1.990	-1.490	0.740	0.730
t0-t+15	2.066	4.410	3.949	0.710	0.600	0.820	1.540	-0.850	3.480	0.180	-0.570	0.200	1.330
t+1-t+15	3.085	7.510	4.458	0.780	0.930	0.590	1.340	-0.200	2.360	-0.180	0.380	0.420	1.220
						Percentage Returns							
t-30-t0	10.7468	10.9608	10.3127	-0.8075	0.3682	-2.2575	-0.4783	-1.5265	4.6131	-0.7109	-3.8404	-1.0450	-0.5494
t-30-t+1	9.7355	9.7559	9.8104	-0.8773	0.0398	-2.0278	-0.2790	-2.1750	5.7242	-0.3505	-4.7880	-1.2639	-0.4395
t0-t+30	4.8766	5.2298	4.8362	-0.8744	-0.7635	-1.0220	0.2203	-2.9990	3.7553	0.1916	-4.1598	-1.5790	-0.0100
t+1-t+30	5.8431	6.3850	5.3158	-0.8046	-0.4377	-1.2541	0.0200	-2.3559	2.6649	-0.1708	-3.2059	-1.3607	-0.1204
t-15-t0	4.5132	4.0986	6.7478	0.8208	0.9510	0.6687	1.0318	0.3967	2.7778	1.6713	-0.5570	0.9749	0.6266
t-15-t+1	3.5589	2.9682	6.2618	0.7498	0.6206	0.9053	1.2341	-0.2645	3.8694	2.0404	-1.5370	0.7515	0.7378
t0-t+15	1.8514	1.5448	3.5328	0.7136	0.5949	0.8380	1.5419	-0.8612	3.3001	0.1815	-0.5913	0.2011	1.3359
t+1-t+15	2.7900	2.6595	4.0064	0.7845	0.9252	0.6015	1.3389	-0.2040	2.2145	-0.1809	0.3981	0.4233	1.2240

sixty-day prediction period, an investment strategy involving any subgroup of banks is inferior to a strategy that invests in an index. The profits to be made by investing in an index are much larger than the profits to be made by investing in bank stocks. By investing $100 in the NYSE/AMEX index over the thirty day period prior to the event, a profit of $10.829 could have been made. Investments in the various subgroups of banks over the same period would have resulted in losses as high as $3.850 (large banks) and profits of not more than $4.650 (small banks). The results for the fifteen day period prior to the announcement and thirty day period following the announcement are similar.

These results indicate that the default announcement by Brazil did not convey any new negative information to the market. The market had already been in the process of penalizing banks for holding assets whose quality had been deteriorating.

IV. Analysis of Related Events During 1981-87.

Since August of 1982, when Mexico became the first major borrower to default on its external debt to U.S. banks, the market has been continuously monitoring the activities of both the borrowers and the creditors. To test for learning in the market from 1981, when Poland defaulted on its foreign borrowing, to 1987, when Brazil defaulted on

its external debt, several events that reflect the quality of the assets held by the creditors are identified and analyzed. The market reaction to each one of these events is individually analyzed. First, the excess returns for the days surrounding each of the events are computed using the standard residual methodology. Next, the volatility of the returns are computed for each event period. These are compared to the volatility of the returns for the corresponding pre-event periods. Finally, a multivariate regression model is used to estimate the regression coefficients associated with each of the events.

Fourteen events during the period 1981 to 1987 are identified. These are listed in Table 55. A sample of banks for which return data are available for the period 1981 to 1987 is used for these tests. The sample contained 70 banks. Table 56 shows the excess returns on days t_{-1}, t_0, t_{+1} and t_{+2} for each of the fourteen events. Tables 57 and 58 show the volatility of returns during the pre-event and event periods for each of the events listed in Table 55. The volatility for each firm i is computed as

$$\sigma_i^2 = [\sum_{t=1}^{N} (R_t - r)^2] / N ;$$

where, R_t is the returns for firm i over period t,

r is the average return for firm i over period t, and is expressed as

$$r = \sum_{t=1}^{N} R_t / N ;$$

where, N is the number of observations in period t.

Table 55. Specific Events Related to Banks' Foreign Debt Reported in the Wall Street Journal During 1981-87 (Dates shown are publication dates)

Calendar Date	Event Number	Wall Street Journal Index Description
04/16/81	1	Poland offered a moratorium on some debt
08/20/82	2	Mexico seeks to stop paying debt principal; foreign lenders will meet today on proposal
		Treasury bill futures prices surged after rumours swept markets that one or more major U.S. banks faced problems in their loan exposure in Mexican pesos
09/03/82	3	Gold soars to 11-month high on rumour that Argentina may repudiate its debt and nationalize its banks
11/05/82	4	New SEC rules to throw light on bank foreign loans Herzog denies another peso devaluation
		The financial problems of Mexico, Argentina and Poland and other developing countries could cause trouble for their neighbours if banks cut back international lending
01/20/83	5	SEC staff warned bank-holding companies to keep their stockholders up to date about bank lending in economically troubled countries
		Romania asking bankers to reschedule its foreign debt
		Chile's central bank to stand behind the eight banks the government took over
08/29/83	6	Brazil falls deeper into an industrial recession; Brazil has the world's biggest foreign debt, which a growing number of Brazilians doubt the country will be able to repay
		The story of how Brazil tries to refinance its debt but failed

Table 55 (Continued)

Calendar Date	Event Number	Wall Street Journal Index Description
01/05/84	7	The Venezuelan government will ask its creditor banks for a moratorium on its foreign debt
04/12/84	8	Credit quality has deteriorated in the past six months in Argentina, Brazil and other countries Questions arise over Argentine bailout package Bailout revelations: U.S Treasury and Federal Reserve Bank of New York guarantee a portion of the loan to Argentina
06/22/84	9	Latin American debtor nations meet; discuss options
07/03/85	10	The World Bank estimated developing countries will have to roll over or amortize two-thirds of their debt outstanding over the next five years, saying the job will be difficult, though not impossible
10/07/85	11	Treasury Secretary Baker, Fed Chairman Volcker and IMF working on a plan to help debtor nations Announcement that US will propose a plan for shoring up the global debt situation drew cautious approval and considerable skepticism Mexico states that it will have to increase its external financing as a result of recent earthquake disasters In what appears to be a showdown with its creditor banks, Brazil hinted it may seek an agreement with the IMF that would avoid the usual strict economic austerity; such austerity has become a prerequisite for creditor banks to postpone principal payments of debtor nations

Table 55 (Continued)

Calendar Date	Event Number	Wall Street Journal Index Description
		Secretary Baker reveals new initiative calling for all parties in the debt situation to intensify efforts to assist debt ridden nations
02/23/87	12	Brazil's unilateral suspension of interest payments on its commercial foreign debt presents international banks with one of their biggest challenges since the onset of the global debt crisis in 1982
05/20/87	13	Banking Gamble: Citicorp sharply lifts loss reserves, putting its rivals on the spot; move may hurt banks' united front
		Dollar slumps ahead of news of Citicorp's loss; rumours of bank's troubles linked to foreign loans and Third World debt starts drop by currency
05/27/87	14	Norwest Banking Corp became first big banking concern to follow Citicorp's lead in owning up to its Latin American debt woes by raising its loan-loss reserve by $200 million; move will result in second-quarter loss of about $160 million

