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Foday Y. Deen-Conteh

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Assessing the Impact of Transition from Rules-based to Principles-based Accounting in the Recognition of Revenue: A Study of Public Companies listed in the Russell 3000 Index that Elected the Full Retrospective Method of Accounting

Foday Y. Deen-Conteh

Justine Haigh, PhD: Chairperson

Debra Espinor, PhD: First Reader

David Tucker, PhD, CPA: Co-Chairperson and Second Reader

A Dissertation Submitted to complete the Doctor of Business Administration degree with a concentration in Accounting at George Fox University

February 2020

GEORGE FOX UNIVERSITY
COLLEGE OF BUSINESS

Dissertation Completion Approval
Doctor of Business Administration

Student Name: Foday Deen-Conteh Student ID#: 1874387

Cohort #: 11 Concentration: ACCT

Project Title:
Assessing the Impact of Transition from Rules-based to Principles-based Accounting in the Recognition of Revenue: A Study of Public Companies listed in the Russell 3000 Index that Elected the Full Retrospective Method of Accounting

has been approved for the Doctor of Business Administration Program
at George Fox University as a dissertation for the DBA degree.

Approval Signatures:

Chair Date 2/21/20

Dr. Justin Haigh, PhD
Chair (print)

Member Date 2-24-20

Dr. Debby Espinor, EdD
Member

Member Date 3-2-20

Dr. David Tucker, PhD
Member (print)

Date 2/28/20

Dr. Justine Haigh, PhD - Director, DBA Program

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Dedication

This dissertation is dedicated to the Almighty God who watched over me during this period. I also dedicate this dissertation to my late Dad, Yusufu Deen-Conteh (Papa Deen), who believed in me, and instilled in me the values and moral benefit of hard work. I also dedicate this dissertation to my late Grandfather, David B. Johnson (Pa Johnson), who saw the desire in me at an earlier age for western education.

Acknowledgements

I thank my dear wife, Claudia Diah Deen-Conteh, for her dedicated effort of encouragement in seeing me through this adventurous period. A special thanks to my children Dandia, Yuusuf, and Fatima for their support and motivation. To my Mom, Bisodu Christina Johnson, I thank you for supporting me. To Reverend Wilfred Showers and Alusine Kallon, I acknowledge your foundational support in preparing me for life after high school.

I acknowledge the roles played by Dr. Jekabs Bikis, Dr. Justine Haigh, Dr. David Tucker, and Dr. Debby Espinor of my dissertation committee. Their academic and professional advice obtained during this time have made me become a better researcher and person. I also acknowledge Dr. James F. Kiawo, Dr. Daniel B. Koroma, Joseph Piccini CPA, Adam Behrman CFA, and Frank Bellotti CPA-retired for their support and guidance during these difficult times. Lastly, I acknowledge the supportive roles played by members of Cohort 11, of the George Fox University Doctoral Program, for organizing group studies and supporting each other during these difficult times.

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ABSTRACT

This research empirically assesses the impact on the financial statements for businesses listed on the Russell 3000 Index after the transition to FASB ASC Topic 606: Revenue from Contract with Customers. The study was focused on the 272 companies that elected the Full Retrospective Method of accounting after transition from rules-based accounting to principles-based accounting. The research applied Gray Comparability Index and Student t-Test to determine the significance of the difference between the ex ante and ex post revenues reported in the Form 10K filed with the Securities Exchange Commission. The companies were divided into all adopters, early-adopters, and non-early adopters to assess their impact on the financial statements. The results indicated that there was no statistical or material difference for all the participants (all adopters) investigated. The results also indicated that there was no statistical or material difference for early-adopters and non-early adopters. Additional results by industry segments indicated that the difference in revenues for health care was statistically significant and material. The impact on the financial statements for the rest of the industries were not material or statistically significant. The results provided answer to the research question that there is no difference between the before and after revenues in the financial statements after the transition to principles-based accounting in the United States for companies tracked by the Russell 3000 Index. This research brings to the awareness of stakeholders the impact on the financial statement after the transition from rules-based to principles-based accounting in the implementation of the new revenue recognition standard in the United States. The findings in this study have implications to the FASB, IASB, professional accounting firms, management, and investors as they look forward towards the ongoing convergence between US GAAP and IFRS on other accounting standards not related to revenue.

Keywords: principles-based, rules-based, harmonization, revenue recognition, comparability, conservatism, materiality, relevance, ASU No. 2014-09, FASB Topic 606, positive accounting theory, Gray Comparability Index.

CHAPTER 1: INTRODUCTION

This chapter describes the problem statement, purpose, significance, and application of the study. It also describes the research question, hypotheses, definition of terms, limitations, and assumptions of the research.

Problem Statement

Management faces the critical issue of making decisions on when and how to recognize revenue (Kieso, 2001). Decision-making process is a central function in organizational management that is critical for the survival of a business. Revenue is the single most important line item in the financial statement relied upon by investors for business valuation and decision making (Zhao, 2010). Reliance on accounting information by investors and other stakeholders is very important for the comparability of financial statements. This reliance led to the promulgation of the Financial Accounting Standard Board's principles-based approach in revenue recognition. The principles-based approach became known as Accounting Standard Code (ASC) Topic 606: Revenue from Contracts with Customers (FASB, 2014a). Before the promulgation of ASC Topic 606, there were over 200 rules used by management to recognize revenue for businesses spread across multiple industries (Bramwell, 2014; Sedki et al., 2014). These rules—otherwise known as rules-based accounting—are complicated, lack clarity, and demonstrate "inconsistency in FASB's conceptual framework, the philosophical underpinnings of the board's accounting standards" (Cheney, 2006, p. 33). The complexity and confusion in the application of these rules leave management with no choice but to make judgment calls that result in underreporting or overreporting of revenue (Cheney, 2006). The transition from rules-based and harmonization to principles-based accounting system could bring clarity and minimize confusion in the comparison of financial statements by stakeholders. Also, the move to principles-based accounting will do away with the cherry-picking of over 200 pronouncements

on revenue recognition, which will require management to make more judgment calls in the application of a uniform principle-based approach to revenue recognition.

Proponents of the harmonization of Generally Accepted Accounting Principles (GAAP) argue that financial transactions with similar economic characteristics should be accounted for in the same manner across business segments and geographical locations for it to be useful to stakeholders (Bradshaw & Miller, 2008; Yekini, 2009). The harmonization of accounting standards would equip stakeholders to make meaningful comparisons instead of looking at misleading financial statements with dissimilar economic characteristics. The comparison of line items in the financial statements, recorded and estimated based on similar economic characteristics of the nature of the goods and services sold, becomes useful for stakeholders to assess the economic and financial performance of businesses (Yekini, 2009). It is worthy to note that accounting information in published financial statements must be relevant, reliable, comparable, and consistent in its application and meaning for it to be useful to stakeholders (Kieso, 2001).

Purpose of Study

The objective of this study is to empirically assess the impact on the financial statements for businesses who transition from rules-based accounting to principles-based accounting in revenue recognition. The transition to principles-based accounting was a decision made by the Financial Accounting Standards Board (FASB), the regulatory accounting standard setting body. This research focuses on United States public companies that are registered with the Securities and Exchange Commission (SEC) and that have elected the Full Retrospective Method of Accounting when transitioning from the old to the new GAAP. Under the Full Retrospective Method of Accounting, businesses are required to adjust prior period financial data disclosed in the financial statements (Conner, 2017). This study also assesses the impact on the financial statement of companies that adopt the new accounting standard before January 1, 2018 (early-

adopters), those that transitioned on or after January 1, 2018 (non-early adopters), and all companies (all adopters) that elected the Full Retrospective Method of Accounting when transitioning from the old to the new GAAP (early plus non-early adopters). This study brings to the attention of management the impact that the accounting principles of conservatism, comparability, and relevance have in making revenue estimates. This study also brings awareness of investors and regulators the financial impact of the transition from rules-based to principles-based accounting. It is worthwhile to note that the accounting principle of conservatism is part of this study, but it is not the reason for the study. The reason for the study is to assess if there is a significant difference in reported revenues between rules-based and principles-based accounting.

Significance and Application of Study

This study is significant to management, accounting standards setting bodies, investment communities, and other users because revenue is an important indicator for the success of a business over a given time period (Bramwell, 2014). The principles-based approach in the recognition of revenue allows for comparison across industries, aligns the United States with global accounting standards, and removes inconsistencies in revenue recognition (Aronson, 2017). Kothari, Ramanna, and Skinner (2010) stated that a principles-based accounting system creates broad principles, allowing managers to make judgements based on the economic reality of a business, and that the framework behind the principles would allow managers to apply "important accounting properties such as conservatism" (2010, p. 275) that best record contractual transactions. This study assesses the impact of the transition to principles-based accounting in the reporting of revenue on the financial statements, as managers use conservatism in applying the new law to public companies in the United States. This research provides useful information to users of financial statements and the Financial Accounting Standard Board on the

impact of transitioning from rules-based to principles-based accounting, as little research has been done since the implementation of the new accounting principles.

Research Questions and Hypotheses

The research question is as follows: "Is there a difference between the before and after revenue in the financial statements after the transition to principles-based accounting?" First, this research investigates the difference in reported revenue for all companies that elected the Full Retrospective Method of Accounting when adopting the new accounting standard before, during, or after the effective date of January 1, 2018. This category or participants are labeled as All Adopters. All public companies are mandated by law to transition from rules-based to principles-based accounting. It is expected that there will be a significant difference in revenues after transitioned to principles-based accounting. Second, this research investigates the difference in reported revenue for companies that are early adopters of the new principles-based accounting before January 1, 2018. These category or participants are labelled as Early-Adopters. The study of early adopters is important because it provides an explanation of the impact on the financial statements before the effective date of the new accounting standard. It is expected that management of early-adopters will report significant difference in revenues after transitioning to principles-based accounting. Reporting significant difference in revenue is a characteristic of early adopters due to their large capital market size, desire for positive impact on revenue, and management self-interested motive (Stent, 2011). Finally, this research assesses the difference in revenues for companies that adopt the new principles-based accounting on January 1st, 2018 excluding the early adopters. These companies are labelled as non-early adopters. There are three sets of hypotheses to be tested in this study, which are (1) All Adopters, (2) Early Adopters, and (3) Non-Early Adopters. The first category of hypotheses tested all the companies or participants in this study. This included early and non-early adopters. The second category of hypotheses tested companies that early adopt the new accounting standard. The third category of hypotheses

tested companies that adopt the new accounting standard on or after January 1, 2018. The three sets of hypotheses are stated below:

I. *All Adopters (Early and Non-Early Adopters):*

- (H_{01}) There is no significant difference in revenues before and after management transitioned to principles-based accounting. (This is the null hypothesis.)

  (H_{a1}) There is significant difference in revenues after management transitions to principles-based accounting. (This is the alternative hypothesis.)

II. *Early Adopters*

- (H_{02}) There is no significant difference in the before and after revenues for early adopters of principles-based accounting. (This is the null hypothesis.)
- (H_{a2}) There is significant difference in revenues after management transitions to principles-based accounting for early adopters. (This is the alternative hypothesis.)

FASB ASC Topic 606 allows companies to adopt the new principles-based accounting early. Management could have a motive to early-adopt the new law, which could be driven by management's self-interest motive to report lower or higher revenue. Identifying the reasons to adopt the new law early is beyond the scope of this research.

III. *Non-Early Adopters*

- (H_{03}) There is no significant difference in the before and after revenues for non-early adopters of principles-based reporting. (This is the null hypothesis.)
- (H_{a3}) There is significant difference in revenues after management transitions to principles-based accounting for non-early adopters. (This is the alternative hypothesis.)

Management could opt to adopt the new accounting standard at the effective date of implementation instead of an early date, which could be due to management's self-interested motive to minimize an unfavorable outcome that could result from the application of the new

accounting law. The identification of the reasons to not adopt the new accounting law early is beyond the scope of this study.

This research uses Gray's Comparability Index to assess the difference between the revenue reported by the old and new accounting standards. The Accounting principles of conservatism, comparability, and relevance are used in conjunction with Positive Accounting Theory to explain the results of management's choice in the selection and application of accounting policies and estimates. These theories provide answers to the research questions and hypotheses to determine whether the revenue reported by management in the application of the old and new standards is significant based on their judgments.

Definition of Terms

Below are terms used to understand this research.

- Harmonization: This is defined as the making of accounting practices more compatible making it easy for the comparability of financial statements (Nobes, 2002)
- The Security Exchange Commission (SEC): This is the United States government agency responsible to control the issuance and trade of public shares (Nobes, 2002). This agency requires public companies to report on the accounting standards used in the preparation of its financial transactions file on Form 10K, the standard document used for annual filing.
- Financial Accounting Standards Board (FASB): A United States agency responsible for the promulgation of accounting standards or generally accepted accounting principles otherwise known as US GAAP.
- International Accounting Standard Board (IASB): An international body responsible for the promulgation of accounting standards known as International Financial Reporting Standard (IFRS).

- Accounting Standards Update (ASU): The formal way in which FASB communicates to the public when changes to the accounting standards are about to be made or made.
- ASU No. 2014-09 Revenue from Contracts with Customers: This is the formal communication by FASB to the public on the change in the accounting of revenue from rules-based accounting to principles-based accounting.
- Accounting Standard Code (ASC): This is a promulgation of an accounting standard or law by FASB under the new codification system.
- FASB Accounting Standard Code Topic 606: This is the new revenue recognition standard promulgated by the Financial Accounting Standard Board (FASB, 2014a)
- Financial Accounting Standard (FAS): This is a promulgation of an accounting standard or law by FASB under the old codification system.
- Revenue: This is defined as the amount recorded for "the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services" (FASB, 2014a, p. 2). Revenue is identified as a line item in the financial statement filed in Form 10K with the Security Exchange Commission (SEC).
- Contract: This is defined as "an agreement between two or more parties that creates enforceable right and obligations" (FASB, 2014a, p. 2)
- Performance Obligation is defined as "a promise in a contract with a customer to transfer a good or service to the customer" (FASB, 2014a, p. 3)
- Transaction Price is defined as "the amount of consideration (for example, payment) to which an entity expects to be entitled in exchange for transferring promised goods or services to a customer, excluding amounts collected on behalf of third parties" (FASB, 2014a, p. 3)

- Full Retrospective Method: This is defined as the application of a new accounting law by restating prior year accounting statements as if the law has been in use (Nobes, 2002)
- Gray Comparability Index (GCI): An instrument used in assessing the difference in accounting practices derived from the results or line items reported in the financial statements (Ali et al., 2016).
- Rules-based accounting (RBA): This is an accounting framework that is largely driven by many bright-lines, exceptions, scope restrictions, implementation guidance with variations across industries, and contradictions with other accounting standards (Sundvik, 2019).
- Principles-based accounting (PBA): This is an accounting framework that allows accountants, management, and financial statement preparers to rely on professional judgment in the interpretations of similar economic transactions based on the core principles laid out by an accounting standard setting body.
- Russell 3000 Index: This is a market-capitalization-weighted index of the 3,000 largest publicly traded companies, which represents 98% of publicly registered incorporated equity securities in the United States (Cheney, 2006).
- Materiality or Material: This is used in accounting to denote a threshold or an amount in which its omission or misstatement impacts the decisions of financial statement users.
- Significant: This word is used in this research to describe the degree of relevance and materiality of the difference in restated and reported revenue to users of financial statements.
- Calendar Year: This the reporting year of a company that starts its annual financial year from January 1 and ends on December 31.

