

Reserve Requirements: Not a Solution to the Potential

Capital Inflow Problem in Cuba

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I. Introduction

In the "Carlos Diaz Alejandro Lecture" at the 1992 ASSA meetings, Guillermo Calvo stated that "the resurgence of capital inflows into Latin America] has been a source of concern for policy makers in the region." (ASCE Newsletter May 1993, p. 3). In particular, Calvo stated that "...there are fears that some of the capital inflows are of the 'hot money' variety. These highly speculative flows could be reversed on short notice and, possibly, spark a domestic financial crisis." (ibid.). Calvo proposes raising marginal reserve requirements on short-term bank deposits to discourage the inflow of 'hot money' as a way to deal with the possible detrimental effects of substantial capital inflows. (ibid.)

Reserve requirements are a tax on the banking industry because these funds could otherwise be invested at a higher rate of return than paid by regulators. One of the most valuable insights that economic analysis has provided in public finance is that the person who effectively pays the tax is not necessarily the person upon whom the tax is levied (Atkinson and Stiglitz 1980, p. 160). In the financial economics literature of the reserve requirement tax in the U.S. banking system, the issue of who bears the tax has not been settled. The stockholders collect the tax through their agents, the bank management. However, the question of how much of the tax is shifted forward to borrowers and/or backwards to depositors remains an unresolved empirical issue.

In Calvo's analysis there is an implicit assumption that depositors bear all of the tax. If that is not the case, then a policy of raising marginal reserve requirements on short-term bank deposits may have unexpected (and possibly undesirable) consequences. The purpose of this paper is to review the literature of the incidence of the reserve requirement tax in the U.S.

banking system to draw the implications of a public policy prescription that a central bank in a post-Castro Cuba may follow to deal with prospective capital inflows.

This paper proceeds as follows: First, I review the literature of the incidence of the reserve requirement tax, then I review the literature on the rationales for reserve requirements. In a final section I discuss some public policy implications.

II. The Incidence of the Reserve Requirement Tax.

Reserve requirements are considered a tax on the banking industry because these funds could otherwise be invested at a positive rate of interest (Black 1970). The reserve requirement tax has three components: the reserve requirement ratio, the deposit category to which the ratio is applied, and an interest rate that captures the opportunity cost of not being able to invest the funds. That is, at time t ,

$$RRTAX_t = RR_t * it - r' D_t it$$

where $RRTAX_t$ is the reserve requirement tax, RR_t are the required reserves, D_t is a vector of deposit categories, r is a vector of the reserve requirement ratios on each of the deposit categories, and it is the opportunity cost. The amounts are substantial, averaging more than \$3 billion per year in the 1980s, with a high of almost \$6 billion in 1981. If, beginning in 1959, the required reserves were hypothetically placed in a trust fund and invested in three-month Treasury bills, the resulting sums would be dramatic.

In fact, at the end of 1988, the balance in the trust fund would be more than \$160 billion. This figure grows in magnitude and importance when compared to the \$20 to \$80 billion the FDIC (Federal Deposit Insurance Corporation) may need to bail out failed banks in the next few years.

The effects of reserve requirements on the banking industry have been investigated from different perspectives: First, there is the question of who bears the tax; is it depositors (Fama 1980), borrowers (Fama 1985, and James 1987), or stockholders (Kolari et al. 1988; Slovin et al. 1990; and Osborne and Zaher 1990)? Next, there is the issue of reserve requirements as a user tax; that is, what are the costs and benefits of a bank charter? (Frodin 1980, and Henderson 1987). Finally, there is the response of banks to the reserve requirement tax. In the 1970s, this was known as the "membership issue" as banks left the Federal Reserve System, opting instead for state charters (Gambis and Rasche 1979, Frodin 1980, and Santoni

1985). Also in the 1970s, banks engaged in financial innovation-- e.g., the use of Repurchase Agreements-- to avoid the tax. The historical record indicates that larger banks adopted the financial innovation alternative, while smaller banks opted to leave the system (Kolari et al. 1988, p. 184). In the 1980s, banks avoided the tax by shifting their activities from funding loans to issuing guarantees (Baer and Pavel 1988).