Source: Wall Street Journal Index (various issues)

Table 56. Daily Average Excess Returns of Banks During Specific Events : 1981-87[a]

Event	Time Relative to Event t_{-1}	t_0	t_{+1}	t_{+2}
1	0.0440	0.0960	0.3503	-0.0099
2	0.9433**	-0.7329**	-0.4633	-0.2562
3	0.1304	-0.2904	-0.5831*	-0.0767
4	0.1146	0.6213*	0.0970	0.3818
5	0.1852	-0.3192	0.0752	0.2952
6	-0.3014	-0.0086	0.2026	-0.1065
7	0.2211	0.3907	0.1166	0.1462
8	-0.3732	-0.1434	-0.2390	0.0476
9	-0.1697	0.0388	-0.2764	0.1586
10	-0.2646	0.5028*	0.3951*	0.3407
11	0.3492	0.3353	0.0705	0.0534
12	0.8404**	0.4100	-0.2921	0.0580
13	0.1031	0.0752	-0.2872	0.4071
14	-0.2268	0.0388	-0.2365	0.0188

[a] Estimation period ranges from 150 days before the event to 30 days before the event

* significant at the 0.95 level

** significant at the 0.99 level

TABLE 57. Comparison of Pre-Event Period and Event Period Volatility for Specific Events During 1981-87

Event	Pre-Event[a] Period	Event[b] Period	$\sigma_{eve}^2/\sigma_{pre\text{-}eve}^2$	$\sigma_{pre\text{-}eve}^2/\sigma_{eve}^2$
1	0.0002109	0.0001820	0.8632	1.1585
2	0.0002973	0.0004916	1.6533	0.6048
3	0.0003724	0.0002914	0.7818	1.2792
4	0.0004470	0.0003444	0.7704	1.2981
5	0.0003251	0.0003035	0.9334	1.0713
6	0.0001972	0.0001224	0.6208	1.6109
7	0.0001430	0.0001686	1.1791	0.8481
8	0.0001432	0.0001459	1.0185	0.9818
9	0.0003370	0.0001930	0.5729	1.7454
10	0.0001976	0.0001926	0.9746	1.0261
11	0.0002053	0.0001809	0.8808	1.1353
12	0.0003899	0.0003366	0.8633	1.1583
13	0.0003124	0.0004487	1.4364	0.6962
14	0.0003481	0.0003068	0.8815	1.1344

[a] Pre-event period starts 30 days before the event and ends 4 days before the event

[b] Event period starts 3 days before the event and ends 5 days after the event

TABLE 58. Comparison of Pre-Event Period and Event Period Volatility for Specific Events During 1981-87: Using Alternate Measure of Volatility

Event	Pre-Event[a] Period	Event[b] Period	$\sigma_{eve}^2/\sigma_{pre\text{-}eve}^2$	$\sigma_{pre\text{-}eve}^2/\sigma_{eve}^2$
1	0.0002119	0.0001551	0.7320	1.3660
2	0.0003348	0.0004794	1.4319	0.6984
3	0.0003760	0.0002441	0.6492	1.5404
4	0.0004474	0.0002920	0.6526	1.5322
5	0.0003244	0.0003027	0.9331	1.0718
6	0.0001910	0.0001134	0.5940	1.6835
7	0.0001463	0.0001564	1.0690	0.9354
8	0.0001457	0.0001277	0.8766	1.1408
9	0.0003280	0.0001904	0.5805	1.7225
10	0.0002019	0.0001752	0.8674	1.1528
11	0.0002041	0.0001837	0.9000	1.1110
12	0.0003884	0.0003117	0.8023	1.2465
13	0.0003368	0.0003713	1.1025	0.9071
14	0.0003613	0.0002286	0.6327	1.5805

[a] Pre-event period starts 30 days before the event and ends 1 day before the event

[b] Event period starts on the event day and ends 5 days after the event

The volatility in the pre-event and event periods are individually computed as

$$\sigma^2 = [\ \sum_{i=1}^{n} \sigma_i^2\ ] / n\ ;$$

where n is the number of firms in the sample. These volatility measures are reported in Tables 57 and 58.

Two different pre-event and event periods are used. In Table 57 the pre-event period starts 30 days before the event and ends 4 days before the event. The event period starts 3 days before the event and ends 5 days after the event. In Table 58 the pre-event period starts 30 days before the event and ends one day before the event. The event period starts on the event day and ends five days after the event.

If the volatility during the event period is larger than the volatility during the pre-event period, it implies heightened uncertainty around the event period. During the event period, the market is reacting to the signal conveyed by the event. The uncertainty in market values is being resolved, and consequently, the volatility is also higher. If the volatility during the event period is smaller than the volatility during the pre-event period, it suggests earlier resolution of uncertainty surrounding the event. If the volatility during the event and pre-event periods are the same, it means that the event, by itself, did not convey any new information. Consequently, the volatility during

the event period is not larger than the volatility in the pre-event period.

In Table 59 the regression coefficients associated with each of the fourteen events are shown.

The first event in Table 55 is the debt moratorium announcement by Poland on April 15, 1981. Faced with a deteriorating economy, Poland was forced to stop servicing its $30 billion debt to foreign banks. Most of its external borrowing was from European banks. Consequently, the announcement should not have affected U.S. banks, and the deterioration in the quality of the loan assets should have been limited to European banks.[60] The excess returns for the four days surrounding the event reported in Table 56 show that there was no significant effect on the U.S. bank share prices due to the Polish default announcement. This is consistent with our a priori expectation. The volatility measures in Tables 57 and 58 show that the event period volatility is much smaller than the pre-event period volatility. This shows that the announcement did not result

---

[60] Madura, McDaniel and Whyte (1990) find that events related to the banking industry in the U.S. also affect the banking industry in other countries. The event they analyze is the $3 billion loan-loss reserve increase announcement by Citicorp in 1987 to write-off a portion of its foreign loans. They find that Citicorp's announcement had a positive and significant effect on the share prices of British banks. However, the moratorium announcement by Poland was in 1981. The market was not fully aware of the extent to which creditor banks were exposed to foreign loans.

Table 59. Regression Coefficients of the Indicator Variables for Specific Events During 1981-87

Event Number	Coefficient
1	-0.000729
2	-0.008377**
3	-0.004623*
4	0.005267*
5	-0.002725
6	0.002173
7	0.002379
8	-0.000656
9	-0.000724
10	0.005631*
11	0.003071
12	0.002866
13	-0.002166
14	0.000693

* significant at the level of 0.95
** significant at the level of 0.99

in an increased level of uncertainty in bank stock prices in the U.S.

