WHEN DO COSTA RICA NATIONAL BANKS RESPOND TO RESERVE REQUIREMENT CHANGES?

Terrance Jalbert, University of Hawaii at Hilo
Jonathan Stewart, Abilene Christian University
Mercedes Jalbert, The Institute for Business and Finance Research

ABSTRACT

The process of changing reserve requirements in Costa Rica is a three step process. First the central bank makes the decision to change reserve requirements. Several days to several weeks later, the change is announced in the official newspaper. The actual reserve requirement change takes place from several weeks to several months later. Previous studies have limited their analysis to an examination of the decision and the announcement dates. The research shows that Costa Rica national banks do not respond to reserve requirement change announcements or reserve requirement change decisions. In this paper we examine the extent to which Costa Rica national banks respond to reserve requirement changes on the effective day of the reserve requirement change. We find evidence that Costa Rica national banks change their interest rate spreads on the effective day.

JEL: E42, E58

KEYWORDS: Reserve Requirements, Banking, Costa Rica, Interest Rates

INTRODUCTION

Reserve requirement changes have been extensively examined in U.S. markets. Far less is known about responses to reserve requirement changes in other countries. This paper examines Costa Rica national bank responses to reserve requirement changes. Costa Rica provides a unique setting for examining responses to reserve requirement changes for four reasons. First while geographically small, Costa Rica is home to three of the ten largest Central American banks. Costa Rica has about 28 percent of Central American Bank Assets (Ballestero and Martinez, 2007). Second, Costa Rica banks accept deposits and make loans both in U.S. dollars and colon, the local currency. Banks hold reserves against deposits in both currencies, but reserve requirements have sometimes been different for deposits in the two currencies. Moreover, reserve requirement changes do not always coincide. Third, the Costa Rica Central Bank made ten reserve requirement change announcements between 1996 and 2010. These announcements made 18 changes of colon denominated deposit reserve requirements and ten changes of dollar denominated reserve requirements. By comparison, the most recent reserve requirement change in the United States occurred in 1992. Finally, Costa Rica has both government sponsored banks and privately owned banks providing a rich environment to study responses of various institution classes to regulation changes.

The process of implementing a reserve requirement change in Costa Rica starts with the decision by the Central Bank to change rates. Several days (sometimes several weeks) later the decision becomes public. The public announcement appears in the official Costa Rica Newspaper, *La Gaceta*. A lag of several days to several months occurs between the announcement date and the effective date of the change. This sequence of events is depicted in Figure 1.

The motivation for this study emanates from earlier work which finds that Costa Rica national banks do not respond to reserve requirement change announcements (Stewart, Jalbert and Jalbert, 2008, 2010). One plausible explanation for the lack of response is that reserve requirement change information is

leaked to national banks prior to the announcement. Earlier studies have found no information leakage effects (Stewart, Jalbert and Jalbert, 2010). So the combined evidence shows no response to reserve requirement changes on the decision or announcement dates. Thus an open question remains regarding if, when and how Costa Rica national banks respond to reserve requirement changes.

Figure 1: Costa Rica Reserve Requirement Change Process

This figure shows the sequence of events that occur for a reserve requirement change in Costa Rica. The decision date is the day that the Costa Rica bank makes a decision to change reserve requirements. The announcement date is the day that the Central bank decision is made public. The effective date is the day that the reserve requirement change becomes policy.

In this study we examine the response of Costa Rica national banks to reserve requirement changes on the effective date of the reserve requirement change. Evidence to suggest that banks respond predictably on the effective date suggests a predictable opportunity for market participants who observe the announcement. Market participants that observe a reserve requirement increase would want to borrow in advance of a corrosponding interest rate increase. Market participants that observe a reserve requirement decrease would want to lend before the impending interest rate decline. Such a pattern might also explain the findings of Jalbert, Stewart and Jalbert (2006), that uncovered interest rate arbitrage opportunities are present in the Costa Rica deposit account market.

The remainder of this paper is organized as follows. In the second section, we discuss the relevant literature. A discussion of the Costa Rica banking system follows. Next, we discuss the data and methodology used in the paper. In the ensuing section the test results are presented. The paper closes with some concluding comments and suggestions for future research.

LITERATURE REVIEW AND BACKGROUND

Two basic theories relating to the role of reserve requirements appear in the literature. The first argues that reserve requirements are a tool of monetary policy. This theory suggests that central banks reduce reserve requirements in order to free bank reserves. By doing so, they increase the money supply and provide economic stimulus. Hein and Stewart (2002), and Stewart and Hein (2002), find support for the contention that reserve requirement changes have not been recently used as a monetary tool in the United States. They find the Federal Reserve commonly offsets reserve requirement changes with open market operations. The increase in money supply caused by a reduction in reserve requirements is at least partially offset by Federal Reserve sales of Treasury securities.

A second theory posits that reserve requirements are a tax on financial institutions. If this theory holds Central Banks might use reserve requirement changes during economic downturns to bolster the health and stability of financial institutions. A number of authors have tested hypotheses related to this theory and generally find evidence supporting this supposition (Black, 1975, Fabozzi and Thurston, 1986, Fama, 1985, and James, 1987).

The tax theory of reserve requirements is well accepted. However, less clear is who ultimately bears the tax. One line of literature suggests that financial institutions pass the tax onto their customers. However, there is disagreement regarding which customers, or combination of customers, ultimately bear the tax. Black (1975) and Fabozzi and Thurston (1986)) contend that bank depositors shoulder the tax in the form of lower deposit rates on reservable time deposits. Fama (1985) and James (1987) argue that borrowers shoulder the tax when they pay higher borrowing rates. A third group of researchers (Cosimano and

McDonald (1998) and Hein and Stewart (2002)) argue that financial institutions bear the tax in the form of lower profitability. They argue that competition prevents financial institutions from passing the tax on to either depositors or borrowers. Several authors find that U.S. bank stock prices move inversely to announced reserve requirement changes supporting this contention (Kolari, Mahajan, and Saunders, 1998, Slovin, Sushka and Bendeck, 1990, and Osborne and Zaher, 1992). Sellon and Weiner (1996) and (1997) provide an extended discussion of the history and goals of reserve requirements and reserve requirement changes.

While substantial research is available regarding the role of reserve requirements and reserve requirement changes in the U.S., much less evidence is available on the role of reserve requirements in other countries. Most notable is a general lack of evidence from lesser developed countries. Reinhart and Reinhart (1999) suggest that Costa Rica and other countries use reserve requirement changes to deal with capital flow problems. They contend that reserve requirement changes mitigate the impact of foreign exchange market interventions and offset the effects of large capital flows. They conjecture the precise implications of reserve requirement changes depend on whether borrowers or depositors pay the tax implied by reserve requirement increases. They examine ten countries, including Costa Rica, finding evidence that both deposit and lending rates respond to reserve requirement changes.

