2022

Relationship Between Assets, Liabilities, Earnings Before Interest and Taxes, and Financial Distress

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This is to certify that the doctoral study by

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Walden University
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Abstract

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by

Joseph Anthony Baker

Master of Science, DeVry University, 2017

Bachelor of Science, Park College, 1991

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

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Abstract

Retail sector investors who do not interpret Altman's Z′′-score accurately can underestimate a company's economic viability and ability to secure debt and equity financing. Grounded in agency theory, the purpose of this quantitative correlational study was to examine the relationship between assets, liabilities, earnings before interest and taxes (EBIT), and financial distress. The data were based on financial statements from 101 U.S. public retail sector companies (U.S. Securities and Exchange Commission Standard Industrial Codes 5200 through 5990). Multiple linear regression (MLR) analysis indicated a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score for financial statements prepared under ASC 840, $F(3,100) = 8.165$, $p < .001$, $R^2 = .202$, and for financial statements prepared under ASC 842, $F(3,100) = 3.682$, $p = .015$, $R^2 = .102$. A key recommendation is for business managers to apply the MLR equations' coefficients to optimize their asset acquisition or earnings strategies. The implications for positive social change include the potential to enhance the financial literacy of individual investors by showing how using Altman's Z′′-score can help them decide the levels of investment risk they might be willing to take.

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Dedication

First, I dedicate this study to Jehovah and His son, Jesus Christ, for I believe that I was empowered and enabled to complete this work through Them. This study is also dedicated to my parents, grandparents, and siblings for the inspiring examples they set. My grandparents and parents insisted that my siblings and I do our best as we began our educational journeys. All they asked of us was that we strive to go further in our education than they did and that we do at least as well as they did. I also dedicate this work to my children and grandchildren. May my example inspire them to do at least as well as I have. Finally, I dedicate this work to all those who find it informative and valuable.

Acknowledgments

Thank you, Dr. Douglas Gilbert, Dr. John Bryan, and Dr. Theresa Neal, for your constructive advice as I completed this work. Your time and effort to review and critique my work helped me produce a study that I can be proud to have conducted. I also thank the Doctor of Business Administration faculty and staff at Walden University's College of Management and Human Potential for their excellent guidance as I learned the intricacies of becoming a doctoral scholar. Finally, I thank all the teachers I had the privilege of learning from throughout my academic journey.

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Section 1: Foundation of the Study

Investors in the U.S. public retail sector rely on financial statement information to aid their investment decisions but may not know how an accounting rule change, capitalizing operating leases, affects the content of statements. This study assessed the relationship between assets, liabilities, earnings before interest and taxes (EBIT), and financial distress using Altman's Z′′-score. Altman's Z′′-score is a refinement of the Altman Z-score that Dr. Edward Altman introduced in 1968. Altman's Z′′-score is an accounting-based financial distress predictor designed to use the balance sheet and income statement data.

Section 1 introduces background information on the problem, a problem statement, the study's purpose, and nature, the research question, and the hypothesis. Section 1 also introduces the theoretical framework guiding the research and operational definitions, assumptions and limitations, the significance of the study, and a review of the professional and academic literature. In Section 2, I extend the discussion of the information introduced in Section 1 by introducing more information about the study. I discuss the researcher's role and describe the research method and design. I also discuss the study population, the minimum and maximum sample size, and the statistical tests that I used to analyze the study data. Finally, in Section 3, I present the study findings, including descriptive statistics. I also discuss the study's application to professional practice implications for social change and recommend action and further research.

Background of the Problem

Investors and lenders rely on financial statement information to aid their decisions about investing in or lending to these companies. Financial reporting aims to provide sound financial performance information about the companies presenting financial statements (Financial Accounting Standards Board [FASB], 1984). A negative assessment of a company's economic viability might hamper its ability to secure debt and equity financing (Altman et al., 2019; Garcia Osma et al., 2018) and increase its debt financing costs (Jagannathan et al., 2017; Penman & Zhang, 2020).

Recent changes in reporting standards might make it more challenging for investors and other stakeholders to evaluate the financial health of U.S. public companies. In 2020, U.S. corporations raised $2.5 trillion in financing through new bond and stock issues (Board of Governors of the Federal Reserve System, 2021). Leasing is an important form of financing that companies use to acquire equipment and property (Cotei & Farhat, 2017). Equipment financing and leasing companies generated $12.1 billion in new financing and leasing revenue during December 2020 (The Equipment Leasing and Finance Association, 2021). For financial reports submitted before December 2018 under Accounting Standards Codification (ASC) 840, companies were not required to recognize operating lease liability on their balance sheets (FASB, 2019c). For reporting periods ending after December 2018, a new lease accounting standard announced under Accounting Standard Update (ASU) 2016-02 (FASB, 2016) requires public companies to record assets and liabilities associated with operating leases that

extend beyond 1 year (FASB, 2019d). According to Fafatas and Fischer (2016), the U.S. retail sector might record an additional $203 billion on its balance sheets because of the reporting change. Capitalizing operating leases could affect decisions made by stakeholders such as boards, managers, bankers, and financial analysts (van Kints & Spoor, 2019). Adding right-of-use assets and liabilities to a company's balance sheet might also adversely affect investors' and lenders' assessments of a company's equity and operational risk (Giner et al., 2019). The nature of financial reporting, therefore, has significant implications.