The second event in Table 55 is the moratorium announcement by Mexico on August 19, 1982. At the time of the default, Mexico owed more than $60 billion to foreign banks, most of which were to U.S. banks. The Wall Street Journal reported the announcement on August 20, 1982. On the same day, it also reported that the Treasury bill futures prices surged as a result of U.S. banks' problem foreign loans. Since the moratorium announcement by Mexico was the first of its kind faced by U.S. banks and was for a substantial amount, we would expect the market to react negatively. The abnormal return associated with this event are shown on the second row in Table 56. It is positive on the day before the announcement. As expected, it is negative and significant on the announcement day. On the two days following the event, the abnormal returns are negative, though not significant. The volatility measures in Tables 57 and 58 show that the event period volatility is much larger than the pre-event period volatility (65% and 43% respectively). This indicates that there is heightened uncertainty during the event period compared to the pre-event period. The market is reacting to the announcement by adjusting downward the prices of bank equities.[61]

---

[61] These results are consistent with the results from Section I, where a larger sample is used.

The third event in Table 55 is the Wall Street Journal report that Argentina may default on its $38 billion loans from U.S. banks. The abnormal return of the sample of banks for the event day is -0.29%. On the press day (September 3, 1982) the abnormal returns for the sample of banks is -0.58% and significant. On day t_{+2}, the abnormal return is -0.08%. This implies that the market reacted negatively to the information published in the Wall Street Journal about the problems faced by banks with loans to Argentina and the impending default. However, the volatility measures associated with this event in Tables 57 and 58 are not consistent with the results in Table 56. The event period volatility is smaller than the pre-event period volatility in both tables. This means that there appears to be less uncertainty about bank equity prices during the event period, relative to the equity prices in the pre-event period. One possible explanation for this apparent contradiction in results between the excess returns and the price volatility is that the pre-event period straddles the Mexican default announcement. The pre-event period extends from thirty days before the event to four days before the event in Table 57 and to one day before the event in Table 58. The pre-event period for this event extends from the middle of July to the end of August of 1982. A major portion of the volatility during this period is due to the uncertainty in bank stock prices around the Mexican default

announcement. Consequently, the volatility during the pre-event period is large, relative to the event period volatility.

The next event in Table 55 (event 4) is the report in the Wall Street Journal of November 5, 1982, that the Securities and Exchange Commission had issued new directives to banks regarding disclosure of information related to foreign loans. Banks were now required to report significant foreign loan exposures in their financial statements. This would result in less information asymmetry in the market about banks' external lending. On the same day, it was also reported that the Mexican authorities denied rumors about another devaluation of their currency. A third related report was about the impact of impending cuts in international lending to developing countries on their economies. None of the abnormal returns associated with this event reported in Table 56 are negative. In fact, the event day excess returns are positive and significant. The volatility measures reported in Tables 57 and 58 show that event period volatility is smaller than the pre-event period volatility.[62]

On January 20, 1983, the Wall Street Journal reported three related events (event 5). The first event was the

---

[62] The positive excess returns on the event day could be due to a positive reaction to the new directives. Alternatively, it could be a result of confounding events during that period.

request by Romania to its creditors to reschedule its foreign debt. The second event was the nationalization of eight banks by the government of Chile. The third event was the reiteration of its new directives regarding banks' external lending to bank-holding companies by the Securities and Exchange Commission. While none of the excess returns associated with this event are significant, the event day abnormal returns are negative. The volatility during the event period is about the same as the volatility during the pre-event period. The excess returns and the variances imply that bank equities were not significantly affected by these events.

Event 6 is the report on August 29, 1983, about the economic and financial problems faced by Brazil, the largest debtor nation. It was also reported that Brazil was unsuccessfully trying to refinance its debt. The ability of Brazil to repay its $85 billion external debt was being questioned by Brazilians as well as outsiders. Though the excess returns associated with this event are negative on three of the four days reported in Table 56, none of them are significant. The volatility during the event period is also smaller than the volatility during the pre-event period. The negative excess returns indicate that the market did not react favorably to the news about Brazil's

market did not react favorably to the news about Brazil's problems.[63]

On January 5, 1984, the Wall Street Journal reported that the Venezuelan government would seek relief on debt service payments from its creditors (event 7). At that time, Venezuela had borrowed $21 billion from foreign creditors. None of the abnormal returns associated with this event are significant. The signs on the abnormal returns reported are all positive. The event period volatility is slightly higher than the pre-event period volatility. (Event period volatility is 18% and 7% higher than the pre-event period volatility in the Tables 57 and 58). Our a priori expectation is that the negative information conveyed by the event would result in downward adjustment of bank equity prices. However, this is not the case. The market did not react to the event. There are two possible reasons for this. First, the debt owed by Venezuela to its creditors formed a small fraction of the total debt owed by Third World borrowers. The report about Venezuela might not have a large impact on all the creditor banks. Consequently, the abnormal returns are not negative. Second, the prior defaults by Mexico and other borrowers could have signaled the market about the Venezuelan problem loans before the published report. The market had already

---

[63] However, the lack of statistical significance implies that this is not conclusive.

incorporated this information while valuing bank securities. Hence, the absence of a negative reaction following the event.

On April 12, 1984, (event 8) the Wall Street Journal reported that the credit quality of some of the major borrowers from U.S. banks had deteriorated over the previous six months. On the same day, details of the Argentine debt relief package were also reported. It was revealed that the U.S. Treasury and the Federal Reserve Bank were guarantors for some of the new loans provided to Argentina. The active role played by the U.S. monetary authorities and their loan guarantees should have signaled the market that they were willing to stand behind some of the new loans issued by commercial banks. Consequently, the market should have reacted favorably to this report as some of the risks in international lending was shared by these agencies. However, we find that the abnormal returns are negative on t_{-1}, t_0 and t_{+1}, though none of them are significant. The volatility during the event and the pre-event periods are similar. It appears that the negative impact of the report about the deteriorating credit quality of the foreign borrowers overshadows the positive effects of the report about U.S Treasury backing the new bank loans to Argentina.

During the week of June 19, 1984, Latin American debtor nations held a summit at Cartegena (event 9). The primary objective of the summit was to discuss the mutual problems

faced by the debtors. The debtor nations decided to put up a united front in dealing with creditors. The Wall Street Journal also reported that some of the participants were blaming the continuation of their problems on IMF austerity measures. The general trend of the reports coming out of the summit indicated a hardening of the stance taken by debtor nations. The abnormal returns associated with this event in Table 56 are negative on two days and positive on the remaining two days. However, none of them are significant. The volatility during the pre-event period is over 70% higher than the volatility during the event period. The reason for the absence of a negative reaction to the event could be that the market had previously anticipated the united response by the debtor nations during the summit. None of the reports coming out of the summit conveyed any new significant information to the market.

Event 10 is the Wall Street Journal report on July 3, 1985, that the World Bank had estimated that two-thirds of the external debt owed by developing countries would have to be rolled over during the next five years. The abnormal returns associated with this event indicate that the market did not react to this report. The abnormal returns are positive and significant on the event day and the press day (0.50% and 0.40%, respectively). The lack of a negative reaction to the report could again be attributed to the market anticipating it well ahead of time. The event period

volatility is not much different from the pre-event period volatility.