Except for the membership issue, which DIDMCA (The 1980 Depository Institutions Deregulation and Monetary Control Act) made moot, these questions are still unanswered. The focus of this paper is on the implications of the reserve requirement tax from the perspective of who bears the tax. Therefore, in what follows, I review the studies that have considered the incidence of the tax.

Researchers in finance have recently re-examined the incidence of the reserve requirement tax. The conventional view was that depositors bore the reserve tax willingly because bank demand deposits yield transaction services (Fama 1980). Fama (1985) and James (1987) found that changes in the reserve requirement ratios of large denomination certificates of deposit (CDs) did not affect the premium on the rates of interest of CDs, relative to the rates of interest on Treasury bills (TBs) of equal maturity. Since CDs are not negotiable instruments and, thus, yield no transaction services, they concluded that bank depositors do not bear the tax. Since the stock of banks trade in competitive markets, and thus would not bear the tax, they concluded that bank borrowers bear the tax. [2] But other authors, using the event study methodology described in the Appendix, found that the stock returns of banks respond to changes in reserve requirement ratios; they concluded that stockholders bear a portion of the reserve [3] requirement tax (Kolari et al. 1988), (Slovin et al. 1990), (Osborne and Zaher 1990).

Thus, the question of who bears the tax among depositors (conventional view), borrowers (spread between CDs and TBs), or stockholders (event studies) is still not settled-- also, the U.S. taxpayers may bear some of the tax through the FDIC. As stated above, the person who effectively pays the tax is not necessarily the person upon whom the tax is levied. The stockholders collect the reserve requirement tax through their agents-- the bank management. However, the question of how much of the tax is shifted forward to borrowers and/or backward to depositors or stockholders remains an unresolved empirical issue. In what follows I review these studies in more detail.

Do bank depositors bear the tax?. Researchers in finance have studied the differences in expected yields on long-term credit instruments for some time (Fisher, 1959; Fair and Malkiel, 1971). However, until recently, the yield spread between short-term credit instruments-- Treasury Bills (TBs), commercial paper (CP), bankers' acceptances (BAs), and large denomination certificates of deposit (CDs) -- received little attention. In the 1970s, as interest rates rose (increasing the opportunity cost of holding cash balances in non-interest bearing accounts), many corporations began cash-management practices to optimize the yield on the short-term portion of their portfolios; also, money market mutual funds became

a significant component of monetary aggregates, a reflection of similar optimizing behavior by the public. Not surprisingly, in the 1980s, the yield spread between short-term credit instruments was the subject of several studies (Fermi and Gaines, 1980; Cook, 1981; Cook and Lawler 1983; and Rowe, Lawler, and Cook, 1986). However, none of these studies considered that only CDs are subject to reserve requirements.

Fama (1985) calculated the average, continuously compounded yield to maturity of CDs, banker's acceptances (BAs), commercial paper (CPs), and TBs each month for the period from January 1967 to May 1983. He found that, for 90 day maturities, the spread between CDs, BAs, and CPs were, on average, less than ten basis points. On the other hand, the spread between that group of securities and TBs were, on average, over one hundred basis points, reflecting their larger default risk. Fama concluded that bank depositors do not bear the tax and asserted that, since bank stocks trade in competitive markets, banks stockholders would not bear the tax either. Therefore, bank borrowers must bear the reserve requirement tax.

Fama considered, and dismissed, the possible effect of the FDIC subsidy on the spread between CDs and TBs of equal maturity. His argument was that CDs are insured to \$100,000 but are denominated in units of \$1,000,000 or more. Also, he stated that it was not obvious, at the time, that deposit insurance was underpriced. Fama's results are not totally convincing because of his data. Although the average yields may be close, we need to consider the variance of these average returns, and the monthly variations in the spreads. James (1987) addresses these issues and controls for the possible mispricing of deposit insurance.

