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Anomalies in Swedish Stock

Interest Rates & NIFTY 50 Index

Highlights

Evidence from Emerging Market

Financial Crises & Failed Corporate

Discovering Thoughts, Inventing Future

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Financial Crises and Failed Corporate Governance

By William C. Handorf
George Washington University

Abstract- The banking sector is special given the importance of credit to support economic growth, and enormous public costs periodically sustained to bailout extensive institutional failures. US banks fail in waves approximately every generation and are unable to cope with severe economic downturns and incur excessive risk in a predictable and preventable manner. Is good corporate governance focusing on efforts to refresh boards by age or term limits the cause of episodic failure? As institutions refresh boards, banks lose directors with experience related to prior periods of crisis. Consistent with the *availability* heuristic, recall and memory are important to judgment. If relatively few directors have personal experience of a prior financial disaster, they are unable to recommend more conservative strategies. While some deservedly will believe the proposal a reversal in good governance, banks should consider suspending term and/or mandatory age limits for a few directors. Each board will need to overcome common "blind spots" that young equals good. *Ageism* is well-known and documented.

Keywords: g2 (financial institutions & services) and g3 (corporate finance & governance).

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I. Introduction

With financial history as a guide, the US banking system is halfway between the *Great Recession* when almost 500 institutions failed and the next debacle. History need not repeat but does so with uncanny regularity. Why are bankers unable to learn from experience? The *error learning* model allocates failure to several categories to include preventable bankruptcies in predictable situations.[1] Is *good corporate governance* contributing to these episodic managerial mistakes for the banking sector? The governance and financial crisis literature offer limited guidance. Most studies agree that the board of directors is the cornerstone of the governance framework. Failures leading to bankruptcy can be traced to directors failing to exercise their responsibilities, and an inability of the board to comprehend the complexity of their business.[2] Academic and practitioner studies reach conflicting views of the composition and structure of the board leading to failure during crises. Many, but not all, studies suggest banks with more diverse independent directors adopt more conservative policies and achieve better credit ratings conducive to survival. Although banks have relied more fully on independent directors to provide advice and monitoring, failure has not abated during periods of economic and financial upheaval.

According to a recent survey compiled by Spencer Stuart, the average tenure of a Standard & Poors 500 independent director in the US is 8.2 years and 82 percent of directors have been on their board less than 16 years. To refresh the board, 42 percent of firms mandate a maximum retirement age of 75.[3] As a result of forced and voluntary turnover, the average bank can be directed by three distinct boards between crises that occur approximately every 20 to 25 years. Each successive board invariably believes it is more capable than predecessors and risk management models better calibrated. Failure is considered remote and not an agenda item highlighted for discussion. "We are smarter" is a common refrain. Hubris remains constant as a character trait across generations of management and boards.

According to another survey by Institutional Shareholder Services (ISS), "Refreshment is among the most hotly-debated topics across US boardrooms and within the broader corporate governance community. Among institutional investors, 68 percent pointed to a high proportion of directors with long tenure as cause for concern. Some urge wider use of forced exit mechanisms, such as mandatory retirement ages or term limits."[4]Subramanian provides a counter-argument, "Boards have an obligation to ensure the proper mix of skills and perspectives. Age and term limits are a blunt instrument for achieving optimal board composition."[5] We explore failure in the banking industry to determine if periodic crises and financial panics are predictable and preventable, and to assess what extent corporate governance contributes to the inability to learn from the long and costly experience.

We later recommend that banks suspend mandatory term or age limits for a *few* directors to ensure the board is better able to retrieve the lessons of prior crises. Award-winning work in the social psychology field by Tversky and Kahneman suggest that recall and memory are important to judgment. If an event is easier to recall or retrieve from memory, it can be applied more quickly and fully when developing

Author: Ph.D, School of Business, Department of Finance, George Washington University, Washington. e-mail: whandorf@gwu.edu

strategy according to the *availability* heuristic. Theorists, practitioners and investors deservedly will find the modest proposal to suspend term or age limits for several directors within the banking sector as a major reversal in good corporate governance. However, banks are a special sector of commerce.

II. Current State of the Industry

The banking sector is different than other industries given the importance of access to credit by consumers and businesses to support economic growth. Massive public costs incurred by the Federal Deposit Insurance Corporation (FDIC), Federal Reserve System and Department of Treasury to resolve potentially hundreds of institutional failures add to the specialness of the financial sector. However, concern with the health of the banking system appears misplaced ten years after the last financial calamity.[6]

The US banking system is currently robust given consistent profits and sufficient capital to pay shareholders respectable dividends, repurchase stock and still retain adequate earnings to support growth and originate new loans critical to sustaining economic expansion.

Preliminary anecdotal evidence shows risks are creeping back into the financial system that invariably precede a crisis. Many analysts undoubtedly will apply Fishoff's *hindsight bias* heuristic and arrange emerging evidence into a more confident account of the antecedents of failure *after* the next wave of bank liquidations.[7] There are very few projections of eminent financial disaster. Rizzi, however, reminds bankers of the risks, "You are assured of losing money if you are complacent and ignore the inherent cyclicality of banking, believing *this time is different*."[8]

- The Office of the Comptroller of the Currency identified the easing of commercial loan standards as a top risk in the industry. The Comptroller warned, "The worst loans are often made in the best of times."[9]
- The *Economic Growth, Regulatory Relief and Consumer Protection Act of 2018* raised the threshold over several years for *systemically important financial institutions* to $250 billion thereby reducing institutions subject to more restrictive regulation from 38 to 12.[10]
- Investors are increasingly relying on "drive-by" appraisals to value large pools of residential mortgage collateral. Such valuations are a quick and inexpensive method to value houses. Although Congress prohibited such valuations for traditional mortgages originated by banks following the last crisis, the restrictive rules do not apply to institutional investors.[11]
- After years of low interest rates consistent with an accommodative monetary policy engineered by the Federal Reserve, investors are seeking high-yield investments and aggressively purchasing leveraged-debt securities with far fewer protective covenants than common several years ago and expose creditors to higher losses given default in the next downturn.[12]

Despite the illustrative warnings and red flags, the public can take solace from another regulatory pronouncement the Comptroller of the Currency previously provided Congress, "Under the provisions of the new law, the failure of efficiently and honestly managed banks is practically impossible."[13] The year quoted was1914 – not a century later – following the creation of the Federal Reserve System. Regulators, like bankers, also retain confidence the most recent financial disaster will be the last given safeguards of a new restrictive law passed by Congress and creation of a regulatory body to ensure the mandate is accomplished.

Bank crises are *not* a new phenomenon. A crisis can include a *panic* where the financial markets, the inter-bank market and depositors lose confidence in the banking sector and withdraw funds, and *failure* when many institutions are liquidated or merged by regulatory authority. Crises occur in the US and other countries approximately every generation.

Prior to more fully reviewing the financial, economic and managerial reasons banks fail, it is useful to briefly note the similarity of the occurrence and the resolution of bank failures and periodic market panics in the United States during the past century. Increasingly more advanced financial models incorporating more powerful technology, erudite mathematical algorithms, advanced financial logic and restrictive statistical assumptions, coupled with managerial confidence, lull bankers and regulatory supervisors alike into unwarranted confidence and complacency. Prudential corporate governance discourages retention of board members with long tenure and experience extending to the preceding crisis. The 20th century American philosopher Santayana penned the oft-repeated phrase, "Those who cannot remember the past are condemned to repeat it."[14]

III. Prior Banking Crises

After winning the presidential election in 1912, Woodrow Wilson placed high priority on banking reform as a result of the devastating banking crisis and severe recession of 1907. The *Federal Reserve Act of 1913* created the existing central bank. Commercial banks could now look to the Federal Reserve for a source of liquidity should nervous depositors withdraw funds given concerns about the safekeeping of a local or city bank. The formation of the central bank did not end bank

failures or financial panics over the next century. Hummel, among many commentators, staunchly criticizes the Federal Reserve System, "There is more than a *prima facie* case against the Fed's success at either stabilizing the US economy or preventing banking crises."[15]

The *Banking Act of 1933* established the Federal Deposit Insurance Corporation and gave the new agency the authority to provide federal deposit insurance as of 1934 following numerous bank failures and bank runs resulting from the *Great Depression*, the *Dust Bowl* and subsequent *National Banking Holiday* when deposit institutions were closed to provide regulators time to differentiate viable from failing banks. Despite the creation of a momentous new federal regulatory agency protecting modest customer deposits, banks continued to fail and financial crises periodically persisted over the ensuing 80 years.

Researchers long have noted bank failures coincide with adverse developments in the economy. Freidman & Swartz contend problems in the financial system worsen an economic contraction by reducing the wealth of bank shareholders and precipitating a rapid decline in the supply of money.[16] Bernanke extends their pioneering work by evaluating how debtor bankruptcies may further affect economic output. He indicates, "As the real costs of intermediation increase, some borrowers (especially households, farmers and small firms) find credit to be expensive and difficult to obtain. The effects of this credit squeeze on aggregate demand helped convert the severe downturn of 1929-30 into a protracted depression."[17] Any investigation of bank failure must recognize the impact of bank liquidations on the economy and simultaneously consider the loss of economic output on the ability of debtors to both obtain and repay bank loans.

The Federal Reserve shocked the markets in 1979 by dramatically increasing short-term interest rates to control inflation that then sharply exceeded policy goals. The action had unintended consequences for the soon-to-be beleaguered savings and loan or thrift industry. Thrifts provided long-term, fixed-rate mortgage loans to local home owners funded by short-term insured deposits subject to rate ceilings then imposed by regulation Q. S&Ls suffered severe disintermediation as customers withdrew funds in favor of Treasury securities offering higher yields than financial institutions were then able to pay on deposit products. Congress passed several laws, to include the *Depository Institution Deregulation and Monetary Control Act of 1980* and the *Depository Institutions Act of 1982* to alleviate the industry's liquidity and interest rate risk difficulties by allowing thrifts to extend credit in areas they had no experience. The new lending authority turned out badly as problem loans proliferated, net interest margins narrowed or turned negative, and capital evaporated; about one-third of the 3,200 thrifts failed between 1986 and 1995.

The *Financial Institutions Reform, Recovery and Enforcement Act of 1989* created the Resolution Trust Corporation to liquidate and manage insolvent thrifts, imposed new restrictions, abolished the supervisory authority of the Federal Home Loan Banks and created a new, and short-lived agency, called the Office of Thrift Supervision to oversee the rapidly shrinking industry. As a result of the turmoil, commercial banks aggressively entered the residential mortgage loan market vacated by thrift institutions thereby setting the stage for the next crisis. Despite the attention of public policy to the thrift industry, Boyd and Gertler lay blame to the nation's largest banks during this period and raised the profile of TBTF or too-big-to-fail featured in subsequent law following the next disaster. They indicate, "Large banks were mainly responsible for the unusually poor performance of the overall industry. First, deregulation and financial innovation led to increased overall competition for the banking industry. Second, the existing regulatory environment tended to subsidize risk-taking by large banks more than small banks. The rationale was based on the *Great Depression* when the failure of a large bank could be contagious."[18]

Rapidly rising home prices preceding the *Great Recession* encouraged prospective home owners, long-term investors and short-term flippers or speculators to purchase properties funded by high-risk loans and very high loan-to-value ratios. Banks and brokers originated high-yield loans and willingly extended subprime financing to individuals with impaired credit, accepted low-documentation loans with little verification of income and cash flow, and structured loans with payments initially set low and exposed unsuspecting mortgagors to subsequent payment shock. The loans were packaged and sold to Wall Street investment banks to create Private Label Mortgage Backed Securities, which were then cannibalized to create even more exotic and toxic Collateralized Mortgage Securities (CMO) promising even higher returns. The CMOs quickly lost substantial value when mortgagors with subprime credit and undocumented sources of cash flow were unable to cover payments that afterward increased in the most recent, but by no means the last, banking crisis.

Congress and the administration responded to the *Panic of 2008* with policy initiatives comparable to that which has followed US banking crises over the past century: 1) conduct hearings, 2) enact new restrictive laws that attempt to prevent similar abuses in the future, and 3) create a new regulatory agency to promulgate rules and monitor institutional compliance with the law. The Wall *Street Reform and Consumer Protection Act of 2010* created the Consumer Financial Protection Bureau, and required banks, especially those deemed to be systemically-important or TBTF, to increase

funding by equity capital, direct more attention to maintaining adequate levels of liquidity and enhance risk management. Calomiris directs especial attention to misplaced policies of Congress that encouraged risk-taking and partly holds legislators responsible for the almost 500 bank failures during and subsequent to the *Great Recession*. He indicates, "Numerous housing policies promoted subprime risk by subsidizing the inexpensive use of financial leverage. These policies included political pressures from Congress on Fannie Mae and Freddie Mac to promote 'affordable housing' by investing in high-risk, subprime mortgages and 2006 legislation enacted to encourage rating agencies to relax standards for subprime securitizations."[19]

The US has a long and undistinguished historical record of bank failure, market panic and legislative response. The cycle raises many questions. Why do well conceived public policy initiatives precipitate unintended consequences leading to subsequent bank failure? What issues exist, if any, beyond an adverse economy, deregulation, too-big-to-fail incentives, flawed reliance on optimistic models, ignorance of risk, mis-priced and questionable acquisitions, and mismanagement? Are these preventable problems in predictable situations that should have been discovered and acted upon by knowledgeable and experienced bank directors? Parsons cites the results of almost 100 FDIC *Material Loss Reviews* that highlight issues leading to governmental losses incurred when banks are liquidated or merged, "Ineffective bank directors are identified as a primary cause of bank failure."[20]

IV. Bank Failure

Banks ultimately fail because of inadequate capital and/or a liquidity crisis. A few banks have been considered well-capitalized and liquid, yet were closed by regulatory authorities as a result of fraud or money laundering, such as existed at the Bank of Credit and Commerce International in 1991 or United American Bank and related institutions controlled by the Butcher brothers in Tennessee and Kentucky in 1983/4. These institutional problems are anomalies.

Capital ratios usually decline to very low or negative levels given excessive losses on high-risk loans and, more recently, highly-rated mortgage investment securities that quickly migrated to speculative status and/or default. The poorly underwritten troubled loans and securities are neither supported by adequate levels of loan loss reserves nor priced appropriately for risk. The problems are more pronounced when a bank retains a concentrated portfolio experiencing greater than expected losses. Kindleberger, among other academics, claim that bank failures are part of the business cycle and result from myopic foresight by bankers.[21] Bank capital ratios also decline when undue growth is funded by high-cost, non-core uninsured and broker-placed deposits and borrowed money. Capital ratios decline as assets grow more quickly than equity capital. In addition, bank internal controls and underwriting ability prove inadequate to support periods of above-average growth. Management invariably react to excessive losses by shrinking the balance sheet to maintain fragile and deteriorating capital ratios. The shrinkage strategy merely exacerbates losses as fixed operating expenses become a progressively larger share of declining income.

Once a bank's capital, asset quality and earnings problems are well known by regulatory supervisors, credit rating agencies and the inter-bank market, liquidity issues arise. The press publishes adverse articles about the financial problems of the bank. Core and non-core depositors alike withdraw funds. If a rapidly deteriorating bank has little high-quality collateral available for pledging at the central bank or correspondent banks, liquidity pressures deepen. Weak banks lacking unencumbered quality assets are unable to borrow funds in the inter-bank market even on a short-term basis. Diamond and Dybvig believe the mission of the banking industry is conducive to precipitating banking panics, "Banks create liquidity risk for themselves as they provide liquidity to customers in the form of loan commitments and mismatched terms of longer term assets funded by shorter term liabilities."[22] Ultimately, banks fail because management and the board of directors are unable to establish a viable business plan implemented by qualified management, and unwilling or unable to identify, measure, monitor and control risks commensurate with a safe and sound institution.

High-risk residential and commercial mortgage loans and loans to high-risk mortgagors fueled the most recent US banking boom and bust. Prior crises have featured problematic loans to the energy, agriculture, commercial real estate and developing country sectors. Institutions invariably emulate early entrants initially enjoying high yields yet do not fully analyze the inherent risks. While asset classes precipitating panics and failure change over time, the preventable process leading to liquidation is remarkably similar. A former Comptroller of the Currency responsible for regulation and supervision of national banks indicated: "The [bank] failures for the current year have been numerous, many having been characterized by gross mismanagement and some by criminality of an aggravated nature…." Although these words easily could have been written in the US during or just after the *Great Recession*, they were penned in 1891.[23] Bank crises fueled by mismanagement and, sometimes fraud, are a recurring chapter of American financial history over a very long period of time. The economic, financial and managerial issues precipitating failure are next evaluated from the

devastating US banking experience during the *Great Recession*.

V. Leading Causes of Failure During the Great Recession

The Economy: Bank failure has long been linked to adverse conditions of the economy. There is disagreement and debate whether economic contractions precipitate conditions conducive to bank failure or whether bank problems cause or worsen economic recessions. We provide recent evidence of bank failure and related economic and market metrics indicative of prior business cycles to assess whether bank directors should have identified the deteriorating macro-economic environment prior to the recent crisis. Other researchers previously cited have exhaustively examined economic conditions and bank failure. Our empirical objective merely illustrates *red flags* a knowledgeable director should or could have identified prior to the *Great Recession* to guide adoption of more conservative financial strategies consistent with survival. Table 1 reviews 25 years of illustrative banking and economic data between 1992 and 2017. Was the most recent upsurge of bank failure preventable and easily observed by an alert and experienced board?

- On average, 32 banks failed annually in the US over the quarter century depicted and ranged between zero in both 2005 and 2006 to 180 in 1992 and 154 in 2010. Relatively new directors can be lulled to complacency when there are no headlines applicable to bank liquidation or panics.
- The average, annual real or inflation-adjusted gross domestic product (GDP) expanded by 2.54 percent per year over the 25 years illustrated and ranged from 4.69 percent in 1999 to -2.78 percent in 2009.
- The annual consumer unemployment rate averaged 5.97 percent and ranged between 4.00 percent in 2000 and 9.60 percent in 2010.

We employ statistical correlation analysis to study the influence between the economy and bank failure. Correlation analysis provides a measure of the relative, not absolute, relationship between variables and does not suggest causality or economic consequence. Table 2 illustrates the coincident and one-year lagged bank failure correlation data that can range from + 1.00 or perfect positive correlation to – 1.00 or perfect inverse correlation. Our analysis is focused on whether flawed governance led to failure rather than extensive econometric analysis of failure already cited.