Stewart, Jalbert and Jalbert (2008) examine the tax hypothesis of reserve requirements in Costa Rica. Their data covers a ten year period from 1996 through 2006 including 1-, 3-, and 6-month deposit rates. Data are collected for government banks, private banks and non-bank financial institutions. Loan rates are also examined for several loan categories. They find mixed evidence regarding who bears the brunt of the tax. Evidence from earlier reserve requirement changes support the theories that the tax is passed on to depositors or to borrowers. More recent evidence supports the theory that financial institutions and their shareholders bear the tax in the form of lower profits.

The standard approach for testing the bank profitability hypothesis is to examine stock price changes around reserve requirement chance. Unfortunately in Costa Rica, reliable and accurate stock price data is not readily available. In a recent paper, Stewart, Jalbert and Jalbert (2010) develop a methodology to test the bank profitability theory in the absence of stock price data. Their approach involves using the spread between loan and deposit rates as a proxy for bank profitability. They find that private banks and non-bank financial institutions change their spreads in predictable ways around reserve requirement announcements. However, their results show that government banks do not change their interest rate spreads around reserve requirement change announcements. Moreover, they find no evidence of information leakage between the decision date and the announcement date. This finding leaves open the question of how and when Costa Rica government banks respond to reserve requirement changes. The goal of the current research is to close this gap in the literature. In this paper, we examine effective dates of reserve requirement changes. Specifically we answer the question: Do government banks change their interest rate spreads around reserve requirement changes?

As noted above, government banks respond differently to reserve requirement change announcements. To fully understand this behavior, it is necessary to identify how government banks differ from their private and non-bank financial institution competitors. Clearly privately owned banks are driven by the goal of profit maximization. Government banks however, may have a different role. Stewart, Jalbert and Jalbert (2010), conduct a survey of the mission statements of five Costa Rica Government banks. They find that each of the government banks reference some social objective in their mission or vision statements. Generally, these statements refer to improving the welfare of the Costa Rica people, or improving the economic development of the country. It is clear Costa Rica government bank objectives differ from those of private institutions.

THE COSTA RICA BANKING SYSTEM

The Costa Rica Central Bank frequently changed reserve requirements in the mid 1990's and early 2000's. Moreover sometimes reserve percentages differed for deposits denominated in Costa Rican colon and in U.S. dollars. In the mid 1990's, the Costa Rica banking system applied as many as five different required reserve rates depending on currency and maturity of the deposit. Colon denominated deposits were classified into the following groups: money market securities, time deposits of 180 days or less and time deposits greater than 180 days in maturity. U.S. dollar denominated deposits were classified as money market securities or time deposits. Table 1 shows reserve requirement rates for colon denominated securities with less than 180 days to maturity and dollar denominated time deposits. These rates are as presented in Stewart, Jalbert and Jalbert (2008 and 2010). In some instances the data reported here do not indicate a rate change, even though an effective date is presented. In these instances, reserve requirements were changed, but not for the type of deposits presented in the table.

Table 1 shows frequent changes in reserve requirements. Reserve requirements decreased from 36% and 43% on dollar and colon denominated deposits respectively in 1996, to 15% for both classes of deposits currently. Most recently changes have involved increases in reserve requirement rates. The central bank frequently announces several reserve requirement changes at one time that are phased in over several months. We take the announcement date to be the date that the reserve requirement change was published in La Gaceta, the official newspaper of the Costa Rican Government. For example, on January 22, 1997, a series of changes were announced that were phased in on eleven separate dates over a fourteen month time period. These changes resulted in a single required rate across all deposit classes beginning February 1, 2002. On June 30, 2005, the most recent reserve requirement change was announced.

DATA AND METHODOLOGY

This study uses the same data as Stewart, Jalbert and Jalbert (2010). As noted in Stewart, Jalbert and Jalbert, 2008 and 2010, stock data would be ideal for analyzing the effect of reserve requirement changes on financial institution profitability. Stock price data were obtained from Superintendencia General de Valores (SUGEVAL). SUGEVAL is the Costa Rica counterpart to the U.S. Securities and Exchange Commission. However, due to reporting problems and a lack of liquidity the data were not useable.

Liquidity issues are evident in the data as the average stock in Costa Rica trades on only 13.5 percent of all trading days (Stewart, Jalbert and Jalbert, 2008). The data also shows that stock prices sometimes remained unchanged for long periods of time. As noted in Stewart Jalbert and Jalbert (2010) these findings may be because the data was substantially incomplete. Supporting this contention is the observation that on some trading days, no individual stock transactions were reported, but there was a reported change in the Costa Rica stock index level. The incomplete nature of the data could be a result of certain regulatory and confidentiality issues that prohibit SUGEVAL from disclosing a complete transaction list.

In an attempt to obtain additional data, the authors contacted the Costa Rica stock exchange, Bolsa Nacional de Valores. Despite a personal visit to the exchange and several email follow ups requesting data, the authors were unable to obtain additional data. Collectively these outcomes suggest that tests based on stock price reactions to reserve requirement changes are not currently feasible.

To overcome these data limitations, this paper uses a proxy measure of financial institution profitability. This proxy permits the evaluation of theories based on bank profitability. We measure bank profitability as the spread between loan rates and deposit rates. This spread represents the gross profit on lending operations, and is believed to be a reasonable measure for overall bank profitability.