James (1987) examined the behavior of CD yields in relation to other money market instruments using weekly data for the period from Jan. 1977 to Dec. 1984. This period is of interest because although there were changes in reserve requirement ratios, according to James, deposit insurance rates did not change. [4] Specifically, James investigated the average spread between CDs and Commercial Paper or Treasury bills between Nov. 1978 to July 1980 -- when the reserve requirements on CDs were 5% (because of a 2% surcharge), and the control periods between Jan. 1977 to Nov. 1978 and between July 1980 to Dec. to 1984 -- when the reserve requirements were 3%. Ironically, James reports CD-TB spreads that were wider during the period when reserve ratios were lower. But this is not surprising because the spread between CDs and TBs depends on more than reserve requirements on CDs and FDIC rates, including liquidity, the perceived risk of banks, and differential tax treatment.

Fama (1985) and James (1987) found that changes in the reserve requirement ratios of CDs did not affect the premium on the rates of interest of CDs, relative to the rates of interest on CPs and TBs of equal maturity. Since CDs are not negotiable instruments and, thus, yield no transaction services, they concluded that the borrowers bear the tax. Their evidence has been accepted as conclusive and referenced in other research (Kanas 1987, fn. 4, p. 430). However, there is empirical evidence that depositors bear the reserve requirement tax on CDs.

First in 1974, and later in 1975 and 1976, the Federal Reserve tied reserve requirements ratios to the maturity structure of large CDs. Using a "fairly general model," and testing it with "new data on the estimated composition of CDs by original maturity," Humphrey (1979) investigated the effect these changes in reserve requirement ratios had on the intra-maturity deposit composition for 46 large money center US banks. One of his major conclusions was that

...anywhere from two-thirds to all of the potential increase in bank earnings from the reduced reserve requirements appear to have been directly passed on to CD holders in the form of rate increases...(p.65).

If bank depositors do not bear the reserve requirement tax, the potential increase in bank earnings would not have been passed on to them. Alternatively, if bank borrowers and/or stockholders bear the reserve requirement tax, the rate paid to depositors would not have changed with changes in the tax.

Thus, the question of whether bank depositors bear the tax is not resolved. Part of the answer may be found in the way Fama and James measured the reserve requirement tax on CDs. The reserve requirement tax has three components: the reserve requirement ratio, the deposit base to which the ratio is applied, and an interest rate that captures the opportunity cost of not being able to invest the funds. However, Fama and James considered only changes in the reserve requirement ratios.[\[5\]](#) Also, Fama and James looked only at the period from Jan. 1977 to Dec. 1984, while Humphrey's study covered only the years from 1974 to 1976. However, Alvarez (1993) using monthly data from 1980 to 1990 found that a properly constructed aggregate measure of the tax confirms Humphrey's results.[\[6\]](#)

Do bank borrowers bear the tax? In the finance literature, the question of why bank borrowers willingly bear the reserve requirement tax, or, alternatively, why borrowers pay a premium for bank loans is known as the uniqueness of bank loans. However, the hypothesis that borrowers pay a premium for bank loans cannot be tested directly for lack of data availability. Fama (1985), in the seminal paper on the "uniqueness of bank loans," was the first to look at the influence that reserve requirements on CDs may have on the spreads between short-term credit instruments. As stated above, the conventional view was that depositors bore the reserve tax willingly because bank demand deposits yield transaction services. Fama (1985) and James (1987) found that changes in the reserve requirement ratios of large denomination certificates of deposit (CDs) did not affect the premium on the rates of interest of CDs, relative to the rates of interest on Treasury bills (TBs) of equal maturity. Since CDs are not negotiable instruments and, thus, yield no transaction services, they concluded that bank depositors do not bear the tax. Since the stock of banks trade in competitive markets, and thus would not bear the tax, they concluded that bank borrowers bear the tax and, thus, there must be something special and unique about bank loans. Also, James (1987) and Lummer and McConnel (1989), using event study methodology, provided empirical evidence that the stock returns of firms react to announcements of bank loan agreements. Their results support the hypothesis that there is something unique about bank loans, and that borrowers are willing to pay a premium for bank loans.