- The correlation between real GDP and bank failure is negative as expected. When the economy is expanding, fewer banks fail and as fewer banks are liquidated the economy expands. The correlation coefficient is -.36 on a coincident basis, which is significant at the five percent level and -.74 on a one-year lagged basis, which is significant at the one percent level. The confidence level represents the likelihood of wrongly rejecting the null hypothesis indicative of no relationship between the variables tested. Based on the simplistic statistical results, economic conditions impact loan losses, earnings, capital and ultimately failure. And, bank failures deepen the economic malaise.
- The correlation between the unemployment rate and bank failure is positive as expected. As households lose the ability to generate cash flow from employment, they pay obligations more slowly, if at all. Banks incur more slow, non-accrual and classified loans and the resultant credit problems are only partly resolved by loan modification or foreclosure. The correlation coefficient between bank failure and unemployment is .83 on a coincident basis and .60 on a lagged basis; the statistical relationship is significant at the one percent level for either perspective.

The cursory analysis merely confirms that recessionary economic conditions and bank problems are strongly related. The rudimentary statistical analysis begs the question of how bankers, directors and regulators can assess deteriorating economic conditions *prior* to a recession. There are no perfect models but the *yield curve slope* and *credit spread* provide well known and valuable managerial estimates suggestive of an adverse economic environment detrimental to bank viability. Attentive and knowledgeable directors need to act on the information suggestive of economic weakness to modify business plans and reduce risk exposure before a contraction.

The *yield curve slope* reflects the difference in yield between long-term and short-term debt securities. The yield curve slope shown in Table 1 represents the difference in yield between 10-year US Treasury notes and three-month US Treasury bills. Over the period sampled, the slope averaged 1.91 percent and ranged between 3.58 percent in 1992 and .07 percent in 2006. The US Treasury yield curve reflects expectations of future short-term interest rates and a liquidity premium investor's demand for accepting incremental price risk with long-term, high duration securities.[24]

An upward sloping yield curve, such as existed in 1992 or 2003, suggests interest rates will rise, which is consistent with a recovering or expanding economy. An inverted or flat yield curve, such as occurred in 2006, provides evidence interest rates will decline, which is compatible with a slowing or contracting economy.

No economic model is flawless. Estrella, Mishkin and Trubin show the slope of the US Treasury yield curve can be used to convey estimates of the probability of a recession occurring in the US within the

next year.[25,26] The average probability of a recession based on the mean yield curve slope of 1.91 percent over the 25 year period sampled is 2.21 percent.*The probability of a recession occurring in 2007 flashed to a very high 25.59 percent based on the minimal slope of .07 percent posted in 2006. The market indicator suggestive of an imminent recession was then ten times greater than typical and should have raised sufficient concern for directors to adopt more conservative financial strategies. The market provides management and regulatory supervisors with an advance warning that offers time to modify business plans and diminish risk exposure.

Another convenient economic metric illustrative of an adverse shift in the economy is the *credit spread* between debt securities of the same term but different quality. As shown in Table 1, the average credit spread between medium-quality (i.e., rated A or BBB) corporate bonds and US Treasury bonds over the quarter century depicted is 2.41 percent and ranged from 4.04 percent in 2009 to 1.51 percent in 1997. The spread increases when investors believe a recession is more likely and medium-grade bonds are more probable to be downgraded to speculative status or default and incur losses. Investors sell corporate bonds and buy Treasury bonds in anticipation of a downturn and the actions lead to wider credit spreads. Investors reach for yield in the expansion by purchasing corporate notes and selling Treasuries and the action leads to narrower spreads. The credit spread widened dramatically in 2008 and 2009 prior to the worst period of the US banking bust and had been trending up prior to the onset of the recession.

Recessions within the business cycle are not new events and there are well known metrics to measure the likelihood of economic adversity occurring when management, the board and regulatory supervisors retain experience and remain vigilant. If the board has approved financial policies that increase risk exposure, such as increasing financial leverage, pursuing aggressive growth or entering a new or untested lending market, the consequence can be devastating. The FDIC noted the typical characteristics of the 489 banks failing between 2008 and 2013 included, "heightened concentrations of ADC (real estate acquisition, development and construction) lending, rapid asset growth, reliance on funding sources other than stable core deposits and relatively lower capital-to-assets ratios."[27] The failing banks did not modify plans or heed warning signs indicative of imminent economic distress. The losses were predictable.

Financial Factors: Rather than present innumerable financial and regulatory ratios common to the banking sector, it is more effective to assess the *Risk Index* found to have predictive power regarding potential financial and regulatory problems. The financial metric comprises the banking industry's well-known regulatory paradigm known as CAMELS (capital adequacy, asset quality, management, earnings, liquidity and sensitivity). The index evaluates the Tier One Leverage Capital ratio of a bank (i.e., tangible equity divided by total assets), the mean return on assets (ROA) computed over a period of time and risk represented by the sample standard deviation of the return on assets. The index incorporates capital, earnings and risk, and identifies how many standard deviations a bank is from experiencing financial problems during the ensuing year. Statistics are now commonly encountered in the banking industry and more complex regulatory rules.

Risk Index = (Tier One Capital + Mean ROA – Regulatory Threshold)/Sample Sigma of ROA

A strong bank will have a high *Risk Index* (e.g., greater than ten) if it relies on relatively more equity capital to fund assets and earns high profits on a consistent basis that provide the foundation for retaining earnings and creating capital internally. Bankers unable to control risk will experience high year-to-year volatility of earnings, which leads to a high sigma of ROA and a low index. Earnings are inconsistent when management is unable to identify, measure and control credit, interest rate, liquidity and operational risks and pursue inappropriate business strategies. Over 95 percent of banks that failed in 2009 retained a *Risk Index* less than three in 2008.[28] There was a high probability the capital for such banks would be less than five percent necessary to be judged *well capitalized* by *Prompt Corrective Action* standards then imposed by the FDIC.

Table 3 illustrates the Tier One Leverage Capital ratio, mean ROA computed over a half-decade between 2013 and 2017, and the sample sigma of ROA derived over the same five-year period for the four largest US banks. These banks comprise 45.3 percent of total banking assets as of 2018. The *Risk Index* shown for the top four banks can be converted into a probability each bank's capital might decline below the five percent *Prompt Corrective Action* threshold.** The largest banks highlighted are also required to hold incremental capital to meet demands applicable to supplementary leverage, a capital surcharge and a countercyclical capital buffer. The Table presents comparable data for an illustrative community bank that failed in 2010 relative to a very low two percent regulatory capital threshold that if violated requires the institution to be liquidated or merged by regulatory authorities.

The four systemically-important US banks have very strong capital ratios and consistently stable profits commensurate with effective risk management as of 2018. With a *Risk Index* ranging from over 150 to above ten, the probability of the systemically-important banks encountering financial problems is remote and

consistent with the current strong position of the banking industry. Banks, however, appeared similarly strong prior to other crises chronicled. The weakest of the top four banks (adversely impacted by the 2017 Tax Act rather than operational or credit problems) retains a *Risk Index* above ten, which is comparable to less than a ½ of one percent probability of experiencing incremental regulatory oversight and far above that indicative of failure.

By contrast, the $13 billion South Carolina bank closed in 2010 had Tier One Leverage capital of only 7.12 percent as of 2009, an alarming average annual ROA of -1.44 percent lost over the prior five years and an unusually high ROA sigma of 2.84 percent. The *Risk Index* compared to a two percent threshold was a very low 1.30, which is well below three common to failing banks and a five percent threshold. There was almost a 30 percent chance of problems becoming so severe for the southern bank to require liquidation or merger in 2010. Failure should not have been a surprise to management or the board. The index is able to synthesize a bank's capital, earnings and risk profile regardless of source into one easily measured metric.

The *Risk Index* will decline for the industry and other common financial metrics, such as problem assets and loan losses, escalate as the US approaches the next challenging eonomic phase of the business cycle when capital ratios decline, earnings become far more erratic and business managers are unable to achieve desired goals from unrealistic business plans. Just as many bankers and regulators fail to monitor deteriorating economic trends illustrated by a flatter yield curve or a increasing credit spread, management of failing banks do not concentrate on the financial metrics indicative of impending *problem bank* designation. The Offices of the Inspector General for the Department of Treasury and the FDIC evaluated the 2008 failure of Washington Mutual and commented, "Primary areas of concern were the lack of effective internal controls and insufficient commitment of the board to take action to address identified weaknesses."[29] Ultimately, bank failure reflects tardy bank supervision, poor management and inadequate monitoring and oversight by the board. The losses are preventable.

Managerial Issues: The *Cadbury Report* published in Britain in 1992 defines *corporate governance* as the system by which companies are directed and controlled.[30] The board of directors establishes the direction of an enterprise by approving appropriate policies and business plans, and recruiting, compensating and monitoring executive management and operations to ensure shareholders, among other competing stakeholders, are treated fairly and provided appropriate risk-adjusted returns on capital invested. The board of directors of a regulated bank or bank holding company typically conducts its business by committee. Some committees for US financial institutions, such as audit and enterprise risk, are required by the Securities and Exchange Commission (SEC) and the institution's relevant primary regulator. Other committees, such as credit, finance or information technology, often reflect prior problems encountered by the institution.

As banks create new committees, time demands on directors increase and encourage the board to add new directors. Regulators, consistent with accepted best corporate governance practices, increasingly encourage banks to add additional directors that are not only independent of management but also promote diversity to provide new perspectives by which to monitor management and operations, control risk and create value. Diversity may be narrowly defined, such as by gender or race, or more broadly characterized by features that promote varied business, academic, military and governmental experience.

The *managerial model* of corporate governance dominated in the United States in the first half of the twentieth century by which the board was mostly comprised of senior executives. Independent directors were identified by, beholden to and supportive of the CEO. Baum succinctly evaluated what precipitated the rise of the *monitoring board* in the 1970s.[31]

> *First, the sudden collapse of the major railway company Penn Central in 1970. Second, Eisenberg's influential book 'The Structure of the Corporation' published in 1976. According to Eisenberg, the board's essential function was to monitor the company's management by being independent from it. The reliance on independent directors as a panacea for various corporate governance ills has reached its zenith in the US.*

There is mixed support in the banking sector regarding the benefit of independent directors to operate safely and create value as companies shifted strategy from the *managerial* to the *monitoring model*. Baum further notes, "The empirical support for staffing boards with independent directors, however, remains surprisingly shaky given the ubiquitous reliance on independent directors. The global financial crisis of 2008 has added further doubts."[32] Erkens et al. studied the performance of almost 300 global financial firms' during the most recent financial crisis and their research did not support the often-stated corporate governance benefit of adding independent directors to a board.[32] Alonso and Vallelado evaluated a large sample of international commercial banks to test hypotheses related to the dual role of directors (i.e., monitoring and advising). They find, "Larger and not excessively independent boards might prove more efficient in monitoring and advising functions."[33] These studies suggest independent directors, *per se*, do not necessarily prevent or preclude financial distress.

Other governance studies assess the benefit, if any, of board diversity on bank performance. Pathan and Faff conducted a longitudinal study of large US bank holding companies prior to and after the rules of Sarbanes-Oxley were introduced and focused on the composition of boards. They noted, "Although gender diversity improves bank performance in the pre-Sarbanes-Oxley Act (SOX) period (1997-2002), the positive effect of gender diminishes in both the post-SOX (2003-2006) and the crisis periods (2007-2011)."[34] The results are comparable to those expressed by Adams et al. who studied the benefit of gender diversity and found, "Female directors have better attendance records than male directors and more likely to join monitoring committees. These results suggest that gender-diverse boards allocate more effort to monitoring. However, the average effect of gender diversification on firm performance is negative."[35] Not all studies show efforts to promote gender diversity are misplaced or without merit. Fernandes et al. evaluated the performance of supervisory boards during the recent crisis and found, "Gender and age diversity improved banks' performance during the crisis; hence, diversity matters."[36] The later results are consistent with an analysis of companies in the non-financial sector by Bernile et al. except during times of financial volatility.[37] A crisis, however, is precisely the time banks fail and invariably reflects the board's inattention to risk.

The governance literature provides conflicting evidence regarding board structure and performance. If the US is at the inflection point between the last financial crisis and the next period of unwarranted bank failures, governance is critical. In a study of systemically-important US bank holding companies, Handorf focused on board structure and safety and soundness measured by a credit rating.[38]

> *Holding company boards comprised of more independent directors, to include female directors, achieve better credit ratings. Diversity of experience allows bank holding company boards to make better decisions, formulate superior plans and policies and improve monitoring of operations and executive management. Holding companies with more independent directors on the board err on the side of safety*.

Despite the wealth of studies and conflicting conclusions applicable to governance from a sample of divergent studies cited, we have not identified why so banks succumb to economic contraction and incur excessive financial risk. Coktan et al. succinctly addressed this question from a governance perspective, "We find that firms that go bankrupt have smaller, less independent boards and more restrictions on shareholder governance."[39] Kress further argues, "The directors of the United States' largest financial institutions are too busy to execute their governance roles effectively."[40] Independent directors must be unburdened by excessive other work to create value and promote a safe and sound institution.

Efforts to refresh the board by instituting mandatory age limits, promote diversity and achieve other laudable corporate governance goals create issues that deserve additional investigation within the banking sector. The typical bank or holding company has three *distinct boards* between banking crises given an average eight-year tenure of directors and 25 years between crises. The industry is unable to benefit from the well-known *error learning* model and profit from those directors with experience from prior crises. As earlier noted, failure includes 1) those that are preventable in predictable operations, 2) unavoidable in complex situations and 3) intelligent at the frontier where problems can occur quickly and on a small scale.[1] Regardless of type of failure, management and the board must learn from its own mistakes and those of others. Yet, the very board turnover believed useful to effective corporate governance by refreshment strategies deprive banks of experience that might prevent mistakes in predictable situations. Nestor links financial institution failure with the characteristics of independent directors, and finds, "The best performing boards were not too young and retained longer average tenure."[41]

Over 80 percent of S&P directors have less than 16 years of tenure on their existing board and many have less than five years of experience. Tversky and Kahneman published the *availability* heuristic almost 50 years ago. Their award-winning work indicates that recall and memory are important to judgment.[42] If an event is easier to recall or retrieve from memory, it can be applied more quickly and fully when developing strategy. Relatively new directors have no personal experience of a prior crisis by which to easily retrieve and productively apply to oversight and strategy. Because the crisis prior to that of the *Great Recession* was a thrift catastrophe and focused on banks judged too-big-too-fail, we more fully assess the board tenure of the three largest savings and loans that failed in the 2008 era. These institutions include IndyMac, Downey and Washington Mutual (WaMu). Other large thrifts and banks would have failed except for ill-timed purchases by bank holding companies. The brief analysis is structured to spur debate of emerging governance practices within the banking system.

Based on 2008 proxy data filed by each savings and loan with the SEC, two of the failing thrifts retained no independent directors with first-hand knowledge of the prior thrift crisis. The two boards had an average tenure of four to six years that deprived the institutions of the *availability* heuristic that might have allowed some

experienced directors to incorporate conservatism into planning, monitoring and advising duties. By contrast, the third institution retained five directors with excessively long-term experience that represented almost 40 percent of the board. The later institution had an entrenched board often criticized by governance critics and would have benefitted by board refreshment strategies. The risk manager of the third thrift stated, "It's a crash that can largely be attributed to a failure of culture and governance by the board."[43]

Banks may be able to reduce the likelihood of recruiting a CEO or approving business plans contributing to preventable failure in predictable contractionary economic environments by retaining several directors with long-term banking experience including prior crises. The suggestion requires financial institutions to rethink board refreshment strategies linked to mandatory term and age limits. The relatively few directors retained must maintain good health, mental acuity, commitment and independence. One director's dire warning can be and likely will be ignored by a board dominated by newer directors from diverse fields of expertise. By contrast, two directors of fourteen common in large bank holding companies can forcefully argue against excessive financial risk, compensation plans that encourage undue risk-taking and CEOs focused on short-term results. Failure is acceptable if organizations are able to learn from flawed innovative strategies limited in scope. Failure is unacceptable if preventable in predictable situations.

Banks can learn from history by recruiting *and* retaining directors at an earlier age and by increasing mandatory age limits for a *few* experienced directors retaining intellectual abilities, physical well-being, stamina and commitment. Board evaluation is critical to good governance and diversity, and must not be ignored. Byrd et al. articulates a potential problem for boards dominated by long-serving directors, "The relationship between CEO pay and the median tenure of outside directors becomes positive supporting a *CEO allegiance* hypothesis."[44] The well-intentioned caveat suggests director independence can be compromised when serving with the same CEO for long periods of time. However, having no long-term independent director experience has its own risk – failure. The proposal advanced in this article is consistent with existent research. Doorga studied the role of independent directors serving on bank boards and indicated, "Longer tenure increases an individual's commitment towards the firm. Highly experienced board members are tougher on management because they understand prior missteps better than newer directors."[45]

VI. Conclusion

US banks have a long history of succumbing to economic contractions aggravated by business strategies focusing on growth, questionable acquisitions, investment in high-yield loans and securities funded by high-cost, non-core sources. Business recessions are not new. The potential adverse consequence of ill-advised business plans on capital, earnings, and liquidity are well known. Congress reacts to a surge of bank liquidations and panics in a predictable manner by holding hearings, enacting a new restrictive law and creating a regulatory agency to ensure the legislative mandate is accomplished. The process repeats every generation in the United States and many other regions of the world.

The governance and crisis literature offer limited guidance. Academic and practitioner studies reach conflicting views. Many, but not all, studies suggest banks with more diverse independent directors adopt more conservative policies and achieve better credit ratings conducive to survival. The directors cannot be too busy and hold senior, full-time positions or serve on many boards simultaneously. More experienced directors, if any are retained as proposed, are likely to have retired from full-time employment and if limit board service to one or two companies should be able to focus on the bank. Several directors, including the lead director, must have banking experience. Most SEC-registered banks have such expertise given the expectation that at least one member of the audit committee is a *financial expert*; most institutions possess far more experts than one director well versed in accounting and finance. The skill set of the board must also include strategic planning, human resource management, marketing and business development, information technology, audit and project management among other personal attributes suggestive of loyalty and care.