Table 1: Costa Rica Reserve Requirement Rates

Meeting Date	Date Published	Effective Date	Colon Denominated Time Deposits ≤ 180 Days	Dollar Denominated Time Deposits
1-31-1996	2-16-1996	Pre-3-1-1996*	30%	17%
1-31-1996	2-16-1996	3-1-1996	30%	17%
1-31-1996	2-16-1996	4-1-1996	30%	17%
1-31-1996	2-16-1996	5-1-1996	30%	17%
1-31-1996	2-16-1996	6-1-1996	30%*	17%
1-31-1996	2-16-1996	7-1-1996	28%*	17%
1-31-1996	2-16-1996	8-1-1996	26%*	17%
1-31-1996	2-16-1996	9-1-1996	24%*	17%
1-31-1996	2-16-1996	10-1-1996	22%*	17%
1-31-1996	2-16-1996	11-1-1996	20%*	17%
1-31-1996	2-16-1996	11-28-1996	17%*	17%
1-31-1996	2-16-1996	12-31-1996	17%	17%
1-22-1997	2-22-1997	3-1-1997	17%	5%*
1-22-1997	2-22-1997	4-1-1997	17%	5%
1-22-1997	2-22-1997	5-1-1997	17%	5%
1-22-1997	2-22-1997	6- 1-1997	17%	5%
1-22-1997	2-22-1997	7-1-1997	16%*	5%
1-22-1997	2-22-1997	8-1-1997	16%	5%
1-22-1997	2-22-1997	10-1-1997	16%	5%
1-22-1997	2-22-1997	12-1-1997	18%*	5%
1-22-1997	2-22-1997	1-1-1998	17%*	5%
1-22-1997	2-22-1997	2-1-1998	16%*	5%
1-22-1997	2-22-1997	3-1-1998	15%*	5%
4-1-1998	5-5-1998	5-1-1998	15%	5%
9-16-1999	09-27-1999	10-15-1999	14%*	5%
2-9-2000	2-24-2000	3-1-2000	12%*	5%
2-9-2000	2-24-2000	4-1-2001	11%*	5%
2-9-2000	2-24-2000	10-1-2001	10%*	5%
12-6-2000	12-15-2000	1-1-2001	11%*	5%
12-6-2000	12-15-2000	10-1-2001	10%*	5%
3-28-2001	4-10-2001	5-1-2001	9%*	5%
3-28-2001	4-10-2001	9-1-2001	7%*	5%
3-28-2001	4-10-2001	2-1-2002	5%*	5%
12-18-2002	1-23-2003	1-16-2003	6.5%*	6.5%*
12-18-2002	1-23-2003	2-16-2003	8%*	8%*
12-18-2002	1-23-2003	3-16-2003	10%*	10%*
7-26-2004	8-3-2004	9-1-2004	11%*	11%*
7-26-2004	8-3-2004	10-1- 2004	12%*	12%*
6-15-2005	6-30-2005	7-16-2005	13.5%*	13.5%*
6-15-2005	6-30-2005	8-16-2005	15%*	15%*

*This table shows the required reserve rates in Costa Rica banks for colon and dollar denominated accounts. Date Published is the date the reserve requirement change was announced in La Gaceta. Effective Date is the date the reserve requirement change took effect. * indicates a reserve requirement change that affected a given deposit class.*

Interest rate data were collected from the Costa Rica Central Bank on loans and deposits. The data covers the time period of February 21, 1996 through January 22, 2008 including 4,354 daily observations. For a few series data was not reported on October 31, 2007 resulting in 4,353 observations. Data were collected for Government Bank deposit and loan rates for both colon and dollar denominated accounts. Loan data is categorized as agricultural, ranching, construction, industrial, real estate and other. Daily deposit rate data for 1-month, 3-month, and 6-month time deposits were collected.

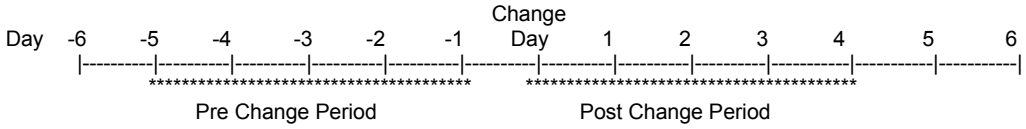
Data on loan maturity were not available from the Central Bank. The Central Bank apparently aggregates loan rate data across maturities. Because of this limitation maturity matching of deposit and loan rates was not possible. To address this issue, we compare each loan rate to several deposit rates with different maturities. The interest rate spread is computed as follows:

Spread = Loan Rate – Deposit Rate (1)

This process resulted in eighteen dollar denominated interest rate series and eighteen colon denominated interest rate series for examination. The interested reader is referred to Stewart, Jalbert and Jalbert (2008 and 2010) for summary statistics of the data.

The market reaction to changes in reserve requirements is analyzed by comparing the spread levels in the five days before the reserve requirement change, the pre-announcement period, and the five days after the reserve requirement change, the post-announcement period. The announcement day is included in the post-announcement period. We graphically depict this time frame in Figure 2. We test for differences in the spread before and after each reserve requirement change using the Mann-Whitney test.

Figure 2: Examination Period



This figure shows the time frame examined for each interest rate spread.

RESULTS

Table 2 presents results of the analysis on interest rate spreads for colon denominated securities. The results are presented for 1-month, 3-month and 6-month deposit rates for agriculture, cattle ranch, industrial, construction, real estate and other loans. The analysis outcomes are reported for each of the twenty-six reserve changes that occurred between July 1, 1996 and August 16, 2005.

The results are mixed. For fourteen reserve requirement changes, no evidence of a spread change was evident. For five reserve requirement changes, there was evidence of a spread change, but the change was not significant. For seven reserve requirement changes, there was evidence of a significant change in interest rate spreads. For most reserve requirement changes with a significant result, the results are consistent for most loan types deposit maturity.

A closer examination of the spreads shows that three significant spread changes were associated with the January 31, 1996 announcement. The remaining significant spreads were each associated with a different announcement. The analysis shows that three significant spread changes involved a spread decrease and four involved a spread increase. Thus, there is no discernable pattern to draw additional inferences from.

The careful reader will recall in some instances one announcement served notice for several future reserve requirement changes. For example, the January 31, 1996 announcement provided notification of twelve future reserve requirement changes. Of interest is to determine if spread changes occur for a consistent effective date. That is, does the spread change for the first effective date after an announcement, but not for later effective dates? Such a pattern would explain the absence of a statistically significant change in rates following some of the multiple date announcements. The results show that three significant spread changes occurred on the first effective date after an announcement. Four significant changes occurred for the second or later effective date associated with an announcement. Thus, no obvious pattern is present to draw additional inferences.