The next major event included in Table 55 occurred during the week of October 7, 1985 (event 11). An economic summit of the group of industrialized nations was held in Seoul. During the summit, U.S. Treasury Secretary James Baker announced a new plan to deal with the debt problems faced by developing countries, especially, Latin American borrowers. For the first time, the U.S. monetary authorities detailed a long term plan to help debtor nations and U.S. creditor banks.[64] The abnormal returns indicate that there were no significant adjustments to bank equity prices during the period reported in Table 56. The volatility during the event and pre-event periods are also not different from each other. The absence of a reaction to the Baker initiative could be due to two reasons. Firstly, the market was not impressed by the new plan announced to solve the debt problem. Consequently, it did not react favorably to the announcement. Secondly, the market might have been uncertain about the details of the plan. It might have been waiting for further details on the implementation of the new plan. Hence, the lack of a reaction during the days reported.

On February 20, 1987, Brazil announced that it was

---

[64] The details of the Baker initiative are described in Chapter Two.

suspending debt service payments owed to creditor banks on its $100 billion external debt (event 12). Prior defaults by other Latin American borrowers were for smaller amounts. Brazil was the largest debtor nation at the time of the default. The market for bank stocks did not react negatively on the announcement day (t_0). On the press day, the sample of bank stocks experienced a 0.29% drop (not significant). The pre-event period volatility is 15% larger than the event period volatility. The abnormal returns in Table 56 are consistent with the abnormal returns reported in Section II. The absence of a significant negative reaction to the default announcement can be attributed to the anticipation of the event by the market. The event, by itself, did not convey any new information to the market. The market was aware of the size of the external debt owed by Brazil. It was also aware of the previous problems faced by Brazil in servicing its debt (event 6). The Wall Street Journal reported that during the period preceding the default announcement, there was speculation about Brazil not being able to service its external debt. Consequently, the announcement did not come as a surprise to the market. Hence, the lack of a significant negative reaction following the event.

Event 13 is the May 19, 1987 announcement by Citicorp that it was increasing its loan-loss reserves by $3 billion to cover bad foreign loans. On the same day, the Wall

Street Journal reported that the depreciation in the value of the dollar was related to the problem loans faced by Citicorp and other lenders. We do not find any significant adjustments to the equity prices of banks included in our sample. The abnormal returns are positive on t_{-1}, t_0 and t_{+2}, and negative on t_{+1}.[65] The volatility during the event period is larger than the volatility during the pre-event period. A week later, Norwest announced that it was also raising its loan-loss reserves to write-off a portion of its foreign loans (event 14). The abnormal returns are not significant in this case, either. The volatility during the event and pre-event periods are similar for this event.

Of the fourteen events analyzed above, six are either default announcements by debtor nations or rescheduling of debt announcements (events 1, 2, 3, 5, 7 and 12). The first of these events is the debt moratorium by Poland in 1981. The last of these events is the debt moratorium by Brazil in 1987. Others include defaults by Argentina, Romania, and Venezuela. Event 2 is the default announcement by Mexico in 1982. We find that the market reacted negatively to the earlier default announcements.[66] We also find that the market reaction to the latter default announcements

---

[65] This contradicts the results of Musumeci and Sinkey (1990). Using a much smaller sample of banks, they find that the market reacted positively to the announcement.

[66] The absence of a significant negative reaction to the Polish announcement is discounted due to the reasons described previously.

(especially the Brazilian default announcement) were not similar to the market response to the earlier default announcements. The Brazilian default was for a larger amount than the Mexican default ($100 billion versus $60 billion). However, the magnitude of the negative reaction to the two similar announcements was larger for the Mexican event. While it was significant for the two-day event period in the case of the Mexican event, it was not in the case of the Brazilian event. The market reaction to this set of similar events is changing over time.

Events 6, 8, 9 and 10 reflect the deteriorating quality of the loan assets held by U.S. creditor banks. They represented an increasing probability of default by borrowers, and consequent loss of value for the lenders. The abnormal returns associated with the first three of these events are negative (though not statistically significant). The abnormal return associated with the last event is positive and significant. We find that the market reaction to this set of similar events changes over time.

To find out if the market reaction to the Mexican default announcement is statistically significantly different from that of the Brazilian default announcement, tests are conducted to see if the difference between the two-day excess returns for the two events is significantly different from zero. The test is formulated as:

$(X_A-X_B)/s\{X_A-X_B\}$ is distributed as t with (m+n-2)

degrees of freedom,

where, X_A is the mean excess return for the event period during the Mexican event,

X_B is the mean excess return for the event period during the Brazilian event,

$s^2\{X_A-X_B\} = s^2[(1/m)+(1/n)]$,

$s^2=[\ (X_{iA}-X_A)^2 + \ (X_{iB}-X_B)^2]/(m+n-2)$,

X_{iA} is the excess return of bank i for the two-day event period during the Mexican event,

X_{iB} is the excess return for bank i for the two-day event period during the Brazilian event,

m is the number of banks used in the sample for the Mexican event,

and, n is the number of banks used in the sample for the Brazilian event.

The relevant values are:

$X_A = -1.1962$

$X_B = 0.1179$

$s\{X_A-X_B\} = 0.327349$

$(X_A-X_B)/s\{X_A-X_B\} = -4.01437$

Since the difference in means falls outside the acceptable region in the t-distribution, the hypothesis that the two-day mean excess returns for the two events are equal is rejected, and there is evidence to the contrary.

To test the learning in the market from the Mexican event of August, 1982, to the Brazilian event of February,

1987, events 2, 3, 5, 7 and 12 from Table 55 are further analyzed. All five of these events represent default announcements by sovereign borrowers. Since the preliminary analysis indicated that the Polish default had no effect on the equity prices of U.S. banks, it is not included in this analysis.

The abnormal returns on days t_{-1}, t_0, t_{+1} and t_{+2} for the five events are shown in Table 56. In this analysis, one measure of learning is the speed with which the market adjusts to the default announcements. Since speed is inversely related to time, this study defines speed of market reaction as the inverse of the number of days immediately following the events during which the group of banks experienced downward adjustments in equity prices. This definition of speed of market reaction results in undefined values when there are no downward adjustments following the events. To eliminate outliers, the time the market takes to adjust downward following the events is approximated to one day.