Any board retaining a few directors with long experience will likely find these directors exceed common age limits prescribed by "good governance" policies. Each board considering the proposal will need to overcome common "blind spots" that young equals good well known and documented by social psychologists.[46] *Ageism* is a very implicit bias in America and other areas of the world.

The proposal will not cure all ills facing the financial sector every generation or so. However, if two experienced, long-term bank directors are able to provide an influential voice against excessive stock repurchase activity, undue dividend payouts, unusually quick growth funded by non-core deposits and borrowed money, expensive acquisitions and unwarranted expansion into high-risk lending and

investing, the suggestion will prove not only sensible but cost-efficient.

There are many risks to be identified, measured, monitored and controlled within a financial institution. Some risks are well known and others are evolving, such as those applicable to cyber, Cloud computing, crypto-currency, fintech, vendor management, and social media. Institutions must anticipate the consequence of volatile inflation and interest rates, trade tariffs, a rapidly expanding federal debt and the possibility of a recession. The panoply of risks does require a diverse board and diversity includes a few directors with long-term experience that extends to a prior crisis period.

Repeated legislative efforts to respond to prior crises by introducing a central bank and lender of last resort, providing modest deposit insurance, and requiring more stringent regulatory rules applicable to capital, liquidity, and risk management have not been sufficient despite expectations to the contrary. More recent managerial guidance to include the introduction of the *monitoring* model, increased reliance on independent directors, and greater attention to diversity and refreshment strategies have produced mixed results. Indeed, Essen et al. found that prior governance recommendations have not allowed banks to prosper or avoid failure during crises, "Good governance prescriptions, such as board independence, incentive compensation and the separation of the CEO and board chair, have on the whole proved harmful to firm performance in times of crisis."[47] The governance proposal herein advanced pits the *availability* heuristic suggesting that recall and memory are important to judgement and boards should retain a few long-term experienced directors against the *CEO allegiance* hypothesis indicating long-term directors can become too close to CEOs and full board turnover is important. The managerial controversy is important to resolve as the US approaches ever closer to the next banking crisis.

Footnotes

* The probability of a recession using Excel equals: NORMSDIST (-.6045 - .7374 * Yield Curve Slope) where the values were estimated by the authors to obtain the best fit to predicting future recessions.[26] The slope is the difference in yield between ten-year and three-month US Treasury securities.

** The *Risk Index* can be converted into a probability the indicated capital ratio will decline below the regulatory threshold if earnings are symmetrically distributed around the mean rather than normally distributed. For example, an index of ten corresponds to a probability of capital declining below the stated threshold of ½ of one percent (e.g., $.5[1/\{10^2\}$) while an index of three represents a probability of incurring capital problems of 5.56 percent (e.g., $.5[1/\{3^2\}$). It is important to remember that 95 percent of failing banks in the last crisis retained an index of less than three one year prior to failing relative to a five percent capital threshold.

$$\text{Probability} = .5\,[1/(\textit{Risk Index})^2]$$

The analysis is consistent with Tchebysheff's inequality for a symmetrical distribution. The probability multiplies by .5 because of concern with very weak performance below the mean rather than outstanding earnings above the mean. We focus on the left tail of the distribution because that exposure represents the area capital will be judged inadequate relative to the threshold utilized.

Table 1: Annual Bank Failure and Economic and Financial Factors (1992-2017)

Factor	Mean	High	Low
Banks Failing	32	180	0
Real GDP Growth	2.54%	4.69%	-2.78%
Unemployment Rate	5.97%	9.60%	4.00%
Yield Curve Slope	1.91%	3.58%	0.07%
Credit Spread	2.41%	4.04%	1.51%

Sources: Federal Deposit Insurance Corporation, Bureau of Economic Analysis (Department of Commerce), Department of Labor and Federal Reserve Bank of St. Louis

Table 2: Correlation Coefficients of Failing Banks and Economic Indicators (1992-2017)

Factor	Real GDP Growth	Unemployment Rate
Banks Failing	-.359**	.827*
Lagged Banks Failing (One-year lag)	-.737*	.600*

*Statistical Confidence: * @ 1%, ** @ 5%*

Table 3: Risk Index and Financial Metrics

Bank	Tier 1 Capital	Mean ROA	ROA Sigma	Risk Index	Probability
BankAmerica	9.00%	1.19%	.03%	158.70	.002% < 5%
J P Morgan	8.71%	0.85%	.07%	62.59	.01% < 5%
Wells Fargo	8.39%	1.32%	.12%	39.63	.03% < 5%
Citibank	9.03%	0.76%	.42%	11.49	.38% < 5%
Carolina First	7.12%	-1.44%	2.84%	1.30	29.78%<2%

Source: Uniform Bank Performance Reports Compiled by Federal Financial Institutions Council: 2013-2017 for first four banks and 2005-2009 for Carolina First Bank.

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Financial Leverage and Firm Financial Performance in Nigeria: A Panel Data Analysis Approach

By Kenn-Ndubuisi, Juliet Ifechi & Nweke, Chijioke Joel
Rivers State University

Abstract- This study examined the relationship between financial leverage and firm financial performance in Nigeria using 80 non-financial firms quoted on the Nigerian Stock Exchange from 2000 to 2015. The total debt to capital ratio, debt to equity ratio, cost of debt, debt to asset ratio and long term debt to capital ratios were proxies for financial leverage. Panel data technique in the form of the pooled regression model, fixed effect model, random effect model, and the marginal model had been applied to test hypotheses. The findings of the study revealed earnings per share is significant and negatively related to the debt to equity ratio and the total debt to total asset measures of financial leverage while the return on equity shows an insignificant relationship with the financial leverage measures in Nigeria while the direction of the relationship differs from one variable to the other. It was positive with the total debt to capital ratio and the cost of debt while the total debt to asset ratio, long term debt to capital ratios and the debt to equity ratio was negative.

Keywords: financial leverage, firm performance, earnings per share, return on equity.

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Keywords: financial leverage, firm performance, earnings per share, return on equity.

I. Introduction

The financial decision of a firm is of paramount importance because of its resultant effect on the survival and performance of the firm. Capital is a basic resource in a company's financial decision making process amongst others in corporate finance; it is either sourced internally through retained earnings, depreciation, tax shields and other non-cash transactions or externally through debt and/or equity.

The use of the debt finance by a firm is known as financial leverage which spans out from the debate of the optimal capital structure and has been up for discussion for several decades. The use of debt in the capital structure mix is that its efficient use reduced the weighted average cost of capital which aids the increase in the net returns of the firm (Kenn-Ndubuisi & Onyema, 2018). The more debt financing a firm uses in its capital structure, the more financial leverage it employs. Therefore, we can say that leverage is one of the tools required by a company to enhance performance.

Studies have been carried out on the relationship between financial leverage and financial performance in Nigeria such as Ogiriki, Andabai & Bina (2018); Abdul & Badmus (2017); John-Akamelu, Iyidiobi & Ezejiofor (2017); Abubakar (2016); Chinaemerem & Anthony (2012); Akande (2013); Dare & Sola (2010) amongst others.

Some of these studies, focused on a particular sector of the economy or used a small sample size like Abdul & Badmus (2017) that studied the chemical and paints firms using only three quoted firms; Dare & Sola (2010) examined the Nigerian petroleum industry; John-Akamelu, Iyidiobi & Ezejiofor (2017) also investigated only the food production firms using six quoted firms. Also, Adenugba, Ige & Kesinro (2016) investigated five firms for six years; Akande (2013) studied ten firms for 20 years while Thaddeus and Chigbu (2012) sampled only six banks.

With small sample sizes, there might be a limit to generalization to only the sampled sector(s) which was measured by the authors. Empirical studies have also shown varying results thereby, creating a void in this research; A positive significant effect was supported by Ogiriki, Andabai & Bina (2018) using the ROE, ROA on long term debt in Nigeria; Abdul & Badmus (2017) discovered a negative relationship between ROA and debt ratios that is insignificant while John-Akamelu, Iyidiobi & Ezejiofor (2017) concluded that financial leverage has no significant effect on the EPS.

Therefore, this study tends to fill this gap in knowledge by improving on the previous research done by investigating the effect of the financial leverage on financial performance of quoted non-financial firms in Nigeria using eighty (80) non- financial companies from 10 sectors registered under the Nigerian stock exchange from 2000 – 2015.

The hypothesis to be tested will be impact of financial performance measures (Return on equity (ROE) and earnings per share (EPS) on the financial leverage measures in Nigeria (Debt to equity ratio, cost of debt, total debt to total asset, long term debt to capital ratio and total debt to capital ratio).

Author α: Department of Banking and Finance, Rivers State University, Port Harcourt. e-mail: kenndubuisijuliet@gmail.com
Author σ: Department of Mathematics and Statistics, Alex Ekwueme Federal University Ndufu-Alike, Ikwo.

II. Related Literature Review

Ogiriki, Andabai, & Bina (2018) examined financial leverage and its effect on corporate performance of firms in Nigeria from 1999-2016 using long-term-debt, return on asset and return on equity as dependent and explanatory variable respectively by employing the Ordinary Least Square (OLS). The result revealed that ROA and ROE had positive effect on long-term debt of firms that was significant respectively. The study concluded that financial leverage has a significant influence on the corporate performance of firms in Nigeria and recommended the effective management of the long-term debts.

John-Akamelu, Iyidiobi & Ezejiofor (2017) studied the effect of financial leverage on the financial performance of food production firms in Nigeria from 2009 to 2014 using the earnings per share, Return on Equity, Return on Assets as a proxy for performance. The paired sample t-test analysis showed that financial leverage has no significant effect on the EPS of food production firms in Nigeria while there are effects on return on equity and return on assets of companies in Nigeria. They recommended that the amount of debt finance in the financial mix of the firm should be at the optimal level to ensure the firms' assets are utilization appropriately.

Abdul & Badmus (2017) assessed the relationship between leverage (equity) and debt ratio on return on assets of chemicals and paints firms quoted in the Nigerian stock exchange using the ordinary least square (OLS) on a sample of three firms from 2000 – 2009. They concluded that the equity finance had a significant and positive impact on ROA while the DR reported a negative and insignificant relationship on the performance measures. Therefore, firms in the sector should employ more equity finance and avoid more debt.

Akani & Kenn-Ndubuisi (2017) examined the effect of capital structure and board structure on firm performance in Nigeria using the Vector auto regression (VAR) test on forty listed companies in the Nigerian Stock Exchange (NSE) from 2008 to 2016. The result established that there exists a significant negative relationship between capital structures (DER) and the firm performance using ROA and ROE.

Abubakar (2016) investigated the effects of financial leverage on firms' performance using 66 non-financial firms of the Nigerian Stock Exchange from 2005- 2014. Panel data techniques in the form of Pooled Ordinary Least Squares (POLS), Fixed Effects and Random Effects estimators revealed that an increase in the equity portion of total debt-equity ratio (TDER) has a significant positive effect on firms' financial performance measured by return on equity (ROE). The study concludes among others that financial leverage surrogated by total-debt equity ratio (TDER) is an important indicator of firms' financial performance and vice versa. He recommended that non-financial firms' quoted on the NSE should increase the equity portion of the debt-equity mix in their capital structure to improve firms' financial performance.

Adenugba, Ige & Kesinro (2016) studied the relationship between financial leverage and firms' value using a sample of five firms listed on Nigerian Stock Exchange (NSE) for 6 years from 2007-2012. The Ordinary Least Square (OLS) statistical technique showed a significant relationship and effect between financial leverage and firms' value. The study concludes that financial leverage is a better source of finance than equity to firms when there is a need to finance long-term projects.

Rehman (2013) studied the relationship between financial leverage and financial performance of quoted sugar companies in Pakistan. The results revealed a positive relationship between the debt-equity ratio on the ROA and sales growth while it was negative with the earning per share, net profit margin and return on equity. This negative relationship between debt-equity ratio and earnings per share (EPS) support the fact that as debt increases, the interest payment will also rise, so that EPS will decrease.

Akande (2013) studied the relationship between financial leverage and performance using financial statements of 10 Nigerian firms over 20 years from 1991-2010. The Ordinary Least Square (OLS) regression analysis was conducted on panel data collected using ROA, ROE, EPS, and DPS on the one hand and DC (total debts to capital employed) as proxies for firm's performance and debt financing respectively. Results showed that a positive relationships exist between DC and ROE, EPS and DPS, while a negative relationship exists between DC and ROA. The study concluded that financial leverage would considerably impact on firm performance.

Akinmulegun (2012) empirically examines the effect of financial leverage on selected indicators of corporate performance in Nigeria using earnings per share (EPS), net assets per share (NAPS) as a proxy for performance using the Vector Auto-Regression (VAR) technique for analysis. Findings indicated that leverage significantly affects corporate performance in Nigeria. Therefore, theories that are adequate for indigenous macroeconomic variables can be developed rather than the structured theories adopted by the advanced developed countries of the world, as these theories cannot be appropriate proxies for advancing the course of the developing nations.

Chinaemerem and Anthony (2012), carried out a study on the impact of capital structure on the financial performance of Nigerian firms using 30 non-financial quoted companies on the Nigerian Stock Exchange (NSE) for a period of 7 years from 2004-2010. Panel data was analyzed using the ordinary least

squares (OLS) method of estimation. The result showed that a firm's financial leverage (debt ratio) has a significantly negative relationship with the firm's financial performance (ROA and ROE).

Onaolapo (2010) examined the impact of capital structure on firm's financial performance using sample of thirty non- financial firms listed on the Nigerian Stock Exchange during the seven-year period, 2001- 2007 by adopting the Ordinary Least Squares (OLS) as a method of estimation. The result reveals that a firm's capital structure has a significantly negative impact on the firm's financial measures agreeing with prior empirical studies and also provide evidence that supports the Agency cost theory.

Dare & Sola (2010) studied the impact of capital structure on corporate performance in the Nigerian Petroleum Industry using the panel data analysis consisting of the Fixed-effect estimation, Random-effect estimation, and Maximum likelihood estimation. There exist a positive relationship between earnings per share and dividend per share on leverage ratio recommending that the management of the industry should do more to improve on their leverage ratio.

III. Methodology

Data on debt ratios and performance sourced from the annual report, financial statements of companies and the fact books of the Nigerian stock exchange in Nigeria for the period under review.

a) Operational variables

1. Financial leverage

Leverage ratio is any of several financial measurements that look at how much capital comes in the form of debt. The financial leverage measures commonly used are

a. $$Long\ term\ debt\ to\ capital\ ratio = \frac{Long\ Term\ Debt}{Long\ Term\ Debt + Minority\ \ Interest + Equity} \quad (1)$$

b. $$Total\ debt\ to\ capital\ ratio = \frac{Current\ Liabilities + Long\ Term\ Debt}{Current\ Liabilities + Long\ Term\ Debt + Minority\ Interest + Equity} \quad (2)$$

c. $$Total\ debt\ to\ Asset\ ratio = \frac{Total\ Debt}{Total\ Asset} \quad (3)$$

d. $$Cost\ of\ Debt = \frac{Total\ Interest\ Payable}{Total\ Debt} \quad (4)$$

e. $$Debt\ to\ Equity\ ratio = \frac{Total\ Debt}{Total\ Equity} \quad (5)$$

1. The measures for financial performance include:

$$\text{Re}turn\ on\ Equity\left(ROE\right) = \frac{\text{Pr}ofit\ After\ Tax\left(PAT\right)}{Turnover} \quad (6)$$

$$\text{Earnings per share (EPS)} = \frac{\text{Net income – dividend on preference share}}{\text{Average outstanding common share}} \quad (7)$$

b) Model specification and method of data analysis

The model is specified thus:

- $EPS = f\left(DER, COD, TDTA, LTDCR, TDCR\right)$
- $ROE = f\left(DER, COD, TDTA, LTDCR, TDCR\right)$

Where, EPS = Earnings per share, ROE = Return on equity, DER=Debt on equity ratio, COD = Cost of debt, TDTA= Total debt to asset ratio, LTDCR = Long term debt to capital ratio, TDCR= Total debt to capital ratio.

Since the study involves measurement of the relationship among variables in a longitudinal setting, we adopt a longitudinal data regression model. The families of longitudinal data regression model to be considered

here are, Pooled regression model, fixed effect model, random effect model, and marginal model. While the first three are subject specific, the last is the population average model. The choice of the model among the subject-specific models will be made using the Hausman test while model adequacy will be ascertained using F-ratio and diagnosis of the model residuals.

Pooled Regression Model: The model involves pooling all the variables over time and is given by:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{it} + ... + \beta_k X_{it} + \varepsilon_{it} \quad (8)$$

i = 1, 2,...,k, t = 1, 2,…,T

Where,

Y_{it} = Response Variables (here EPS and ROE for ith company on tth year)

X_{it} = explanatory Variables (here DER, COD, TDTA, LTDC, TDCR ith company and tth year).

β_k^s = Regression coefficients for kth variable.

ε_{it} = error term.

Fixed Effect Model: Here the explanatory variables are fixed, and the intercept varies from one company to another. It is given by:

$$Y_{it} = \beta_{0i} + \beta_1 X_{it} + \beta_2 X_{it} + ... + \beta_k X_{it} + \varepsilon_{it} \quad (9)$$

Where the intercept would be represented thus:

$$\beta_{0i} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + ... + \alpha_k D_{ki} \quad (10)$$

i = 1, 2,...,k, t = 1, 2,…,T

Where,

Y_{it} = Response Variables (here EPS and ROE for ith company on tth year)

X_{it} = explanatory Variables (here DER, COD, TDTA, LTDC, TDCR ith company and tth year).

β_k^s = Regression coefficients for kth variable.

D_i = Dummy variables

ε_{it} = error term.

Random Effect Model: This is also known as an error correction model. Here the dummy variables in Equation 3.8 a are expressed through error term or disturbance.

$$Y_{it} = \beta_{0i} + \beta_1 X_{it} + \beta_2 X_{it} + ... + \beta_k X_{it} + \varepsilon_{it} \quad (11)$$

Where,

$$\beta_{0i} = \beta_1 + u_i \quad (12)$$

Therefore Equation 3.9 becomes:

$$Y_{it} = \beta_1 + \beta_1 X_{it} + \beta_2 X_{it} + ... + \beta_k X_{it} + u_i + \varepsilon_{it}$$

$$Y_{it} = \beta_1 + \beta_1 X_{it} + \beta_2 X_{it} + ... + \beta_k X_{it} + w_{it} \quad (13)$$

i = 1, 2,...,k, t = 1, 2,…,T, $w_{it} = u_i + \varepsilon_{it}$

Where,

Y_{it} = Response Variables (here EPS and ROE for ith company on tth year)

X_{it} = explanatory Variables (here DER, COD, TDTA, LTDC, TDCR ith company and tth year).