- Fiscal Year: This is the reporting year of a company that starts and ends its annual financial year from any of the calendar months. For example, a company could begin its fiscal calendar in June of Year 1and end in May of Year 2.
- Breakage and Loyalty Program: This is a benefit that is entitled to a customer after a legally binding agreement. However, the benefit has become non-redeemable due to the balance remaining or expiration date of an agreement.
- Revenue Timing: This is the difference in time interval in which revenue is recorded in the books of account.
- Variable Consideration: This is when the consideration amount or transaction price is affected by other incentives that cause the amount recorded as revenue to vary.
- Bright-Line Test: These are "accounting rules, generally included quantitative thresholds that direct how specific scenarios should be reported in the financial statements, and offer little opportunity for the application of professional judgment" (Duchac, 2004, p. 325).

Limitations and Assumptions

This research is limited to public companies as the implementation of ASC Topic 606 is not effective for private companies until 2020. Obtaining current and historic financial statements for private and not-for-profit organizations is difficult and currently a database is not readily available that brings all businesses in one database. This makes it impossible to generalize the results derived from this study to private companies and not-for-profit organizations.

This research assumes that economic, political, and cultural factors are irrelevant since Gray Comparability Index requires financial statements to be restated for prior periods used to calculate the index (Gray, 1980). Hence, by using restated financial data, this research compares apples to apples taking into consideration the same factors that prevail in the fiscal periods used

in the implementation of the new accounting standards. Table 1 below shows the implementation dates.

Table 1: Implementation Dates

Dec 15, 2016	Year 2017	Year 2018
After this date, early adoption is permitted as per FASB ASC TOPIC 606 for Rules-based accounting (RBA)	Full year of reporting for early adopters. Rules-based accounting (RBA)	Full year of reporting for non-early adopters. Principles-based accounting (PBA)

This research assumes that by adoption of Positive Accounting Theory (Watts & Zimmerman, 1978), management will make estimates in implementing the accounting standard that benefits their self-interest motives. However, evaluating and measuring these motives is not the objective of this research.

This research uses the accounting principle of Comparability and Gray Conservatism Index, also known as Gray Comparability Index (Gray, 1980; P. Weetman et al., 1998), to explain the difference between the ex ante and ex post revenue posted in the Form 10K. However, one limitation of this research is that it does not offer more than a suggestion as to the reasons for the difference, which could be a different study altogether.

What to Expect in the Upcoming Chapters?

The following chapters reviews prior literature on accounting conceptual frameworks, principles, rules, and positive accounting theory. The discussion of research methodology, Gray's Conservatism or Comparability Index, and Student t-Test are used as statistical tools to answer the research question and hypotheses. This is followed by the results, findings, conclusions, and recommendations.

CHAPTER 2: REVIEW OF LITERATURE

This chapter provides the historical development of GAAP and its relationship with the conceptual framework surrounding the promulgation of accounting laws applicable to the United States. The conceptual framework is the basis for the promulgation of US accounting laws in the United States that led to over 200 accounting rules (Bramwell, 2014) under the old rules-based accounting system. Understanding the foundation of and the reasons for the creation of these rules provide an insight into FASB decision to harmonize into a single revenue recognition model based on principles-based accounting. Relevant research conducted on the transition from rules-based to principles-based accounting and studies addressing the impact on the financial statements after transitioning to a principles-based accounting, are addressed in this chapter. This chapter also examines positive accounting theory in conjunction with the principle of conservatism in the estimation of revenue by management.

Background of US GAAP

In an article describing the significant events evolving around the accounting profession in the United States, Zeff (2003) stated that the "U.S. accounting profession emerged during the last quarter of the 19th century" (2003, p. 190) with the creation of the American Association of Public Accountants (AAPA) in 1887, which was a major accounting professional body for the certification of professional accountants. The AAPA was British-dominated, which paved the way for the early development of professional accountancy in the United States to emulate the British model of chartered accountancy (Flesher et al., 1996). The AAPA has evolved and taken different names, to the American Institute of Accountants (AIA) in 1917, and then in 1957 to American Institute of Certified Public Accountants (AICPA). Flesher, Miranti, and Previts (1996) state that the initial focus of the AICPA in the 1950s was on the research of accounting standard setting. This led to the formation of the Accounting Principles Board (APB) by the AICPA and "earned some credit for narrowing the areas of the difference in a number of

controversial areas of GAAP" (Zeff, 2003, p. 195) such as the accounting of revenue and earnings performance.

The promulgation of accounting standards by the APB was heavily contested by the Big Eight accounting firms and that led to a commission of inquiry for a better alternative to APB (Zeff, 2016). This further led to the Wheat Study Group by the AICPA that recommended the establishment of the Financial Accounting Standard Board (FASB) in 1972 as an independent body responsible for the promulgation of accounting standards in the United States (Zeff, 2003).

The Securities Exchange Commission (SEC) was created in 1934 to regulate public companies in the United States (Flesher et al., 1996). The SEC relied on early professional accounting bodies, such as the APB and FASB to issue rules and guidelines that became known as GAAP (Zeff, 2003). FASB has been creating accounting standards in the United States that were driven by rules, frameworks, and concepts. The accounting laws in the United States are mostly established in rules-based accounting framework. The merit of changing to principles-based accounting was authorized by the Sarbanes Oxley Act of 2002 (Zeff, 2005) and the harmonization of US GAAP with international standards (Komai & Richardson, 2011). Thus, Section 108 of the Sarbanes Oxley Act of 2002 requires the SEC to recognize as a GAAP promulgated by a body, such as FASB, as long as it keeps GAAP current with international convergence (Center for Audit Quality, 2008; Church, 2016). Testimonies from Paul Volker and Sir Davis Tweedie, former heads of the United States Federal Reserves and the International Accounting Standards Board respectively, advocated against the compliance of rules-based accounting. Their position ran contrary to the spirit of an accounting law relevant for the comparison of financial statements of similar economic assets (Boone et al., 2013). The testimonies revealed that the "concerns that the underlying objectives of accounting standards are sometimes obscured by dense language, detailed rules, and numerous exceptions" (Boone et al., 2013, p. 714).

The laws promulgated by FASB before the passage of the new revenue recognition standard make room for less judgment and more prescriptive approach in the application of accounting laws. This led to the argument for an accounting approach with the use of judgment by preparers with knowledge of the economic substance behind the financial transactions (Wüstemann & Wüstemann, 2010). In addition, this makes the case for the transfer to a principles-based accounting system, the harmonization of US accounting standards with international standards, and ensuring the comparability of revenue using a single revenue recognition model.

Principles-Based Vs. Rules-Based Accounting

The word *principles* has been used by practitioners and academics in applying accounting processes and describing accounting theories (Littleton, 1938). As such, accounting principles must be obeyed if a business is to survive for the foreseeable future, since bad accounting practice finds its way into the financial statements and provides wrong information for stakeholders. According to Littleton (1938), for a principle to be accepted, a principle should separate related facts and those unrelated to different types of businesses. Recently, in discussing management accounting principles, Maszlerz (2014) stated that the Chartered Institute of Management Accountants (CIMA) and American Institute of Certified Public Accountants (AICPA) defined accounting principles in the financial management context of (1) providing relevant information, (2) modelling value creation, and (3) communicating impact. The viability or success of existing or newly accepted accounting principles depends on the consistent application of the logic expected in reporting comparability of financial statements. Accounting principles can then be tested by putting them through logical analyses based on a major assumption that expresses results and conditions, a minor assumption that accepts or denies the results and conditions, and a conclusion that validates or invalidates the assumption. This research makes assumptions, and states a research question and hypotheses that provide answers

based on the comparison of the reported revenue of the rules-based accounting and the principles-based accounting.

According to McCarthy and McCarthy (2014) the subjection of economic entities to management control when shifting from rules-based to principles-based accounting requires a higher level of professional judgment. This is essential especially when estimating revenue and involves inherent subjectivity of the financial statement preparers. Therefore, a rules-based accounting framework involves bright-line tests in which financial transactions can be manipulated by different financial statement preparers. This can often lead to inconsistencies across industries. Thus, a principles-based accounting framework decreases the complexity, makes it easier for compliance, and allows preparers to exercise more judgment (McCarthy & McCarthy, 2014). Two of the four hypotheses hypothesized that the preparers of financial statements will make aggressive decisions to report revenue when there is a self-interest motive under rules-based or principles-based accounting. The results in their study did not support the hypotheses. The results stated that "there was not a statistically significant difference in the amount of judgment required when applying rules-based standards and subjects applying principles-based standards" (McCarthy & McCarthy, 2014, p. 21). The findings indicated the difficulty in the application of accounting standards, whether rules or principles-based accounting, and calls for future research to explore the impact of management intention in the application of an accounting standard on a financial statement to accommodate a principles-based accounting standard. In this present research, the assessment of the impact on the financial statement, after transitioning to principles-based accounting, compares the restated revenue of the rules-based accounting and the reported revenue of the first years of the principles-based accounting to determine the significance of the difference.

A recent study conducted by Sundvik (2019) echoed the mixed findings in which he stated that revenue "is higher when firms' standards are based more on principles" (2019, p. 3)

and that rules-based accounting has the opposite effect. This is evident during the transition from rules-based (local standards) to principles-based accounting (international standards) when performing analytical works on archival data of businesses. The hypotheses were framed around actual and estimated revenues, which projected a higher reported amount for estimated revenue under principles-based accounting, and a higher reported amount for real revenue under rules-based accounting. The researcher outlined a significant difference when using principles-based accounting which gives preparers of financial statements the discretion to use their judgment. The judgment associated with a principles-based accounting approach, and bright-line (less judgment) associated with rules-based accounting, explains the higher reporting of earnings in principles-based compared to rules-based (Sundvik, 2019). This stated difference between principles-based and rules-based accounting is supported by Guillaume and Pierre (2016). They indicate that the difference is due to the heavy reliance of professional judgment in the recognition of revenue across industries for principles-based accounting versus bright-line application of the recognition of revenue under rules-based accounting. This current study looks at the financial impact between two sets of accounting standards, which is more relevant to users of financial statements in 2019, as public companies are required to transition from rules-based to principles-based accounting effective January 1, 2018. This is one of the recommendations for future research recommended by Guillaume and Pierre (2016). The objective of this research is not to discern why the results are different, but to determine the extent of the difference based on restated and reported revenue after implementation of principles-based accounting.

ASU No. 2014-09 / FASB ASC Topic 606: Revenue from Contracts with Customers

FASB creates accounting laws in the United States under Accounting Standard Codifications (ASC) and the International Accounting Standard Board (IASB) under International Financial Reporting Standards (IFRS). In the United States, the changes that led to the promulgation of an accounting law is preceded by a communication by FASB usually known

as an Accounting Standard Update (ASU). The FASB and IASB completed its joint convergence revenue recognition project in 2014, which led the FASB to issue ASU No. 2014-09: Revenue from Contract with Customers, and codified as FASB ASC Topic 606: Revenue from Contract with Customers (FASB, 2014a, 2014b, 2014c). The IASB also issued a similar law on revenue recognition titled IFRS 15: Revenue from Contract with Customers. The FASB ASC Topic 606 and IFRS 15 are both results of the convergence project completed in 2014, which are both based on the principles-based accounting framework (FASB, 2014a, 2014b, 2014c). ASU No. 2014-09 was issued to converge and align with the recognition of revenue in the United States and the IASB. The focus of this study is on FASB ASC Topic 606 and not on IFRS 15.

According to FASB (2014a), the main provisions of FASB Topic 606 is based on a principles-based accounting system (core principle) that revenue is to be recognized after "the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in the exchange for those goods or services" (2014a, p. 2). In order for the core principle to be achieved, they stated that businesses must follow a five-step model in which (1) contracts are clearly identified with customers, (2) performance obligations are clearly identified in the contracts, (3) transaction prices are clearly determined, (4) transaction prices in the contracts are allocated to their performance obligations, and (5) the timely recognition of revenue as the performance obligations are fulfilled. They also stated that these main provisions are different from the old accounting standards. The old accounting standards was limited to the realization concepts, made up of rules to account for transactions of narrow issues, and without the reference of common conceptual frameworks in accounting. FASB (2014c) stated that the new principles-based accounting approach "would eliminate the previous diversity in practice and create greater comparability across entities, industries, and reporting periods" (2014c, p. 654).

The effective date for public companies to implement this law was January 1, 2018, but early adoption was permitted, which allowed businesses to early adopt for fiscal year 2017. In the year of initial application, FASB (2014c) allowed businesses to apply a Full Retrospective Method—allowing the restating of revenue for the prior comparative period to ensure that revenue derived from contracts are measured and applied consistently in accordance with another standard (FASB ASC Topic 250, Accounting Changes and Error Correction), FASB ASC Topic 250 allows a business to restate prior numbers when accounting changes occurred due to the promulgation of a new accounting law. The Modified Retrospective Method was an optional method allowed in the year of initial application, in which the beginning balance of equity in the balance sheet is adjusted for, does not require the restatement of comparative years, but require additional disclosures for stakeholders to understand the financial position of the business. This research is focused on the Full Retrospective Method and not on the Modified Retrospective Method.

Critical Areas in ASU No. 2014-09 / FASB ASC Topic 606

There are some critical or other key areas stated in ASU No. 2014-09: Revenue from Contract with Customers. These critical areas are important for the readers to know to understand this research. These key areas are judgments made by accountants in the application of the new law, dissenting vote or opinions made by a regulator, control of goods and services as legal claim on contracts, the timing in revenue recognition, and the possible variability in impacts by industry segments and markets (FASB, 2014c). These areas are discussed in the following paragraphs.

Judgment calls are made along the way in the recognition of revenue. One of the judgment calls, made during and at the end of each reporting period, involves estimating the expected value or most likely amount of revenue that is entitled to the business when the transaction price involves variable consideration. A consideration or transaction price “can vary

because of discounts, rebates, refunds, credits, price concessions, incentives, performance bonuses, penalties, or other similar items" (FASB, 2014a, p. 32). R. Harold Schroeder, a member of FASB and the only dissenting vote in the passage of this new law, agreed with the core five-step principle of the new law to be applied by management in reporting revenue that the business expects to be entitled based on the performance of its obligations. However, Schroeder believed that in the accounting of variable consideration where revenue is accounted based on the probability that a significant portion of estimated revenue will not be reversed, and where the assurance of a collectability threshold are contradictory with the objective stated in FASB ASC Topic 606-10-10-1 of the new law. Schroeder believed that this could lead to a downward adjustment in the recording of revenue, a conservative bias in the recording of revenue rather than a neutral approach. A conservative bias does not reflect what is truly earned by the business. The estimation of revenue should be based on unbiased expectation of considerations entitled to the business. His view was acknowledged and addressed by FASB in a later Exposure Draft (ED). Respondents of the ED acknowledged their support for the five-step core principle of the law but disagreed with some areas where judgments may raise concerns of comparability.

FASB's focus on the simplification of revenue timing and the accounting of the consideration or amounts stipulated in contracts is a critical area covered in the new revenue recognition standard. Section 606-10-50-17 of the new accounting standard requires an entity to disclose (qualitative and quantitative) the timing of revenue based on the performance obligations and transaction price fulfilled by a business in a current or prior period, if they are material. Consideration can be recognized at a point when all the five steps in the new revenue recognition standard are met. However, when the customer expects to receive benefits over time, control passes to the customer as performance obligations are fulfilled, and the business has the legal right to demand payments for performance obligations fulfilled. The timing in the

recognition of revenue is based on progress made in the contract's performance obligations and on variable elements of performances to be fulfilled.