Using the above definition, the speed of market reaction for events 2, 3, 5, 7 and 12 are computed as 1/3, 1/3, 1, 1 and 1 respectively. Figure 2 shows the plot of speed of market reaction versus calendar time when the five events occurred. The shape of the graph resembles the S-shaped learning curve generated by normal learning processes. The shape reflects an increase in the speed of

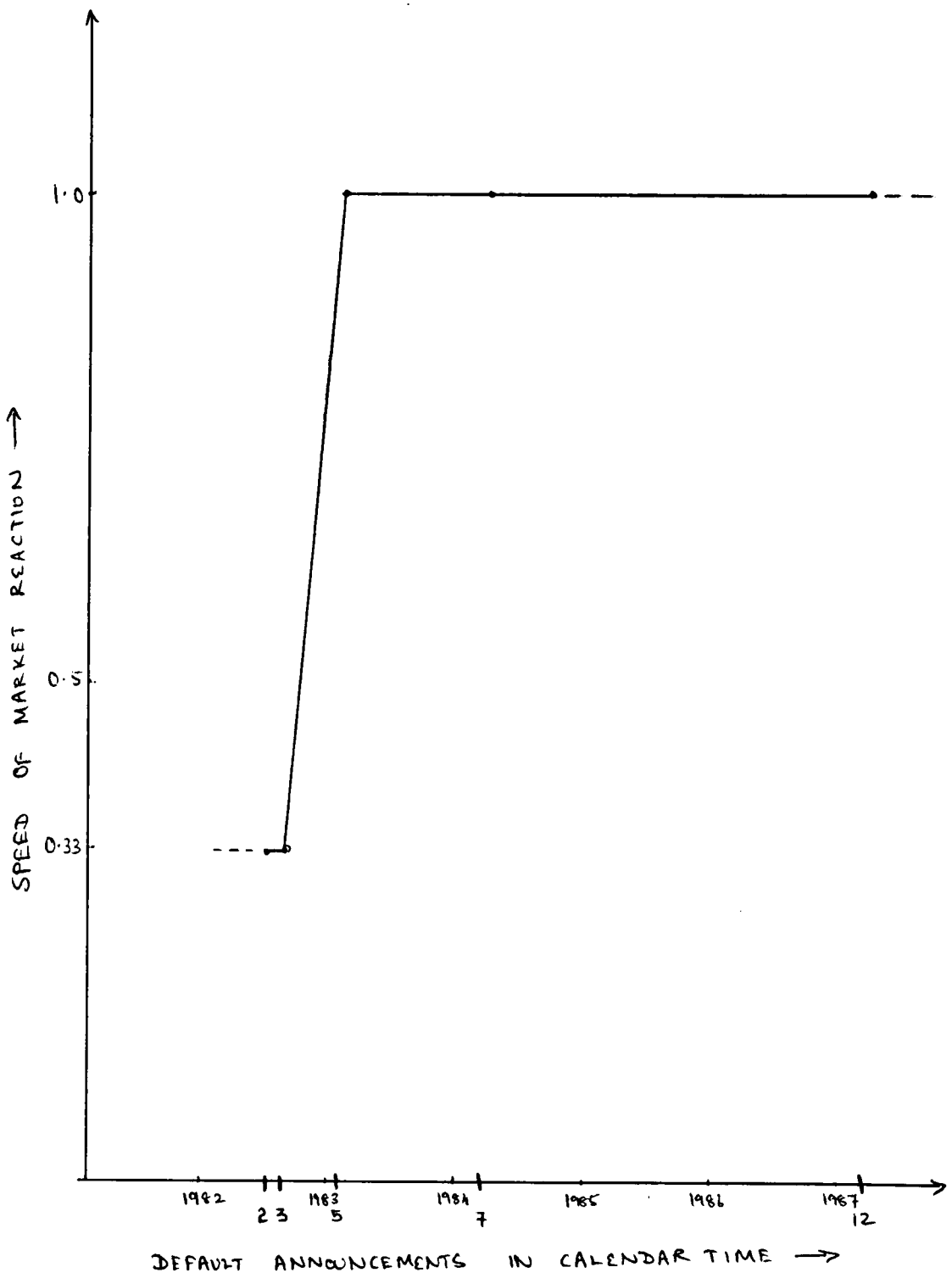


Figure 2. Market Learning Curve (Speed of Market Reaction) : 1982-1987

market reaction (and hence, learning) from one event to the next. It shows that beginning with event 5, the market adjustment to an event, if any, was very rapid. This result is consistent with our earlier findings.

The regression coefficients associated with the five events in Table 59 are also plotted against the calendar time when the events occurred (Figure 3). Again, the graph resembles the S-shaped learning curve, reflecting smaller adjustments from one event to the next.

The above comparisons and analyses imply that the market response to similar events related to debt defaults by foreign borrowers over the six-year period from 1981 to 1987 were not similar. There appears to be a learning effect in the market. Initially, the announcements were a surprise and they conveyed new information to the market. The market impounded this information in its valuation of bank equities. Following these initial defaults, the market revalued all foreign loan assets of banks. Based on its assessment, it adjusted the market prices of bank equities well ahead of the succeeding default announcements. The latter default announcements did not convey any new information to the market as they were expected. Consequently, there were no negative reactions following the latter defaults.

The regression coefficients in Table 59 are consistent with the above conclusions. While the coefficients