Table 2: Mann-Whitney Test: Colon Denominated Interest Rate Spreads

		Effective Date								
		July 1, 1996 (12)			**August 1, 1996 (34)**			**September 1, 1996(56)**		
		Pre	Post	M-W	Pre	Post	M-W	Pre	Post	M-W
Agriculture	1 Month	12.0317	12.0317	0.000	12.112	12.295	-2.327**	11.972	11.972	0.000
Cattle Ranch	1 Month	11.999	11.999	0.000	12.078	12.263	-2.327**	12.464	12.464	0.000
Industrial	1 Month	11.831	11.831	0.000	11.911	12.094	-2.327**	11.907	11.907	0.000
Construction	1 Month	13.235	13.235	0.000	13.315	13.498	-2.327**	13.385	13.385	0.000
Real Estate	1 Month	9.110	9.110	0.000	9.190	9.374	-2.327**	9.361	9.631	0.000
Other	1 Month	14.480	14.480	0.000	14.560	14.744	-2.327**	14.537	14.537	0.000
Agriculture	3 Month	11.835	11.835	0.000	11.915	12.099	-2.327**	11.751	11.751	0.000
Cattle Ranch	3 Month	11.803	11.803	0.000	11.883	12.067	-2.327**	12.243	12.243	0.000
Industrial	3 Month	8.914	8.914	0.000	8.994	9.178	-2.327**	9.140	9.140	0.000
Construction	3 Month	11.634	11.634	0.000	11.714	11.898	-2.327**	11.686	11.686	0.000
Real Estate	3 Month	13.038	13.038	0.000	13.118	13.302	-2.327**	13.164	13.164	0.000
Other	3 Month	14.284	14.284	0.000	14.364	14.547	-2.327**	14.316	14.316	0.000
Agriculture	6 Month	10.652	10.652	0.000	10.732	10.915	-2.327**	10.592	10.592	0.000
Cattle Ranch	6 Month	10.619	10.619	0.000	10.699	10.883	-2.327**	11.084	11.084	0.000
Industrial	6 Month	10.451	10.451	0.000	10.531	10.714	-2.327**	10.527	10.527	0.000
Construction	6 Month	11.855	11.855	0.000	11.935	12.118	-2.327**	12.005	12.005	0.000
Real Estate	6 Month	7.730	7.730	0.000	7.810	7.994	-2.327**	7.981	7.981	0.000
Other	6 Month	13.100	13.100	0.000	13.180	13.364	-2.327**	13.157	13.157	0.000
		October 1, 1996(78)			**November 1, 1996(9,10)**			**November 28, 1996 (11,12)**		
Agriculture	1 Month	11.526	11.529	-2.327**	11.463	11.474	-1.833*	11.543	11.543	0.000
Cattle Ranch	1 Month	12.663	12.660	2.327**	12.675	12.675	0.000	12.882	12.882	0.000
Industrial	1 Month	11.835	11.839	-2.327**	11.881	11.881	0.000	12.026	12.026	0.000
Construction	1 Month	13.313	13.310	2.327**	13.287	13.287	0.000	12.708	12.708	0.000
Real Estate	1 Month	9.289	9.289	0.000	9.250	9.250	0.000	9.488	9.488	0.000
Other	1 Month	14.465	14.468	-2.327**	14.483	14.483	0.000	14.504	14.504	0.000
Agriculture	3 Month	11.307	11.307	-2.327**	11.241	11.252	-1.833*	11.321	11.321	0.000
Cattle Ranch	3 Month	12.441	12.438	2.327**	12.453	12.453	0.000	12.670	12.670	0.000
Industrial	3 Month	9.0671	9.0672	-2.327**	9.027	9.027	0.000	9.266	9.266	0.000
Construction	3 Month	11.613	11.616	-2.327**	11.659	11.659	0.000	11.804	11.804	0.000
Real Estate	3 Month	13.091	13.088	2.327**	13.066	13.066	0.000	12.486	12.486	0.000
Other	3 Month	14.243	14.246	-2.327**	14.261	14.261	0.000	14.282	14.282	0.000
Agriculture	6 Month	10.146	10.149	-2.327**	10.083	10.094	-1.833*	9.925	9.925	0.000
Cattle Ranch	6 Month	11.283	11.280	2.327**	11.295	11.295	0.000	11.264	11.264	0.000
Industrial	6 Month	10.455	10.459	-2.327**	10.501	10.501	0.000	10.408	10.408	0.000
Construction	6 Month	11.933	11.930	-2.327**	11.907	11.907	0.000	11.090	11.090	0.000
Real Estate	6 Month	7.909	7.909	-2.327**	7.870	7.870	0.000	7.870	7.870	0.000
Other	6 Month	13.085	13.088	-2.327**	13.103	13.103	0.000	12.886	12.886	0.000
		July 1, 1997 (13,14)			**December 1, 1997 (15,16)**			**January 1, 1998 (17,18)**		
Agriculture	1 Month	10.577	10.577	0.000	10.907	10.907	0.000	10.907	10.907	0.000
Cattle Ranch	1 Month	10.694	10.694	0.000	11.317	11.317	0.000	11.317	11.317	0.000
Industrial	1 Month	10.356	10.356	0.000	11.090	11.090	0.000	11.090	11.090	0.000
Construction	1 Month	10.909	10.909	0.000	11.524	11.524	0.000	11.524	11.524	0.000
Real Estate	1 Month	7.957	7.957	0.000	8.138	8.138	0.000	8.138	8.138	0.000
Other	1 Month	13.655	13.655	0.000	12.952	12.952	0.000	12.952	12.952	0.000
Agriculture	3 Month	9.799	9.799	0.000	10.289	10.289	0.000	10.289	10.289	0.000
Cattle Ranch	3 Month	9.195	9.195	0.000	10.700	10.700	0.000	10.698	10.698	0.000
Industrial	3 Month	7.178	7.178	0.000	7.251	7.251	0.000	7.251	7.251	0.000
Construction	3 Month	9.578	9.578	0.000	10.473	10.473	0.000	10.473	10.473	0.000
Real Estate	3 Month	10.131	10.131	0.000	10.906	10.906	0.000	10.906	10.906	0.000
Other	3 Month	12.877	12.877	0.000	12.335	12.335	0.000	12.335	12.335	0.000
Agriculture	6 Month	8.414	8.414	0.000	9.126	9.126	0.000	9.127	9.127	0.000
Cattle Ranch	6 Month	8.531	8.531	0.000	9.536	9.536	0.000	9.536	9.536	0.000
Industrial	6 Month	8.193	8.193	0.000	9.309	9.309	0.000	9.309	9.309	0.000
Construction	6 Month	8.746	8.746	0.000	9.743	7.743	0.000	9.743	9.743	0.000
Real Estate	6 Month	5.794	5.794	0.000	6.357	6.357	0.000	6.357	6.357	0.000
Other	6 Month	11.492	11.492	0.000	11.171	11.171	0.000	11.171	11.171	0.000

Table 2: (Continued)