$\beta_k^{'s}$ = Regression coefficients for k[th] variable.

D_i = Dummy variables

ε_{it} = error term.

Marginal Model: This has the same structure with the pooled regression model but uses a different estimation procedure as well has a different interpretation. While the pooled regression model uses maximum likelihood estimation procedure, the marginal model uses generalized estimating equations with different "working correlation matrix."

IV. Result and Discussion

Table 1: Panel Data Regression Analysis of Financial Performance (Earning Per Share) on Financial Leverages

Variable	Model Method			
	Pooled Regression Model	Fixed Effect Model	Random Effect Model	Marginal Model
Constant (C)	5.6372*** (0.0000)	-0.6196 (0.5256)	1.2558 (0.1824)	4.6847*** (0.000)
Long term debt to capital ratio (LTDCR)	-0.1221 (0.7215)	0.2184 (0.4898)	0.1400 (0.6532)	0.0498 (0.8700)
Total debt to capital ratio (TDCR)	-0.6790 (0.4436)	-0.2824 (0.7665)	-0.5190 (0.5652)	-0.1864 (0.8460)
Debt to equity ratio (DER)	-2.0483*** (0.0001)	-0.4326 (0.4659)	-0.9998* (0.0706)	-1.5711*** (0.006)
Cost of Debt (COD)	-5.9401 (0.1550)	-2.0121 (0.6155)	-3.1731 (0.4174)	-4.0739 (0.2870)
TDTA	-9.1476*** (0.0022)	10.8825*** (0.0005)	5.1921* (0.0828)	-7.8018** (0.017)
F-value	6.8*	6.68*	1.47*	Wald Statistic=17.32, Correlation matrix= Stationary (1)
Durbin-Watson (D.W)	1.42	2.02	1.84	
( ) – P-value, * - significant at 10% ** - significant at 5% *** - significant at 1%		Hausman Test p-value = 0.000		

Source: Research findings from strata 11

Table 2: Panel Data Regression Analysis of Financial Performance (Return on Equity) on Financial Leverages

Variable	Model Method			
	Pooled Regression Model	Fixed Effect Model	Random Effect Model	Marginal Model
Constant (C)	0.4792 (0.0000)	0.3608 (0.0000)	0.4028 (0.0000)	0.4531 (0.0000)
Long term debt to capital ratio (LTDCR)	-0.0252 (0.2011)	-0.0092 (0.6353)	-0.0136 (0.4749)	-0.0176 (0.350)
Total debt to capital ratio (TDCR)	0.0187 (0.7142)	-0.0100 (08637)	-0.0035 (0.9476)	0.0202 (0.714)
Debt to equity ratio (DER)	-0.2003 (0.0000)	-0.1686 (0.0000)	-0.1818 (0.0000)	-0.1883 (0.0000)
Cost of Debt (COD)	0.1670 (0.4875)	0.2160 (0.3773)	0.1969 (0.4073)	0.1118 (0.632)
TDTA	-0.5617 (0.0011)	-0.1254 (0.5129)	-0.2709 (0.1342)	-0.4666 (0.013)
F-value	12.6*	4.81*	6.69*	Wald Statistic= 43.76, Correlation matrix= Stationary (1)
Durbin-Watson (D.W)	1.6	2.1	2.0	
( ) – P-value, * - significant at 10% ** - significant at 5% *** - significant at 1%		Hausman Test p-value = 0.175		

Source: Research findings from strata 11

V. Findings

From the tables above, two competing models that will be used to make an inference to this work are the pooled regression and the marginal regression models which have similar results. The F-values of each of the model was found to be significant with the value of ($P<0.05$), indicating overall adequacy of the regression models.

The empirical evidence of the earnings per share (EPS) on the financial leverage measures suggests that the debt to equity ratio and the total debt to total asset has negative and significant impact on EPS while the long term debt to capital ratio, total debt to capital ratio and the cost of debt has a negative impact on EPS which is insignificant. This result agrees with Rehman (2013) that found a negative relationship between financial leverage and firm performance using the EPS and disagrees with John-Akamelu, Iyidiobi, and Ezejiofor (2012) which found no significant effect between EPS and the financial leverage measures.

On the other hand, the long term debt to capital ratio, debt to equity ratio and the total debt to total asset have a negative impact which is insignificant with ROE whereas the total debt to capital ratio and the cost of debt reported a positive impact which is also insignificant. This result disagrees with John-Akamelu, Iyidiobu, and Ezejiofor (2017) which found a significant relationship using the ROE and agrees with Akani and Kenn-Ndubuisi (2017) and Rehman (2013) that found a negative relationship between ROE and DER.

VI. Conclusion and Recommendation

This study empirically tested the relationship of financial leverage on firm financial performance in Nigeria throughout 2000 – 2015 using the panel data regression models (pooled regression model, fixed effect model, random effect model and marginal model).

In accordance with the research findings that earnings per share has a significant negative relationship with the financial leverage measures, we therefore support the saying that the increase in debt of a firm will also come with an increase in their interest payment on such debt which in turn leads to a decrease in the earnings per share of such firm. On the other hand, the return on equity (ROE) has no significant relationship with the financial leverage measures.

The empirical evidence shows that the impact of the financial leverage varies among different performance measurement for Nigerian firms.

Therefore, in line with the findings of this study, we recommend the following:

1. With a negative impact between DER and the performance measures, management of quoted firms in Nigeria should be cautious in their employment of leverage so that the cost of debt does not outweigh its benefits as proposed by the tradeoff theory.
2. The TDTA also has a negative impact on the financial leverage measure, therefore, firms should also apply caution in the use of leverage to finance assets as a continuous rise in debt not adequately managed can move the control of firms from the shareholders to the debt holders.
3. For firms to enhance their financial performance, it is necessary that they find the appropriate mix of debt to equity capital that best suits them which can become their optimal capital structure.

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Granger Causality between three-month Short-Term Interest Rates and NIFTY 50 Index

By Amar Rao
Shoolini University

Abstract- This research paper study granger causality between three-month short-term interest rates and stock index prices represented by NIFTY 50 of National Stock Exchange. For the study, daily observations of prices were taken between the period of the year January 2002 to March 2019. Stationary of data was tested and confirmed by Augment Dickey-Fuller test. To determine causality between short term interest rates and stock index prices, Granger Causality test was used. Result analysis shows that there exists no causality relationship between three-month short term interest rates and stock index prices of NIFTY 50.

Keywords: *lending rates, stock returns, interest rate, granger causality test, NSE, NIFTY, stationary, causal relationship.*

GJMBR-C Classification: *JEL Code: G10*

Strictly as per the compliance and regulations of:

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Amar Rao

Abstract- This research paper study granger causality between three-month short-term interest rates and stock index prices represented by NIFTY 50 of National Stock Exchange. For the study, daily observations of prices were taken between the period of the year January 2002 to March 2019. Stationary of data was tested and confirmed by Augment Dickey-Fuller test. To determine causality between short term interest rates and stock index prices, Granger Causality test was used. Result analysis shows that there exists no causality relationship between three-month short term interest rates and stock index prices of NIFTY 50.

Keywords: lending rates, stock returns, interest rate, granger causality test, NSE, NIFTY, stationary, causal relationship.

I. Introduction

"Bulls make money, Bears make money, Pigs get slaughtered."

The quote mentioned above is quite relevant in today's financial markets especially equity markets. The actual meaning behind this maxim of wall street is to warn investors against greed and fear. It merely says, one has to have a view about the direction of stock prices in one way, either bullish, which is represented by bull or bearish represented by bear, if you have a sideways view or undecided about the direction of the market like pig, you will be punished by markets in terms of losing your investment. Since a long time, financial markets provide a platform for people to earn profits and build a fortune. History of stock markets can be traced back to France where it had a system of courretiees dechange who managed agricultural debts through the country on behalf of banks. As Author (Vidal, 1910)written about the system of producers, traders, merchant commission agents, brokers, money lenders in his report. He even talked about producers of transferable securities who were known as financiers who negotiated with the government who borrow money.

Active stock market history can be traced back to Belgium(Van Overfelt et al., 2009). Countries like Beuges, Flanders, Ghent, and Rotterdam in the Netherlands all hosted their stock market system in the 1400s and 1500s. *In 1602, the Dutch East India company became the first publicly traded company by releasing shares of the company on the Amsterdam Stock Exchange*[1].

The history of the capital market in India dated to the eighteenth century when the East India Company securities were traded in the country. Until the end of the nineteenth century, securities trading was unorganized, and the main trading centers were Bombay (now Mumbai) and Calcutta (now Kolkata) (Pathak Bharti). The first stock exchange was established in Bombay in 1875 with the name Native Shares and Stock Brokers Association. In 1927, Bombay stock exchange (now BSE) got recognized("bombayact_1925.pdf," n.d.) After India got independence in 1947, the size of the equity market was quite small. The controller of the capital issue was the primary regulator which micromanaged every issue like pricing, timing, interest rate, etc. Indian government enacted the Securities Regulation Act, 1956 to regulate Indian capital market but the Indian capital market was not adequately regulated and monitored until the establishment of Securities Exchange Board of India in 1992.

Indian stock market broadly consists of BSE and NSE, although regional stock exchanges are there, trading is limited. *The National Stock Exchange of India Ltd. (NSE) is the leading stock exchange in India and the second largest in the world by a number of trades in equity shares from January to June 2018, according to World Federation of Exchanges (WFE) report. NSE launched electronic screen-based trading in 1994, derivatives trading (in the form of index futures) and internet trading in 2000, which were each the first of its kind in India.*[2] Nifty is a benchmark index of NSE which consist of top 50 stock by free-float market capitalization. The flagship NIFTY 50 index is widely tracked and traded as the benchmark for Indian capital markets. The NIFTY 50 is based on the free float market capitalization methodology(NIFTY50 Equal Weight Index – Methodology Document, August 2018).

The Nifty index has a base date of November 3, 1995, and a base value of 1000. BSE Sensex and NIFTY 50 continued to scale new highs with Sensex gaining 11.3 percent and NIFTY gaining 10.2 percent respectively during the year 2017-18.

Author: Shoolini University. e-mail: amarrao@shooliniuniversity.com

[1] "Establishment of the Stock Market." Investify, investify.co.nz/establishment-of-the-stock-market/, Retrieved March 13, 2019,

[2] "National Stock Exchange of India Ltd." *NSE*, www.nseindia.com/global/content/about_us/about_us.htm.

experienced high inflations and stability in monetary conditions. Their findings were mainly related to the period of high inflation and low inflation. They pointed put during the periods of high inflation; interest rates are quite relevant to explain changes in future values of inflation and stock returns whereas, under low inflation, equity investors anticipated interest rates much better.

(Narang, 2015) analysed the effect of Reserve Bank of India changes in repo rate and its effect on Nifty and Sensex. He studied specific dates and rise/fall in Nifty and Sensex, but his study was only confined to a short period, consist of only three events from 15 January 2015 to 22 June 2015. In the end, he concluded that change in repo rates create volatility in the market and if interest rate changes are favorable then both Nifty and Sensex go up and vice versa.

(Prabu A Edwin (Reserve Bank of India), Bhattacharyya Indranil (Reserve Bank of India), Ray Partha (Indian Institute of Management Calcutta, 2015) researched in their working paper, how stock returns in India impacted by announcements of monetary policy by using event study and identification through hetero-scedasticity(IH) methodology with daily data over ten year period 2004-2014. The working paper's main findings are that tightening of monetary policy leads to a decline in stock returns as results from IH are statistically insignificant which is also confirmed by the ES approach. On the other side, the authors pointed out that unanticipated policy announcements seem to have a weak impact on the stock index.

(Upadhyay, 2015)explored the causality relationship between stock returns and interest rates. The author considered weighted lending rates as a proxy for interest rates and BSE SENSEX for study. The author also gave reasons for interest rate changes such as inflationary expectations, short-term political gains, deferred consumption, the risk of investments, liquidity preferences, etc. She concluded that no causality exists, i.e., BSE SENSEX does not Granger Causality interest rates and vice versa.

II. Research Methodology

Present study focusses on whether short term interest rates represent by the three-month yield of government bond granger causality stock market index represented by a NIFTY index of National Stock Exchange. For this purpose, the null hypothesis will be

H_0: No significant impact of changes in short term interest rates on a stock market index price.

H_1: There is a significant impact of changes in short term interest rates on a stock market index price.

The examined period for testing this hypothesis is from January 2002- March 2019 and the reason for the concerned period is that global economy experienced a deceleration in growth rates and recorded an output growth of 2.4 percent during the past year. The beginning of the tenth five-year plan raised new challenges for the Indian economy at the whole. In the year 2001-02, the overall growth rate of 5.4 percent achieved supported by a growth rate of 5.7 percent in agriculture and allied sectors and 6.5 percent in services. It was a period of continued high real interest rates, and the average annual rate of inflation represented by the Wholesale Price Index (WPI) increased from 3.3 percent in 1999-2000 to 7.1 percent in 2000-01. Daily observations are taken for both i.e. short-term interest rates (three-month government bond yields) and stock market index (NIFTY) from web portal (https://in.investing.com/) which is a global financial portal consist of news, analysis, quotes, technical and fundamental data about local and global financial products such as stocks, bonds, commodities, interest rates.

NIFTY 50 index is a benchmark representation of National Stock Exchange. It represents the weighted average of twelve sectors and consists of a portfolio of blue-chip companies, i.e., the largest and most liquid Indian Securities. It consists of 50 companies out of 1600 companies listed on the NSE (August 2018). It is managed by India Index Services and Products which is a subsidiary of NSE Strategic Investment Corporation Limited. NIFTY 50 was launched in April 1996. It is a free float market capitalization weighted index. NIFTY 50 stocks represent about 65% of the total market capitalization of the National Stock Exchange. The base year for NIFTY 50 is 1995, and the base value is 1000.

Short term interest rates represent by three-month government bond yield has been taken. They are called T-Bills and comes in different maturity period of 91 days, 182 days and 364 days. T-Bills are risk-free instruments as the sovereign guarantee of government backs them. Auctions are held by Reserve Bank of India from time to time to infuse and suck out the liquidity.

Methods developed by Granger are used to test the relationship between the stock market index and short-term interest rates. First, we need to check the stationary character of observations for both stock market index price and short-term interest rates. We used the Augmented Dickey-Fuller Test for checking the stationarity of the data and finding unit roots in time series and Granger causality test for verifying the causality between the short-term Interest rate and NIFTY 50 stock market index prices.

III. Findings

Granger causality requires that the series have to be covariance stationary, so an Augmented Dickey-Fuller test has been calculated. The results of the test are given in Table 3. From the table, we can conclude that stock market index prices represented by NIFTY 50 and short-term interest rates on three-month bonds are stationary at first difference which rejects the null hypothesis in ADF test that data has a unit root.

Table 3: Unit Root Test Results

Variables	Augmented Dickey-Fuller Test
	At First Difference (P-Value)
Three-month bond daily price	0.0000*
Nifty50 daily price	0.0000*

After confirming the stationarity of data observations, the Granger Causality test developed by Granger for examining the short-run interdependence between variables. The same test has been applied to test the hypothesis whether changes in short term interest rates cause changes in stock market index prices or vice-versa.

Figure 1: Three-month short-term interest rate time series line chart

Figure 2: NIFTY50 index daily price line chart

Figure 3: Scatter plot of three-month bond interest rates and NIFTY

Table 4: Hypothesis Testing

The results in Table 4 show that null hypothesis, i.e., no significant impact of changes in short term interest rates on stock market index price is accepted, it means three-month short-term interest rates does not Granger causality stock index prices represented by nifty as well stock index prices does not Granger causality short term interest rates. Changes in short term interest rates do not signal changes in the stock price index; it implies that past values of short-term interest rates do not contain information to predict stock market index prices and vice versa.

IV. Conclusion

Macroeconomic indicators are useful in forecasting prices of a financial asset, and these can be categorized in leading, coincident and lagging indicators while leading indicators like short term interest rates signal a change in money supply in an economy. In the spirit of same, we tested the Granger causality between three-month short term interest rates and benchmark index of National Stock Exchange and our results found out that no causality exists between these two variables.

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The Anatomy of Anomalies in the Sweden Stock Market

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GJMBR-C Classification: *JEL Code: H54, F65*

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The Anatomy of Anomalies in the Sweden Stock Market

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I. Introduction

a) Stock Price

Swedish stock prices we use in this study are from Rydqvist (2015), which are collected from a hard copy of the official quotation list of the Stockholm Stock Exchange kept by the National Library of Sweden. Prices are recorded from 1912 (the beginning of our sample). Stocks are traded in a call auction[1] followed by floor trading[2]. Initially, there are two auctions per day. The aftermarket operates between the first and the second auction, as well as after the second auction. From 1932, there is only one auction per day.

The quotation lists contain various transaction prices. Table 1 summarizes the evolution of data reporting. Throughout this period the registrar collects the high and low transaction prices from the auction, and from 1927-1978, the registrar further records the last transaction price. From 1920-1978, the high and low transaction prices from the aftermarket are also recorded. The maximum number of recorded transaction prices increases from initially two prices (high and low) to as many as ten prices in 1927-1931. In 1932, the registrar settles at a set of maximum five transaction prices

b) Stock returns

Our original sample covers stock transaction prices and best uncleared buy and sell limit order prices[3] from each day in 1912-1978. In total, there are 2,194,226 firm-day observations of 297 firms. Based on our research purpose, we only select one class share to our final sample if a firm has multiple classes of shares outstanding. This criterion reduces our observations to 1,877,602. Among them, there are 667,268 firm-days with at least one trading price, which only accounts for 36 percent. To augment valid observations reasonably, we compute the mean of the best buy and sell price in limit order book, if both exist, as a pretended transaction price, and we name this price "midpoint price". Then, each day the stock price is calculated as the equally weighted average of all transaction prices and the midpoint price. This procedure helps us increase the number of observations to 1,156,077, accounting for 62 percent of the sample. Stock returns are the main variables in our analysis. The realized return from period t - 1 to t is calculated as:

$$R_t = \frac{P_t \times S_t + D_t - P_{t-1}}{P_{t-1}} \quad (1)$$

where P_t (P_{t-1}) is the price per share at time t (t-1), D_t is the cash dividend, and S_t is the split factor. The split factor equals 1 if there are no new shares distributions.