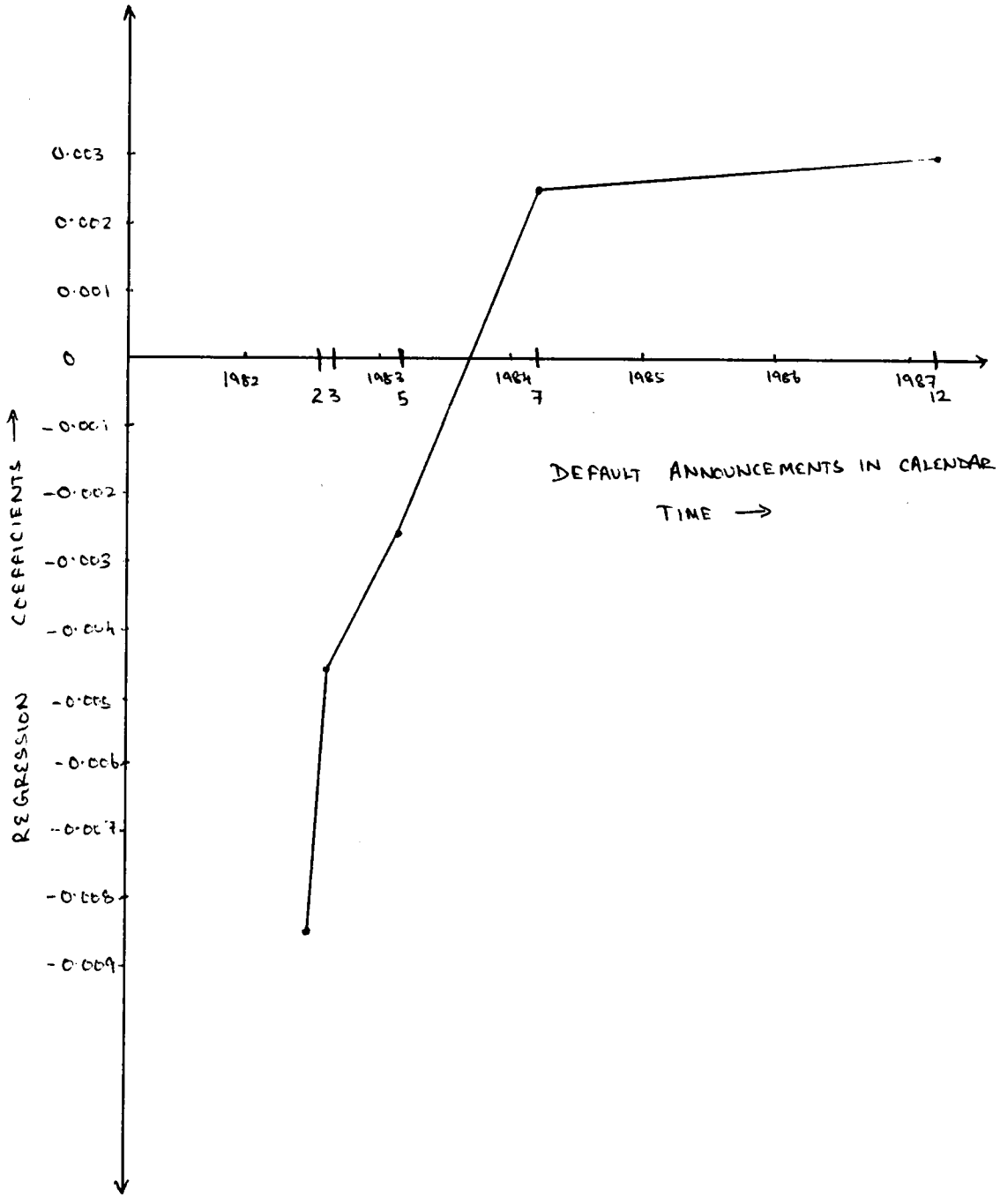


Figure 3. Plot of Regression Coefficients Versus Events in Calendar Time : 1982-1987

associated with the initial events are predominantly negative (and significant for events 2 and 3), the coefficients for the latter events are predominantly positive. The coefficient associated with the Mexican default announcement is -0.008377 and significant. The coefficient associated with the Brazilian default announcement is 0.002866 (and not significant).

V. Bank Learning in the Intervening Period.

Since the Mexican default of August 1982, banks have also modified their policies in lending to foreign borrowers. The Securities and Exchange Commission issued new guidelines to banks in October 1982, which requires them to disclose all foreign loan exposure that exceeds 15% of the banks' primary capital or 0.75% of their total assets. Previously, banks were not required to disclose their loan exposure to any single foreign country. With the new guidelines, the market has more information about the risk faced by banks in their loan portfolio, and are in a better position to value bank equity prices.

Table 60 shows the capital ratios and foreign loan to total asset ratios of banks from 1981 to 1986. The capital ratios of banks increased from 6.7374% in 1981 to 7.3751% in 1986. The international debt crisis, along with the energy crisis in the early 1980s, increased the insolvency risk of banks. In order to minimize problems related to bank

Table 60. Capital Ratios and Foreign Loan to Total Asset Ratios of Banks, 1981-86 (All Figures in %)

End of Year	Capital Ratio	Foreign Loan to Total Asset Ratio
	All Banks	
1981	6.7374	4.9569
1982	6.7101	5.0677
1983	6.8221	5.1511
1984	6.9211	4.7524
1985	7.1828	4.0004
1986	7.3751	3.4069
	Banks With Foreign Loans	
1981	6.0287	8.6288
1982	6.1857	8.6032
1983	6.4678	8.3563
1984	6.6081	7.7960
1985	6.9699	6.5340
1986	7.3080	5.7564

	Change in Capital / Change in Total Assets	
Period	All Banks	Banks With Foreign Loans
1981-82	8.5012	9.5405
1982-83	13.5166	27.7954
1983-84	10.6353	11.1098
1984-85	11.2844	11.3313
1985-86	9.5726	9.2466

capital adequacy, bank regulators encouraged banks to increase their capital ratios. This is reflected in the capital ratios of banks during the six year period. During the same period the capital ratios of banks with foreign loans in their loan portfolio increased from 6.0287% to 7.3080%.[67]

The last column in Table 60 shows the foreign loan to total asset ratios. For the group of all banks this ratio increased from 4.5969% in 1981 to 5.1511% in 1983, before declining to 3.4069% in 1986. For the group of banks with foreign loans in their asset portfolio, it declined from 8.6288% in 1981 to 5.7564% in 1986. This implies that banks were getting rid of foreign loans in their asset portfolios, or were shifting away from the foreign lending market. By this action banks were acknowledging the risks in international lending and were depending less on foreign loans as a source of income. Figure 4 shows the plot of capital ratios and foreign loan to total asset ratios from 1981 to 1986.

The bottom panel in Table 60 shows the yearly change in capital to change in total asset ratios for the two groups of banks. From 1982 to 1983, banks with foreign loans in

---

[67] The capital ratios were also computed without including loan-loss reserves as a component of the primary capital of banks. The revised capital ratios also showed an upward trend from 1981 to 1986, implying that the increase in capital was not due to increase in loan-loss reserves alone. Banks were also increasing the other components of the primary capital in order to improve the capital ratios.