Under the new accounting law, a contract exists when two or more parties have rights that are enforceable in a court of law, even when those rights are not in writing, and applicable within the context of the domicile of legal jurisdiction. The identification of a customer is an area about which respondents of one of the ED raised concerns; facts and circumstances could lead to revenue recognition in industries that are heavily impacted. Those industries noted by respondents of one of the ED are biotechnology, pharmaceutical, aerospace and defense, healthcare, oil and gas, and higher education. The previous revenue recognition guidance requires the assessment of the transfer of risks and rewards of ownership in recording revenue in the books of accounts, which is different from the new guidance which focuses on the time the customer obtains control of the goods and services. FASB decided that revenue should be measured using the allocation of transaction price to performance obligation approach. The price used in this approach is one for which the businesses have a legal claim based on the contract, and enforceable in a court of law. Also, disclosure is required for the amount and time that revenue will be recognized for remaining obligations listed under an existing contract, and for any change in judgments on revenue, and the associated risks with the collectability of remaining consideration. Businesses must disclose significant judgments and estimates made in revenue recognition.

Section 606-10-05-2 of the new principles-based accounting framework makes it clear that the core principles of recognizing revenue is surrounded by contracting. Therefore, the new principles "depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods and services" (FASB, 2014a, p. 14). KPMG (2016) stated that these core principles should be clearer in its applicability across businesses on key revenue recognition issues. These key

revenue recognition issues are the amortization of costs to obtain a contractual agreement or contract modifications, variable considerations, loyalty programs, accounting for breakage revenue, sales outside of the main revenue stream, and their presentation in the financial statements. The new principles-based accounting framework requires businesses to make the judgment call in (1) applying the expected value or the most likely amount in recognizing considerations variability caused by rebates, refunds, price concessions, and other incentives in bundling packages; (2) recognizing the incremental cost of contracting and amortizing when performances obligations are met; (3) customer points redeemable in a loyalty program, based on the specific terms and conditions agreed upon, recognized over time, and (4) the recognition of revenue when a customer fails to use an exercisable right paid for in advance, known as breakages in the customer using the full amount of a gift card, based on the transfer of right performed in the contract (FASB, 2014a, 2014b, 2014c). ASU No. 2014-09 / FASB ASC Topic 606 provides accountants the greater latitude to make judgments in applying the core principles in the new law to address these critical areas.

Accounting Conservatism and Positive Accounting Theory

The accounting principles of conservatism and positive accounting theory are two of the theoretical frameworks used in this research. Karahan Gokmen (2013) stated that the principle of conservatism in accounting is as old as the origin of accounting itself, which has made this accounting topic, debatable amongst accounting academicians, an integral part in the preparation of financial statements. According to Watts and Zimmerman (1983) accountants have focused on the administering and monitoring of revenues from contracts of members of the merchant guilds of businesses and joint ventures, which have influenced the application of conservatism in the accounting and reporting of contracting. Unsurprisingly, when accountants are confronted with the task to make decisions on the reporting of financial transactions, they use their best judgment, and are driven by the accounting principle of conservatism (Sterling, 1967).

Therefore, the realization of revenue has its deep roots in the accounting principle of conservatism, which made this principle fundamental in accounting. As suggested by Sterling (1967), accounting conservatism is the root cause of the revenue recognition principle. In Section C of ASU No. 2014-09, the accounting principle of conservatism is identified as a constraint which affects the judgments made by management. Judgments are made in estimation of revenue when a transaction price involves variable consideration to be recognized to the extent that the probability of significant reversal will not occur. In Section C of the new accounting standard, FASB (2014c) stated Mr. Schroeder's opinion that the probability constraint introduces bias towards conservatism. It is also worth noting that the accounting principle of conservatism is allowed by the Securities Exchange Commission (SEC) to play a role in its accounting on revenue recognition and deemed essential in the fair presentation of financial information (Watts, 2003). Recently, the International Accounting Standards Board (IASB) further asserted that conservatism or prudence is used by accountants to exercise restraints when making judgments in the face of uncertainty (Bloom, 2018), despite the FASB and the IASB exclusion of conservatism in the joint 2006 convergence project (Karahan Gökmen, 2013).

Watts and Zimmerman (1978) conducted research that provides the beginning of positive accounting theory, and explored the attitudes of financial management in the selection of accounting laws and policies that influence investors in their decision making process. They stated that management plays a key role in influencing accounting standard-setting bodies in the passage of accounting laws in which the motive of businesses is to maximize the utility of managers or the self-interest of corporations. Therefore, Watts and Zimmerman (1978) predicted that, in the selection of an accounting standard, financial managers will "choose accounting standards which report lower earnings (thereby increasing cashflows, firm value, and their welfare) due to tax, political, and regulatory considerations rather than to choose accounting standards which report higher earnings and, thereby, increase their incentive compensation"

(1978, p. 118). The reporting of lower earning or revenue to minimize exposure to government regulatory considerations connects the theory of positive accounting to the accounting theory or principle of conservatism. It is important to note that the principle of conservatism acts as a check and balance in curtailing the self-interest motive of managers.

The Accounting Concepts of Comparability, Relevance, and Materiality

The accounting principles of comparability and relevance are other guiding principles used in this research. This section uses extant literature to discuss the accounting concept of comparability during convergence and harmonization of accounting standards. These accounting concepts and processes are important to this research because they could impact the judgments made by management in the recognition of revenue when transitioning to principles-based accounting.

Comparability is listed as one of the qualitative characteristics of accounting information that ensures that accounting information is measured in a consistent way across businesses and industries (Kieso, 2001). According to Gordon and Gallery (2012) comparability is one of four principal qualitative characteristics of accounting information that enables the comparison of the performance of businesses over time. Comparability is not well researched as a construct, not that well understood by accounting researchers, and is more important during harmonization, convergence, and standardization of accounting practices. There are four types of comparability: surface comparability, deep comparability, non-convergent comparability, and intrinsic comparability (Gordon & Gallery, 2012). Surface comparability involves transactions from two different entities that look similar, are accounted for the same way, but the economic circumstances are different. Deep comparability involves similar transactions treated the same. Non-convergent comparability allows options and deviations. Intrinsic comparability involves dissimilar economic events using different accounting methods. This research is focused on deep comparability. The new accounting law under ASU No. 2014-09 and FASB ASC Topic 606

stated that the significant benefit in "reporting revenue from contracts with customers is greater consistency in the accounting for economically similar transactions" (FASB, 2014c, p. 648). This involves treating similar transaction the same across businesses. For comparability to be useful to investors, the information must truly represent underlying economic conditions of the financial transactions, and the methods for accounting for the financial transactions must be uniformly and consistently applied across companies and industries at a moment in time.

Significance is synonymously used with *relevance* in accounting. Srivastava (2014) stated that "revenue is one of the largest and most-relevant items in firms' financial statements" (2014, p. 661). Relevance explains the degree of importance of accounting information. Kieso (2001) stated that "to be relevant, accounting information must be capable of making a difference in a decision" (2001, p. 38). FASB ASC Topic 606 require companies to disclose relevant information of revenue reported in a current period in which performance obligations were partially fulfilled. However, FASB ASC Topic 606 does not require disclosing this information if the amount is not relevant or significant. The difference between restated and reported revenue is tested in this research. Both restated and reported revenues are relevant information that require disclosure for certain companies depending on the method of implementation selected.

Kieso (2001) stated that the accounting constraint or concept of "materiality relates to an item's impact on a firm's overall financial operations" (2001, p. 49). Materiality influences the judgment of a stakeholder or a reasonable person and that an amount greater than 5 percent of net income or earnings could be material (Kieso, 2001). An amount greater than 5 percent of earnings is also used by the SEC staff when assessing accounting materiality (Eilifsen & Messier, 2014). Ali, Akbar and Ormrod (2016) used Gray Comparability Index and Student t-test to assess the significance of the difference in profits and equity between IFRS and UK GAAP. The researchers used Gray Partial Comparability Index, developed by Weetman and Gray

(1991), to assess the impact of adjustments made to earnings or profits for significant or material financial transactions in reconciling from IFRS to UK GAAP. Ali et al. (2016) used multiple percentages of materiality to test whether the accounting adjustments made between IFRS and UK GAAP are material. Razak and Alqurashi (2018) examined 127 Saudi Arabian publicly traded companies that transitioned to IFRS on January 1, 2017. The researchers used Gray Comparability Index to assess the impact of before and after net income on the financial statements and Student t-test to test the statistical significance of the differences. Accounting materiality thresholds of 5 percent and 10 percent were calculated to assess the materiality of the difference in the before and after net income reported in the financial statements. The findings concluded that 74.19% reported material change in net income (45.97% negative impact and 28.22% positive impact) and 25.81% reported no material change (no impact in the financial statement).

This current research does not use Gray Partial Comparability Index, as applied by Ali et al. (2016), because a reconciling adjustment is not required between restated and reported revenue in this current research. However, this current research uses an accounting materiality threshold of an amount greater than 5 percent (or a ratio 0.05) of revenue to assess accounting materiality. Five percent or a ratio of 0.05 is also applied in this current research to test the level of significant in the difference in reported and restated revenues when applying Student t-test.

Gray Comparability Index (GCI)

Gray (1980) stated that the idea leading to the origin of the Gray Comparability Index stems from the criteria for the comparison of performance initiated by the European Federation of Financial Analysts Societies (EFFAS) in 1967. This idea for a common performance led to the creation of accounting ratios or indices to compare the impact of reported data in financial statements. EFFAS's objective was to create a yardstick between disclosed and adjusted profits. This yardstick provides a neutral indicator that financial analysts can use to compare the

financial performance of companies across Europe and the world. Gray (1980) created an index, based on the EFFAS method, by taking the difference between adjusted and disclosed profits divided by adjusted profit, and the results are subtracted from number 1, to arrive at a ratio termed Gray Conservatism Index. This is also known as Gray Comparability Index. This index assesses the difference between the application of two or more accounting standards by businesses.

Gray (1980) compared the profit measurement behavior in Europe. The researcher analyzed a total of 90 public-listed companies in France, Germany, and the United Kingdom, for a five-year period ranging from 1971 to 1975. The number of companies were reduced to 72 because of incomplete financial data, mostly companies listed in France that did not report adjusted revenue and net profit required for the study. The researcher calculated an index (a ratio) for each company and classified index into nine categories or scales. The many categories are included to make room for tolerance among countries. Table 2 below listed the nine categories or scale.

Table 2: Conservatism or Comparability Degree Scale from Gray (1980)

Category	Index (ratio)	Interpretation
I	< 0.50	Less conservative or pessimistic
II	0.50 - 0.74	Less conservative or pessimistic
III	0.75 - 0.94	Less conservative or pessimistic
IV	0.95 - 0.99	Neutral
V	1.00	Neutral
VI	1.01 - 1.05	Neutral
VII	1.06 - 1.25	More conservative or optimistic
VIII	1.26 - 1.49	More conservative or optimistic
IX	1.50 or >	More conservative or optimistic

The computation of the Gray Conservatism Index revealed differences amongst Germany, France, and United Kingdom listed companies. The main question in Gray's (1980) research is "are these differences statistically significant?" (1980, p. 68). The null hypothesis stated that "the proportion of company profits disclosures which are classified in each of the categories of conservatism is the same for all countries" (Gray, 1980, p. 69), and it was tested using the chi

square. However, the results from the tests indicated that that country's factors play a role in the determination of profits measurement behavior, which rejects the null hypothesis stated above. Weetman, Jones, Adams, and Gray (1998) renamed the Gray Conservatism Index to the Comparability Index. This "places clearer emphasis on relative accounting treatment without requiring a judgment as to which is more or less conservative" (1998, p. 192). This allows the Gray index of Comparability to be used as a comparison measure during accounting convergence and harmonization, which quantify the difference in accounting methods at an event or incident in time.

There are limitations of Gray Comparability Index that could affect the analysis and interpretation of the calculated data or indices. This analysis and interpretation may affect the outcome of the findings when the indices calculated are extreme, when the numerator is of a relatively large amount, and when the base number or denominator is close to zero (Ali et al., 2016). This research will review the data to ensure that extreme values do not distort the results and interpretations. Another limitation is the size of the company. Small companies can distort the calculation due to the non-availability of data (Ali et al., 2016). This research uses companies that are registered with the SEC. This makes data readily accessible directly or through a reputable third party.

Other Comparability Indices

Van der Tas (1988) quantified the degree or comparability of the harmonization of accounting standard and the impact harmonization had on financial reports. This led to the development of a framework that defines harmonization and determines the extent of harmony in the accounting standard. The method or framework developed can be used to measure the impact of harmonization on financial reporting. The researcher introduced the H, I, and C Indices for measuring the impact of accounting standards on financial statements. The H Index stands for Herfindahl Index, which weighs the relative frequencies from high to low on the congruent or

concentration of accounting methods used by businesses under investigation. The frequency is the total number of parties concentrated on a method divided by total number of parties on all methods. The H Index increases as concentration of opinions on methods increases and indicates that harmonization increases or is in progress. The H Index ranges from 0 (no harmony) to 1 (complete harmony). The C Index takes into consideration the H Index and modifies it to account for multiple accounting periods. The I Index, on the other hand, is used in measuring the opinion of accounting in two or more countries. Krisement (1997) stated that these indices are useful where the application of several methods are used in recording a financial transaction. He went on to say that this happens in an environment where companies are required to follow different rules when operating in different financial markets. In this paper, the focus is on harmonization of a singular approach in recording revenue in the same financial market.

Krisement (1997) presented an approach to quantify the degree of comparability of accounting or financial data based on the frequencies of their application. The researcher's approach measured the degree of comparability by means of an entropy index based on the convergence of financial information, dependent on the relative frequencies of the accounting laws, and use for all or subsets of business segments. The researcher further stated that a combination of C-index and Entropy is appropriate to measure the degree of comparability for multiple reporting. For this research, Krisement's (1997) approach for measuring the degree of accounting comparability is not appropriate because this research is looking at a singular accounting law applied uniformly across all businesses and segments, with a singular form of reporting prescribed by the United States Securities Exchange Commission.

Empirical studies on the Impact after Transition to Principles-Based Accounting Using Gray Conservatism or Comparability Index

Pires and Decourt (2015) used the Gray Comparability or Conservatism Index (GCI) to measure the impact after the final transition or mandatory convergence from Brazilian GAAP

(rules-based accounting system) to IFRS (principles-based accounting system). In Brazil, the convergence happened in two stages: in 2008 (first) and in 2010 (final). The Brazilian study focuses on the final stage as required by the new accounting standard Law No. 11,638 that mandated convergence to IFRS. In 2010, the year to adopt IFRS, Brazilian companies restated 2009 financials of revenue, net income, shareholders equity, and total assets to ensure that investors can compare the impact of the transition from the rules-based accounting to principles-based accounting. Restating these financials is important for decision making by stakeholders. Their study was a quantitative research in which they selected 83 companies with equity in excess of 1 billion Brazilian reáls that are publicly traded. Data was extracted from the Securities and Exchange Commission's database in Brazil. Student t-Test was used to measure the significance of the differences of variables for the 2009 restated variables and 2010 reported variables. Based on the theory of conservatism and judgments made by management, the results indicated a significant increase in net income and shareholder equity, and less significant increase in total assets. The researchers improved the understanding of managers, investors, and regulators to understand the impact on convergence to principles-based accounting on the financial statement. The originality of their research is important because the year of transitioning to principles-based accounting enabled stakeholders to assess the impact on the financial statements of the new law and proved useful in decision making.