Fama attributed this uniqueness of bank loans to the function of banks as delegated monitors (Diamond 1984+MDBOE+MDNME) which comes from their positions as holders of inside debt. Specifically, Fama mentioned access to ongoing deposit histories as part of the informational advantage of banks. The ongoing history of a borrower as a depositor provides information that allows a bank to identify the risks of loans to depositors and to monitor the loan at lower cost than other lenders.[\[7\]](#)

This view that bank borrowers bear the reserve requirement tax has apparently been adopted by the Fed. The December 1990 press release announcing the removal of reserve requirements on Certificates of Deposit and Eurodollar deposits states that the Fed. expects this action to allow banks to make more loans. But unless bank borrowers bear some of the tax, there is no reason to believe that lowering reserve requirements would result in an increase in commercial and industrial bank loans.

Do bank stockholders bear the tax? The evidence that bank stockholders bear some of the tax is clear, whether one uses event studies or a properly constructed aggregate measure of the tax.

Kolari et al. (1988); Osborne and Zaher (1990); and Slovin et al. (1990) performed a series of event studies, where the event was defined as changes in reserve requirement ratios, to investigate the incidence of the reserve requirement tax. These studies found evidence that stockholders bear at least a portion of the reserve requirement tax. However, these event studies are not fully satisfactory as a means to study the incidence of the reserve requirement tax for at least two reasons: First, these event studies,

by design, dealt only with the changes in reserve requirement ratios, ignoring the level of interest rates (and thus the opportunity cost component of the tax). Also, these event studies did not consider the contemporaneous level and the composition of bank deposits. Since banks can change their deposit mix to lower the influence of the tax, ignoring the deposit mix component of the tax produces biased results. For example, Kolari et al. investigated the changes in reserve requirement ratios between November 1972 to December 1976. However, as the following table shows, during this period neither the required reserves (REQRES, measured in billions of dollars), nor the three-month Treasury bill (TB3M) remained stable.

Table 1. Period: Nov. 1972 to Dec. 1976

Variable	Mean	S.D.	Max.	Min.
TB3M	6.4%	1.3%	8.7%	4.3%
REQRES	3.44	1.57	3.78	3.11

Although the case for event studies as a method to investigate the incidence of the reserve requirement tax is weakened by the objections above, the result the bank stockholders bear some of the tax has been confirmed in other empirical work. Alvarez (1993), using monthly stock returns of banks of different sizes for the period from 1980 to 1990, found a negative correlation between bank stock returns and a properly constructed aggregate measure of the tax.

In summary, the question of who bears the reserve requirement tax is still not settled. It appears that bank depositors, bank borrowers, and bank stockholders each bear some of the tax.

III. The Rationale for Reserve Requirements

Laws requiring banks to hold a volume of reserves equal to a prescribed portion of their deposits originated in this country more than a century ago. Since then both the financial system and the rationales supporting reserve requirements have changed considerably. Nevertheless, the practice of requiring reserves has continued without interruptions. (Goodfriend and Hargraves 1983, p. 3)

Reserve Requirements as a Revenue Source for the U.S. Treasury. Most current textbooks that discuss the subject assert that the Federal Reserve conducts monetary policy through the instruments of: 1) open market operations i.e. adding or subtracting reserves by purchasing or selling securities from the banking system, 2) making it more expensive to acquire reserves at the discount window, i.e. changing the discount rate or, 3) changing reserve requirement ratios^[8] That is, the contemporary rationale for reserve requirements is that they are needed for the implementation of monetary policy; the opportunity cost to the banks and the revenue gained by the U.S. Treasury are treated as incidental to the primary purpose of conducting monetary policy.

The view that reserve requirements are needed for the control of monetary aggregates has been questioned by Goodfriend and Hargraves (1983, p. 3-21). They trace the changing rationale of reserve requirements from the passage in 1863 of what is known as the National Bank Act to the passage of the 1980 Depository Institutions Deregulatory and Monetary Control Act (DIDMCA). They conclude that reserve requirements should be considered solely as a source of revenue to the Treasury since

In contrast to the relatively minor role that reserve requirements have played in liquidity provision and in implementing the Fed's credit and monetary control policies, reserve requirements have consistently functioned to provide revenue for the United States Treasury.