		Effective Date								
		February 1, 1998 (19, 20)			**March 1, 1998 (21,22)**			**October 15, 1999 (23,24**		
		Pre	**Post**	**M-W**	**Pre**	**Post**	**M-W**	**Pre**	**Post**	**M-W**
Agriculture	1 Month	10.907	10.898	1.350	10.623	10.623	0.000	12.237	12.237	0.000
Cattle Ranch	1 Month	11.317	11.410	-1.350	11.399	11.399	0.000	12.427	12.427	0.000
Industrial	1 Month	11.090	11.192	-1.350	11.105	11.105	0.000	12.573	12.573	0.000
Construction	1 Month	11.523	11.616	-1.350	11.541	11.541	0.000	12.667	12.667	0.000
Real Estate	1 Month	8.138	8.230	-1.350	8.363	8.363	0.000	11.740	11.740	0.000
Other	1 Month	12.952	13.045	-1.350	12.814	12.814	0.000	14.368	14.368	0.000
Agriculture	3 Month	10.289	10.281	1.350	10.169	10.169	0.000	11.448	11.448	0.000
Cattle Ranch	3 Month	10.700	10.793	-1.350	10.945	10.945	0.000	11.638	11.638	0.000
Industrial	3 Month	7.521	7.613	-1.350	7.909	7.909	0.000	10.951	10.951	0.000
Construction	3 Month	10.473	10.566	-1.350	10.651	10.651	0.000	11.785	11.785	0.000
Real Estate	3 Month	10.906	10.999	-1.350	11.089	11.087	0.000	11.878	11.878	0.000
Other	3 Month	12.335	12.427	-1.350	12.360	12.360	0.000	13.579	13.579	0.000
Agriculture	6 Month	9.126	9.024	1.350	8.738	8.738	0.000	10.802	10.802	0.000
Cattle Ranch	6 Month	9.536	9.536	0.000	9.514	9.514	0.000	10.993	10.993	0.000
Industrial	6 Month	9.309	9.309	0.000	9.220	9.220	0.000	11.139	11.139	0.000
Construction	6 Month	9.743	7.743	0.000	9.656	9.656	0.000	11.233	11.233	0.000
Real Estate	6 Month	6.357	6.357	0.000	6.478	6.478	0.000	10.305	10.305	0.000
Other	6 Month	11.171	11.171	0.000	10.929	10.929	0.000	12.934	12.934	0.000
		March 1, 2000 (25,26)			**January 1, 2001 (31,32)**			**April 1, 2001 (27,28)**		
Agriculture	1 Month	12.354	12.354	0.000	12.150	11.810	1.833*	11.753	11.807	-1.35
Cattle Ranch	1 Month	12.419	12.419	0.000	12.208	11.879	1.833*	11.851	11.904	-1.350
Industrial	1 Month	12.127	12.127	0.000	12.132	11.724	1.833*	11.508	11.562	-1.350
Construction	1 Month	12.528	12.528	0.000	12.725	12.322	1.833*	12.120	12.174	-1.350
Real Estate	1 Month	11.043	11.043	0.000	11.144	11.200	-1.833*	11.736	11.790	-1.350
Other	1 Month	14.398	14.398	0.000	14.144	13.866	1.833*	13.956	14.001	-1.350
Agriculture	3 Month	11.989	11.989	0.000	11.690	11.378	1.830*	11.339	11.394	-1.350
Cattle Ranch	3 Month	12.055	12.055	0.000	11.748	11.448	1.830*	11.438	11.438	-1.350
Industrial	3 Month	10.679	10.679	0.000	10.684	10.768	-1.833*	11.323	11.377	-1.350
Construction	3 Month	11.762	11.762	0.000	11.672	11.291	1.833*	11.095	11.148	-1.350
Real Estate	3 Month	12.164	12.164	0.000	12.265	11.890	1.833*	11.707	11.761	-1.350
Other	3 Month	14.033	14.033	0.000	13.694	13.434	1.833*	13.542	13.596	-1.350
Agriculture	6 Month	11.432	11.432	0.000	11.412	11.071	1.833*	10.696	10.804	-1.350
Cattle Ranch	6 Month	11.497	11.497	0.000	11.469	11.140	1.830*	10.794	10.901	-1.350
Industrial	6 Month	11.205	11.205	0.000	11.394	10.985	1.830*	11.451	10.559	-1.350
Construction	6 Month	11.606	11.606	0.000	11.897	11.554	1.830*	11.063	11.171	-1.350
Real Estate	6 Month	10.121	10.121	0.000	10.405	10.461	-1.830*	10.679	10.787	-1.350
Other	6 Month	13.476	13.476	0.000	13.405	13.127	1.833*	12.899	13.007	-1.350
		October 1, 2001 (29,30)			**May 1, 2001 (33, 34)**			**September 1, 2001 (35,36)**		
Agriculture	1 Month	11.683	11.983	0.000	11.888	11.888	0.000	12.116	12.029	0.800
Cattle Ranch	1 Month	11.760	11.760	0.000	11.985	11.985	0.000	12.213	12.122	0.800
Industrial	1 Month	11.755	11.755	0.000	11.643	11.643	0.000	11.870	11.847	0.800
Construction	1 Month	12.794	12.794	0.000	12.255	12.255	0.000	12.483	12.545	-0.800
Real Estate	1 Month	12.134	13.134	0.000	11.871	11.871	0.000	11.863	11.917	-0.800
Other	1 Month	13.844	13.844	0.000	14.090	14.090	0.000	14.318	14.251	0.800
Agriculture	3 Month	11.269	11.269	0.000	11.475	11.475	0.000	11.702	11.616	0.800
Cattle Ranch	3 Month	11.347	11.347	0.000	11.572	11.572	0.000	11.800	11.709	0.800
Industrial	3 Month	11.721	11.721	0.000	11.457	11.457	0.000	11.449	11.503	-0.800
Construction	3 Month	11.342	11.342	0.000	11.229	11.229	0.000	11.457	11.434	0.800
Real Estate	3 Month	12.380	12.380	0.000	11.841	11.841	0.000	12.069	12.131	-0.800
Other	3 Month	13.431	13.431	0.000	13.677	13.677	0.000	13.905	13.838	0.800
Agriculture	6 Month	10.761	10.761	0.000	10.965	10.965	0.000	11.194	11.107	0.800
Cattle Ranch	6 Month	10.838	10.838	0.000	11.063	11.063	0.000	11.291	11.200	0.800
Industrial	6 Month	10.833	10.833	0.000	10.720	10.720	0.000	10.948	10.925	0.800
Construction	6 Month	11.871	11.871	0.000	11.333	11.333	0.000	11.561	11.663	-0.800
Real Estate	6 Month	11.212	11.212	0.000	10.949	10.949	0.000	10.941	10.995	-0.800
Other	6 Month	12.922	12.922	0.000	13.168	13.168	0.000	13.396	13.329	0.800

Table 2: (Continued)