Similar originality in research due to the mandatory convergence to International Financial Reporting Accounting Standard (IFRS) in Europe presented an opportunity for Istrate (2013) to research the comparability, harmonization, and impact on financial statements of European-listed companies. Istrate (2013) stated that "It was to be expected that the transition to IFRS would have a major impact on financial statements" (2013, p. 2). The Gray Index of Comparability and simple averages were used to measure the impact on the financial statement in the transition made by European countries to IFRS, a principle-based accounting approach.

According to Istrate (2013), the Gray Conservatism or Comparability Index, as indicated in prior research, can be done in two ways, as depicted in Figure 1 (Formula 1) and Figure 2 (Formula 2) below.

Figure 1: Formula 1

$$\boldsymbol{Gray\ Index\ of\ Conservatism}\ (\boldsymbol{Index\ of\ Comparability - IC}) = \mathbf{1} - \frac{\boldsymbol{New\ GAAP\ Numbers - Previous\ GAAP\ Numbers}}{|\boldsymbol{New\ GAAP\ Numbers}|}$$

Figure 2: Formula 2

$$\boldsymbol{Gray\ Index\ of\ Comparability}\ (\boldsymbol{IC}) = \mathbf{1} - \frac{\boldsymbol{Previous\ GAAP\ Numbers - IFRS\ Numbers}}{|\boldsymbol{Previous\ GAAP\ Numbers}|}$$

Furthermore, the researcher stated that most studies used the formula in Figure 1, which was originally proposed by Gray (1980). Others preferred the formula in Figure 2, which was adopted by Weetman, Jones, Adams, and Gray (1998). Data was obtained from public companies listed on the Paris, Brussels, Amsterdam, and Lisbon Stock Exchanges to analyze equity, net income, leverage, return on equity, and return on assets. The data was gathered manually by scanning through published financials. A total of 593 European-listed companies were selected as a sample. One sole financial year with restated data was used to compare prior year to current year to guarantee the homogeneity of the derived conclusion. The results showed that some countries in Europe were more conservative when making judgments in applying the new accounting standard and others were less conservative. One of the limitations in his research is that of the (time consuming) impossibility of accessing data which restricts the statistical processing of data to companies that are accessible. This current research will remove this limitation by obtaining data from a third-party professional firm that specializes in the collection and housing of financial data required by the research.

Callao, Jarne, and Lainez (2007) investigated 35 publicly listed companies in Spain after the implementation of IFRS, to measure the quantitative impact on the financial statements. According to the researchers, the Spanish accounting laws were based on the legal system of Roman Law and were heavily driven by Regulatory proclamations. The two objectives in the study were "(1) to establish whether the financial statements of Spanish firms are comparable when some apply IFRS and others continue to use Spanish standards and (2) to determine the effect of the adoption of IFRS on the relevance of financial reporting in Spain."(Callao et al., 2007, p. 165). The null hypothesis—that no statistically significant difference between the results of the old and new accounting law—was rejected. The Student t-Test and Wilcoxon signed-rank test was used to analyze the hypotheses. The results indicated significant differences on the image of Spanish companies when operating under IFRS accounting law than under Spanish law. The significant differences were found in the data reported for operating income and extra-ordinary income due to the difference in accounting treatment. Limitations in this research include the short period of implementation, the small size of the sample data, and the difficulty in obtaining detailed relevant information. A similar limitation relating to the short period of implementation, within the same time period of research, was found by Jaruga, Fijalkowska, Jaruga-Baranowski, Frendzel (2007) when they investigated the impact of the implementation of IFRS on Polish companies listed on the Warsaw Stock Exchange. Jaruga et al. (2007) analyzed 255 financial statements relating to a singular financial year and observed a significant difference in the accounting of fixed assets, revenue recognition, equity accounting, and hedging. The limitation on the availability and disclosure of quantitative information was also mentioned by Lopes and Viana (2008) when they investigated 44 Portuguese publicly listed companies in Euronext Lisbon after they adopted IFRS. In the analysis of the data, they stated that 37 of the 44 companies indicated that the transition had a significant impact and was a material event in their financial reporting and business operations.

In the United Kingdom (UK) The adoption of IFRS required publicly traded companies to disclose “profit and equity under both the new and old regulations” (Ali et al., 2016, p. 46) and provided an opportunity to measure the impact in the change from UK GAAP to IFRS. Ali, Akbar, and Ormrod (2016) focused their research on Alternative Investment Market (AIM) companies because they had not been investigated before. AIM companies in the UK are small size companies which are given the ability to raise capital from the public to MCAP companies that traded in the NASDAQ in the United States. The population included 764 AIM listed companies that were required to produce reconciliation statements between old and new GAAP and employed at least 20 employees. A random sample of 50% was selected to arrive at 286 companies. The sample was divided into voluntary and mandatory adopters. The researchers argued that analyzing their sample data between voluntary and non-voluntary adopters could enable them to “understand the motive of voluntary adopters for the early adoption of IFRS and the implications of IFRS mandatory adoption” (Ali et al., 2016, p. 47). Data was obtained from the FAME (Forecasting Analysis and Modeling Environment) database and was used to calculate the Gray Conservatism Index for profits and equity. The calculations from the Gray Index showed that profits are positively affected. Ali et al (2016) stated that profits reported under IFRS are comparatively higher than UK GAAP and that voluntary or early adopters reported higher profits driven by management opportunistic objectives than did mandatory adopters, as indicated with positive accounting theory. The voluntary adopters increased earnings attributable to management self-interested motive. The results obtained from the Gray Index was also confirmed by the Student t-test. The researchers recommended that the study be implemented in “different jurisdictions which have not yet adopted IFRS, such as the US, Japan, and Columbia etc., but have announced their intention to adopt IFRS” (Ali et al., 2016, p. 60).

Early Adopters of Accounting Standards

The early adoption of an accounting standard allows companies that are prepared to implement and apply a new accounting standard before the effective date. Non-early adoption allows companies who need additional time for implementation to delay the implementation of a new accounting standard until the effective date. Langer and Lev (1993) listed several examples of accounting standards promulgated by FASB with an option for companies to early adopt before the effective date of implementation. FAS No. 52 (Foreign Currency Translation) was issued in 1981 and was effective in 1983; FAS No. 71 (Accounting for the Effects of Certain Types of Regulation) was issued in 1982 and was effective in 1984; and FAS No. 96 (Accounting for Income Taxes) issued in 1987 and was effective 1992. According to FASB, one of the reasons for non-early adoption (extended adoption period) is to alleviate the total cost of implementation, which is not part of this current research. However, Langer and Lev (1993) stated that "increasing reported earnings – consistently discriminates between early and late adopters" (Langer & Lev, 1993, p. 516). The researchers analyzed 225 firms that elected to early adopt FAS No. 87 (Employers' Accounting for Pensions) obtained from the Compustat database across 34 industries. One of the findings showed that the majority (151) of the early adopters reported increased earnings. The increase in the difference of the before and after revenue of early adopters is the focus of this current research.

In December 1985, the FASB issued FAS No. 87 titled Employers' Accounting for Pensions. This new accounting standard required all companies in the United States to use a uniform method of accounting with an effective date of 1987, but companies could early adopt in 1986. Stone and Ingram (1988) investigated 265 public companies that elected to early adopt this new accounting standard to determine the effect after its application on the financial statements. The researchers reduced the companies investigated to 227 companies due to the availability of data within the financial database, Compustat. In January of 1985, *The Wall Street Journal*, as

cited in Stone and Ingram (1988), suggested that companies that elected not to early adopt the new accounting standard would see a negative impact on their financial statement. On the flip side, the journal indicated that only companies that had a positive effect on their financial statements could early adopt this accounting standard. The analysis of the data showed that the majority (190 companies) reported decrease or favorable effect of pension expense in their financial statements (income statements) after the application of the new accounting standard. Gujarathi and Hoskin (1992) explored early adoption of FAS No. 96 (Accounting for Income Taxes). The researchers stated this is motivated by their desire to increase earnings. Firms have the option to use the Full Retrospective Method of Accounting, allowing businesses to restate prior year reported earnings numbers. The researchers investigated 292 firms, of which 60 elected the Full Retrospective Method of Accounting. The financial statement effect on earnings showed a significant increase for all the firms under investigation. However, only 15% of those that elected the Full Retrospective Method of Accounting showed a significant increase in earnings. This current research investigates the difference between the before and after reported revenue of early adopters that elect the Full Retrospective Method of Accounting when implementing FASB ASC Topic 606.

The following chapter describes the research methodology, population, sample, how Gray's Comparability Index and Student t-test is used as statistical tools to answer the research question and hypotheses, and the collection process of secondary data to conduct the research.

CHAPTER 3: METHOD

Background

This research incorporated a quantitative and post positivist approach. Post positivist approach or post positivism research, as used in accounting research, provides explanations to the selection of accounting practices and how stakeholders are influenced by the use of information derived from accounting data (Olalere, 2011). This research applied content analysis and event-study methodology to identify and analyze revenue of public companies after the transition to principles-based accounting. The essence was to measure the difference between the restated and reported revenues of companies that elected the Full Retrospective Method of Accounting.

Population and Sample Data

The sample in this study included 272 public companies listed in the Russell 3000 Index and elected the Full Retrospective Method of Accounting when implementing FASB ASC Topic 606 - Revenue from Contracts with Customers. The Russell 3000 Index is a market-capitalization (MCAP) index of the 3000 largest publicly traded companies in the United States and representing 98% of SEC registered shares-based companies (Lobo et al., 2017). The companies in this index shared the similar characteristics of a for-profit business. The justification for the 272 companies was that FASB ASC Topic 606 required companies that elected the Full Retrospective Method of Accounting to restate prior year revenue. This was prior year revenue earlier filed with the SEC under the old rules-based accounting framework. The restatement was from a rules-based accounting framework to the new principles-based accounting framework. Also, Gray Comparability Index required the restatement or adjustment of the old accounting law (reported revenue) to the new accounting law (restated revenue) to supply a common yardstick of measurement (Gray, 1980). After an analytical review of the data,

five companies were removed from the total count of data, which reduced the usable data to 267 companies. Inclusion of these five companies would have resulted in extreme values that could have distorted the results. The removal of data that could distort results aligned with previous studies (Ali et al., 2016). The remaining 2,728 public companies listed in the index declined to elect the Full Retrospective Method of Accounting. Therefore, the remaining 2,728 companies did not meet the restatement or adjustment criteria required for the computation of Gray Comparability Index. The sample was broken into (1) early adopters, which included companies that adopted the new GAAP on January 2017; (2) non-early adopters, which included companies that adopted the new GAAP on or after the effective date of January 2018; and (3) all adopters, which included both early and non-early adopters. This goal was to assess the impact of the difference in the before (reported) and after revenues (restated) on the financial statements.

Data Description and Sources

Public companies registered with the Russell 3000 Index are required by law to file quarterly and annual financial reports with the Securities Exchange Commission (SEC). These annual reports are filed via authorized paperwork or forms. These forms are stored with the SEC in an electronic public database known as the Electronic Data Gathering, Analysis, and Retrieval System (EDGAR). The typical forms filed with the SEC are 10Q, 10K, and 8K. Form 10Q is used for quarterly filing, Form 10K is used for annual filing, and Form 8K is used to announce a major event. This study was restricted to Form 10K to assess the impact of revenue for an annual period of business operations. The data contents included in Form 10K are regulated by the SEC and are required to be audited or reviewed by a public accounting firm before filing with the SEC.

Analyzing the companies listed under the Russell 3000 Index to manually extract the data points required for this research would be a time-consuming task that could take months of man hours to complete. Therefore, this research used proprietary data collected by a company called

Audit Analytics, an innovative intelligence-gathering third party company that focuses on accounting and financial data (Audit Analytics, 2019). Audit Analytics agreed to make the data accessible to the author of this research for a fee. Utilizing data from this source minimized measurement errors and mitigated data limitations faced by previous researchers. The sales team at Audit Analytics initially provided a sample data for review. The review of the sample data revealed that they have all the data fields needed for this study. An email and phone call (Derryck Coleman, Research Manager at Audit Analytics, 27 November 2019, personal communication) from Audit Analytics indicated that the data collection process was a tedious and complicated task that involved a dedicated team of research analysts. These research analysts reviewed the data before, during, and after the implementation of FASB ASC Topic 606. The SEC filings of companies listed on the Russell 3000 Index were monitored quarterly by Audit Analytics. Once the Form 10Ks were filed with the SEC, Audit Analytics collected the data from EDGAR using proprietary searching methods. A Research Analyst was required to manually review the actual filings in case the search did not yield any results to validate the accuracy of the search results.

The data provided by Audit Analytics reflected companies that have fully adopted FASB ASC Topic 606 and those that have substantially completed the adoption process. The data fields included:

- company name, company unique identifier (CIK Code), form type, filing date;
- fiscal period ending, trading ticker, market, market index, industry, North American Industry Classification System (NAICS) code, SEC classification code (SIC Code), fiscal year-end of company. URL link to the filing support, disclosures on judgements on revenue recognition;
- indication of the selection of early adoption, indication of adoption completion, adoption method, and adoption begin date;

- restated revenue (postadoption revenue) and reported revenue (preadoption revenue);
- cumulative effect on revenue, cumulative effect on net income, cumulative effect on retained earnings;
- impact on accounting policies, reported and restated net income, disclosure of material impact, other financial impact, impact on internal controls, comment letters, and remaining implementation matters.

Revenue was the main variable used in this research and the preferred currency for revenue was the United States dollar.