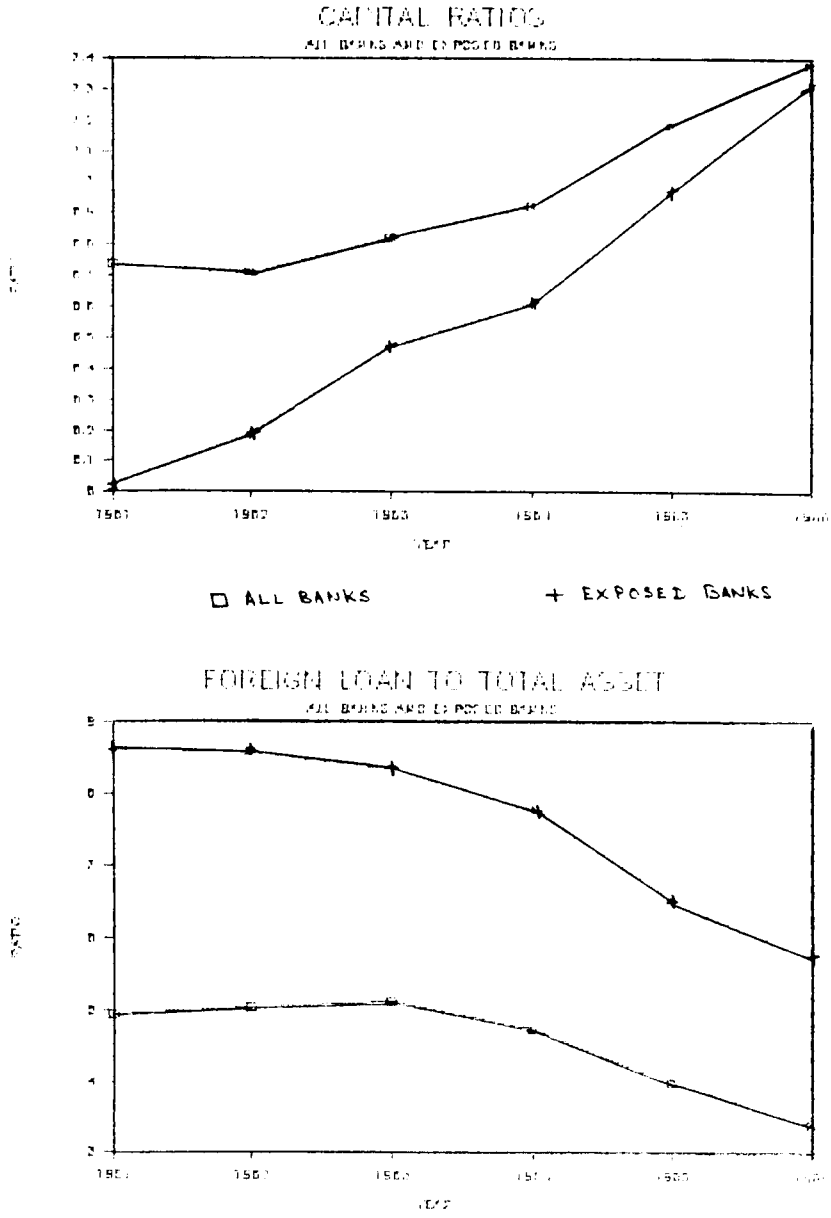


Figure 4. Capital Ratios and Foreign Loan to Total Asset Ratios of Banks : 1981-1986

their asset portfolio altered their capital by a very large amount relative to their total assets. This is reflected in the large value of the ratio (27.7954%) relative to the values in the other years and the group of all banks.

Table 61 shows the loan-loss reserves of banks as a fraction of bank capital and total assets. The loan-loss reserves to capital ratio increased from 9.7326% in 1981 to 17.0021% in 1986. The corresponding numbers for banks with foreign loans in their asset portfolio are 10.8157% in 1981 and 13.9589% in 1986. The loan-loss reserves as a fraction of the total assets of banks increased from 0.6309% in 1981 to 1.0290% in 1986 for the group of all banks, and from 0.6364% to 1.0103% for the banks with foreign loans. These numbers indicate that banks were increasing their loan-loss reserves to write-off bad loans.

The above tables show that, along with the market learning, banks were also adapting to the problems faced by borrowers in servicing their debt to banks. They were recognizing the higher risk in international lending and greater probability of default by foreign borrowers. Banks were also reducing their exposure to foreign loans, as reflected in the changes in the foreign loan to total asset ratios over the six-year period. (As discussed in Chapter II, a comparison of exposures of individual banks in 1982 and 1986 indicates that banks became more conservative in the foreign lending market.)

Table 61. Loan-Loss Reserves as a Ratio of Bank Capital and Total Assets, 1981-86 (All Figures in %)

End of Year	Loan-Loss Reserves to Capital Ratio	Loan-Loss Reserves to Total Asset Ratio
	All Banks	
1981	9.7326	0.6309
1982	10.1577	0.6617
1983	10.5481	0.7030
1984	11.6186	0.7844
1985	12.1037	0.8578
1986	17.0021	1.0290
	Banks With Foreign Loans	
1981	10.8157	0.6364
1982	11.2325	0.6841
1983	11.4779	0.7328
1984	12.6311	0.8206
1985	12.8882	0.8954
1986	13.9589	1.0103

VI. SUMMARY.

This chapter reported the empirical findings of this study. The results of the various hypotheses detailed in Chapter V are presented. We find evidence of announcement and contagion effects following the Mexican default announcement. We do not find any significant effects following the Brazilian announcement. Analysis of sub-events prior to these events indicate that there was some leakage of information about the problems faced by Mexico and Brazil in servicing their debt to U.S. creditor banks. We find that the market adjusted bank equity prices in response to the information conveyed by these sub-events. We also find evidence of learning in the market by analyzing similar events over a six-year period. The next chapter restates the conclusions and contribution of this study.

CHAPTER VIII

CONCLUSIONS

The purpose of this dissertation was to test and compare the announcement and industry contagion effects of the Mexican foreign debt moratorium announcement of August 19, 1982 with that of the Brazilian debt moratorium announcement of February 20, 1987. While several studies have attempted to measure the market reaction to the Mexican moratorium announcement by studying the bank stock price adjustments before and after the event, very few have looked at the market reaction following the Brazilian moratorium announcement. This dissertation analyzed the bank stock price behavior for an extended period of time around both the Mexican and Brazilian announcements within a framework that allows resolution of the conflicting results from the earlier studies. In addition to measuring individual announcement and industry contagion effects, the learning, with respect to market reaction to information about Third World debt defaults, that occurred in the period between the two announcements was also analyzed by comparing the bank share price changes during the two events, and by analyzing a number of other related events during the six-year period from 1981 to 1987.

Three sets of hypotheses were tested. The first set of hypotheses examined whether the default announcements by

Mexico and Brazil conveyed any new information to the market or whether there was information leakage prior to the announcements. The second set of hypotheses tested for contagion effects in the market following the moratorium announcements. Here, the objective was to find out if all banks, foreign loan-exposed and non-exposed, were uniformly penalized, or if the market correctly penalized only exposed banks, following the negative signal conveyed by the events. The third set of hypotheses tested for learning in the market from 1981 to 1987. The purpose of these tests was to find out whether the market reacted in the same way to similar events over time, or if its reaction modified from one event to another.

The standard residual methodology was used to estimate abnormal returns. Different estimation periods were used to make sure that the parameters were not biased due to any particular estimation period. Intervention analysis and chow-tests were conducted to confirm the results. Regression analysis was used to analyze various sub-events during the six-year period.

This study finds that the Mexican debt moratorium announcement conveyed new information to the market. There was also a contagion effect where banks without any exposure to Mexico experienced downward adjustments in their security prices. Analysis of several events prior to the Mexican announcement indicated that there was some information

leakage and bank equity price adjustments during these events. We find that the market did not react to the Brazilian moratorium announcement. The event did not convey any new information to the market. However, the market did recognize and react to several of the events prior to the announcement. Consequently, the announcement, by itself, did not convey any new information. Finally, we find that the market response to debt default announcements changed over time. With each event, the magnitude of the market reaction became smaller. The market became increasingly aware of the deterioration in the quality of loan assets held by U.S. banks. Hence, the latter default announcements did not convey as much information as the earlier announcements. The market did learn from the earlier events and modified its response to the latter events.

A number of further research topics have been envisioned during this exploration. This study limited itself to focusing on U.S. banks. An extension of this study would be to analyze the effects of the moratoria announcements on the European and Japanese banking industry, which are also active in international lending. However, the analysis should be modified to reflect the different regulatory and institutional environment in which European and Japanese banks operate compared to those in the U.S. The conclusions of this study could be enhanced by looking at exposure of banks to all foreign borrowers and not

limited to the defaulting country. Another extension of this study would be to conduct more rigorous tests of learning in the market and relate the results to one or more theories developed in the psychology literature. Yet another extension would be to analyze the market response to the recent loan-loss reserve increases by the creditors and their impact on international lending.