(Ibid., p. 19)

From 1863 to the passage of the Federal Reserve Act of 1913, reserve requirements were advocated at the national level on the basis of the liquidity rationale. But,

...although reserve requirements contributed somewhat to individual bank liquidity, the banking crisis of 1873, 1893, and 1907 demonstrated that fractional reserve requirements could not guarantee sufficient liquidity for the banking system as a whole. (Ibid., p. 4)

For the first few years after the founding of the Fed, the need to ensure the ability of banks to convert deposits into currency continued to be the rationale offered for the continuing imposition of reserve requirements.

However,

By the 1920s, Fed policy had grown from an almost purely defensive operation trying to ensure convertibility and avert crisis to one of actively attempting to influence credit conditions. A new rationale for reserve requirements emerged along with this shift in Fed policy and the liquidity rationale was officially rejected in the report of the 1931 Federal Reserve System Committee on Bank Reserves. (Ibid., p. 5)

From the 1920s until the 1950s, the Fed credit policy was the rationale for reserve requirements. It is ironic that in the same document where the liquidity rationale is abandoned in favor of the Fed credit policy rationale, it is pointed out that

...reserve requirements did not function well to restrain credit expansion during the stock market boom of 1928-29. (Ibid., p. 6)

Furthermore,

From 1942 until the Treasury-Federal Reserve Accord of 1951 the Fed's credit policy became a strict bond price support program...Since the policy was deliberately accommodative, reserve requirements did not function at all during this period to restrain credit expansion. (Ibid., p. 7)

Starting in the 1950s, the rationale for reserve requirements has shifted from the Fed credit policy rationale of earlier years to the contemporary view that reserve requirements are needed for monetary control.[\[9\]](#)

The belief that reserve requirements are useful for monetary control is generally based on the "money multiplier" model of money stock determination. (Ibid., p. 7)

However, in order for this model of money stock determination to work; that is, in order for reserve requirements to stabilize the money multiplier,

The Fed must maintain control of reserves. If the volume of reserves is determined by the banking system demand then reserve requirements do not constrain monetary expansion. Reserve demand is simply accommodated and required reserves serve only to enlarge the demand for reserves at any given level of deposits. In this case, the stock of deposits is determined independently of reserve requirements.

In practice, the Fed has never adopted operating procedures designed to control reserves in

order to use the money multiplier relationship to control deposits. (Ibid., p. 7)[\[10\]](#)

The changing rationales for reserve requirements have led one author to observe that:

...traditional arguments in support of reserve requirements would warrant reinterpretation as being either naive, or possibly even cynical. The apparent ease with which reserve requirement advocates shifted from the "liquidity" to the "fulcrum of monetary control" position suggests the latter interpretation. (Greenbaum 1983, p. 60)

Reserve Requirements, Financial Innovation, and Monetary Control. Additional evidence that reserve requirements should be considered solely as a source of revenue to the Treasury comes from Greenbaum who argues that:

Most supporters of the traditional view recognize that reserve requirements induce financial institutions to sustain the costs of producing money substitutes that are not subject to reserve requirements. However, adherents to the traditional view tend to ignore the implications of financial innovation. (Greenbaum 1983, p. 63).[\[11\]](#)

Greenbaum acknowledges (Ibid. fn 7, p. 63) that the interest rate ceilings imposed by Regulation Q were important stimulators of financial innovation. But reserve requirements have been instrumental in the development financial innovations such as Repurchase Agreements and Loan Commitments.

One implication of financial innovations ignored by those who advocate that reserve requirements are needed for monetary control is that they can lead to perverse results in the conduct of monetary policy. For example, reserve requirements on the deposits used to fund bank loans lower the rate of return banks can earn on those loans. Therefore, banks have an incentive to develop financial products to circumvent reserve requirements. One such financial innovation is loan commitments which, since they are an off-balance sheet activity, are not subject to reserve requirements. In a loan commitment, the bank agrees to make a loan under the provisions made in the loan covenants specified in the commitment. The volume of bank loans made as a result of commitments (i.e., the take down decisions of firms with loan commitments), depends on what happens to the level of interest rates after the loan commitment is made. If interest rates go up, take downs can be expected to increase. As the practice of bank lending through commitments becomes widespread, Fed actions to influence interest rates can have perverse effects in the short-run. For example, when the Fed engages in open market operations to push interest rates up in order to lower the quantity of credit demanded the take downs increase, resulting in the opposite of what the Fed was seeking. (Deshmukh et al. 1982, Greenbaum 1983, p. 64-5)

Another perverse result that reserve requirements may have on the effectiveness of monetary policy was demonstrated by Kanatas and Greenbaum (1982) who show that,

...raising reserve requirements may increase the variance of monetary aggregates, and thereby subvert the implementation of monetary policy. (Ibid., p. 509)

which leads them to conclude that,

...the major monetary policy argument used by the Federal Reserve and others to advocate reserve requirements is seriously flawed. (Ibid., p. 519).