		Effective Date								
		February 1, 2002 (37, 38)			**January 16, 2003 (39, 40)**			**February 16, 2003 (41, 42)**		
		Pre	**Post**	**M-W**	**Pre**	**Post**	**M-W**	**Pre**	**Post**	**M-W**
Agriculture	1 Month	12.293	12.293	0.000	15.031	15.323	-2.327**	15.375	15.543	-1.549
Cattle Ranch	1 Month	12.379	12.379	0.000	14.913	15.234	-2.327**	15.311	15.471	-1.549
Industrial	1 Month	12.157	12.157	0.000	15.054	15.338	-2.327**	15.485	15.627	-0.775
Construction	1 Month	13.003	13.003	0.000	15.627	15.951	-2.327**	16.271	16.393	-0.775
Real Estate	1 Month	12.134	12.134	0.000	14.509	14.509	-2.327**	14.836	14.964	-0.775
Other	1 Month	14.557	14.557	0.000	17.933	18.115	-2.327**	18.657	18.737	-0.775
Agriculture	3 Month	11.880	11.880	0.000	13.691	13.983	-2.327**	14.030	14.198	-1.549
Cattle Ranch	3 Month	11.965	11.965	0.000	13.572	13.893	-2.327**	13.966	14.126	-1.549
Industrial	3 Month	11.721	11.721	0.000	13.168	13.453	-2.327**	13.491	13.620	-0.775
Construction	3 Month	11.744	11.744	0.000	13.714	13.999	-2.327**	14.140	14.282	-0.775
Real Estate	3 Month	12.590	12.590	0.000	14.356	14.610	-2.327**	14.926	15.048	-0.775
Other	3 Month	14.144	14.144	0.000	16.593	16.774	-2.327**	17.312	17.392	-0.775
Agriculture	6 Month	11.371	11.371	0.000	12.745	13.037	-2.327**	13.086	13.254	-1.549
Cattle Ranch	6 Month	11.457	11.457	0.000	12.626	12.947	-2.327**	13.021	13.182	-1.549
Industrial	6 Month	11.235	11.235	0.000	12.768	13.052	-2.327**	13.196	13.338	-0.775
Construction	6 Month	12.082	12.082	0.000	13.411	13.665	-2.327**	13.982	14.104	-0.775
Real Estate	6 Month	11.212	11.212	0.000	12.222	12.508	-2.327**	12.547	12.675	-0.775
Other	6 Month	13.635	13.635	0.000	15.647	15.829	-2.327**	16.368	16.447	-0.775
		March 16, 2003 (43, 44)			**September 1, 2004 (45, 46)**			**October 1, 2004 (47, 48)**		
Agriculture	1 Month	15.834	15.886	-1.350	12.007	11.990	2.880***	12.240	12.240	0.000
Cattle Ranch	1 Month	15.679	15.730	-1.350	11.907	11.890	2.880***	12.140	12.140	0.000
Industrial	1 Month	15.797	15.848	-1.350	12.297	12.230	2.880***	12.480	12.480	0.000
Construction	1 Month	16.586	16.637	-1.350	12.587	12.580	2.880***	12.830	12.830	0.000
Real Estate	1 Month	15.116	15.167	-1.350	9.977	9.970	2.880***	10.120	10.120	0.000
Other	1 Month	18.874	18.925	-1.350	13.657	13.650	2.880***	13.920	13.920	0.000
Agriculture	3 Month	14.485	14.570	-1.350	11.087	11.069	2.880***	11.319	11.319	0.000
Cattle Ranch	3 Month	14.330	14.415	-1.350	10.987	10.969	2.880**	11.219	11.219	0.000
Industrial	3 Month	13.767	13.852	-1.350	9.057	9.049	2.880***	9.199	9.199	0.000
Construction	3 Month	14.449	14.534	-1.350	11.377	11.309	2.880***	11.559	11.559	0.000
Real Estate	3 Month	15.237	15.322	-1.350	11.667	11.659	2.880***	11.909	11.909	0.000
Other	3 Month	17.525	17.610	-1.350	12.737	12.729	2.880***	12.999	12.999	0.000
Agriculture	6 Month	13.543	13.611	-1.350	10.585	10.577	2.880***	10.825	10.825	0.000
Cattle Ranch	6 Month	13.387	13.455	-1.350	10.488	10.475	2.880***	10.725	10.725	0.000
Industrial	6 Month	13.506	13.574	-1.350	10.875	10.815	2.880***	11.065	11.065	0.000
Construction	6 Month	14.295	14.362	-1.350	11.165	11.165	0.000	11.415	11.415	0.000
Real Estate	6 Month	12.824	12.892	-1.350	8.555	8.555	0.000	8.705	8.705	0.000
Other	6 Month	16.582	16.650	-1.350	12.235	12.235	0.000	12.505	12.505	0.000
		July 16, 2005 (49,50)			**August 16, 2005 (51,52)**					
Agriculture	1 Month	12.730	12.730	0.000	12.570	12.474	2.327**			
Cattle Ranch	1 Month	12.770	12.770	0.000	12.600	12.552	2.327**			
Industrial	1 Month	12.720	12.720	0.000	12.520	12.416	2.327**			
Construction	1 Month	13.340	13.340	0.000	13.010	12.994	2.327**			
Real Estate	1 Month	10.760	10.760	0.000	10.600	10.520	2.327**			
Other	1 Month	14.170	14.170	0.000	14.010	13.922	2.327**			
Agriculture	3 Month	11.750	11.750	0.000	11.590	11.494	2.327**			
Cattle Ranch	3 Month	11.790	11.790	0.000	11.620	11.572	2.327**			
Industrial	3 Month	9.780	9.780	0.000	9.620	9.540	2.327**			
Construction	3 Month	11.740	11.740	0.000	11.540	11.436	2.327**			
Real Estate	3 Month	12.360	12.360	0.000	12.030	12.014	2.327**			
Other	3 Month	13.190	13.190	0.000	13.030	12.942	2.327**			
Agriculture	6 Month	9.020	9.050	-0.800	9.010	8.914	2.327**			
Cattle Ranch	6 Month	9.060	9.090	-0.800	9.040	8.992	2.327**			
Industrial	6 Month	9.010	9.040	-0.800	8.960	8.856	2.327**			
Construction	6 Month	9.630	9.660	-0.800	9.450	9.434	2.327**			
Real Estate	6 Month	7.050	7.080	-0.800	7.040	6.96	2.327**			
Other	6 Month	10.460	10.490	-0.800	10.450	10.362	2.327**			

*This table shows average interest rate spreads for the five day periods before (Pre) and after (Post) each reserve requirement changes for securities denominated in Costa Rica Colon. The spread is the loan rate minus the corresponding deposit rate. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively. The Mann-Whitney Test (M-W) is for differences in interest rate spreads before and after the announcement.*

Table 3 shows results of tests on dollar denominated securities. Presentation of the results is in a manner analogous to the colon denominated securities analysis. The findings for dollar denominated securities show a higher level of significance than for the colon denominated securities. The results show significant spread changes for four of eight reserve requirement changes. From the remaining reserve requirement changes, evidence of a spread change is evident in two cases, but the results are not significant. No clear pattern is present with regard to the sequence of effective dates. For the July 26, 2004 reserve requirement change, a significant spread change occurred for the first effective data but not for subsequent effective dates. For the June 15, 2005 change, no significant spread change was found for the first effective date associated with the reserve requirement announcement. However, the second effective date associated with the same announcement produced significant results. Three significant results involved the spread widening and one significant result involved the spread narrowing.

Combined, the results provide some evidence that national banks change their interest rate spreads around effective dates of reserve requirement changes. The evidence of change is stronger among dollar denominated securities than for colon denominated securities. These findings explain the lack of significance around decision dates and announcement dates found by Stewart, Jalbert and Jalbert (2010). Indeed, government banks do not respond at the decision date or announcement date. However, they do respond at the effective date of the reserve requirement change.