Gray Comparability Index

This research used Gray Comparability Index to assess and measure the impact in the financial statements between the application of the old GAAP (rules-based) and the new GAAP (principles-based) approach. Revenue data point was applied to Gray Comparability Index to assess the difference between the before and after revenue. This difference was derived by taking (1) the current year's reported revenue from the application of the principles-based accounting framework (new GAAP) minus the (2) the restated revenue derived from the application of the rules-based accounting framework (old GAAP). The difference, obtained between the restated and reported revenue, was divided by the restated revenue, to derive the Gray Comparability Index. In this research, the formula used in calculating Gray Comparability Index is stated In Figure 3 below:

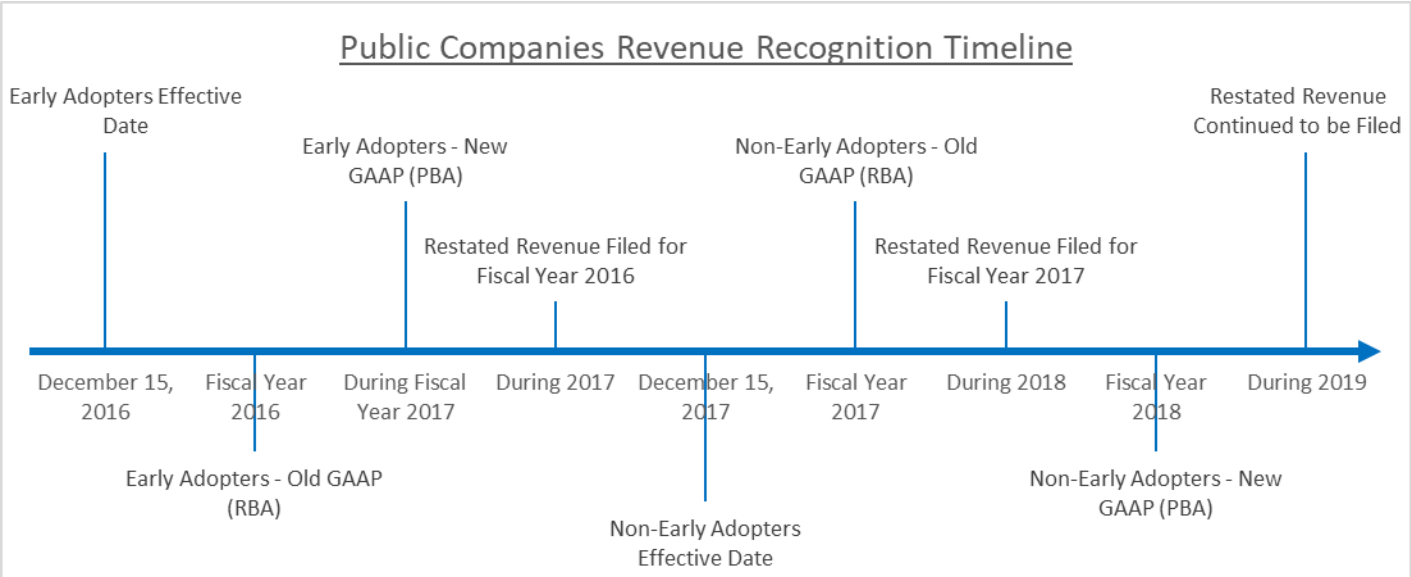
Figure 3: Formula for Gray Comparability Index

$$\boldsymbol{Gray\ Comparability\ Index = 1 - \frac{Restated\ Revenue - Reported\ Revenue}{Restated\ Revenue}}$$

Where Restated Revenue was the adjusted revenue from Rules-Based Accounting to Principles-Based Accounting when the Full Retrospective Method of Accounting is elected as per FASB

ASC Topic 606. Reported Revenue was the revenue announced with the SEC that was based on the old rules-based accounting system before the implementing of FASB ASC Topic 606. Both the restated revenue and reported revenue were announced in the Form 10K when filed with the SEC. The filing of Form 10K happens at various times in the year based on the financial reporting period of the company. These reporting periods were based on a calendar year or a fiscal year. Companies that early adopted the new standard restated year 2016 revenues and those that implemented on the effective date restated year 2017 revenues. Therefore, the companies that early adopted FASB ASC Topic 606 were expected to announce their Restated Revenue in their Form 10K during 2017. This announcement varied due to the reporting period (fiscal or calendar year) of the company. Likewise, the companies that implemented FASB ASC Topic 606 on the effective date of January 1, 2018 were expected to announce their restated revenue in the Form 10K in during 2018. Figure 4 below depicts the timeline in which FASB ASC Topic 606 was implemented, and when reported revenues and restated revenues were filed in the Form 10K with the SEC.

Figure 4: Pubic Companies Revenue Recognition Timeline



Gray Comparability Index was calculated for each company selected as part of this study. The index was calculated using Microsoft Excel. The computed indices were placed on an augmented Gray Comparability Index Scale to determine the impact that the difference between the before and after revenue had on the financial statements. This study applied accounting materiality as one of the concepts used to answer the research question and assumed that materiality is based at a 5 percent threshold or level. The augmented Gray Comparability Index Scale is shown on table 3 below:

Table 3: Descriptive Augmented Gray Comparability Index Scale (Materiality at 5%)

Category	Index (ratio)	Gray Interpretation	Materiality Interpretation
I	< 0.50	Negative Impact (Pessimistic)	Material
II	0.50 - 0.55	Negative Impact (Pessimistic)	Material
III	0.56 - 0.94	Negative Impact (Pessimistic)	Material
IV	0.95 - 0.99	No Impact & Neutral	Not Material
V	1.00 - 1.05	No Impact & Neutral	Not Material
VI	1.06 - 1.10	Positive Impact (Optimistic)	Material
VII	1.11 - 1.15	Positive Impact (Optimistic)	Material
VIII	1.16 - 1.20	Positive Impact (Optimistic)	Material
IX	> 1.20	Positive Impact (Optimistic)	Material

Table 3 was an augmented and modified interpretation of the original index scale from Gray (1980). Many categories were included to allow for variations for companies in different industries. A negative impact indicated a less conservative and material approach by management in reporting revenue under the new principles-based accounting. A positive impact indicated management was not conservative but optimistic and material in reporting revenue under the new principles-based accounting. The level of materiality was stated at 5 percent of revenue. However, the Gray Comparability Index by itself did not establish the significance of the differences in revenues in the financial statement. Therefore, a Student t-test was used to measure the statistical significance of the indices obtained from the calculations of Gray Comparability Index.

Data Treatment and Analysis Strategy

This research deployed Gray Comparability Index and Two Sample Paired t-Tests to assess and analyze the sample data. First, a two-sample Student t-test was used to assess the difference between two reported revenues before and after the adoption of principles-based accounting. Then a test was applied to determine the significance of the difference in the restated and reported revenues for early adopters and non-early adopters of principles-based accounting. The Student t-test allowed the researcher to compare the event study, before and after the occurrence of the event. The event was the transition from rules-based to principles-based accounting in the implementation of FASB ASC Topic 606.

In this research, two groups of sample data were investigated: the revenue data before the implementation of principles-based accounting (rules-based accounting), and the revenue data after the implementation of FASB ASC Topic 606 (principles-based accounting). Each company that was under investigation was measured twice: once before and once after the adoption of principles-based accounting. Under the assumption that the population of reported revenues (and therefore, the associated sample) is approximately normally distributed and the samples are independent, three main hypotheses were tested as follows:

I. *Test of a statistically significant difference in revenues between the ex ante and ex post principles-based accounting for All Adopters (Early Adopters and Non-Early Adopters).*

$H_{o1}: \mu_0 = \mu_1$ ……...1a

$H_{a1}: \mu_0 \neq \mu_1$……....1b

where:

H_{o1} = the null hypothesis

H_{a1} = the alternative hypothesis

μ_0= the reported revenue (preadoption revenue – *ex ante*) before transition to principles-based accounting.

μ_1 = the restated revenue (postadoption revenue – *ex post*) after transition to principles-based accounting

In the first setting, the null hypothesis (1a) stated that there was no significant difference in reported revenues before and after management transitioned to principles-based reporting. The alternative hypothesis (1b) stated that restated revenues (postadoption revenue – *ex post*) were different from reported revenues (preadoption revenues – *ex ante*) after management transitions to principles-based accounting.

II. *Test of a statistically significant difference in revenues for Early Adopters of principles-based accounting*

$H_{02}: \mu_2 = \mu_3$…….2a

$H_{a2}: \mu_2 \neq \mu_3$ …….2b

where:

H_{02} = the null hypothesis

H_{a2} = the alternative hypothesis

μ_2= the reported revenue (preadoption revenue – *ex ante*) of early adopters of principles-based accounting.

μ_3 = the restated revenue (postadoption revenue – *ex post*) of early adopters of principles-based accounting

In the second setting, the null hypothesis (2a) stated that there was no significant difference in reported (preadoption) and restated (postadoption) revenues for early adopters of principles-based accounting.

The alternative hypothesis (2b) stated that reported revenues (preadoption) were different from restated revenues (postadoption revenues) after management transitions to principles-based accounting for early adopters.

III. *Test of a statistically significant difference in revenues for Non-Early Adopters of principles-based accounting*

$H_{03}: \mu_4 = \mu_5$…….3a

$H_{a3}: \mu_4 > \mu_5$ …….3b

where:

H_{03} = the null hypothesis

H_{a3} = the alternative hypothesis

μ_4= the reported revenue (preadoption revenue – *ex ante*) of non-early adopters of principles-based accounting.

μ_5 = the restated revenue (postadoption revenue – *ex post*) of non-early adopters of principles-based accounting.

In the third setting, the null hypothesis (3a) stated that there was no significant difference in reported (preadoption) and restated (postadoption) revenues for non-early adopters of principles-based reporting. The alternative hypothesis (3b) stated that reported revenues (preadoption

revenues) were different from restated revenues (postadoption revenues) after management transitions to principles-based accounting for non-early adopters.

The interpretation of the results of the t-test were determined by reviewing the T Stat value and compared with the T Critical value. The T Stat value condensed the differences between the before and after revenue into one value. When the T Stat value has a negative sign, this reveals that the sample revenue fell to the left of the normal curve and was lower than the hypothesized revenue. A positive T Stat value showed the opposite value. A T Stat value of zero indicated that the null hypothesis was exactly accepted. The T Critical value was driven by the level of significance assigned to a t-test. A significance level of 5% indicated there was a 5% chance of making the wrong decision when the null was true. The significant level and the materiality level of 5% were identical.

The following chapter answers the research question and the hypotheses. The information resulted from the computation and analysis of the data obtained from Audit Analytics are presented.

CHAPTER 4: RESULTS

Background

The objective of this study was to empirically assess the impact on the financial statement for those companies tracked by the Russell 3000 Index and that elected the Full Retrospective Method of accounting after transitioning to principles-based accounting. The results obtained from the data analysis and interpretations based on the hypotheses are discussed in this chapter. There is one research question and three sets of hypotheses. The research question was "Is the difference between the before and after revenue in the financial statement significant after the transition to principles-based accounting for public companies in the United States?" There were two variables studied which were: (1) reported revenue (preadoption revenue) and (2) restated revenues (post adoption revenue). The focus was on the difference between restated and reported revenue. These variables led to the creation of three sets of equations that emanated from the three sets of hypotheses that were used to answer the research question. In summary, the three sets of null hypotheses stated that there was no difference in reported and restated revenue after the transition from rules-based to principles-based accounting for (I) All Adopters, (II) Early Adopters, and (III) Non-Early Adopters. The alternative hypotheses of each of the three sets were bidirectional, which indicated that there were differences between restated and reported revenues. Gray Comparability Index and Student t-Test were used as the basis to deduce the results from the data collected from Audit Analytics.

Descriptive Statistics

Table 4 below reported descriptive statistics of the data used in this research. The descriptive statistics were calculated for the reported (preadoption revenue), restated (post adoption revenue), and the difference between restated and reported revenue for the 267 companies investigated in this study. The average revenue was $7,912,589,237 for restated revenue, $7,850,447,454 for reported revenue, and $62,141,783 for the difference between

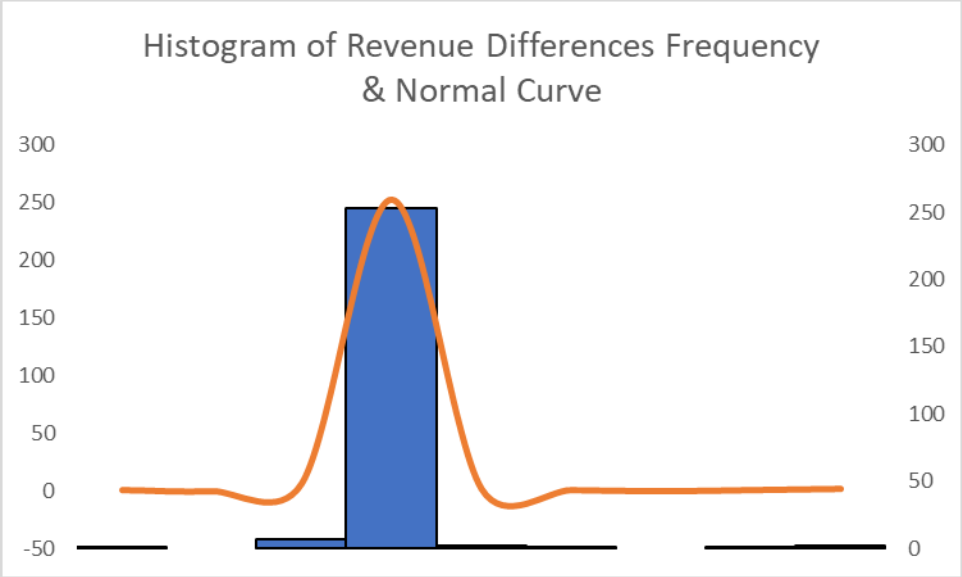
restated and reported revenues. The median was $1,394,312,000 for restated revenue, $1,378,510,000, and zero for difference in revenue. The average distance (standard deviation) between the average revenue and each revenue value was $17,731,108,992 for restated revenue, $17,653,789,771, and $693,314,947 for the difference in revenues. The minimum revenue was $133,000 for both restated and reported revenues. The minimum was $(3,849,000,000) for the difference in revenues. The maximum revenue was $118,243,000,000 for restated revenue, $122,092,000,000 for reported revenue, and $6,621,000,000 for the difference in revenues.

Table 4: Descriptive Statistics

Restated Revenue		*Reported Revenue*		*Difference in Revenue*	
Mean	7,912,589,237	Mean	7,850,447,454	Mean	62,141,783
Median	1,394,312,000	Median	1,378,510,000	Median	0
Standard Deviation	17,731,108,992	Standard Deviation	17,653,789,771	Standard Deviation	693,314,947
Minimum	133,000	Minimum	133,000	Minimum	(3,849,000,000)
Maximum	118,243,000,000	Maximum	122,092,000,000	Maximum	6,621,000,000
Sum	2,112,661,326,309	Sum	2,096,069,470,309	Sum	16,591,856,000
Count	267	Count	267	Count	267

This research assumed that the sample was approximately normally distributed. The focus of this research was the statistical significance of the difference between the restated and reported revenues. Therefore, this research used the values derived from the difference between the restated and reported revenues to test for normality. According to Gordon (2012) normality can be visually assessed by plotting the frequencies of data in histograms. Figure 5 below showed that the difference in revenues for the 267 companies under investigations looks approximately normally distributed and heavily tailed.

Figure 5: Visual test for Normality



However, a simple visual test works well for small data sets (Garson, 2012). Therefore, further testing was performed using the Kolmogorov-Smirnov (K-S) test required for large population and sample size, which was the case for this current study. Table 5 below showed that the computation of the K-S test indicated that K-S T Value of 0.95505618 was less than the T-Critical value (obtained from Kolmogorov-Smirnov Table) of 1.3581 (see Appendix A), which indicated a failure to reject the null hypothesis that the data was normally distributed. The K-S normality test was used by Ali et al. (2016) in the examination of 115 companies that transitioned from UK GAAP (rules-based accounting) to IFRS (principles-based accounting).

Table 5: Kolmogorov-Smirnov Test Result

Description	Results
Count	267
Mean	62,141,783
SD	693,314,947
K-S Test Statistic (T Value)	0.95505618
T-Critical Value for Alpha of 0.05	1.3581

The 267 companies shared similar characteristics. They were publicly traded companies in the major stock markets in the United States and also across a broad spectrum of industries in the United States. The companies had their shares traded in the National Association of Securities Dealers Automated Quotations Systems (NASDAQ) and the New York Stock Exchange (NYSE). The industries were Beverages, Apparel, and Mining; Consumer Products; Electronics and Machinery; Financial and Insurance; Financial Services; Health Care and Insurance; Health Care and Pharmaceuticals; Industrial and Manufacturing; Information Technologies and Services; Manufacturing and Construction; Natural Resources and Food; Real Estate and Commodities; Services; Telecommunications; Transportation; and Transportation and Leisure. Table 6 below shows the count by the various industries and the dominant market traded.