In fact, there is ample evidence that indicates that the Fed. has employed interest rate smoothing as its only instrument of monetary policy. The literature on interest rate smoothing is quite extensive and has been reviewed from the perspective of reserve requirements as a source of revenue for the Treasury (Goodfriend). Goodfriend provides an explanation on how interest rate smoothing works in a rational

expectations model with three basic equations; a money supply rule, a money demand function, and a Fisher equation relating the nominal interest rate to an ex-ante real interest component plus an expected inflation component. From the perspective of this model, reserve requirements are not needed for monetary control.

The institutional means of interest rate smoothing have been varied and at times very complicated. In the 1970s the procedure was straight forward.

In the 1970s the Federal Reserve used an adjustable federal funds rate peg by establishing bands of 50 basis points, on average, within it which it would keep the funds rate by appropriate open market operations whenever the limits of the band were hit. (Ibid., p. 231)

During the period from 1979 to 1984 the procedure was much more complicated. However, in recent years, the structure of reserve requirements has remained irrelevant to monetary policy.

Even since reserve requirements were made contemporaneous in February of 1984, ostensible to improve monetary control, the Fed has continued to target borrowed reserves or the federal fund rate. (Ibid., p. 231-2)

This theoretical, institutional, and empirical evidence leads Goodfriend to conclude that reserve requirements may be investigated solely as a means to raise revenue for the Treasury.

...the fact that the Fed has employed interest rate smoothing throughout its history implies that the standard rationale for reserve requirements -- that they are necessary for monetary control -- has been highly misleading. The interest rate smoothing characterization of monetary policy thereby provides indirect support that reserve requirements have functioned exclusively as a tax. (Ibid., p. 228)

But, does the above imply that reserve requirements are based on a pure revenue raising rationale? Since the Fed. turns its profits over to the Treasury, one way to measure the reserve requirement tax is to calculate those amounts in absolute terms and as a percentage of government receipts (Stevens 1991, Barro 1982, Goodfriend and Hargraves 1983). Unlike the others, who consider Treasury revenues attributable to all outside money issued by the Fed., Stevens estimates include only revenues attributable to reserve requirements.

Stevens concludes that a pure revenue or "seigniorage" rationale for the reserve requirements tax is weak; he also rejects the suggestion that the rationale for the tax may not be revenue, but an implicit license, or user fee (p. 8). In this paper, the reserve requirement tax is viewed from the perspective that, regardless of its rationale, it is a burden on financial intermediation. This perspective appears to be shared by Stevens who states that the "[e]xperience with reserve requirements suggests that their rationale is ultimately irrelevant because they are an unsustainable regulatory intrusion in competitive markets" (p.16).[\[12\]](#)

Furthermore,

Whatever level of reserve-requirement-based taxation seemed appropriate 20 years ago is almost certainly too high today. In a competitive financial system, the application of an effective reserve requirement to a sub-set of institutions should spell their ultimate demise. (Greenbaum 1983, p.67)

IV. Conclusions and Public Policy Recommendations

The incidence of the reserve requirement tax is not clearly established. Also, the rationale for the tax has shifted with what appears to be the wind of circumstances. Therefore, it is surprising that so many otherwise astute economists, continue to support its enactment. In a futile bout with capital controls in the Euromarket, Paul Volker, then undersecretary of the Treasury, went to London to argue for the imposition of reserve requirements on Eurodollar deposits (Wriston 1992, p. 64). More recently, reserve requirements have been suggested as "one feasible route to EMU, and hence salvation for the EMS" (Eichengreen and Wyplosz, 1993). To Calvo's credit, he suggests reserve requirements as a solution to the "capital inflow problem" in Latin America only as a politically more feasible alternative to government fiscal restraint.