In this paper, we use stock returns at three levels: annually, monthly, and daily. For annually (monthly) returns, we use stock prices at the end of the year (month) as P_t, and we use stock prices at the beginning of the year (month) as P_{t-1}. If P_{t-1} is missing, we adopt a 10-day rule to calculate annually (monthly) returns, which is the same method as used by CRSP to handle missing data. Specifically, when P_{t-1} is missing, we search back for 10 business days to find the latest available stock price as a proxy for P_{t-1}.

We also adopt 10-day rule[4] to compute daily returns. After implementing 10-day rule, we get 3,447 annually returns, 45,087 monthly returns and 1,416,745 daily returns in our sample. We report the distribution of the number of business days that we have searched back in Panel A of Table 2. There are 1,289,769 daily returns calculated based on two consecutive business days' prices, which accounts for 91% of total available daily returns. 10-day rule helps us increase the number of observations by 10%.

Author: Assistant Professor of Finance, Paseka School of Business, Minnesota State University Moorhead, Moorhead, MN 56529, United States of America. e-mail: xiang.gao@mnstate.edu

[1] A call auction market is different with a continuous market as follows: In a call auction market, an auction takes place at specified times; in a continuous market, orders are executed whenever a buy and sell order match up.

[2] Floor trading is continuous trading.

[3] The "best buy" is the highest uncleaned buy price, and the "best sell price" is the lowest uncleaned sell price.

[4] We have experimented with 1-day rule and 5-day rule as robust tests, which do not influence the findings in this study.

Since we adopt 10-day to calculate daily returns, according to random walk hypothesis, there is obviously heteroskedastic problem due to time-series gap when we use daily return as the dependent variable for regression analysis. To alleviate this concern, following Green and Rydqvist (1999), we adopt weighted least squares (WLS)[5] for all regression analyses that use daily return as the dependent variable. The weights in the WLS regressions are simply the reciprocal of square root of the calendar days that have elapsed between trades.

To value Sweden stock market performance, we calculate equally weighted average market returns from 1912 to 1978. Sweden nominal annual return is 10%, which is slightly lower than US 12% during 1926-1978 (Jones, 2002). The real annual return, calculated as the difference between nominal return and inflation rate[6], is 6.18%, while the real annual return in U.S. is 11%. More details about Sweden market performance are available in Table 3.

c) Literature Review

The seasonality of stock return is a long-standing object of interest along the chronicle of finance research not only in the U.S. but also across the world. Jennergren and Korsvold (1975) are the very first to investigate this topic for Scandinavian markets. They report positive and significant autocorrelation among Swedish stocks. Rozeff and Kinney (1976) present evidence of monthly seasonality for New York Stock Exchange from 1904-1974. Gultekin and Gultekin (1983) examine seasonality across major industrialized economies. They find evident January effect in most countries and April returns in U.K. Jones, Pearce, and Wilson (1987) extend the findings about January effect and confirm its existence long before income tax reform in 1918. Keim and Stambaugh (1984) use a fairly long sample of 55 years (1928-1983) to examine weekend effect. Negative Monday returns are detected for SP500 constituents stocks, exchange-traded stocks, and active OTC stocks. Condoyanni, O'Hanlon, and Ward (1987), comparing U.S. with other six economies, suggest that negative mean weekend returns are universal across these countries, rather than U.S. specific. Thaler (1987a) and Thaler (1987b) do a thorough investigation on literatures about seasonality anomalies, concluding the cause and behavior of those patterns need more research. Ariel (1987) then focus on monthly return of stock returns based on CRSP value weighted index and equally weighted index. His findings suggest that stock indices earn positive returns only within the beginning and first half of each month but zero average returns in latter halves. Jaffe and Westerfield (1989), following Ariel (1987), test monthly return patterns for countries other than U.S. They report only weak effect for those countries but there does exist significant "last day of the month" effect. Lakonishok and Smidt (1988) further use a sample of 90 years of Dow Jones Industrial Average (DJIA) and find evidence of persistently abnormal returns around the turn of the week, the turn of the month, the turn of the year, and holidays. Kim (1994) researches on holiday effects in three major stock markets of U.S.: NYSE, AMEX, and NASDAQ and find abnormally high returns before holidays. Also, holiday effects exist in U.K. and Japan, and they are independent of the holiday effect in the U.S. market. Ostermark (1989), focusing on Finland and Sweden, demonstrate that most of the stock prices in both markets are predictable with seasonal and even non-seasonal models. Cadsby and Ratner (1992) also provide evidences of senilities of stock returns for international economies but certain countries with their own specific institutional practices do not have such effects. Aggarwal and Rivoli (1989) complement the seasonality literature by researching the markets of four emerging economies: Hong Kong, Singapore, Malaysia, and Philippines. They find significant January effects and day-of-week effects across all the four markets. Agrawal and Tandon (1994) study eighteen countries for five seasonal patterns: the weekend, turn-of-the month, end-of-December, monthly, and Friday the 13th. They observe vivid effects of the first four but do not find the Friday the 13th to be supported internationally. Solnik and Bousquet (1990) find not only positive Monday effect but also negative Tuesday effect. Kohers, Kohers, Pandey, and Kohers (2004) claim that day-of-week effects have vanished in large developed economies. However, Doyle and Chen (2009) do not agree with that and confirm wandering day-of-week effects in that the effects are seen in form of interaction between year and weekday. Lasfer (1995) claim that the ex-day abnormal returns are no longer significant since the introduction of ICTA 1988, a tax reform which treats dividend and capital gain the same, in U.K. Later Green and Rydqvist (1999) study the ex-day effect of U.S. stock market by comparing it with Swedish lottery bonds, supporting the tax-based explanation. Corhay, Hawawini, and Michel (1987) test the risk premium from Fama-MacBeth estimate for seasonality for four exchanges: the NYSE, London, Paris, and Brussels. They report that in Belgium and France, risk premia are positive in January and negative the rest of the year. There is no January seasonal in the U.K. risk premium but a positive April seasonal and a negative average risk premium over the rest of the year. In the U.S., the pattern of risk-premium seasonality coincides with the pattern of stock-return seasonality. Both are positive and significant only in January.

[5] To control for cross-section correlation of stocks returns, we also have clustered standard errors at day-level, which does not influence the significance of our results.

[6] To control for cross-section correlation of stocks returns, we also have clustered standard errors at day-level, which does not influence the significance of our results.

II. The January Effect [7]

Rozeff and Kinney (1976) find that, during 1904-1974, NYSE equally weighted average monthly return in January is 3.5 percent, while other months average about 0.5 percent. So more than one-third of the annual return occurs in January alone. In this section, we will investigate this seasonal pattern in Sweden market.

We start from comparing the pooled average return of each month. Monthly average return is calculated from dummy variables regression:

$$R_{it} = \sum_{t=1}^{12} \beta_t \times D_t + \epsilon_{it}\,, \qquad (2)$$

where R_{it} is the monthly return, and D_t is the dummy variable indicating corresponding month. Since we force the intercept of the regression to be zero, the estimated t is actually month *t*'s average return in statistical sense. To take care of cross sectional correlations among stocks returns, we cluster standard errors at month-level. The regression results are shown in Table 4. The average January return is higher than all other remaining months, and the return differences between January and other months, except July, are significant at the 1% level. The average July return is slightly lower than January, but the difference is not significant at any conventional level. The mean February-December return is 0.53%, 86% less than January return (3.77%). In Table 4, we also tabulate the average monthly return for U.S. market from 1945 to 1979, reported by Givoly and Ovadia (1983). The Swedish average January return is 3.77%, comparable to 4.36% of U.S. Table 4 clearly shows that Sweden has similar January effect to U.S.

The abnormal January return might be caused by window dressing strategy used by institutional investors near quarter end to improve the appearance of performance. To investigate this explanation, we have checked institutional investors' market weights in Sweden. The aggregate market cap to the whole market of pension fund, mutual fund, and insurance company is tiny at the beginning of the sample period. It increases form 1.50% in 1950 to 15.10% in 1979, still a very small portion of the whole market. Therefore, window dressing could not provide a satisfactory explanation for January abnormal return.

Since our whole sample period is subjected to capital gains taxation of stocks[8], the tax-loss selling theory might be one possible explanation for the January Effect. The argument is that the prices of stocks which have previously price drop will decline further in the latter months as owners sell off the shares to realize capital losses for tax purpose. Then, after the new year, loser stocks' prices bounce up in the absence of selling pressure, which causes the January Effect.

To value the tax-loss selling theory, we follow Reinganum (1982) to define a measure of potential tax-loss selling (PTS) as dividing the stock price of the last trading day of the year by the maximum stock price of the concurrent year. By construction, the tax-loss selling measure could not jump beyond the interval of [0, 1]. For example, if the price of a stock on December 31 equals 20 and the maximum price during this year is 25, the value of PTS would be 0.80 (= 20/25). The average PTS of the whole sample is 0.9. In each year *t*, stocks are ranked in ascending order according to PTS. Based on these rankings, firms are equally divided into three groups: the winner group (top 33%), the middle group, and the loser group (33%)[9]. The winner group's average PTS is 0.97, and the loser group's average PTS is 0.80.

Before we formally start our analysis based on PTS, it is important to stress the evolution of the number of firms in each portfolio, since Swedish market is less liquid during our sample period. Reporting the number of firms in each winner/loser portfolio could help us evaluate the reliability of our coming analysis. The related plot is provided in Figure 1. As the trading frequency on the market increases, the number of firms in each winner/loser portfolio also increases: from 5 in 1912 to around 30 in 1978. After 1917, each portfolio contains 15 or more firms, alleviating our concerns that there are too few firms in each group. Predicted by the tax-loss selling theory, loser stocks surfer significant selling pressure in December, which will cause sustained losses. However, such selling pressure will not occur to winner stocks. Figure 5 plots the pooled average daily return of both winner and loser portfolios around turn-of-year. It is clearly that the loser portfolio suffers constant loss from day -17 to day -5, but the return re-bounces dramatically in the beginning of the new year. However, for the winner portfolio, we do not observe such constant losses at the end of the prior year. This finding is compatible with the tax loss selling theory. In addition, from the whole sample, we find the sum of daily return from Day +1 to Day +4 is 1.77% (not tabulated), which accounts for 55% of the whole January

[7] In 1914, the outset of World War I, trading was suspended from August through October.

[8] Capital gains taxation of stocks begins in 1910. From 1910 to 1951, short-term capital gains as defined by a holding period of less than five years are taxed as ordinary income, while long-term capital gains are exempt. From 1952 to 1976, a portion π of short-term capital gains is taxed as ordinary income, and the portion depends on the holding period. From 1967---1976, 10% of the sales price of a security held more than five years is taxed as ordinary income. More details could be found in the Supplement of Rydqvist, Spizman, and Strebulaev (2012).

[9] One concern for this classification method is that, in some year, the PTS difference between winner group and loser group could be very small, which cannot efficiently differentiate those two groups. To address this concern, we also have used fixed cutoffs to form winner and loser portfolio. The winner portfolios are organized by stocks with PTS greater than 0.95, and the loser portfolios is formed by stocks with PTS smaller than 0.7. This experiment doesn't influence our finding in this section.

return. This finding is similar to US that January peculiar return is mainly caused by excess returns at beginning several days.

One natural question related to our finding is whether investors could arbitrage against such January seasonal pattern: buy loser stocks at the end of December, hold to the new year, and then sell in January. As we mention before, the lower bound estimation of Swedish average transaction cost is 0.9% of trading price (the sum of brokerage commission and transfer tax), which is greater than any daily return at the beginning of the new year. If we further consider other transaction cost, such as financing cost and opportunity cost, it will substantially stop investors from arbitraging against such seasonal pattern.

III. The Weekend Effect

The Weekend Effect is another seasonal pattern that has been found in U.S. French (1980) studies the period of 1953-1977 and finds that the mean Monday return is negative for the full period (mean= -0.168%, t= -6.8) and the same for every sub-period of 5 years. The mean return is positive for all other days of the week, with Wednesday and Friday having the highest returns. Keim and Stambaugh (1984) have shown that the Weekend Effect holds for S&P Composite Index for period 1928-1982, and Lakonishhok and Smidt (1987) have found consistent negative Monday return by studying Dow Jones Industrial Average (DJIA) for the period 1897-1986. In this section, we will study the Swedish Weekend Effect.

We adopt WLS[10] regression method to calculate the pooled average return for each weekday. To exclude the influence of other weekdays, we abandon 10-day rule in this section. Only daily returns that are calculated from prices of two consecutive business days are included in this sub-sample. The number of total observations is 1,044,953. Following the calendar time hypothesis by French (1980), we expect Monday returns to be 2 or 3 times as large as other trading days, since the time between the close of trading on Friday and the close of trading on Monday is 2 or 3 calendar days[11] rather than the normal one day between other trading days. To control this difference between Monday's return and other weekday's return, we use the following regression function:

$$R_{it} = \sum_{t=1}^{12} \beta_t \times D_t K_{it} + \epsilon_{it}, \qquad (3)$$

where R_{it} stock i's return on weekday t, D_t is the weekday dummy variable, and K_{it} is the number of calendar days that elapse between trade prices. For Monday, K equals to 2 or 3, depending on whether there is trading on Saturday[12]. For remaining weekdays, K equals one. Since we force the intercept of the regression to be zero, the estimated t is the average weekday return. Table 6 reports the pooled regression results for the whole sample period. The pooled regression results show that Monday's average return is significantly positive, which is different from the finding in U.S. Saturday's return is the highest among all weekdays. Following French (1980), we also have decomposed the whole sample period to decades (not tabulated). Comparing weekday returns during different sub-periods, we do not find any evidently constant weekday pattern. Table 6 also has compared weekday's return with the pooled average daily return (0.04%). Monday, Wednesday, Friday, and Saturday's returns are significantly greater than the average daily return, but Tuesday and Wednesday's returns are significantly lower than the pooled average. Due to the high volatility of daily return, we interpret such finding as occasional case, because, after controlling the calendar days intervals, there is no economic reason to consider any of these weekdays different from others.

IV. Momentum and Reversals

In previous literature, momentum and reversals are deemed as the evidence for the predictability of returns and against random walk hypothesis, the basis of efficient market hypothesis. Jegadeesh and Titman (1993) show that stock returns exhibit momentum behavior within 1-year horizon. DeBondt and Thaler (1985), Lee and Swaminathan (2000), and Jegadeesh and Titman (2001) document mid-term reversals for stock returns. Stocks that performed poorly in the past would perform better over the next 3 to 5 years than stocks that performed well in the past. In Barberis, Shleifer, and Vishny (1998), and Hong and Stein (1999), momentum occurs because traders are slow to revise their priors when new information arrives. Reversals occur when traders finally do adjust. In Daniel, Hirshleifer, and Subrahmanyam (1998), momentum occurs because traders overreact to prior information when new information confirms it. Reversals occur as the overreaction is corrected in the long run. In this section, we will investigate momentum and reversals in Sweden.

Following Jegadeesh and Titman (1993), at the beginning of each month t, we rank stocks in ascending order according to their past performance. Based on these rankings, three portfolios are formed[13]. Stocks

[10] We also experiment with clustering standard errors at day-level to mitigate the concern of cross-section correlation among stocks returns, which doesn't influence the significance of our results.

[11] Before 1960, it is 2 calendar days. After 1960, it is 3 calendar days.

[12] Saturday trading ends in 1960.

[13] Different with Jagadeesh and Titman (1993) in which they form decile portfolios, we form tercile portfolios since Swedish market is less liquid during our sample period, and decile portfolios will only contain too few stocks.

ranked in the top 33% constitute the winner portfolio, stocks in bottom 33% constitute the loser portfolio, and the remaining stocks constitute the middle portfolio. These portfolios are equally weighted. The (6, 6) momentum strategies is to form a portfolio based on past 6-month returns and hold the portfolio for 6 months. Following Jegadeesh and Titman (1993), one stock will be selected into the portfolio only if the monthly stock return is not missing in continuous 12 months (6 months before the forming day, and 6 months after forming day). However, only few stocks (usually less than 3) could satisfy this criterion during 1912-1917, so we start our sample from 1918 in this subsection.

To validify our analysis, we need to pay attention to the number of stocks in each winner/loser portfolio, since Swedish market is much less liquid than US during our sample period. If there are only few stocks in each portfolio, it might challenge our previous analysis. Figure 5 plots the evolution of the number of firms in each winner/loser portfolio in 1918-1978. In a sufficient long period (1918-1953), the number of firms in winner/loser portfolio fluctuates around 5, and it starts to increase to around 30 firms in 1970s. However, during our sample period, there are about 103 firms listed on the exchange each year. Thus, the number of firms in each of our portfolio only accounts for a small portion of the whole market, which might influence the confidence of our previous analysis.

Table 7 Panel A reports average monthly raw returns for winner- and loser-portfolio under four different strategies: (6,3), (6, 6), (6,9), and (6,12). Since investors are not allowed to short stocks on the exchange during our sample period, self-financing portfolios (long winner, short loser) are not applicable for our analysis. Instead, we report the average return difference between winner-portfolio and loser-portfolio. Comparing long portfolio returns in Sweden with US, we could find that Swedish long portfolio returns are only half of the U.S. ones. A possible explanation is that our sample includes periods of recession: The Great Depression of 1932-1934 and the World War II (1939-1945). Among these four strategies, winner-portfolio's return is greater than the loser portfolio's return only except (6,12) strategy. Thus, there is some evidence of momentum in Sweden. However, Swedish momentum is not as strong as U.S. Next, we analyze the extent to which the momentum of stocks with extreme rankings disappears or reverses. The analysis is similar to momentum strategy, except the time gap between when the past performance is measured and when the stocks are held is larger.

The (6, 12) momentum strategy is designed to measure returns in the 12-month period immediately after portfolio formation, while the (6, ~24, 12) strategy[14] is designed to measure returns in the 12-month period that begins 24 months after portfolio formation. This allows us to test whether momentum persists, reverses, or disappears in 24 months after a stock's past performance ranks in the top or bottom 33%. Table 7 Panel B presents the long portfolio return of reversal strategies. For reversal strategies, the return difference between winner-portfolio and loser-portfolio is not statistically different from zero under either strategy, which means that the momentum disappears, rather than reverses, in mid-term. However, we can see that the return of self-financing portfolio (long winner, short loser) is negative and significant different from zero under any one of four reversal strategies in U.S.: (6, ~12, 12), (6, ~24, 12), (6, ~36, 12), and (6, ~48, 12), which implies the reversal of momentum in intermediate horizon. All in all, stocks momentum questions the efficiency of Swedish market. In addition, different with US, the momentum disappears, rather than reverses, in intermediate horizon.