CONCLUDING COMMENTS

This paper examines the profitability theory of reserve requirement changes using data from Costa Rica. The profitability theory is typically tested by examining how bank stock prices respond to changes in reserve requirements. In Costa Rica, bank stock data is generally not available, so the normal test approach is not feasible. To circumvent this limitation, we measure financial institution profitability through a proxy variable. Specifically, profitability is measured as the spread between interest rates earned on loans and paid on deposits. An increase in spreads indicates improved profitability for banks while declining spreads indicate lower bank profits.

The process of changing reserve requirements in Costa Rica involves three steps. First, the Central Bank makes a decision to change reserve requirements. A few days to a few weeks later the change is publicly announced along with the effective date of the change. The reserve requirement change becomes policy on the effective date. Previous studies examined interest rate level and spread responses to the Central Bank's decision to change reserve requirements and to the public announcement that reserve requirements would change. These authors note that Costa Rica Governments banks do not respond to reserve requirement changes at either the decision or announcement dates. Private banks on the other hand do respond to the announcement by changing interest rate levels and spreads. Given the lack of response by government banks on the decision and announcement dates, this paper extends the analysis to identify government bank responses to reserve requirement changes on the effective change date. The hypotheses are tested for reserve requirement changes that occurred between 1996 and 2005.

The results show that Costa Rica government banks change their interest rate spreads around the effective dates of a reserve requirement change. The results are mixed for colon denominated securities, but are remarkably strong for dollar denominated securities. This finding suggests that the careful entrepreneur can time loans and deposits to take best advantage of these predictable changes in interest rate spreads.

The tests conducted here examine only data from Costa Rica. The results should not be generalized to other countries as the Costa Rica financial system has many unique peculiarities. Future research should analyze the reaction of private and government banks in other countries. The results here are limited to the examination of a specific announcement window. Further research should examine other response windows to determine the time frame for bank response.

Table 3: Mann-Whitney Test: Dollar Denominated Interest Rate Spreads

		EFFECTIVE DATE								
		March 1, 1997 (1,2)			**January 16, 2003 (3,4)**			**February 16, 2003 (5,6)**		
		Pre	**Post**	**M-W**	**Pre**	**Post**	**M-W**	**Pre**	**Post**	**M-W**
Agriculture	1 Month	5.925	5.936	-1.350	5.166	5.738	2.327**	5.944	5.944	0.000
Cattle Ranch	1 Month	5.925	5.936	-1.350	5.602	5.548	2.327**	5.772	5.772	0.000
Industrial	1 Month	5.925	5.936	-1.350	5.622	5.802	2.327**	6.030	6.030	0.000
Construction	1 Month	5.975	5.986	-1.350	6.245	5.952	2.327**	6.446	6.446	0.000
Real Estate	1 Month	5.175	5.186	-1.350	6.184	5.810	2.327**	6.234	6.234	0.000
Other	1 Month	5.413	5.425	-1.350	7.182	6.493	2.327**	7.541	7.541	0.000
Agriculture	3 Month	5.613	5.625	-1.350	5.831	5.404	2.327**	5.611	5.611	0.000
Cattle Ranch	3 Month	5.613	5.625	-1.350	5.685	5.214	2.327**	5.439	5.439	0.000
Industrial	3 Month	5.613	5.625	-1.350	5.878	5.468	2.327**	5.696	5.696	0.000
Construction	3 Month	5.663	5.675	-1.350	5.912	5.619	2.327**	6.112	6.112	0.000
Real Estate	3 Month	4.863	4.875	-1.350	5.850	5.477	2.237**	5.900	5.900	0.000
Other	3 Month	5.102	5.116	-1.350	6.848	6.159	2.327**	7.208	7.208	0.000
Agriculture	6 Month	5.547	5.558	-1.350	5.632	5.204	2.327**	5.411	5.411	0.000
Cattle Ranch	6 Month	4.670	4.682	-1.350	9.451	9.772	-2.327**	9.912	10.072	-1.549
Industrial	6 Month	5.547	5.559	-1.350	5.568	5.268	2.327**	5.496	5.496	0.000
Construction	6 Month	5.597	5.608	-1.350	5.712	5.419	2.327**	5.912	5.912	0.000
Real Estate	6 Month	4.797	4.808	-1.350	5.650	5.277	2.327**	5.700	5.700	0.000
Other	6 Month	5.035	5.047	-1.350	6.649	5.959	2.327**	7.008	7.008	0.000
		March 16, 2003 (7,8)			**September 1, 2004 (9, 10)**			**October 1, 2004 (11,12)**		
Agriculture	1 Month	5.631	5.631	0.000	6.761	6.761	0.000	6.867	7.011	-1.833*
Cattle Ranch	1 Month	5.948	5.948	0.000	6.781	6.771	2.880***	6.883	7.021	-1.833*
Industrial	1 Month	5.904	5.904	0.000	7.601	7.841	-2.880***	8.002	8.081	-1.830*
Construction	1 Month	6.392	6.392	0.000	7.811	7.771	2.880***	7.825	7.921	-1.830*
Real Estate	1 Month	6.141	6.142	-1.350	6.721	6.671	2.880***	6.757	6.871	-1.830*
Other	1 Month	7.531	7.285	1.350	7.911	7.731	2.880***	7.835	7.931	-1.830*
Agriculture	3 Month	5.297	5.297	0.000	6.448	6.443	2.880***	6.549	6.549	-1.830*
Cattle Ranch	3 Month	5.614	5.614	0.000	6.468	6.453	2.880***	6.565	6.703	-1.830*
Industrial	3 Month	5.570	5.570	0.000	7.288	7.523	-2.880***	7.685	7.763	-1.830*
Construction	3 Month	6.058	6.058	0.000	7.798	7.453	2.880***	7.525	7.603	-1.830*
Real Estate	3 Month	5.807	5.808	-1.350	6.408	6.353	2.880***	6.439	6.553	-1.833*
Other	3 Month	7.197	6.951	1.350	7.598	7.413	2.880***	7.517	7.613	-1.833*
Agriculture	6 Month	5.097	5.097	0.000	6.180	6.170	2.880***	6.272	6.410	-1.833*
Cattle Ranch	6 Month	10.277	10.345	-1.350	8.295	8.275	2.880***	8.521	8.515	1.833*
Industrial	6 Month	5.370	5.370	0.000	7.020	7.250	-2.880***	7.408	7.480	-1.833*
Construction	6 Month	5.858	5.858	0.000	7.230	7.180	2.880***	7.248	7.320	-1.833*
Real Estate	6 Month	5.607	5.608	-1.350	6.140	6.080	2.880***	6.162	6.270	-1.833*
Other	6 Month	6.997	6.751	1.350	7.330	7.140	2.880***	7.240	7.330	-1.833*
		July 16, 2005 (13,14)			**August 16, 2005) (15,16)**					
Agriculture	1 Month	9.580	9.580	0.000	9.190	9.998	-2.327**			
Cattle Ranch	1 Month	8.580	8.580	0.000	8.730	8.898	-2.327**			
Industrial	1 Month	9.350	9.350	0.000	9.770	9.866	-2.307**			
Construction	1 Month	8.900	8.900	0.000	8.700	8.876	-2.327**			
Real Estate	1 Month	9.210	9.210	0.000	9.370	9.482	-2.327**			
Other	1 Month	9.870	9.870	0.000	10.000	10.104	-2.327**			
Agriculture	3 Month	9.270	9.270	0.000	9.600	9.688	-2.327**			
Cattle Ranch	3 Month	8.270	8.270	0.000	8.240	8.588	-2.327**			
Industrial	3 Month	9.040	9.040	0.000	9.460	9.556	-2.327**			
Construction	3 Month	8.590	8.590	0.000	8.390	8.566	-2.327**			
Real Estate	3 Month	8.900	8.900	0.000	9.060	9.172	-2.327**			
Other	3 Month	9.560	9.560	0.000	9.690	9.794	-2.327**			
Agriculture	6 Month	8.970	8.970	0.000	9.300	9.388	-2.327**			
Cattle Ranch	6 Month	6.810	6.840	0.000	6.790	6.742	2.327**			
Industrial	6 Month	8.740	8.740	0.000	9.160	9.256	-2.327**			
Construction	6 Month	8.290	8.290	0.000	8.090	8.266	-2.327**			
Real Estate	6 Month	8.600	8.600	0.000	8.760	8.872	-2.327**			
Other	6 Month	9.260	9.260	0.000	9.390	9.494	-2.327**			