Table 6: Companies by Industry and Market

Industry	Nasdaq	NYSE	Total
Beverages, Apparel, and Mining	4	9	13
Consumer Products	10	15	25
Electronics and Machinery	20	9	29
Financial & Insurance	2		2
Financial Services	11	8	19
Health Care and Insurance	22	1	23
Healthcare & Pharmaceuticals	4		4
Industrial & Manufacturing	2	2	4
Information Technologies and Services	26	16	42
Manufacturing and Construction	5	8	13
Natural Resources and Food	6	8	14
Real Estate and Commodities	5	17	22
Services	2	2	4
Telecommunications	4	14	18
Transportation	1		1
Transportation and Leisure	18	16	34
Grand Total	142	125	267

A total of 13 companies were identified as early adopters and 254 were identified as non-early adopters. The implementation date disclosed by each company was used as the indicator to identify and differentiate between early and non-early adopters.

Results and Findings

The results and findings are presented in line with the research question and testing the three sets of hypotheses stated earlier. The results and findings are broken down into the following categories: (I) All Adopters, (II) Early Adopters, and (III) Non-Early Adopters for the three sets of hypotheses.

All Adopters (All Companies). Table 7 below reveals the results from the computation of Gray Comparability Index (GCI) for the 267 companies under investigation. The results from the computations indicated that six companies (2%) reported a positive impact in their financial statements. These six companies reported higher revenue and were optimistic when reporting revenues. On the other hand, the results from Gray computations indicated that 19 companies (7%) experienced a negative impact or pessimistic view when reporting revenues. The vast majority of 242 companies (91%) experienced no impact in the restatement of revenues from rules-based accounting to principles-based accounting in the implementation of FASB ASC Topic 606.

Table 7: Results of the Impact of Revenue from Gray Comparability Index for All Adopters

Category	Index (ratio)	Positive Impact	Negative Impact	No Impact	Total
I	< 0.50				
II	0.50 - 0.55		1		1
III	0.56 - 0.94		18		18
IV	0.95 - 0.99			21	21
V	1.00 - 1.05			221	221
VI	1.06 - 1.10				
VII	1.11 - 1.15	1			1
VIII	1.16 - 1.20	3			3
IX	> 1.20	2			2
Grand Total		6	19	242	267

Taking into consideration all the companies, the results from Gray Comparability Index indicated that there was no impact on the financial statement in the implementation of the new accounting standard.

Table 8 illustrates the results derived from the computation of Gray Comparability Index applying the 5% materiality threshold. A total of 25 companies (9%) experienced a material impact on their financial statements after transitioning from rules-based accounting to principles-based accounting. The analysis of the data and results indicated that of the 25 companies that experienced a material impact, six were companies that experienced optimistic or higher revenue, and 19 were companies that experienced a pessimistic or conservative (lower) revenues when transitioning from rules-based to principles-based accounting. The vast majority of 242 companies (91%) experienced no material change in the difference between restated and reported revenues at a materiality threshold of 5%. This was the same result arrived at for the count and percentage of companies that experienced no impact on their financial statement when they transitioned from rules-based to principles-based accounting.

Table 8: Results of Gray's Comparability Index (Materiality Level at 5%) for All Adopters

Category	Index (ratio)	Material	Not Material	Total
I	< 0.50			
II	0.50 - 0.55	1		1
III	0.56 - 0.94	18		18
IV	0.95 - 0.99		21	21
V	1.00 - 1.05		221	221
VI	1.06 - 1.10			
VII	1.11 - 1.15	1		1
VIII	1.16 - 1.20	3		3
IX	> 1.20	2		2
Grand Total		25	242	267

A paired two-sample t-test was performed in assessing the significance of the difference between the restated revenues (after the event) and reported revenues (before the event) after

they transitioned from rules-based to principles-based accounting. The null and alternative hypotheses are stated below:

I. *Test of a statistically significant difference in revenues between the ex ante and ex post principles-based accounting for All Adopters.*

$H_{o1}: \mu_0 = \mu_1$ ……...1a

$H_{a1}: \mu_0 \neq \mu_1$……....1b

Table 9 illustrated the results from testing the null hypothesis (H_{01}) that after transitioning to principles-based accounting in the recognition of revenue, there is no significant difference in revenues before and after management transitioned to principles-based accounting. The alternative hypothesis (H_{a1}) posited that after transitioning to principles-based accounting, management reported a difference in revenues. The alternative hypothesis is bi-directional, which requires a two-tail test. A rejection of the null hypothesis could lead to a bidirectional effect, a positive or negative impact.

Table 9: t-Test Paired Two-Sample for means for Restated and Reported Revenues for All Adopters

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7,912,589,237	7,850,447,454
Variance	3.14392E+20	3.11656E+20
Observations	267	267
Pearson Correlation	0.999241733	
Hypothesized Mean Difference	0	
df	266	
t Stat	1.464565421	
P(T<=t) one-tail	0.072110189	
t Critical one-tail	1.650602207	
P(T<=t) two-tail	0.144220377	
t Critical two-tail	1.968922324	

As can be seen in table 9 above, a t-Stat of 1.47 was less than the t-Critical two-tail score of 1.97, which implied a failure to reject the null hypothesis at the 5 percent significance and materiality

level. Another way of looking at this is that the P-Value for the two-tail test was greater than the Alpha (which was 0.05 or 5% significance level), which failed to reject the null hypothesis. In other words, there was no statistically significant difference between the reported sample revenues before and after companies adopted the principles-based accounting. This suggested neutrality between pre-adoption and post-adoption sample revenues. A Pearson correlation of 0.99 indicated that the two samples have a strong positive linear relationship.

Early Adopters. As shown in Table 10, the results from the computation of Gray Comparability Index revealed that three companies (23%) reported lower revenues when restating revenues from rules-based to principles-based accounting. This indicated a conservative approach by management in implementing the new accounting standard. This conservative or pessimistic approach has a material impact on the financial statement. On the other hand, the results from Gray computations indicated that ten companies (77%) experienced no financial impact and no material impact in the financial statement when restating revenues from rules-based accounting to principles-based accounting in the implementation of FASB ASC Topic 606. Therefore, the results from Gray Comparability Index indicated that a total of 13 companies early adopted the new accounting standard. The majority of the 13 companies experienced no financial and material impact on the financial statement in the implementation of the new accounting standard.

Table 10: Gray's Results for Early Adopters

Financial Statement Impact	Material	Not Material	Total
Negative Impact (Pessimistic)	3		3
No Impact		10	10
Grand Total	3	10	13

A paired two-sample t-test was performed to assess the statistical significance of the difference in revenues. The null and alternative hypotheses are stated below:

II. *Test of a statistically significant difference in revenues for early adopters of principles-based accounting*

H_{02}: $\mu_2 = \mu_3$…….2a

H_{a2}: $\mu_2 \neq \mu_3$ …….2b

Table 11 highlights the results from testing the null hypothesis (H_{02}), that there is no significant change in reported revenue for companies that were early to transition to principles-based accounting, against the alternative hypothesis (H_{a2}) that after transition to principles-based accounting the restated and reported revenues are different for early adopters. As disclosed in the table where a t-Value of 0.87 is less than the t Critical two-tail score of 2.18. Also, the P-Value for two-tail test of 0.40 is higher than Alpha of 0.05. Therefore, the t-test results failed to reject the null hypothesis of no difference in revenues. Therefore, there is no statistically significant difference between the before-and-after revenues for companies that were early to transition to principles-based accounting.

Table 11: t-Test Results for Early Adopters

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	12,431,016,462	11,982,068,385
Variance	7.37744E+20	6.50823E+20
Observations	13	13
Pearson Correlation	0.999448149	
Hypothesized Mean Difference	0	
df	12	
t Stat	0.866723144	
P(T<=t) one-tail	0.201545848	
t Critical one-tail	1.782287556	
P(T<=t) two-tail	0.403091696	
t Critical two-tail	2.17881283	

Non-Early Adopters. The Gray Comparability Index results illustrated in Table 12 revealed that 16 companies (6%) reported lower revenues when restating from rules-based to principles-based accounting. This indicated a conservative approach by management in

implementing the new accounting standard. Also, six companies (2%) experienced a positive or optimistic impact of the difference in revenues on the financial statements. However, the results from Gray computations indicated that 232 companies (91%) experienced no financial impact in the financial statement when restating revenues from rules-based accounting to principles-based accounting in the implementation of FASB ASC Topic 606. The results from Gray also revealed that 22 companies (9%) had a material impact and 232 (91%) companies had no material impact in the financial statements. Therefore, the overall results from Gray Comparability Index indicated that the companies experienced no financial and material impact on the financial statement after implementation of the new accounting standard.

Table 12: Gray Comparability & Materiality Results for Non-Early Adopters

Financial Statement Impact	Material	Not Material	Total
Negative Impact (Pessimistic)	16		16
No Impact		232	232
Positive Impact (Optimistic)	6		6
Grand Total	22	232	254

A paired two-sample t-test was performed to assess the statistical significance of the difference in revenues. The null and alternative hypotheses are stated below:

III. *Test of a statistically significant difference in revenues for non-early adopters of principles-based accounting*

$H_{03}: \mu_4 = \mu_5$…….3a

$H_{a3}: \mu_4 \neq \mu_5$ …….3b

Table 13 highlighted the results from testing the null hypothesis (H_{03}) that there is no significant difference in revenues for companies that were non-early in transitioning to principles-based accounting. The alternative hypothesis (H_{a3}) states that after transitioning to principles-based accounting, non-early adopters reported differences in revenues. The two-tailed t-test with a

calculated t-Value of 1.17 is less than t-Critical two-tail score of 1.97. Also, the P-value for two-tail test of 0.24 is higher than Alpha of 0.05. As such, this test fails to reject the null hypothesis of neutrality in the difference in revenues at the 5 percent significance level. Therefore, there is no statistically significant difference between the before-and-after reported revenues for companies that were non-early in transitioning to principles-based accounting.

Table 13: t-Test Results for Non-Early Adopters

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7,681,331,151	7,638,986,541
Variance	2.94452E+20	2.95879E+20
Observations	254	254
Pearson Correlation	0.999440752	
Hypothesized Mean Difference	0	
df	253	
t Stat	1.171477719	
P(T<=t) one-tail	0.121254439	
t Critical one-tail	1.650898678	
P(T<=t) two-tail	0.242508877	
t Critical two-tail	1.969384804	

The results of the hypotheses testing confirmed that overall the computation of Gray Comparability Index indicated no significant difference between the restated and reported revenues when transitioning from rules-based accounting (RBA) to principles-based accounting (PBA) after implementing FASB ASC Topic 606. Hence, this provided an answer to the research question, that there was no significant impact on the financial statements.

Additional Results and Findings

Additional analyses were performed computing Gray Comparability Index and Student t-Tests by other parameters that were not part of the original research. These analyses were performed to further explore the same research question as stated above: “Is there a difference between the before and after revenue in the financial statements after the transition to principles-based accounting?” Instead of focusing on Early-Adopters, Non-Early Adopters, and All Adopters, which was the primary focus of this research, the researcher redirected the focus on

industry types, market segments types, key revenue transaction types, and reporting period types. Furthermore, the researcher took a deeper dive on the 25 companies that meet the materiality threshold of 5% to determine the significance of the difference in revenues.

Impact by Industry Types. The Gray Comparability Index computation by industry types revealed that Transportation and Leisure, Telecommunications, Real Estates and Commodities, and Health Care and Insurance were impacted both negatively and positively. Out of the total of 25 companies that were materially impacted, six companies (24%) were associated with Transportation and Leisure; three companies (12%) associated with Telecommunications; four companies (16%) associated with Real Estate and Commodities; three companies (12%) associated with Consumer Products; and five companies (20%) associated with Health Care. The remaining 16% are associated with Electronics and Machinery, and Financial Services, and Information Technologies and Services. The paired Student t-tests for each of the 16 industries revealed that the t-critical two-tailed value failed to reject the null hypothesis that there was no significance difference between the restated and reported revenues. As indicated in Table 14 below, if the test was for a one-tail test, then Health Care and Insurance Industry revealed that a t-critical one tail value rejects the null hypothesis. The one tailed test for this industry indicated that the differences between restated and reported revenues are statistically significant at a 5% level of significance or materiality.

Table 14: Paired Two Sample for Means – Health Care and Insurance

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	363913933.3	358144451.8
Variance	1.39833E+18	1.39915E+18
Observations	27	27
Pearson Correlation	0.999919655	
Hypothesized Mean Difference	0	
df	26	
t Stat	1.999123182	
P(T<=t) one-tail	0.028074327	
t Critical one-tail	1.70561792	
P(T<=t) two-tail	0.056148654	
t Critical two-tail	2.055529439	

See appendix B for the results of Gray Comparability Index and Student t-tests for other industries with no significant difference in revenues.

Impact by Market Types. The Gray Comparability Index and Student t-Tests were computed to determine the impact on the financial statements of the difference between restated and reported revenues by market segment types. The data revealed that, out of the 267 companies that elect the Full Retrospective Method of accounting, 142 companies (53%) traded with the Nasdaq and 125 companies (47%) traded with the NYSE. The Gray Comparability Index results for companies associated with the Nasdaq revealed that 13 companies (9%) experienced negative impact, two companies (1%) experienced positive impact, and 127 (89%) experienced no impact on the financial statements. The Gray Comparability Index results for companies associated with the NYSE revealed that six companies (5%) experienced negative impact, four companies (3%) experienced positive impact, and 115 companies (92%) experienced no impact on the financial statements. Both Gray Comparability Index and Student t-Test revealed no significant difference between restated and reported revenues. However, out of the total of 25 companies associated with material changes in their financial statements, 15 companies (60%) traded in the Nasdaq and ten companies (40%) traded in the NYSE. See appendix C for the results of Gray Comparability Index and Student t-tests for each market type.

Impact by Revenue Transaction Types. Data analysis revealed that companies disclosed the different types of revenue transactions (revenue streams) that were critical when transitioning from rules-based to principles-based accounting. Out of the 267 companies that elected the Full Retrospective Method of accounting, 205 companies (77%) disclosed various revenue streams that are critical, and 62 companies (23%) chose not to disclosed. Of the 205 companies that chose to disclose, 18 companies (9%) disclosed Breakage and Loyalty Program; 90 companies (44%) disclosed Revenue Timing; six companies (3%) disclosed a combination of Revenue Timing & Breakage and Loyalty; 16 companies (8%) disclosed a combination of Revenue Timing and Variable Consideration; five companies (2%) disclosed Variable Consideration only; one company disclosed a combination of Variable Consideration & Breakage and Loyalty Program; and 69 companies (34%) disclosed other items. Results from Gray Comparability Index revealed that, out of the 25 companies that experienced a material impact in their financial statements, 14 companies (56%) experienced a negative impact, three companies (12%) experienced a positive impact, and both combined accounted for 68% of material differences driven by Revenue Timing. Also, five companies (20%) disclosed a combination of Revenue Timing; Breakage and Loyalty Program; and Variable Consideration as significant and material in transition from rules-based to principles-based accounting. The remaining three companies (12%) disclosed other transaction types that are Non-Revenue Line items that were outside of the mainstream of this study. Further analysis by industry segments revealed that (1) Health Care and (2) Transportation and Leisure were the leading industries that disclosed Revenue Timing as a critical revenue stream. Student t-Test calculations revealed no significant difference between restated and reported revenues for each of the disclosed revenue streams or revenue transaction types. See appendix D for the results of Gray Comparability Index and Student t-tests for each Revenue stream or revenue transaction type.