In a post-Castro Cuba, there should be in place public policies that encourage medium-term and long-term capital inflows. But if faced with the issue of what to do about "hot money," a central banker should remember that we do not really know who bears the reserve requirement tax. If bank borrowers bear the tax, the imposition of reserve requirements will make loans more expensive, reducing the amount of loans, with the consequent slow down of economic activity. If bank stockholders bear the tax, and reserve requirements are imposed, it will make it harder for banks to attract equity capital; this would retard the development and growth of the financial sector.

To conclude, reserve requirements are not a solution to the potential problem of capital inflows in a post-Castro Cuba.

Appendix

Event Studies: A Brief Summary of the Technique.[\[13\]](#)

An event study is a technique of empirical financial research that enables the analyst to assess the impact of a particular event on a firm's stock returns. It considers the returns of the firm's stock around the time of the event. The idea is to determine whether the firm's stock returns were "abnormal," or different from what otherwise would have been expected.

To conduct an event study, the analyst must measure a firm's stock performance against a benchmark. The benchmark is usually the return that the firm's stock would have achieved had the event not occurred. Thus the key to the event study analysis is to determine a model of the return generating process for the firm's stock.

Although benchmarks based on mean-adjusted returns and market-adjusted returns have been used, most analysts employ a more complicated return-generating process called the market model. In this model, the returns for a firm's stock are assumed to be linearly related to the returns on a broad measure of the market returns such as the S&P 500. The market model requires the analyst to estimate the parameters of the following equation using regression analysis:

$$R_{jt} = [\alpha] + \beta R_{mt} + e_{jt}$$

where $[\alpha]$ and β are regression parameters, and e_{jt} is the error term for the time period t . Once these regression parameters are estimated, the firm normal stock returns (the fitted R_{jt}) are then calculated by substituting the estimated parameters ($[\alpha]$ and β) and the return on the market into the equation above.

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Footnotes

Reserve Requirements: Not a Solution to the Potential Capital Inflow Problem in Cuba

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[1] . This paper draws from Chapter 1 and Appendix D of my dissertation at New York University. I want to thank my principal advisors Anthony Saunders and Paul Wachtell for their moral and intellectual support. The usual caveats apply.

[2] . The hypothesis that bank borrowers bear the tax cannot be tested directly because of the lack of suitable data.E

[3] . Considering the extensive recent literature, it is surprising that the question of who bears the burden of bank regulation and how it is borne was considered only of "academic interest" by Rose and Rose (1979 p. 332).

[4] . Although the insurance rates did not change, the risk of bank portfolios may have increased. Therefore, the subsidy implicit in low insurance rates may have increased and this would have to be considered in a study of the spread between the rates on CDs and TBs.

[5] . Fama ignored, and James considered and dismissed the influence of the FDIC.

[6] . A properly constructed aggregate measure of the tax includes all its components. Alvarez (SFA) contains the details of the procedure followed to construct such a measure and the statistical tests that show that it is indeed a proper measure of the tax.

[7] . This view came into question by Scott Lummer in the FMA annual meetings in Orlando, Fl. (Oct. 1990). In oral comments about his current research, he stated that since firms have their own bank accounts histories, they could make them available to prospective lenders. From this perspective, the conventional informational advantage of banks does not appear to be as important. Lummer stated that the informational advantage of banks may be found in inter-locking boards of directors.

[8] . See for example Bogan-Kiernan Macroeconomics West Publishing Chapter 10.

[9] . Goodfriend and Hargraves reference Friedman and Shwartz pp. 627-32 who document this shift and describe it as a "near-revolutionary change." Ibid., p. 7.

[10] . I return to this point in the subsection on interest rate smoothing.

[11] . Greenbaum refers to the "fulcrum of monetary control" as the "traditional" view; whereas I have been referring to it as the "contemporary" rationale to distinguish it from the "liquidity" and the "Fed credit policy" rationales I discussed above.

[12] . Or, in the term coined by McKinnon (1973, 1991) an "instrument of financial repression."

[13] . This appendix draws on Schweitzer (1989)