LIST OF REFERENCES

Aharony, Joseph & Itzhak Swary. "Contagion Effects of Bank Failures: Evidence from Capital Markets." Journal of Business. Vol 56 (November 1983) p 305-22.

Bar-Yosef, Sasson & Lawrence Brown. "A Reexamination of Stock Splits Using Moving Betas." Journal of Finance. Vol 32 No 4 (September 1977) p 1069-80.

Beighley, Prescott. "The Risk Perceptions of Bank Holding Company Debtholders." Journal of Bank Research. (Summer, 1977).

Born, Jeffery A. & Seth C. Anderson. "A Comparison of Intervention and Residual Analysis." Journal of Financial Research. Vol 9 (Fall 1986) p 261-70.

Box, G.E.P. & George Tiao. "Intervention Analysis with Applications to Economic and Environmental Problems." Journal of American Statistical Association. (March 1975). p 70-79.

Brown, Stephen & Jerold Warner. "Measuring Security Price Performance." Journal of Financial Economics. Vol 8 (1980) p 205-58.

Brown, Stephen & Jerold Warner. "Using Daily Stock Returns." Journal of Financial Economics. Vol 14 (1985) p 3-31.

Bruner, Robert F. & John M. Simms. "The International Debt Crisis and Bank Security Returns in 1982." Journal of Money, Credit and Banking. Vol 19 No. 1. (Feb 1987) p 46-55.

Chen, Andrew H. & Gary C. Sanger. "An Analysis of the Impact of Regulatory Change: The Case of Natural Gas Deregulation." The Financial Review. Vol 20 (February 1985). p 36-54.

Claudon, Michael P. World Debt Crisis. Ballinger Publishing Company : 1986. p 24-25.

Cline, William R. International Debt and the Stability of the World Economy.

Cornell, Bradford & Alan C. Shapiro. "The Reaction of Bank Stock Prices to the International Debt Crisis." Journal of Banking and Finance. Vol 10 (March 1986) p 55-73.

DeJong, Douglas & Daniel Collins. "Explanation for the Instability of Equity Beta: Risk-free Rate Changes and Leverage Effects." Journal of Financial and Quantitative Analysis. Vol 20 No 1. (March 1985) p 73-94.

Deshpande, Shreesh & George Philippatos. "Leverage Decision and the Effect of Corporate Eurobond Offerings." Applied Economics. Vol 20 No. 7 (July 1988) p 901-16.

Dimson, Elroy. "Risk Measurement when Shares are Subject to Infrequent Trading." Journal of Financial Economics. Vol 7 (1979) p 197-226.

Dornbusch, Rudiger. "International Debt and Economic Instability." Economic Review : Federal Reserve Bank of Kansas City. (January, 1987) p 15-32.

Fama, Eugene. Foundations of Finance. New York: Basic Books, 1976.

Fischer, Lawrence & Jules Kamin. "Forecasting Systematic Risk: Estimates of Raw Beta that Take Account of the Tendency of Beta to Change and the Heteroskedasticity of Residual Returns." Journal of Financial and Quantitative Analysis. Vol 20 No 2. (June 1985) p 127-149.

Hammer, Richard M. & William D. Rohrer. "U.S. Banks Handcuffed on LDC Swaps." ABA Banking Journal. September 1987. p 126-127.

Hays, Patrick & David Upton. "A Shifting Regimes Approach to the Stationarity of the Market Model Parameters of Individual Securities." Journal of Financial and Quantitative Analysis. Vol 21 No 3. (September 1986) p 307-321.

Holthausen, Robert & Richard Leftwich. "The Effect of Bond Rating Changes on Common Stock Prices." Journal of Financial Economics. Vol 17 (1986) p 57-89.

Kalay, Anver & Uri Loewenstein. "Predictable Events and Excess Returns." Journal of Financial Economics. Vol 14 (1985) p 423-49.

Lamy, Robert, Wayne Marr & Rodney Thompson. "The Mexican Debt Crisis, the IMF, and the Efficiency of Bank Share Prices." Studies in Banking and Finance. Vol 3 (1986) p 203-217.

Larker, David, Lawrence Gordon & George Pinches. "Testing for Market Efficiency: A Comparison of the Cumulative Average Residual Methodology and Intervention Analysis." Journal of Financial and Quantitative Analysis. Vol 15 No 2. (June 1980). p 267-87.

Makin, John H. The Global Debt Crisis. Basic Books Inc. : 1984.

Malatesta, Paul & Rex Thompson. "Partially Anticipated Events." Journal of Financial Economics. Vol 14 (1985) p 237-50.

Murphy, N. B. "The Bank Disclosure Controversy: A Test of the Impact of the 'Problem List'." Journal of Bank Research (Summer 1979).

Musumeci, James and Joseph Sinkey. "The International Debt Crisis, Investor Contagion, and Bank Security Returns in 1987" Journal of Money, Credit and Banking. Vol 22 No. 2 (May 1990) p. 209-220

Orr, Bill. "Third World Debt : New Fixes Needed." ABA Banking Journal. April 1987. p 79-91.

Pettway, Richard. "The Effects of Large Bank Failures upon Investors' Cognizance in the Commercial Banking Industry." Journal of Financial and Quantitative Analysis. Vol 11 (September 1976) p 465-77.

Pettway, Richard. "Potential Insolvency, Market Efficiency, and Bank Regulation of Large Commercial Banks." Journal of Financial and Quantitative Analysis. Vol 15 (March 1980) p 219-36.

Pettway, Richard & Joseph Sinkey. "Establishing On-site Bank Examination Priorities : An Early Warning System Using Accounting and Market Information." Journal of Finance. Vol 35 (March 1980). p 137-50.

Report On Business. "Brazil for Sale." November 1987. p 93-101.

Schoder, Stewart & Prashant Vankudre. "The Market for Bank Stocks and Banks' Disclosure of Cross-border Exposure : The 1982 Mexican Debt Crisis." Working Paper, Wharton School of Finance, University of Pennsylvania, 1986.

Smirlock, Michael & Howard Kaufold. "Bank Foreign Lending, Mandatory Disclosure Rules, and the Reaction of Bank Stock Prices to the Mexican Debt Crisis." Journal of Business. Vol 60 No.3 (1987) p 347-364.

VITA

K.G. Viswanathan was born in Kuala Lumpur, Malaysia on January 28, 1962. He attended Padma Seshadri Bala Bhavan High School, Madras, India and graduated in June 1980. The same year he entered Regional Engineering College, Durgapur, India, and in June 1984 he received a Bachelor of Engineering Degree in Mechanical Engineering. In the fall of 1984 he received a graduate fellowship from Western Michigan University and began study toward a Master of Business Administration degree in Finance. This was awarded in August 1986. In September 1986 he entered the Doctor of Philosophy program in Finance at The University of Tennessee, Knoxville. He received this degree in August 1991.

Since September 1989, the author has been working as Assistant Professor of Finance at Hofstra University, Hempstead. He has participated as a presenter in several Finance conferences. He is a member of the American Finance Association and the Financial Management Association.