Impact by Reporting Period Types. The results revealed that Revenue Timing (over 68%) was disclosed by most of the 25 companies that experienced significant or material difference in revenues. The researcher conducted additional analyses and tests to determine if 'Reporting Period Types' influenced the significance in difference in revenues for all the 267 companies that elected the Full Retrospective Method of accounting. The two reporting period types were calendar year and fiscal year. Computations from Gray Comparability Index revealed that 23 companies (92%) of the 25 companies that experienced a material impact after transitioning to rules-based accounting reported annual financials on a calendar year. Only two companies (8%) reported on a fiscal year. However, the Student t-Test results indicated that the difference in revenues for 205 Companies (77%) that reported under calendar year and 62 companies (23%) that reported under fiscal year were not statistically significant. See appendix E for the results of Gray Comparability Index and Student t-tests for each Reporting Period type.

Significance of Difference in Revenues for Companies that meet the Materiality Threshold of 5%. There were 25 companies (9%), out of a total of 267 companies that elected the Full Retrospective Method of accounting, and that meet the 5% revenue materiality threshold. Table 15 below reveals that the Student t-Test results indicated that a t-Value of 2.09 was more than the t-Critical two-tail score of 2.06, which implied a rejection of the null hypothesis at the 5% significance and materiality level. Also, the t-Critical one-tail score of 1.71 is less than the t-Stat of 2.09, which also implied a rejection of the null Hypothesis. This reaffirmed the Gray Comparability Index statistical significance and materiality. The Student t-Tests results for companies that did not meet the materiality threshold failed to reject the null hypothesis for the one-tail and two-tail tests.

Table 14: Paired Two Sample for Means – Companies meeting Materiality Threshold

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	9633706160	8810210960
Variance	4.063E+20	3.51513E+20
Observations	25	25
Pearson Correlation	0.997497526	
Hypothesized Mean Difference	0	
df	24	
t Stat	2.091806998	
P(T<=t) one-tail	0.023606454	
t Critical one-tail	1.71088208	
P(T<=t) two-tail	0.047212908	
t Critical two-tail	2.063898562	

See appendix F for the results of Gray Comparability Index and Student t-tests for companies that meet the materiality threshold of 5%.

CHAPTER 5: DISCUSSION AND CONCLUSION

Background

As indicated in the introductory chapter, the purpose of this study was to empirically assess the impact on the financial statements for companies tracked by Russell 3000 Index after transitioning from rules-based accounting to principles-based accounting. These companies elected the Full Retrospective Method of accounting in the implementation of FASB ASC Topic 606. It was also stated in Chapter 1 that there was lack of clarity and confusion in the comparability of financial statements before the transition to principles-based accounting. In this current chapter, the researcher discusses the results of this current study linking with the findings from prior research and tying the results to the theories and concepts used in this research. The practical implications of the results and findings change from rules-based accounting to principles-based accounting in the accounting profession are discussed, followed by recommendations for future research.

Results and Findings Linked to Prior Research

All Adopters. The results of this current research show that there is not a statistically significant difference between restated and reported revenues for All Adopters after they transitioned to principles-based accounting. Results from prior research relating to the transition from rules-based to principles-based accounting for studies conducted in Brazil, Belgium, France, Netherlands, Portugal, Spain, and the United Kingdom reached the opposite conclusion (Aisbitt, 2006; Callao et al., 2007; Istrate, 2013; Pires & Decourt, 2015). However, McCarthy and McCarthy (2014) examined the impact of revenue in the financial statement as a result of the FASB and IASB joint revenue recognition convergence project. Their findings indicate that "there was not a statistically significant difference in the amount of judgment required when applying rules-based standards and subjects applying principles-based standards" (McCarthy & McCarthy, 2014, p. 21).

The results from McCarthy and McCarthy (2014) support the findings in this current research. It is interesting to note that both studies focus on the impact of transitioning from rules-based to principles-based accounting in the United States. On the other hand, while the other prior studies also focus on the transition from rules-based to principles-based accounting, their emphasis was on foreign public markets which are different from those in the United States. In a comparison between the Nasdaq and NYSE—which are two different types of markets—the results show the Nasdaq experienced more negative impact in revenue than the NYSE. Therefore, one can infer that the difference in international markets could likely influence the results, and influence comparability. After all, one of the reasons for the harmonization to a single revenue recognition model is for the alignment of the United States accounting standard on revenue recognition to that of the international accounting standard by IFRS (FASB, 2014a, 2014b, 2014c). The purpose was to foster comparability of financial statements across capital markets. This comparability of United States and IFRS financial statements was not the focus of this research, but this observation is worth noting.

Early Adopters. Prior research indicates that reporting of higher revenue is a characteristic of companies with large capital that early-adopt a new accounting standard (Stent, 2011). Findings from the data analyses support Stent (2011) that these companies are large in size and can afford the additional manpower to early-adopt a new accounting standard. However, the overall result for early adopters shows that the difference in the restated and reported revenues is not statistically significant after the transitioning to principles-based accounting. This result is consistent with Gujarathi and Hoskin (1992) in which 85% of the early-adopted companies that elected the Full Retrospective of accounting did not show any significant change in the implementation of FAS No. 96 (Accounting for Income Taxes). The opposite results was stated in Langer and Lev (1993) in which the majority of the early adopters reported increase earnings. However, the results stated by Stone and Ingram (1988) showed that the majority of the

companies that early-adopted a new accounting standard experienced a negative impact on their financial statements in the implementation of a new accounting standard. The results revealed that there is a no statistical difference for early adopters in this current research. Therefore, one could infer that there is no benefit, for financial statement impact purposes, to early adopt the new revenue recognition standard.

Industry Segments and Market Types. The sole dissenting vote for the passage of ASU No. 2014-09/FASB ASC Topic 606 came from a member of the FASB Board, Mr. R. Harold Schroeder, who stated that the use of probability to assess revenue could be interpreted as a bias towards accounting conservatism when judgments are made in recording revenue. It is evident from the additional results and findings that the Health Care industry was heavily impacted. While the two-tail test fails to reject the null hypotheses of no statistical significance between restated and reported revenues, but the one-tail test rejects the null hypotheses. This indicate a negative impact or conservative bias towards the accounting of revenue from rules-based to principles-based accounting as believed by R. Harold Schroeder. Also, ASU No. 2014-09/FASB ASC Topic 606 noted that respondents of an Exposure Draft (ED) indicated that Health Care was stated as one of the industries that will be heavily impacted. Variable Considerations and Revenue Timing are dominant revenue streams or transaction types that are associated with the conservative or lower approach to the recording of revenue. Other prior literature identified these revenue streams as areas of impact for the Healthcare industry (Conner, 2017).

Results and Findings Linked to Theory, Concepts, and Principles

This research draws from Positive Accounting Theory, Accounting Conservatism, Accounting Materiality, and the Accounting Principle of Comparability to assess the impact on the financial statements in the transition from rules-based to principles-based accounting.

The result on materiality, shows that most of the participants deem the difference between restated and reported revenue as not material or statistically significant after

transitioning from rules-based to principles-based accounting. This means that there is no difference between rules-based and principles-based accounting. One could infer that the financial transaction with similar economic transactions are measured consistently across businesses and segments between the two accounting standards. They are comparable. This comparability is deep comparability (Gordon & Gallery, 2012). However, studies from the UK and Saudi Arabia showed the opposite findings after they transitioned from rules-based to principles-based accounting. In the UK and Saudi Arabia, the results on materiality for most of the participants were positively or negatively affected (Ali et al., 2016; Razak & Alqurashi, 2018). One could infer from these findings that UK accountants were more optimistic (positive change) and reported higher earnings, whilst the Saudi Arabian accountants were more pessimistic (negative change) and reported lower earnings. These findings are related to Positive Accounting Theory which assumes that management will make judgments in making accounting decisions based on self-interest, and could report higher or lower earnings based on their personal goals (Watts & Zimmerman, 1978). This inference could not be made for most of the companies under this current study, but could be made for the companies investigated in the prior studies in UK and Saudi Arabia.

Correspondingly, in the United States the results show that of the total number of companies that meet and surpass the 5-percentage point of the materiality threshold, the majority of the participants are more pessimistic (negative change) and report lower earnings. One can speculate that the judgments made by accountants are driven by the application of Positive Accounting Theory in conjunction with Accounting Conservatism. It is very important to note that when accountants are faced with making financial decisions, they apply Positive Accounting Theory and Accounting Conservatism. Accounting Conservatism acts as a constraint in curtailing the self-interest nature of accountants in the accounting and reporting of contract revenue, with a possible goal to minimize tax, political, and regulatory considerations (Watts &

Zimmerman, 1978, 1983). Therefore, when applying the new revenue recognition standard, management's judgment could be affected by Accounting Conservatism as stated by Schroeder's dissenting opinion before the passage of the new standard (FASB, 2014c).

Limitations of Study and Recommendations for Future Research

The reader should take into consideration these limitations—discovered during data collection, analyses, and computations—before making interpretation or speculation from the results and findings of this study. The data used in this study is proprietary data from Audit Analytics, a reputable third party with knowledge and expertise in collecting financial data relating to new accounting standards. This data is protected and subject to a non-disclosure agreement that makes this proprietary data nontransferable to other researchers. However, the data is obtainable from Audit Analytics for a fee. Also, the data analysis reveals that not all companies in the Russell 3000 Index have fully Adopted FASB ASC 606. Some companies are in their early adoption stage, ongoing evaluation stage, and substantially complete stage. Therefore, with the passage of time, the population and sample will likely increase, and could affect the results. A recommendation for future research is for (1) the data collection process to be funded by a university and the data made accessible, at no charge, and (2) for a substantial time period to pass so as to give other companies enough time to fully adopt this new accounting standard, for this study to be replicated by other researchers.

Another limitation is related to the unique participants of the study. This study is geared towards companies listed in the Russell 3000 Index Fund that elect the Full Retrospective Method of accounting in the transition from rules-based to principles-based accounting. Therefore, there is the limitation in the generalizability of the results and findings of this study to private companies, international businesses tracked by other indices, non-profit organizations, governments, and other public companies that did not apply the Full Retrospective Method of accounting.

It is worth noting that one of the goals for the promulgation of ASU No. 2014-09/FASB ASC Topic 606 is to harmonize US GAAP with international standards and for the comparability of financial statements across businesses in the US and around the world. Future research could assess the comparability and harmonization of US GAAP with IFRS in the recognition of revenue. Healthcare was identified as one of the industry segments that was significantly impacted in the transition from rules-based to principles-based accounting in the recognition of revenue. Future research could be conducted on the rest of the financial statements' line items in the balance sheet, income statement, and statement of cashflow to assess the significance of the before and after values filed with the SEC.

Conclusion

Revenue recognition is a challenging issue for preparers and users of financial statements in the United States. Revenue is one of the most important line items reported in the financial statements. Yet the complicated, inconsistent, and often contradictory ways of reporting revenues have made it difficult for stakeholders to gauge performance and make meaningful comparisons across businesses. The Financial Accounting Standard Board (FASB) and the International Accounting Standard Board (IASB) convergence project on revenue recognition led to the passage of ASU No. 2014-09/FASB ASC Topic 606 with a goal to remove inconsistencies, harmonize, and ensure comparability of revenue reported in the financial statements. The results show that there is no statistical or material difference for companies that early-adopt and those that implement the new accounting standard on or after the mandatory effective date. Additional results by industry segments show that the difference in revenues for health care is statistically significant and material. The results provide an answer to the research question that there is no difference between the before after revenue in the financial statements after the transition to principles-based accounting in the United States for companies tracked by the Russell 300 Index.

This study adds to the body of knowledge by using an academic exercise to provide answers to the accounting profession after the transition from rules-based to principles-based accounting in the United States. After a review of the new accounting standard before its implementation, PricewaterhouseCoopers (2016), KPMG (2016), and Deloitte (2017)—all part of the big four professional accounting firms in the United States—indicated that the impact will vary by industries. This current study provides evidence as to which ones are significantly or materially impacted in the financial statements and which ones are not. PricewaterhouseCoopers (2016) went on further to predict in its 2016 Revenue Recognition Survey that in relation to preparation by companies "most don't expect a material impact" (2016, p. 8) of the effect in the financial statements. Also, a similar statement was made by Usvyatsky and Coleman (2017), experts on the new revenue recognition standard at Audit Analytics. Based on the results in this research, these statements are confirmed.

The findings in this study have implications for the FASB, IASB, professional accounting firms, management, and investors as they look forward towards the ongoing convergence of US GAAP and IFRS on other accounting standards not related to revenue. Regulators should consider the impact on the financial statements that future convergences will have on businesses and industry segments, and how this will impact investors and other stakeholders. It is important for stakeholders to be aware of the role played by the desire of management to report lower or higher the dollar value in the financial statements due to the application of accounting conservatism and positive account theory.

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APPENDICES

Appendix A: Kolmogorov-Smirnov Table

http://www.real-statistics.com/statistics-tables/kolmogorov-smirnov-table/

Kolmogorov-Smirnov Table

The table gives the critical values $D_{n,\alpha}$ as described in Kolmogrov-Smirnov Test.

n \ α	0.001	0.01	0.02	0.05	0.1	0.15	0.2
1		0.99500	0.99000	0.97500	0.95000	0.92500	0.90000
2	0.97764	0.92930	0.90000	0.84189	0.77639	0.72614	0.68377
3	0.92063	0.82900	0.78456	0.70760	0.63604	0.59582	0.56481
4	0.85046	0.73421	0.68887	0.62394	0.56522	0.52476	0.49265
5	0.78137	0.66855	0.62718	0.56327	0.50945	0.47439	0.44697
6	0.72479	0.61660	0.57741	0.51926	0.46799	0.43526	0.41035
7	0.67930	0.57580	0.53844	0.48343	0.43607	0.40497	0.38145
8	0.64098	0.54180	0.50654	0.45427	0.40962	0.38062	0.35828
9	0.60846	0.51330	0.47960	0.43001	0.38746	0.36006	0.33907
10	0.58042	0.48895	0.45662	0.40925	0.36866	0.34250	0.32257
11	0.55588	0.46770	0.43670	0.39122	0.35242	0.32734	0.30826
12	0.53422	0.44905	0.41918	0.37543	0.33815	0.31408	0.29573
13	0.51490	0.43246	0.40362	0.36143	0.32548	0.30233	0.28466
14	0.49753	0.41760	0.38970	0.34890	0.31417	0.29181	0.27477
15	0.48182	0.40420	0.37713	0.33760	0.30397	0.28233	0.26585
16	0.46750	0.39200	0.36571	0.32733	0.29471	0.27372	0.25774
17	0.45440	0.38085	0.35528	0.31796	0.28627	0.26587	0.25035
18	0.44234	0.37063	0.34569	0.30936	0.27851	0.25867	0.24356
19	0.43119	0.36116	0.33685	0.30142	0.27135	0.25202	0.23731
20	0.42085	0.35240	0.32866	0.29407	0.26473	0.24587	0.23152
25	0.37843	0.31656	0.30349	0.26404	0.23767	0.22074	0.20786
30	0.34672	0.28988	0.27704	0.24170	0.21756	0.20207	0.19029
35	0.32187	0.26898	0.25649	0.22424	0.20184	0.18748	0.17655
40	0.30169	0.25188	0.23993	0.21017	0.18939	0.17610	0.16601
45	0.28482	0.23780	0.22621	0.19842	0.17881	0.16626	0.15673
50	0.27051	0.22585	0.21460	0.18845	0.16982	0.15790	0.14886
OVER 50	$\frac{1.94947}{\sqrt{n}}$	$\frac{1.62762}{\sqrt{n}}$	$\frac{1.51743}{\sqrt{n}}$	$\frac{1.35810}{\sqrt{n}}$	$\frac{1.22385}{\sqrt{n}}$	$\frac{1.13795}{\sqrt{n}}$	$\frac{1.07275}{\sqrt{n}}$

Appendix B: Gray Comparability Index and Student t-Test by Industry Types

Gray Results by Industry Types & Materiality

Industry	Negative	No Impact	Positive	Total	Material	Material %
Beverages, Apparel, and Mining		13		13	0	0%
Consumer Products	2	22	1	25	3	12%
Electronics and Machinery		28	1	29	1	4%
Financial & Insurance		2		2	0	0%
Financial Services I	1	18		19	1	4%
Health Care and Insurance	4	19		23	4	16%
Healthcare & Pharmaceuticals	1	3		4	1	4%
Industrial & Manufacturing		4		4	0	0%
Information Technologies and Ser	2	40		42	2	8%
Manufacturing and Construction		13		13	0	0%
Natural Resources and Food		14		14	0	0%
Real Estate and Commodities	3	18	1	22	4	16%
Services		4		4	0	0%
Telecommunications	1	15	2	18	3	12%
Transportation		1		1	0	0%
Transportation and Leisure	5	28	1	34	6	24%
Grand Total	19	242	6	267	25	100%

t-Test: Paired Two Sample for Means - Beverages, Apparel, and Mining

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	3598710077	3598710077
Variance	1.45544E+19	1.45544E+19
Observations	13	13
Pearson Correlation	1	
Hypothesized Mean Difference	0	
df	12	
t Stat	#DIV/0!	
P(T<=t) one-tail	#DIV/0!	
t Critical one-tail	#DIV/0!	
P(T<=t) two-tail	#DIV/0!	
t Critical two-tail	#DIV/0!	