*This table shows average interest rate spreads for the five day periods before (Pre) and after (Post) each reserve requirement change for securities denominated in U.S. dollars. The spread is the loan rate minus the corresponding deposit rate. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively. The Mann-Whitney Test (M-W) is for differences in interest rate spreads before and after the announcement.*

REFERENCE

Ballestero, Rocio and Jorge Martinez 2007, "Pulso Entre Titanes, La Banca Cetroamericana Protagoniza un Nuevo Capítulo en su Historia, Donde Se Impondera uná Vertiginosa Copetenia. Los Papeles Estelares los Tienen Cuatro Impotantes Conglomerados Internacionales de Reciente Incursión," *Summa* 155 (April), pp. 96-120.

Black, F.1975, "Bank funds management in an efficient market," *Journal of Financial Economics,* 2, pp. 323-339.

Cosimano, T.F. and B. McDonald 1998, "What's different *among* banks?" *Journal of Monetary Economics* 41, pp. 57-70.

Fabozzi, F. J., and T. B. Thurston 1986, "State taxes and reserve requirements as major determinants of yield spreads among money market instruments," *Journal of Financial and Quantitative Analysis* 21(4), pp. 427-436.

Fama, E. F. 1985 "What's different about banks?" *Journal of Monetary Economics* 15, pp. 29-39.

Hein, Scott E. and Jonathan D. Stewart 2002, "Reserve Requirements: A Modern Perspective," *Economic Review / Federal Reserve Bank of Atlanta*, 2002 4th Quarter, Vol. 87, Issue 4.

Jonathan D. Stewart and Hein, Scott E. 2002, "An Investigation of the Impact of the 1990 Reserve Requirement Change on Financial Asset Prices," *The Journal of Financial Research*, Vol. XXV, No. 3, pp. 367-382.

Jalbert, Terrance, Jonathan Stewart and Mercedes Jalbert (2006) "Uncovered Interest Rate Arbitrage: A Test of the Efficiency of Costa Rica Deposit Accounts," *International Journal of Finance,* Vol. 18(1) pp. 3861-3887.

James, C. 1987 "Some evidence on the uniqueness of bank loans," *Journal of Financial Economics* 19, pp. 217-235.

Kolari, J., A. Mahajan, and E. M. Saunders 1988, "The effect of changes in reserve requirements on bank stock prices," *Journal of Banking and Finance* 12, pp. 183-98.

Osborne, D.K., and T. S. Zaher 1992, "Reserve requirements, bank share prices, and the uniqueness of bank loans," *Journal of Banking and Finance* 16, pp. 799-812.

Reinhart, Carmen M. and Vincent R. Reinhart (1999) "On the Use of Reserve Requirements in Dealing with Capital Flow Problems," *International Journal of Finance and Economics*, vol. 4(1, January) pp. 27-54.

Sellon, G.H. Jr. and S.E. Weiner 1996, "Monetary Policy Without Reserve Requirements: Analytical Issues," *Federal Reserve Bank of Kansas City – Economic Review*, Fourth Quarter, pp. 5-24.

Sellon, G.H. Jr and S.E. Weiner 1997, "Monetary Policy Without Reserve Requirements: Case Studies and Options for the United States," *Federal Reserve Bank of Kansas City – Economic Review*, Second Quarter, pp. 5-28.

Slovin, M. B., M. E. Sushka, and Y. M. Bendeck 1990, "The market valuation effects of reserve regulation," *Journal of Monetary Economics* 25, pp. 3-19.

Stewart, Jonathan, Terrance Jalbert and Mercedes Jalbert (2008), "The Impact of Reserve Requirement Changes within an Emerging Market: The Case of Costa Rica," *Journal of Emerging Markets,* vol. 13(2, Summer), pp. 35-49.

Stewart, Jonathan, Terrance Jalbert and Mercedes Jalbert, (2010) "Measuring the Impact of Reserve Requirement Changes Using Interest Rate Spreads," *Latin American Business Review,* Vol. 11(3) p. 223-248.

BIOGRAPHY

Terrance Jalbert is Professor of Finance at the University of Hawaii at Hilo. He also serves as an arbitrator for the Financial Industry Regulatory Authority. His research appears in journals such as *International Journal of Finance, Journal of Applied Business Research, Financial Services Review, Journal of Accounting Education* and . He can be reached at University of Hawaii, 200 West Kawili St., Hilo, HI 96720, jalbert@hawaii.edu.

Jonathan Stewart is a Professor of Finance at Abilene Christian University. He is a CFA charter-holder and has published articles in *The Journal of Financial Research, The Journal of Investing,* and *The Economic Review of The Federal Reserve Bank of Atlanta.* He has recorded a series of podcasts on finance and investing called *Stewllenium Radio*. He can be reached at 158 Mabee Business Building, ACU Box 29313, Abilene, TX 79699, stewartjo@acu.edu.

Mercedes Jalbert is the Managing Editor for the Institute for Business and Finance Research. Her research appears in journals such as *Financial Services Review, Journal of Emerging Markets, Journal of Diversity Management, Journal of Applied Business Research* and *Latin American Business Review.* She can be reached at The Institute for Business and Finance Research, P.O. Box 4908, Hilo, HI 96720, editor@theIBFR.com.