V. The Ex-day Effect

In this study, we also focus on the anomalies on the ex-day of rights offers, stock dividends, and stock splits. In this subsection, we review these three different methods used to distribute new shares. Stock dividends and stock splits are two similar methods, while the main difference is in accounting setting: stock dividends would increase share capital[15], but stock splits would not. There is no cash transaction involved in these two types of share distributions. However, different with stock splits and stock dividends, if shareholders want to execute the rights offer, they have to pay the firm offering price, in which cash transactions are involved. Along with cash transactions, financing costs (the cost to arrange a loan) might be an important market friction that influences investors decision. The previous literature also has studied the ex-day effects in U.S.: Eades, Hess, and Kim (1984) report positive anomalies on the ex-day of stock splits[16] and cash dividends; Smith (1977) shows positive but insignificant abnormal returns on the ex-right day of rights offers. In this subsection, we will focus on Swedish ex-day effect.

To estimate the average abnormal return on ex-right day, we use the sample of daily stock returns to run

[14] For simplicity, we will call such kind of strategy as "reversal strategy" in the remaining of this article.

[15] Share capital is defined as the product of par-value the number of shares.

[16] In this project, "stock splits" represent both stock dividends and stock splits.

the following WLS[17] regression for rights offers, stock splits, and cash dividends:

$$AR_{it} = b_1 I_N + b_2 I_s + b_3 I_D + \epsilon_{it}, \quad (4)$$

where AR_{it} is the ex-day abnormal return estimated as the difference between the event day (day 0) return and the average daily return from day -60 to day -1, and independent variables (IN, IS, and ID) are three dummy variables indicating ex-right for rights offers, ex-right for stock splits, and ex-right for stock dividends. There are 343 rights offers and 389 stock splits with corresponding daily returns in our sample. The regression results are presented in Table 8 Panel A. Our regression results suggest that, in 1912-1978, there is a positive and highly significant abnormal return (1.298%) on the ex-right day for rights offers. It is much larger than 0.141%, the number reported by Smith (1977) for U.S. For the other event, stock splits, the abnormal return is also positive (1.311%) and strongly significant at 1% level, which is higher than 0.387% from Eades, Hess, and Kim (1984) for U.S. The abnormal return of the ex-dividend day is 0.722%, which is comparable with 0.568% (annualized from 0.142% by multiplying by four quarters in the year) reported by Eades, Hess, and Kim (1984).

Table 8 also has reported the lower bound estimation of the average transaction costs (0.9%) as the sum of brokerage commission and transfer tax. The transaction costs exclude investors from arbitraging against ex-dividend anomalies. The abnormal returns around rights offers and splits are significantly higher than the lower bound of transaction cost, which might imply arbitrage opportunities. However, as we mention before, the lower bound of transaction cost only considers brokerage commission and transfer tax, so it should be an optimistically biased estimation. The model proposed by Rydqvist[18] considers the fixed financial cost as an important cost that keeps investors from arbitraging against the anomalies around rights offers. However, there is no economic theory to explain the anomalies on the ex-right day of stock splits. For such anomalies in U.S., Eades, Hess, and Kim (1984) say "the results are quite surprising" and leave it as an open question.

Rydqvist model attributes the positive abnormal return on ex-right day of rights offers to a positive financing fee that represents a fixed cost to arrange a bank loan to purchase the new shares. When a firm offers shareholders right to purchase n new shares at price P_0, the condition to make long-term investors indifferent between selling the stock including the right at cum-price (P_{t-1}) and exercising the right and then selling the stock at expected ex-price $\hat{P}_t$ is that:

$$P_{t-1} = \hat{P}_t + n\hat{P}_t - nP_0 - c, \quad (5)$$

where c represents fixed financing cost. Then we can write the split factor $S(c)$ that considers the fixed financing fee as:

$$S_t(c) = \frac{P_{t-1}}{\hat{P}_t} = \frac{P_{t-1}(1+n)}{P_{t-1}+nP_0+c}, \quad (6)$$

Since the financing cost is a positive quantity, we must have $S_t(c) < S_t = \frac{P_{t-1}(1+n)}{P_{t-1}+nP_0}$, where S_t is the split factor without considering the fixed financing cost. For simplicity, we ignore the rare events that stock goes ex dividend on the same day as the distribution of rights. Then, the stock return over the distribution of rights using the standard split factors S_t is:

$$r_t = \frac{P_t S_t - P_{t-1}}{P_{t-1}}, \quad (7)$$

However, suppose that the market uses the fee-adjusted split factor such that $P_t = P_{t-1}/S_t(c)$. Substitute this expression into the return equation:

$$AR_t = \frac{P_{t-1}(S_t/S_t(c))}{P_{t-1}} = \frac{S_t}{S_t(c)} - 1, \quad (8)$$

A positive financing fee implies a positive abnormal return, and the abnormal return increases as the financing fee increase. We expect that, as the market efficiency improves, the fixed financing fee will decrease gradually, which is accompanied by the decrease of the abnormal returns on the ex-right day of rights offers. To study the time trend of the abnormal return on the ex-right day of rights offers and splits, we do the following regression:

$$AR_{it} = \alpha + \beta \times (year_{it} - 1912) + \epsilon_{it}, \quad (9)$$

We normalize year by subtracting 1912 (the first year of our sample) as one independent variable. This design makes the estimated equal the predicted event's abnormal return in 1912, and the estimated equals yearly change of abnormal return in the linear model. Table 8 Panel $\hat{\beta}$ reports the estimation results for both rights offers and splits.

For rights offers, the estimated is negative, indicating that the abnormal return on ex-right day of rights offers decreases as time goes by. The predicted abnormal return decreases from 2.08% in 1912 to 0.628% in 1978. Combining the negative estimated with Rydqvist model, we can interpret the decreasing

[17] To control the cross-section correlation among stocks, we also experiment with clustering standard errors at day-level, which does not influence the significance of our estimates.

[18] We refer this model as Rydqvist model in the remaining of this article.

abnormal returns as the manifestation of the decrease of the fixed financing fee, implying the improvement of market efficiency. Although the linear regression model gives us a negative predicted, consistent with the prediction of Rydqvist model, it has an uncomfortable feature that it would predict that, after many years, the abnormal return around rights offers turns negative, meaning the fixed financing fee becomes negative. A more realistic model would predict the anomaly on rights offers keeps decreasing but never crosses zero. To address this limitation of the linear model, we adopt the non-linear power function: $AR_{it} = a \times (year_{it} - 1912)^b + \epsilon_{it}$. If the abnormal return on ex-right day of rights offers keeps decreasing but never crosses zero, we would expect the estimated magnitude controlling variable a to be positive, and the estimated power variable b negative. Our estimation results show that $\hat{a}$= 0.0398 ($p < 0.001$), and $\hat{b}$ = -0.327 ($p < 0.001$), consistent with our prediction. The estimated power function predicts that the abnormal return on the ex-right day of rights offers decreases from 3.98% (2.08% in the linear model) in 1912 to 1.01% (0.63% in the linear model) in 1978.

What surprises us is that the estimated $\hat{\beta}$ for stock splits is positive and strongly significant, implying that the predicted abnormal return keeps increasing. Although $\hat{\beta}$ is statistically significant, there is no economic theory supporting this finding.

To visualize the evolution of the abnormal return on the ex-right day of rights offers and splits, we plot the estimated regression lines in Figure 3 respectively, where the observations of abnormal return scatter around the estimated line. It is obvious to see the decreasing time trend of rights offers and the increasing time trend of splits in Figure 3. Another point we can learn from this figure is that rights offers cluster at both the beginning and end of our sample period. During the middle of sample period (1922-1952) only few rights offers are observed. However, for splits, most observations cluster at the second half of our sample period (1946-1977).

VI. Conclusion

In this study, we have studied the efficiency of the Swedish market for the January Effect, Weekend Effect, Ex-right Day Effect, and momentum and reversals. Similar to previous findings in U.S., we have found striking January effect and peculiar abnormal return on ex-right day for rights offers and splits. In addition, stock's return also exhibits momentum, but such momentum disappears, rather than reverses, in mid-term horizon. We also have observed that the anomaly on ex-right day for rights offers keeps decreasing. Combining such evolution of the anomaly with the Rydqvist model, it implies the decrease of fixed financing cost, which accompanies the improvement of market efficiency.

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A. Commission Fees and Transfer Tax

In this section, we will review the evolution of commission fees and transfer tax in Sweden. Based on the data provided by Kristian Rydqvist, we have plotted commission fees and transfer tax as percent of the transaction price in Figure 4. The brokerage commission fee roughly keeps increasing from 0.25% in 1910 to 0.90% in 1980. In addition, the transfer tax is stable at 0.30% in a long period from 1930-1979, and then it drops to zero in 1980. In this report, we take the sum of commission fees and transfer tax as the lower bound estimation of the transaction cost. The average of the estimation is 1%.

B. Split Factors

This this section, we will review how to calculate the split factors for stock dividends, stock splits, the combination of stock dividends and stock splits, and rights offers, which are the four events that we have focused in Section 4. Split factors are calculated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}}, \tag{10}$$

where Pcum is the stock price right before a new share distribution, and Pex is the expected stock price on the ex-day. The Pcum could be observed directly. However, to calculate split factors, we must estimate Pex.

B.1 Stock Splits

For $an,1$ stock split, the split factor is estimated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}} = \frac{P^{cum}}{P^{cum}/n} = n. \tag{11}$$

B.2 Stock Dividends

For $an,1$ stock dividends, the split factor is estimated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}} = \frac{P^{cum}}{P^{cum}/(1+n)} = 1 + n. \tag{12}$$

B.3 The Combination of Stock Splits and Stock Dividends

For a combination of n, 1stock splits and m, 1 stock dividends, the split factor is estimated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}}$$

$$= \frac{P^{cum}}{P^{cum}/n(1+m)} \quad (13)$$

$$= n(1+m).$$

B.4 Rights offer

In rights offer, whether new shares are excluded from the following cash dividends will influence the calculation of split factors. For a n, 1 rights offer that is followed by 20 Krona cash dividends, the offer price is

P0. If all shares (both new shares and older shares) can claim the following cash dividends, the splits factor is estimated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}}$$

$$= \frac{P^{cum}}{[P^{cum} + nP_0 - (n+1)D]/(1+n) + D} \quad (14)$$

$$= \frac{P^{cum}(1+n)}{P^{cum} + nP_0}.$$

If only old shares can claim on the following cash dividends, the split factor is estimated as:

$$S = \frac{P^{cum}}{\hat{P}^{ex}}$$

$$= \frac{P^{cum}}{[P + nP_0 - D]/(1+n) + D} \quad (15)$$

$$= \frac{P^{cum}(1+n)}{P^{cum} + nP_0 + nD}.$$

This table is provided by The Swedish Stock Market 1912-1978 (Rydqvist 2015). The table displays the transaction prices, which are recorded on the official quotation list, high, low, and last transaction prices from each auction, and high and low transaction prices from the aftermarket. In addition to transaction prices, the official quotation list contains the best uncleared buy and sell limit order price from each auction. The rightmost column states the maximum number of transaction prices that is recorded on a given day.

Table 1: Recorded Transaction Price

	First Auction			Between		Second Auction			After		Max
	High	Low	Last	High	Low	High	Low	Last	High	Low	
1912-1916	H	L	-	-	-	-	-	-	-	-	2
1917-1979	H	L	-	-	-	H	L	-	-	-	4
1920-1926	H	L	-	H	L	H	L	-	-	-	6
1927-1931	H	L	F	H	L	H	L	F	H	L	10
1932-1978	H	L	F	-	-	-	-	-	H	L	5

We adopt 10-day rule to calculate stock yearly, monthly, and daily return. Specifically, when P_{t-1} is missing, we search back for 10 business days to find the latest available stock price as a proxy for P_{t-1}. Panel A provides the distribution of the number of business days that we have searched back when we calculate stock return.

Table 2: The Number of Search Back Business Days in 10-day Rule

Panel A, Distribution of Searching Back Business Days for Daily Return		
Business Day	Frequency	Cumulative Percentage (%)
1	1,044,953	56
2	54,797	59
3	27,477	60
…	…	…
…	…	…
10	789	61
Total missing data	730,621	100
Total Sample	1877602	100
Panel B, Distribution of Searching Back Business Days for Monthly Return		
1	47,088	57
2	2,315	60
3	799	61
…	…	…
…	…	…
10	74	62.66
Total missing data	30,864	100
Total Sample		
Panel C, Distribution of Searching Back Business Days for Yearly Return		
1	3,855	56
2	0	56
3	133	58
…	…	…
…	…	…
10	21	62
Total missing data	2,659	100
Total Sample	6927	100

This table provides Sweden equal-weighted average daily, monthly, and yearly return in 1912-1978. It also reports the average daily and monthly return for all NYSE stocks in 1926-1978, which is calculated from CRSP data. The average annual return in US is 12%, which is provided by Jones (2002).

Table 3: Stock Returns

Equal-weighted Average Market Return in 1912-1978			
	Daily Return (%)	Monthly Return (%)	Yearly Return (%)
Mean	0.0431	0.774	10.99
Standard Error	0.0014	0.136	2.22
Number of Observations	1,146,981	51,784	4,268
NYSE (1926-1978)	0.073	1.197	14.01

This table reports Sweden average monthly return in 1912-1978, and the differences between January return and all other months returns. To control for cross-section correlation among stocks returns, we have clustered standard errors at month-level. The duster method increases the standard errors from 0.14% to the values that have been reported in the table. The last column in the table shows US average monthly return in 1945-1979, which is provided by Givoly and Ovadia (1983). *, **, *** represents significantly different from 0 at the 0.10, 0.05 and 0.01 levels using two-tailed Student's t test.

Table 4: Average Monthly Return

Month	Observations	Mean Return (%)	Difference from January Return (%)	Standard Error for the Difference	U.S. Mean Monthly Return from 1945-1979
January	4,279	3.77			
February	4,336	0.27	-3.51***	0.69	0.53
March	4,361	0.34	-3.44***	0.68	1.84
April	4,317	1.01	-2.77***	0.77	0.94
May	4,319	0.69	-3.09***	0.68	0
June	4,278	0.32	-3.46***	0.64	-0.34
July	4,189	2.67	-1.11	0.68	1.49
August	4,299	0.21	-3.57***	0.69	0.79
September	4,292	-0.78	-4.56***	0.63	-0.11
October	4,264	-0.36	-4.14***	0.74	0.14
November	4,306	0.10	-3.68***	0.71	2.24
December	4,508	1.06	-2.72***	0.62	2.17

Following Reinganum (1982), we have defined the potential tax-loss selling (PTS) as the quotient of the stock price on the last trading day of the year and the concurrent year maximum price. In each year *t,* stocks are ranked in ascending order according to PTS. Based on these rankings, three portfolios are formed. Stocks ranked in the top 33% constitute the winner portfolio, stocks in bottom 33% constitute the loser portfolio, and the remaining stocks constitute the middle portfolio. In this figure, we plot the turn-of-year daily returns for both the winner portfolio and loser portfolio.

Table 5: Daily Return around End-of-Year

	Day 1	Day 2	Day 3	Day 4	Day 5	Sum of daily returns from day 1 to day 5	Total month return	Sum of first 5 days' returns to total monthly return	Expected percentage
			Panel A, January						
Winner	0.621	0.593	0.407	0.174	0.119	1.914	3.948	48%	25%
Middle	0.584	0.494	0.309	0.201	0.255	1.843	4.283	43%	25%
Loser	0.614	0.318	0.381	0.408	0.269	1.99	4.654	43%	25%
			Panel B, Placebo Test for July						
Winner	0.188	0.147	0.124	0.18	0.263	0.902	3.117	29%	25%
Middle	0.237	0.155	0.192	0.244	0.209	1.037	3.911	27%	25%
Loser	0.211	0.222	0.248	0.3244	0.298	1.304	4.356	30%	25%

This table reports Swedish average weekday returns, standard errors, and number of observations for each weekday. Saturday trading ends in 1960. It also provides US average weekday returns in 1953-1977, which is reported by French (1980). We also have compared each weekday's return with the pooled average daily return. *, **, ***represents significantly different from 0 at the 0.10, 0.05 and 0.01 levels using two-tailed Student's t-test.

Table 6: Weekday Return

	Mean Weekday Return in 1912-1978 (%)					
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sweden 1912-1978	0.0543	-0.013	0.0081	0.069	0.0541	0.0901
Standard Errors	0.0037	0.008	0.0089	0.0087	0.0084	0.0103
Difference with average daily return 0.04%	0.0143***	-0.0531***	-0.03199***	0.029***	0.0141*	0.0501***
Obs.	198,296	185,111	194,666	191 ,546	185,265	89,403
U.S. 1953-1977	-0.168	0.016	0.097	0.049	0.087	N/A

Following Jegadeesh and Titman (1993), at the beginning of each month *t,* stocks arc ranked in ascending order according to their past performance. Based on these rankings, three portfolios are formed. Stocks ranked in the top 33% constitute the winner portfolio, stocks in bottom 33% constitute the loser portfolio, and the remaining stocks constitute the middle portfolio. These portfolios are equally weighted. For example, (6, 6) strategies is that each month investors form a portfolio based on past 6-month returns, and hold the position for 6 months. The return of momentum strategy is reported in Panel A. To check whether the momentum reverses in mid-term, we also construct reversal strategies in Panel B. For example, the strategy (6, ~24, 12) selects stocks based on performance over the 6-month period that begins 31 months earlier and ends 25 months earlier. This table also presents US market momentum strategy returns, which is reported by Jegadeesh and Titman (1993 & 2001). *, **, ***represents significantly different from 0 at the 0.10, 0.05 and 0.01 levels using two-tailed Student's t-test.