#DIV/0! = attempt to divide by ZERO

t-Test: Paired Two Sample for Means - Consumer Products

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	9637939916	9656322156
Variance	2.34138E+20	2.34049E+20
Observations	25	25
Pearson Correlation	0.999886063	
Hypothesized Mean Difference	0	
df	24	
t Stat	-0.397916022	
P(T<=t) one-tail	0.347104769	
t Critical one-tail	1.71088208	
P(T<=t) two-tail	0.694209539	
t Critical two-tail	2.063898562	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Electronics and Machinery

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	6809474103	6942778345
Variance	4.84412E+20	5.1555E+20
Observations	29	29
Pearson Correlation	0.999973777	
Hypothesized Mean Difference	0	
df	28	
t Stat	-1.004108793	
P(T<=t) one-tail	0.161962645	
t Critical one-tail	1.701130934	
P(T<=t) two-tail	0.323925289	
t Critical two-tail	2.048407142	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Financial Insurance & Financial Service

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	11453163048	11397305905
Variance	5.90885E+20	5.90793E+20
Observations	21	21
Pearson Correlation	0.999959805	
Hypothesized Mean Difference	0	
df	20	
t Stat	1.174457525	
P(T<=t) one-tail	0.127003425	
t Critical one-tail	1.724718243	
P(T<=t) two-tail	0.25400685	
t Critical two-tail	2.085963447	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Health Care

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	363913933.3	358144451.8
Variance	1.39833E+18	1.39915E+18
Observations	27	27
Pearson Correlation	0.999919655	
Hypothesized Mean Difference	0	
df	26	
t Stat	1.999123182	
P(T<=t) one-tail	0.028074327	
t Critical one-tail	1.70561792	
P(T<=t) two-tail	0.056148654	
t Critical two-tail	2.055529439	

FAILURE TO REJECT NULL HYPOTHESES : 2 Tail Test

REJECT NULL HYPOTHESES : 1 Tail Test

t-Test: Paired Two Sample for Means - Industrial & Manufacturing

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	14494807750	14703930250
Variance	2.28044E+20	2.36339E+20
Observations	4	4
Pearson Correlation	0.999833241	
Hypothesized Mean Difference	0	
df	3	
t Stat	-1.074512365	
P(T<=t) one-tail	0.180662242	
t Critical one-tail	2.353363435	
P(T<=t) two-tail	0.361324485	
t Critical two-tail	3.182446305	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Information Technologies and Services

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7306786548	7138311833
Variance	4.03174E+20	3.7409E+20
Observations	42	42
Pearson Correlation	0.999356594	
Hypothesized Mean Difference	0	
df	41	
t Stat	1.06854514	
P(T<=t) one-tail	0.145762898	
t Critical one-tail	1.682878002	
P(T<=t) two-tail	0.291525795	
t Critical two-tail	2.01954097	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Manufacturing and Construction

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	4088146231	4071269308
Variance	2.97216E+19	2.94007E+19
Observations	13	13
Pearson Correlation	0.999952105	
Hypothesized Mean Difference	0	
df	12	
t Stat	1	
P(T<=t) one-tail	0.168524529	
t Critical one-tail	1.782287556	
P(T<=t) two-tail	0.337049058	
t Critical two-tail	2.17881283	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Natural Resources and Food

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	8675931801	8678367372
Variance	9.21881E+19	9.21519E+19
Observations	14	14
Pearson Correlation	0.999999007	
Hypothesized Mean Difference	0	
df	13	
t Stat	-0.667049552	
P(T<=t) one-tail	0.258203099	
t Critical one-tail	1.770933396	
P(T<=t) two-tail	0.516406198	
t Critical two-tail	2.160368656	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Real Estate and Commodities

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	5225419955	4797466545
Variance	4.08807E+19	3.3257E+19
Observations	22	22
Pearson Correlation	0.970434477	
Hypothesized Mean Difference	0	
df	21	
t Stat	1.251297146	
P(T<=t) one-tail	0.112293357	
t Critical one-tail	1.720742903	
P(T<=t) two-tail	0.224586713	
t Critical two-tail	2.079613845	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Services

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	3295467000	3295587000
Variance	2.5189E+19	2.51851E+19
Observations	4	4
Pearson Correlation	0.999999635	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.055715277	
P(T<=t) one-tail	0.479535818	
t Critical one-tail	2.353363435	
P(T<=t) two-tail	0.959071637	
t Critical two-tail	3.182446305	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Telecommunications

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	9404981333	9361516444
Variance	4.53434E+20	4.4857E+20
Observations	18	18
Pearson Correlation	0.999895232	
Hypothesized Mean Difference	0	
df	17	
t Stat	0.562139901	
P(T<=t) one-tail	0.290678892	
t Critical one-tail	1.739606726	
P(T<=t) two-tail	0.581357784	
t Critical two-tail	2.109815578	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Transportation and Leisure & Transportation

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	15434536143	15349769114
Variance	5.94119E+20	5.88287E+20
Observations	35	35
Pearson Correlation	0.999840723	
Hypothesized Mean Difference	0	
df	34	
t Stat	1.113844571	
P(T<=t) one-tail	0.136579168	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.273158335	
t Critical two-tail	2.032244509	

FAILURE TO REJECT NULL HYPOTHESES

Appendix C: Gray Comparability Index and Student t-Test by Market Types

Gray Results by Market Types & Materiality

Market	Negative	No Impact	Positive	Total	Material	Material %
Nasdaq	13	127	2	142	15	60
NYSE	6	115	4	125	10	40
Grand Total	19	242	6	267	25	100%

t-Test: Paired Two Sample for Means - Nasdaq

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	4010209777	3940945044
Variance	1.55389E+20	1.45319E+20
Observations	142	142
Pearson Correlation	0.999399857	
Hypothesized Mean Difference	0	
df	141	
t Stat	1.397129764	
P(T<=t) one-tail	0.082284684	
t Critical one-tail	1.655732287	
P(T<=t) two-tail	0.164569367	
t Critical two-tail	1.976931489	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - NYSE

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	12345692304	12291642192
Variance	4.6048E+20	4.65925E+20
Observations	125	125
Pearson Correlation	0.999332718	
Hypothesized Mean Difference	0	
df	124	
t Stat	0.758840605	
P(T<=t) one-tail	0.224693968	
t Critical one-tail	1.65723497	
P(T<=t) two-tail	0.449387936	
t Critical two-tail	1.979280117	

FAILURE TO REJECT NULL HYPOTHESES

Appendix D: Gray Comparability Index and Student t-Test by Revenue Stream or Revenue Transaction Types

Gray Results by Revenue Stream or Revenue Transaction Types & Materiality

Revenue Stream or Types	Negative	No Impact	Positive	Total	Material	Material %
Breakage & Loyalty Program		18		18	0	0%
Non Revenue Line Item	2	66	1	69	3	12%
Revenue Timing	14	73	3	90	17	68%
Revenue Timing|Breakage & Loyalty Program	1	4	1	6	2	8%
Revenue Timing|Variable Consideration	2	13	1	16	3	12%
Variable Consideration		5		5	0	0%
Variable Consideration|Breakage & Loyalty Program		1		1	-	0%
Not Disclosed	0	62	0	62	0	0%
Grand Total	19	242	6	267	25	100%

t-Test: Paired Two Sample for Means - Breakage & Loyalty Program

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	13547186333	13528708556
Variance	3.71403E+20	3.70173E+20
Observations	18	18
Pearson Correlation	0.999985918	
Hypothesized Mean Difference	0	
df	17	
t Stat	0.732233705	
P(T<=t) one-tail	0.237000504	
t Critical one-tail	1.739606726	
P(T<=t) two-tail	0.474001009	
t Critical two-tail	2.109815578	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Revenue Timing

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	10212534388	10086058121
Variance	5.29303E+20	5.23206E+20
Observations	90	90
Pearson Correlation	0.999102556	
Hypothesized Mean Difference	0	
df	89	
t Stat	1.223193962	
P(T<=t) one-tail	0.11224267	
t Critical one-tail	1.662155326	
P(T<=t) two-tail	0.224485339	
t Critical two-tail	1.9869787	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Revenue Timing|Breakage & Loyalty Program

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	3059198167	3139898000
Variance	7.15973E+18	9.7785E+18
Observations	6	6
Pearson Correlation	0.997860633	
Hypothesized Mean Difference	0	
df	5	
t Stat	-0.40394872	
P(T<=t) one-tail	0.351474012	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.702948023	
t Critical two-tail	2.570581836	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Revenue Timing|Variable Consideration

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	2487844500	2443692250
Variance	1.38541E+19	1.28634E+19
Observations	16	16
Pearson Correlation	0.996967765	
Hypothesized Mean Difference	0	
df	15	
t Stat	0.560353616	
P(T<=t) one-tail	0.291755655	
t Critical one-tail	1.753050356	
P(T<=t) two-tail	0.58351131	
t Critical two-tail	2.131449546	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Variable Consideration

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7024866667	7066216333
Variance	5.23618E+19	5.27168E+19
Observations	6	6
Pearson Correlation	0.999944696	
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.264990122	
P(T<=t) one-tail	0.130812835	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.261625671	
t Critical two-tail	2.570581836	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Non Revenue Line Item

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7579071655	7507608960
Variance	2.98893E+20	2.98308E+20
Observations	69	69
Pearson Correlation	0.9990772	
Hypothesized Mean Difference	0	
df	68	
t Stat	0.799423882	
P(T<=t) one-tail	0.213414181	
t Critical one-tail	1.667572281	
P(T<=t) two-tail	0.426828361	
t Critical two-tail	1.995468931	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Not Disclosed - Not Disclosed

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	5264806971	5265269439
Variance	1.19174E+20	1.17946E+20
Observations	62	62
Pearson Correlation	0.999946361	
Hypothesized Mean Difference	0	
df	61	
t Stat	-0.028882303	
P(T<=t) one-tail	0.488526374	
t Critical one-tail	1.670219484	
P(T<=t) two-tail	0.977052747	
t Critical two-tail	1.999623585	

FAILURE TO REJECT NULL HYPOTHESES

Appendix E: Gray Comparability Index and Student t-Test by Reporting Period Types

Gray Results by Reporting Period & Revenue Stream or Revenue Types & Materiality

Reporting Period/Revenue Stream	Negative	No Impact	Positive	Total	Material	Material %
Calendar	**17**	**182**	**6**	**205**	**23**	**92%**
Breakage & Loyalty Program		14		14	3	12%
Non Revenue Line Item	2	54	1	57	1	4%
Not Disclosed		51		51	0	0%
Revenue Timing	12	48	3	63	1	4%
Revenue Timing|Breakage & Loyalty Program	1	3	1	5	4	16%
Revenue Timing|Variable Consideration	2	8	1	11	1	4%
Variable Consideration		3		3	0	0%
Fiscal	**2**	**60**	**0**	**62**	**2**	**8%**
Breakage & Loyalty Program		4		4	0	0%
Non Revenue Line Item		12		12	0	0%
Not Disclosed		11		11	4	16%
Revenue Timing	2	25		27	0	0%
Revenue Timing|Breakage & Loyalty Program		1		1	3	12%
Revenue Timing|Variable Consideration		5		5	0	0%
Variable Consideration		2		2	6	24%
Grand Total	19	242	6	267	25	100%

t-Test: Paired Two Sample for Means - Calendar

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7603970797	7557982168
Variance	3.05404E+20	3.07666E+20
Observations	205	205
Pearson Correlation	0.999333279	
Hypothesized Mean Difference	0	
df	204	
t Stat	1.024700031	
P(T<=t) one-tail	0.153359145	
t Critical one-tail	1.652357326	
P(T<=t) two-tail	0.30671829	
t Critical two-tail	1.971660889	

FAILURE TO REJECT NULL HYPOTHESES

t-Test: Paired Two Sample for Means - Fiscal

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	8933021176	8817469773
Variance	3.48226E+20	3.28873E+20
Observations	62	62
Pearson Correlation	0.999357603	
Hypothesized Mean Difference	0	
df	61	
t Stat	1.07871055	
P(T<=t) one-tail	0.142481935	
t Critical one-tail	1.670219484	
P(T<=t) two-tail	0.284963869	
t Critical two-tail	1.999623585	

FAILURE TO REJECT NULL HYPOTHESES

Appendix F: Student t-Test by Companies that meet the Materiality Threshold of 5%

t-Test: Paired Two Sample for Means - Companies meeting Materiality Threshold

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	9633706160	8810210960
Variance	4.063E+20	3.51513E+20
Observations	25	25
Pearson Correlation	0.997497526	
Hypothesized Mean Difference	0	
df	24	
t Stat	2.091806998	
P(T<=t) one-tail	0.023606454	
t Critical one-tail	1.71088208	
P(T<=t) two-tail	0.047212908	
t Critical two-tail	2.063898562	

REJECT NULL HYPOTHESES : 2 Tail Test
REJECT NULL HYPOTHESES : 1 Tail Test

t-Test: Paired Two Sample for Means - Companies not meeting Materiality Threshold

	Restated Revenue (a)	*Reported Revenue (b)*
Mean	7734787902	7751298332
Variance	3.06205E+20	3.08875E+20
Observations	242	242
Pearson Correlation	0.999882019	
Hypothesized Mean Difference	0	
df	241	
t Stat	-0.917517614	
P(T<=t) one-tail	0.179894374	
t Critical one-tail	1.651200843	
P(T<=t) two-tail	0.359788748	
t Critical two-tail	1.969856213	

FAILURE TO REJECT NULL HYPOTHESES