Table 7: Momentum and Reversals

	Sweden in 1912-1978			U.S. in 1965-1989		
	Winner	Loser	Mean Return of Winner - Loser	Winner	Loser	Mean Return of Winner - Loser
Panel A, Momentum Strategy (in%)						
(6, 3) strategy	0.74***	0.47**	0.27**	1 .71***	0.87	0.84***
s.e.	0.15	0.2				
Average # of stocks in each portfolio	12	12				
(6, 3) strategy	0.71***	0.47**	0.24**	l.74***	0.79	0.95***
s.e.	0.15	0.2				
Average # of stocks in each portfolio	11	11				
(6, 3) strategy	0.71***	0.48***	0.23*	1.74***	0.72	1.02***
s.e.	0.16	0.2				
Average # of stocks in each portfolio	10	10				
(6, 3) strategy	0.71***	0.56***	0.15	1.66***	0.8	0.86***
s.e.	0.16	0.19				
Average # of stocks in each portfolio	9	9				
Panel B, Reversal Strategy (in %)						
						U.S. in 1965-1998
(6, ~12, 12) strategy	0.54***	068**	-0.13			-0.24***
s.e.	0.17	0.19				
Average # of stocks in each	9	9				

portfolio				
(6, ~24, 12) strategy	0.65***	0.64***	0.01	-0.26***
s.e.	0.184	0.18		
Average # of stocks in each portfolio	8	8		
(6, ~36, 12) strategy	0.76***	0.72***	0.04	-0.23***
s.e.	0.1 7	0.2		
Average # of stocks in each portfolio	7	7		
(6, ~48, 12) strategy	0.77	O.66	0.11	-0.31***
s.e.	0.18	0.19		
Average # of stocks in each portfolio	6	6		

This table reports abnormal returns on ex-right day for rights offers and ex-right day for stock splits in 1912-1978. It also reports the abnormal returns in US as comparisons. The US abnormal return on splits is reported by Eades, Hess, and Kim (1984), which are significant at 1% level. The abnormal return on rights offers is provided by Smith (1977), and the average is not statistically different from zero. *, **, *** represents significantly different from 0 at the 0.10, 0.05 and 0.01 levels using two-tailed Student's t-test.

Table 8: Ex-day Effect

Panel A, Whole sample estimation			
	Rights Offers (%)	Splits (%)	Dividend (%)
Sweden	1.298***	1.311***	0.722***
Standard Errors	0.17	0.191	0.0287
Obs.	270	389	4931
Sample	343	479	7627
The lower bound of average transaction cost	0.9	0.9	0.9
U.S.	0.141	0.387***	0.568***
Panel B, Year trend estimation			
Intercept	1.91***	-0.71	0.39***
Standard Errors	0.331	0.57	0.069
Slope of (*year* -1912)	-0.019**	0.039***	0.0085***
Standard Errors	0.0074	0.011	0.0016
Panel C, Year trend estimation, Power function of Rights Offers			
$AR_{it} = a \times (year_{it} - 1911)^b + \varepsilon_{it}$			
	Estimation	Standard Errors	
a	0.0398		
b	-0.327		

This figure plots the evolution of the number of firms in each PTS winner /loser portfolio during 1912-1978.

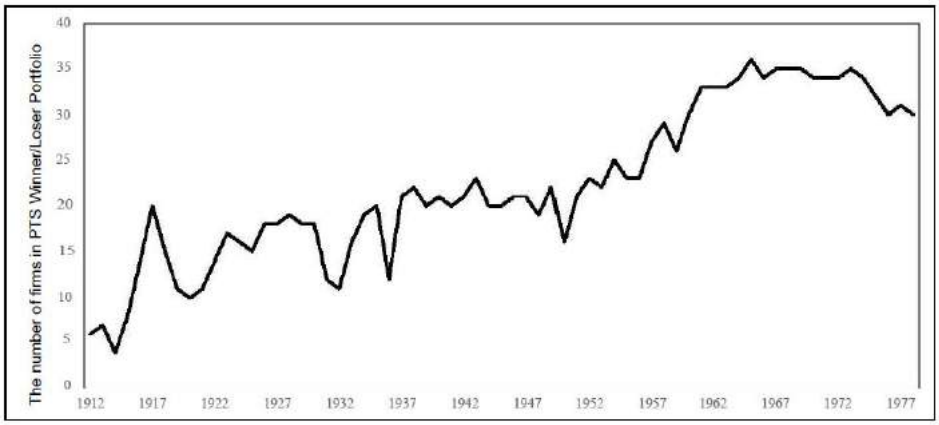


Figure 1: The Number of Firms in PTS Winner /Loser Portfolio

This figure plots the evolution of the number of firms in each winner/loser portfolio under (6,6) momentum strategy during 1918-1978.

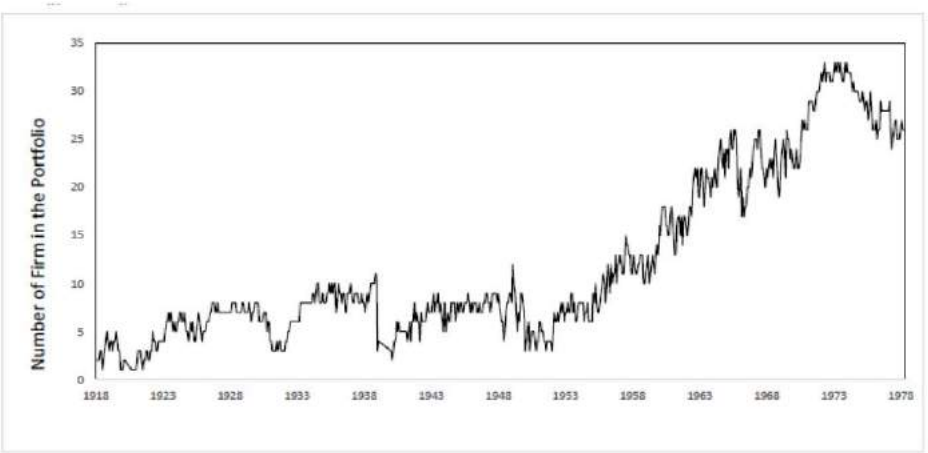
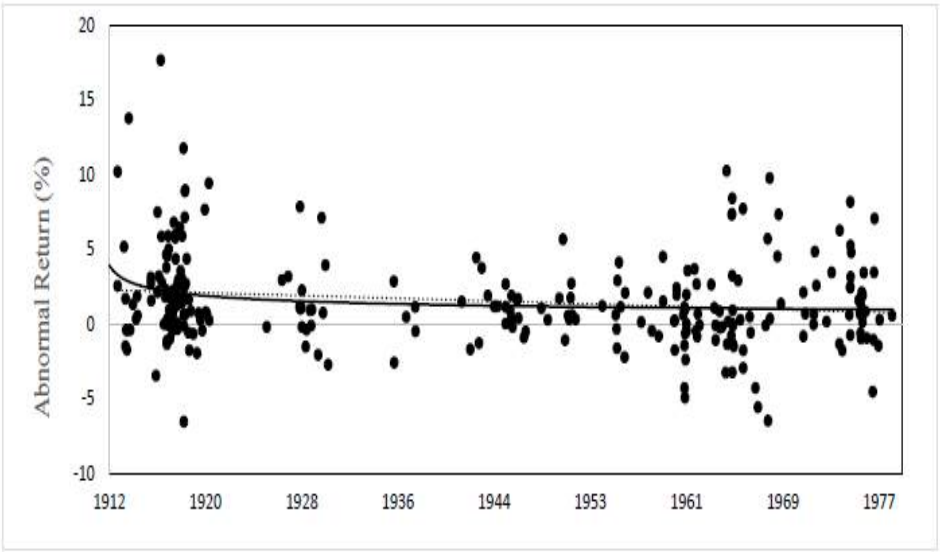
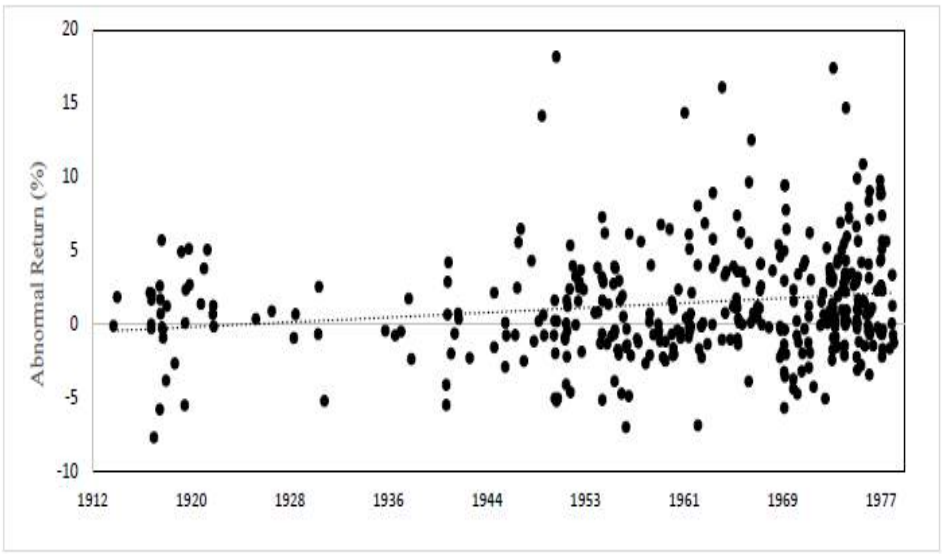


Figure 2: The Number of Firms in Winner /Loser Portfolio under (6, 6) Strategy

This figure plots the estimated regression line of Equation 9 for both rights offers and stock splits. The observed abnormal returns scatter around the regression linear. More details about the regression results could be found in Table 8.



(a) Rights



(b) Splits

The figure plots brokerage commission and transfer tax in percent of the transaction price, which is provided by Kristian Rydqvist. Brokerage commission is determined by the Stockholm Stock Exchange for all its members. In this report, we take the sum of commission fees and transfer tax as the lower bound estimation of the transaction costs.

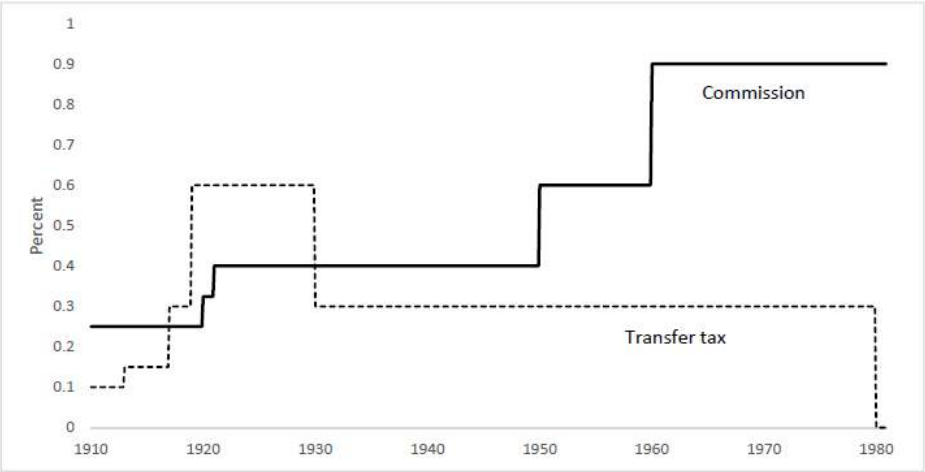


Figure 4: Brokerage Commission and Transfer Tax

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Impact of Demonetisation on Green Banking

By Dr. C.K Hebbar & Prasad Mahale
University College

Abstract- Demonetization is a concept which came into existence to make green banking more successful. This action lead to a powerful reaction on the online banking which gives more preference to green banking. So demonetization is a strategy to create awareness among the rural and urban citizens with regard to the usage of green banking services. Green banking is ethical bank which encourages the online transactions by reducing the carbon footprint from the regular banking activities. Demonetization has spread the wider message to all the people of the country about to increase the cashless transaction, where as green banking is totally about to give more preference to cashless transaction. So there is a great impact of demonetization on green banking services.

Keywords: *demonetization, green banking, mobile banking, credit card.*

GJMBR-C Classification: *JEL Code: E50*

Strictly as per the compliance and regulations of:

Impact of Demonetisation on Green Banking

Dr. C.K Hebbar [α] & Prasad Mahale [σ]

Abstract- Demonetization is a concept which came into existence to make green banking more successful. This action lead to a powerful reaction on the online banking which gives more preference to green banking. So demonetization is a strategy to create awareness among the rural and urban citizens with regard to the usage of green banking services. Green banking is ethical bank which encourages the online transactions by reducing the carbon footprint from the regular banking activities. Demonetization has spread the wider message to all the people of the country about to increase the cashless transaction, where as green banking is totally about to give more preference to cashless transaction. So there is a great impact of demonetization on green banking services.

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I. Introduction

Demonetization is a splendid step that has been taken by our present Prime Minister Mr. Narendra Modi by cancelling the 500 and 1000 rupees notes throughout the India on Nov 8, 2016. It was not the first time when demonetization taken place, this was done in 1946 and 1978, as well. By taking this great step our Prime minister has given more preference to the green banking products. Demonetization is a great concept which comes into existence to make green banking more successful. This action lead to a powerful reaction on the online banking which gives more preference to green banking. So demonetization is beneficial to create awareness among the rural and urban citizens with regard to the usage of green banking services. Thus demonetization provided helping hand to making green banking more popular. Demonetization has taken a place for the purpose of removing black money throughout the India, So demonetization plays a significant role in the implementation of green banking strategy.

II. Concept of Green Banking

Green banking encourages the online transactions by reducing the carbon footprint from the regular banking activities. It promotes healthy environmental conditions by protecting our natural resources. In other words green banking means promoting environmental friendly practices in a regular banking activities and it's also called as sustainable banking. Its main objective is to safeguard our natural resources by reducing quality of paper work. It involves online banking, ATM, green credit card etc.

III. Objectives of the Study

- To study how demonetization leads to green banking
- To know the usage of green banking after demonetization in Bhatkal Taluq.
- To suggest measures to increase the coverage of green banking.

IV. Research Methodology

The required data for the study is collected from primary as well as secondary data. Primary data is collected from using 120 respondents through direct interviews and using questionnaire and the secondary data is collected from journals, articles and websites. For collection of primary data respondents are selected based on the random sampling technique.

V. Limitations of Green Banking

1. The findings and recommendations of this study collected based on limited coverage only.
2. As demonetization is a recent decision, the reactions on green banking cannot be accurately measured.

VI. Data Analysis

The current study is related to "Impact of Demonetization on green banking". For this study Primary data is collected through questionnaire and direct interview from 120 respondents. That was analyzed in order to draw certain conclusion in the following manner.

Author α: Research Guide, Dept. of Commerce, University College, Hampankatta, Mangalore, Karnataka, India.
e-mail: hebbarkc@yahoo.com
Author σ: Research Scholar, Dept. of Commerce, University College, Hampankatta, Mangalore, Karnataka, India.
e-mail: PrasadMahale.PM@gmail.com

Table 1: Demographic profiles of the respondents.

Demographic Factor	Particulars	Respondents	Percentage
Gender	Male	65	54.16
	Female	55	45.84
	Total	120	100
Age	21-31 Years	30	25
	31-41 Years	48	40
	41-61 years	28	23.33
	Above 61 years	14	11.67
	Total	120	100
Education	Primary	20	16.67
	High school	27	22.5
	PUC	30	25
	Graduation	25	20.83
	Post-graduation	10	8.33
	Illiterates	08	6.67
	Total	120	100
Monthly Income	0-2000	15	12.5
	2000-3500	28	23.33
	3500-5000	06	05
	5000-6500	35	29.17
	Above 6500	36	30
	Total	120	100

N=120 Source: Survey

Interpretation:

The above table defines the demographic profile of the respondents who are co-operated for this study. On the basis of above information is made analysis.

Table 2: Kinds of accounts

Particulars	Respondents	Percentage
Saving Account	88	73.34
Fixed deposit	12	10
Current Account	13	10.83
Recurring deposit	07	5.83
Total	120	100

N=120 Source: Survey

Interpretation:

As per as above table is concerned it is cleared that out of 120 respondents 88 are preferred saving bank account, 12 respondents have fixed deposits, 13 are have current account and 07 respondents have recurring deposit. According to this table most of the respondents preferred saving account.

Table 3: Awareness of green banking before demonetization

Particular	Respondents	Percentage
Yes	55	45.83
No	65	54.17
Total	120	100

N=120 Source: Survey

Interpretation:

From the above table it is cleared that majority of the respondents that is 55 respondents are aware of the green banking services before demonetization and 65 respondents do not have any particular information regarding green banking services.

Table 4: Usage of green banking services before Demonetization

Particulars	Respondents
Debit card	70
Credit card	22
Mobile Banking	48
Net Banking	42
Electronic Fund Transfer	56
None of these	11

N=120 Source: Survey

Interpretation:

From the above table we can see that majority of the respondents that is 70 respondents are using Debit card, 22 are using Credit card, 48 respondents are using Mobile banking, 42 are using Net banking, 56 are using EFT services, and unexpectedly 11 respondents are not using any of the above services of green banking. It says that before demonetization the percentage of using services are very low.

Table 5: Usage of green banking services after Demonetization

Particular	Respondents
Debit card	108
Credit card	25
Mobile Banking	96
Net Banking	59
Electronic Fund Transfer	63

N=120 Source: Survey

Interpretation:

From the above analysis we can see that there is a rise in using Debit card from 70 to 108, Credit card from 22 to25, Mobile banking 48 to 96, Net banking from 42 to 59, EFT from 56 to 63 respondents. So we say that there is a good effect of demonetization on green banking services. The number of respondents can be increased by spreading awareness of green banking and user friendly technology.

Table 6: Banks initiatives towards awareness of green banking are sufficient

Particulars	Respondents	Percentage
Yes	65	62.5
No	55	37.5
Total	120	100

N=120 Source: Survey

Interpretation:

Above table is defines that 62.5% of the respondents says that the banks are taking sufficient initiatives towards the awareness of the green banking services and 37.5% of the respondents feel that the banks are not taking sufficient initiatives towards the services of green banking.

Table 7: Green banking make banking more convenient

Particulars	Respondents	Percentage
Yes	98	81.66
No	22	18.34
Total	120	100

N=120 Source: Survey

Interpretation:

From the above table it is clear that 81.66% of respondents says that green banking would make banking more successful and 18.34% of the respondents opinion that green banking is not convenient for them.

VII. Findings

- This study examines that majority of the respondents having their bank account and they prefer saving bank account to save their money and for the better convenience.
- From this study we can analyze that majority of the respondents are created their account before 2014 and they are making regular transactions in the bank.
- From this study we can find that most of the respondents are aware of green banking services but some of them feel that this system is difficult to operate and insecure and uncommon due to lack of information about the usage of technology related to green banking.
- After the demonetization of the 500 and 1000 rupee notes there are great increases in the usage of green banking services. We can also find that some of the banks are not taking initiatives to implement the green banking services among their prospective customers.
- By studying this concept we can find most of the respondents think that green banking would make banking activity more convenient for them.
- Here we can analyze that in Bhatkal Taluq majority of the respondents are not getting accurate information about the adoption of green banking practices because the banks are not taking initiatives in these area to create awareness among this people.
- Finally we found that there is a small impact of demonetization on green banking services in Bhatkal Taluq.

VIII. Suggestions

- Bank should take up a strong step to create awareness about the availability of green banking services especially in rural areas.
- The bank should arrange seminar, work shop in the rural areas that should be in respondent's understandable language. so that customer can get information and it may create interest among those who did not using green banking services.
- The government should implement new plans and policy for popularizing concept of green banking services and practices.
- The bank must install biometric ATMs in the rural areas to meet the requirements of illiterate customers
- The bank should erase or remove tax of fee on the usage of other banks ATMs.

IX. Conclusion

Finally I can conclude that as Bhatkal Taluq takes a serious step towards the green banking, coincidently the demonetization made by the government of India also providing remarkable support to the green banking as a lesser availability of new notes to the common people of Bhatkal Taluq green banking products are becoming more successful. Demonetization has spread the wider message to all the people of the country about to increase the cashless transaction, where as green banking is totally about to giving more preference to cashless transaction. So there is a great impact of demonetization on green banking services. So Bhatkal Taluq banks should adopt green banking technology to create eco-friendly environment. Finally the bank should undertake innovative campaign to create awareness about the benefits available under green banking services.

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The Impact of Liquidity Risk on Banking Performance: Evidence from the Emerging Market

By M. Saifullah Khalid, Md. Rashed & Alamgir Hossain
BRAC University

Abstract- Liquidity crisis is severe in Bangladesh commercial Banks and eventually some commercial banks suffered due to higher default and liquidity problem. This paper aims to empirically study the relationship between liquidity and financial performance of Commercial banks in developing country like Bangladesh. The investigation has been performed using panel data procedure for a sample of Dhaka stock market enlisted all commercial banks (31) during the year of 2010-2017. Our result shows that liquidity has no significant and positive or negative impact on return on asset (ROA), return on equity (ROE) as financial performance. Liquidity risk behaves in equivalent ways in different dependent variables.

Keywords: liquidity risk; banking performance; capital adequacy; return on assets, return on equity.

GJMBR-C Classification: JEL Code: G33

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The Impact of Liquidity Risk on Banking Performance: Evidence from the Emerging Market

M. Saifullah Khalid [α], Md. Rashed [σ] & Alamgir Hossain [ρ]

Abstract- **Liquidity crisis is severe in Bangladesh commercial Banks and eventually some commercial banks suffered due to higher default and liquidity problem. This paper aims to empirically study the relationship between liquidity and financial performance of Commercial banks in developing country like Bangladesh. The investigation has been performed using panel data procedure for a sample of Dhaka stock market enlisted all commercial banks (31) during the year of 2010-2017. Our result shows that liquidity has no significant and positive or negative impact on return on asset (ROA), return on equity (ROE) as financial performance. Liquidity risk behaves in equivalent ways in different dependent variables.**

Keywords: liquidity risk; banking performance; capital adequacy; return on assets, return on equity.

I. Introduction

Liquidity and bank performance are prime components in deciding the endurable, development, supportability, and execution of a banking industry (Edem, 2017). Liquidity is the capacity of the monetary institution to meet all their commitment associated with the need for reserves (Yeager & Seitz, 1989; Gitman, 2009). This study explores the effect of liquidity risk on banking performance. The motives are possible to have a presence scenario of banking performance which is the key objective of the study. Liquidity risk is the opportunity of terrible consequences on the activity of proprietors, clients and different partners of the monetary institution coming about from the failure to demand contemporary fees commitment in a convenient and cost-effective process except obtaining inadmissible hardships (Paul Tsi, 2018). Banks are especially inclined to liquidity risk due to the part in changing maturities and presenting ensures in arrange to demand the liquid funds of their contributors (Diamond & Dybvig, 1983; Rauch et al., 2008). Liquidity risk emerges when a bank is the failure to suit diminishes in liabilities or to finance increments in resources. An illiquid bank cannot get adequate reserves due to the aid of expanding liabilities or to change over resources at a sensible taken a toll (BCBS, 1997). In the current situation, liquidity threat has performed a vital function in banking quandary in the world (Kim Cuong Ly, 2015). In the 2007 monetary crisis in the world, the bank was fizzled when monetary crisis ascended because of destitute liquidity administration and depends on temporary discount reserving that was the reason of the failure of a wide variety of banks e.g. Lehman Brothers and Northern Rock (International Monetary Fund, 2011). Liquidity risk has arisen as like extreme trouble and dissent for the present-day time banks. The factors that imply financial institution liquidity chance consist of destitute resource attributes, below average liquid resources, rising financial operation cost whereas assimilate to reserve resources, concentration in subsidizing origin and reliance on deposits and their vendors (Comptroller of the Currency, 2012). A bank can be failed with adequate funds, solid profit, and great resources in case it cannot hold adequate liquidity (Crowe, 2009). However, a bank which has a higher contribution to retaining liquidity threat coming about from liquidity creation (Bhattacharya & Thakor. 1993; Repullo, 2004). In fact, Liquidity risk management practices hone involve investigation of adjusting sheet to assess prospect money streams and methods subsidizing demand can be accomplished (Martha, 2013).

Author α: MBA Student, BRAC University.
e-mail: khalid.saif002@gmail.com
Author σ: BBA Graduate, IUBAT-International University of Business Agriculture and Technology. e-mail: krashed107@gmail.com
Author ρ: Lecturer, IUBAT-International University of Business Agriculture and Technology. e-mail: alamgir.hossain@iubat.edu

Bank types	Number of banks	Number of branches	Total assets	Total Deposits	ROA (%)	ROE (%)	Liquidity Ratio
State-owned commercial banks (SCBs)	6	3721	3379.5	2700.6	0.21	3.45	30.4
Private commercial banks (PCBs)	40	4758	8758.3	6508.2	0.89	12.01	14.8
Foreign commercial banks (FCBs	9	69	603.9	392.8	2.24	11.31	43.8
State-owned development financial institutions (DFIs)	2	1407	317.6	273.3	-0.62	-3.07	0.0
Total	57	9955	13059.3	9874.9	0.74	10.60	19.9

Source: Bangladesh Bank Annual report 2017

II. Literature Review

Confronted with the significance of liquidity within the working and the endurance of bank and the need of agreement with respect to the components of liquidity risk, the prime objective of this study is to investigate the impact of liquidity risk determinants including return on assets(ROA), return on equity(ROE), different ratios that has a impact on banking performance in order to control the threat of risk by evading the drying of liquidity and financial disaster (Khemais & Abdelaziz, 2017). Generally, liquidity risk is measured from the balance sheet positions. Superior practices for liquidity risk calculate centered on the utilization of liquidity ratios. The ratios former studies used comprehend deposit assets to assets ratio (Bourke, 1989; Molyneux & Thornton, 1992; Barth et al., 2003; Demirguc-Kunt et al., 2003), cash assets to deposits ratio (Shen et al., 2001), and cash assets to customer & short period financing (Kosmidou et al., 2005). The superior esteem of liquidity ratio forms banksmore liquid and lower vulnerable to fizzle. Besides, a few studies exercise loans to deposits ratio (Demirguc-Kunt & Huizinga, 1999; Athanasoglou et al., 2006), net credit to clients and short period financing ratio to evaluate banks liquidity risk (Pasiouras & Kosmidou, 2007; Kosmidou, 2008; Naceur & Kandil, 2009). Thus, banks need to hold the positive rate of their credits as essential funds in an account with the central bank which is utilized basically to accomplish inter-bank obligation conjointly as protections for contributors (Edem, 2017). High liquidity risk occurs in the banking industry due to excessively withdraw the money by clients from the banks. This antagonistically influences the possibilities of banking performance by holding off would be clients and manageable buyers from the bank. As a result, the banks function decreases radically and come about in a critical lessening in benefit (Ejoh et al., 2014). The ability to finance any increments in resources and demand the commitments as they come due or the liquidity administration is crucial to the endurance and practicality for each banking corporation (Farah et al., 2017). The case of cash excess and cash shortage are the key reasons for arising the liquidity risk of a banking organization. Banks confront liquidity threat when ambiguity over their sufficiency emerges at the renegotiating period (Basel committee on banking supervision, 2000). It implies that when cash sources surpass cash consumption, it makes liquid treasury and when the cash consumption surpass money sources, it makes liquidity shortage. This could create a bank incapable to diminish the debts or to gather reserves to expand the resources (Farah et al., 2017). The recent economic quandary, there is a common knowledge that banks had not completely acknowledged the significance of liquidity threat management and the indication of a certain threat for the bank and the more extensive financial practices. As such, policymakers have recommended that bank ought to keep more liquid resources than within the past, and this will offer assistance self-insure against manageable liquidity or financing challenges (Mohammed & Showvonick, 2017).

III. Research Methodology

a) Data and Variables

This study analyzed data from all state-owned commercial banks, private commercial bank's listed in Dhaka Stock Exchange (DSE) and the period of eight years (2010 to 2017),and data were collected from the annual financial statement of those bank's official website and Bangladesh banks website.

Panel A: Sample size	
Number of banks	57
Less: banks without available information	26
Total banks under the study	31
Panel B: Category-wise distribution	
State-owned commercial bank	2
Conventional private commercial bank	22
Islamic private commercial bank	7
Total banks under the study	31
Panel C: Bank-year observations	
Bank-year observations consideration for the study: 31 banks 8 years (2010-2017)	248 bank-years

Two banking financial performance indicator and two liquidity measurement variables were selected to identify the liquidity impact on the banking financial performance. Returns on asset (ROA), return on equity (ROE) were chosen as the financial performance indicators, previous literature also analyzed to select those variables (Alkhatib and Harsheh 2012, Almumani 2013, Roman and Sargu 2014). Here, previous literature (Chowdhury et el nd., Ferrouhi 2014., Edem 2017) was analyzed to determine the liquidity measurement variable of this study. These variables are Cash to Deposit Ratio (CDR) and Loan to deposit ratio (LDR).CDR used to measure bank's liquidity in the case that the bank cannot borrow from other banks; high CDR ratio means that the bank is able to cope long term liquidity risk. Another variable is Loan to deposit ratio (LDR), indicates the relationship of illiquid assets and liquid liabilities. When this ratio is high, it means that the bank is less liquid. Equity over total asset ratio (ETA) act as a control variable and which measures the capital adequacy of an organization. It indicates the company position in terms of capital.

b) Empirical Model

A primary empirical model (i) was developed to explore the liquidity impact on banking financial performance of Bangladesh, in this primary model in equation (i), the dependent variable was financial performance of Banks(BFP) and the independent variable was liquidity risk (LR) and there is an error term (€). Where, α was the intercept and which was unknown for all banks and t is time (t= 2010-2017).

$$BFP_{c,t} = \alpha + \beta_1 LR_{c,t} + €_{c,t} \ldots\ldots \text{(i)}$$

Equation (ii), (iii) are extension form of primary empirical model (i), since we have considered three different banking financial performance (ROA), (ROE) those were placed as dependent variable for bank c in time t at equation (ii), (iii) respectively.

$$ROA_{c,t} = \alpha + \beta_1 LR^{CDR}{}_{c,t} + \beta_2 LR^{LDR}{}_{c,t} + \beta_3 ETA_{c,t} + €_{c,t} \ldots\ldots \text{(ii)}$$

$$ROA_{c,t} = \alpha + \beta_1 LR^{CDR}{}_{c,t} + \beta_2 LR^{LDR}{}_{c,t} + \beta_3 ETA_{c,t} + €_{c,t} \ldots\ldots \text{(ii)}$$

Where β_1 and β_2 respectively represent the regression coefficient of liquidity risk as independent variables of cash to deposit ratio (CDR), loan to deposit ratio (LDR), for bank c in time t, and there is error term $€_{c,t}$. Ordinary Least squire- OLS, FE- Fixed effect model and RE- Random effect model are used to test the static model, those models are exploring specifically the impact of variables toward the performance and those models are also assist to explain the different variables discretely.

c) Descriptive statistics

Below table1 present the descriptive statistics of the variables, where return on asset in average 0.03 and in case of return on equity is 0.12, CDR in average 1.01, Average CDR and LDR indicate Bangladeshi banks are highly liquidate to pay off its creditors and loan is more than its deposit. Standard error for ROA, ROE, are very less but CDR, LDR, ETA is high. Std. deviation of SDR and LDR are highly deviated. Kurtosis of return on asset, CDR, LDR and ETA shows distribution has lighter tails and flatter peak.

Table 1: Descriptive statistics of variables

	ROA	*ROE*	*CDR*	*LDR*	*ETA*
Mean	0.031336	0.126603	1.021148	7.726106	0.187553
Standard Error	0.013117	0.004823	0.45535	4.021918	0.048726
Standard Deviation	0.192785	0.070878	6.692248	59.10989	0.716116
Sample Variance	0.037166	0.005024	4.78618	3.979	0.512823
Range	2.5338	0.4355	9.224	8.1921	9.8558
Minimum	-0.0997	0.0017	0.0053	-0.1272	-0.8868
Maximum	2.4341	0.4372	9.2293	8.0649	8.969
Count	216	216	216	216	216

d) Correlations

In table2 correlation matrix between variable are presented, it's appeared that return on asset and return on equity are weakly correlated, strong correlation between return on asset and ETA are visible, CDR and ROA are weakly and negatively correlated, LDR and ROE also negative and weakly correlated. ETA is strongly and positively correlated with the ROA but with ROE relationship is too week and with CDR it's negative and weak. ETA also too weak with LDR as well as negatively related.

Table 2: Correlation matrix of variables

	ROA	*ROE*	*CDR*	*LDR*	*ETA*
ROA	1				
ROE	0.188098	1			
CDR	-0.0109	0.020454	1		
LDR	0.019401	-0.03146	0.002974	1	
ETA	0.868412	0.057531	-0.02167	-0.00639	1

IV. Empirical Findings

Table 3 presenting the result of multiple regression between liquidity risk and financial performance variables, in this table 3 a comparative result analysis model was developed to illustrate the probable impact of liquidity variable toward the financial performance of Bangladeshi banks, this model consists through three different test results Ordinary Least Squire-OLS, Fixed effect, Random Effect, this model will be used to identify the impact in two phase, first phase liquidity impact on dependent variable as return on asset (ROA), second phase dependent variable as return on equity (ROE).

Table 3: Comparative Result Analysis

ROA Dependent Variable		OLS			FE			RE		
	Variable	*β*	t	P	*β*	t	P	*β*	z	P
	Intercept	-.018	-3.44	0.001	-.02	-5.22	0.000	-.019	-2.96	0.003
	CDR	.00018	0.26	0.793	-.00	-0.46	0.648	-.0001	-0.21	0.834
	LDR	-.0001	-0.18	0.861	-.00	-0.41	0.683	-.00	-0.26	0.794
	ETA	.235	34.95	0.000	.252	42.3	0.000	.244	39.35	0.000
	R-Squared	0.8624								
	F Test	407.32						Wald Chi2(3) = 15.68		
	Adj R-sq	0.8603			Hausman Chi2 (3) = 31.73					

					Hausman Prob>Chi2= 0.0000					
ROE Dependent Variable		OLS			FE			RE		
	Variable	β	t	P	β	t	P	β	z	P
	Intercept	.126	23.87	0.790	.125	23.6	0.00	.126	21.94	0.000
	CDR	.0001	0.27	0.652	.00	0.18	0.858	.001	0.23	0.815
	LDR	-.0003	-0.45	0.425	-.00	-0.34	0.732	-.004	-0.44	0.659
	ETA	.005	0.80	0.000	.009	1.26	0.208	.006	0.89	0.371
	R-Squared	0.0046								
	F Test	0.30						Wald Chi2(3) = 1.03		
	Adj R-sq	-0.01			Hausman Chi2 (3) = 3.91					
					Hausman Prob>Chi2= 0.2709					

In first phase of the model this study tried to identify the liquidity behavior towards return on asset (ROA), OLS test indicate CDR ratio have no impact on the return on asset significantly and positively related and LDR ratio negatively behave on the asset with high insignificance, In the meantime ETA were statically and highly significance towards the assets and ETA has positive impact on ROA. Between fixed effect and random effect model Hausman test shows fixed effect model were most appropriate to explain the impact. In Fixed effect it was visible that LDR and CDR are positively related with asset but level of significance was critically low. Though Hausman test didn't trigger the random effect model but comparative issue of the study it can be said that any variable of this model wasn't statically significant except the ETA. OLS model was the most perfect by comparing fixed and random effect model. This staticall analysis didn't show any strong evidence that liquidity has impact on the banking performance as dependent variable ROA.

Subsequently analyzing the second phase, this study found liquidity variable have no significant impact toward the ROE in case of OLS test but fixed effect and random effect shows there is several influences but statically insignificance at all. Hausman test shows the random effect model was more appropriate for explain the effect of liquidity variable rather than fixed effect model. But there was same reflection of first phase on the second phase were evident.

Overall evaluation of this study found that liquidity has no significant and positive or negative impact on return on asset (ROA), return on equity (ROE) as financial performance. liquidity behave in equivalent ways in different dependent variables.

V. Conclusion

This paper investigated the impact of liquidity on Bank's financial performance, and has been tried to get the relationship between liquidity and financial performance of banks in the Bangladesh perspective. In order to conduct the experiment Dhaka Stock Exchange enlisted banks were selected. In a nutshell, from the research it can say that liquidity has no significant impact on return on asset (ROA) and as well as return on equity (ROE) as financial performance. Researcher's related with research also believe that further research is required to justify the empirical findings of this research.

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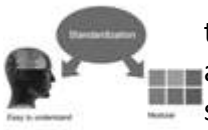

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8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.
Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.

- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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