Problem and Purpose

ASC 842, a new lease accounting standard for public companies, requires that company leaders record operating lease assets and liabilities on their balance sheets (FASB, 2019d). Adding operating lease assets and liabilities to public company balance sheets might adversely impact financial distress assessment (Joubert et al., 2017). Morales-Díaz and Zamora-Ramírez (2018) found that a similar standard, International Financial Reporting Standard (IFRS) 16, resulted in a 59% increase in liabilities on retail sector balance sheets. Joubert et al. (2017) also estimated how IFRS 16 might affect another lease-intensive industry (airline) and found that financial distress measured by Altman's Z-score was negatively affected. The general business problem is that financial distress might lead to bankruptcies within the retail industry. The specific business problem is that retail sector investors might lack sufficient information on the relationship between assets, liabilities, earnings before interest and taxes (EBIT), and financial distress assessed using Altman's Z′′-score.

The purpose of this quantitative study, using a correlational design, was to examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. The independent variables were assets, liabilities, and EBIT. The dependent variable was Altman's Z′′-score. The study population consisted of U.S. companies in the retail sector that, under the Securities Act of 1934, must submit financial statements to the U.S. Securities and Exchange Commission's (SEC's) Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. Within EDGAR, 30 Standard Industrial Classification (SIC) codes ranging from SIC 5200 through SIC 5990 identify distinct business types within the retail sector (U.S. SEC, 2019). The social change implications of this study include providing information that adds to the financial literacy of individual investors in public companies in the retail sector. Enhancing investor financial literacy can promote individuals' economic well-being and enhance their understanding of investing in financial markets (Dewi et al., 2020). This study might show investors how an accounting rule change, capitalizing operating leases, affects financial statement information.

Population and Sampling

The study population consisted of 277 public U.S. companies in 28 unique SIC codes within the retail industry (SIC codes 5200 through 5990) that filed annual financial reports on Form 10-K in the SEC's EDGAR system for reporting periods beginning after December 15, 2018. Ghauri et al. (2020) advised that the sampling method chosen for this study should align with the research purpose. I chose probability-based sampling to select the companies that comprised this study. Cresswell and Cresswell (2018)

recommended probability-based sampling methods because each item in the study population has a chance to be sampled, and probability-based sampling mitigates bias in sample selection. I used G*Power Version 3.1.9, a software package created by Faul et al. (2009), to calculate a statistically sound a priori sample size.

Nature of the Study

There are several methods that researchers can use to conduct their studies. Researchers conduct studies using qualitative, quantitative, or mixed methods (Saunders et al., 2019). A qualitative study design aligns with a research philosophy where the scholar evaluating the research phenomenon subjectively interprets the meaning of data (Saunders et al., 2019). A quantitative research methodology aligns with a research philosophy where the scholar hypothesizes about the phenomenon under study and uses quantifiable data to make reasonable deductions about the population's nature under investigation through statistical sampling and a reliable and valid evaluation tool (Ghauri et al., 2020). Mixed-methods research aligns with a practical perspective where scholars use qualitative and quantitative methods to reach conclusions that lead to the practical application of the knowledge learned from a study (Saunders et al., 2019). I used quantitative data to test a hypothesis about independent variables and a dependent variable in this study. I did not apply subjective interpretations (as in a qualitative method). Given the aim of the study--using quantitative data to test a hypothesis about the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score--neither a qualitative nor a mixed-methods approach was appropriate. Instead, a quantitative method was appropriate for this study.

I examined how capitalizing operating leases might affect the relationships between independent variables and a dependent variable. Quantitative researchers examine how variables correlate to each other to describe a phenomenon or as an experiment to investigate the effect of an independent variable on a dependent variable (Ghauri et al., 2020). I neither sought to describe a phenomenon nor predict causal effects that dependent variables might have on an independent variable through experimentation. Researchers using correlational designs evaluate how strongly variables are associated (Dorestani & Aliabadi, 2017). The independent variables were assets, liabilities, and EBIT in this study. The dependent variable was financial distress as measured using Altman Z′′-score. Bloomfield and Fisher (2019) noted that correlational design research could reveal whether variables are positively related, negatively related, or not related. Investors might use information about the relationship between assets, liabilities, EBIT, and financial distress as measured by Altman's Z′′-score to help them decide the level of risk they might incur in their investments in the U.S. public retail sector.

Research Question

What is the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score?

Hypotheses

H_0: There is no statistically significant relationship between assets, liabilities, EBIT, and financial distress as assessed using Altman's Z′′-score.

H_1: There is a statistically significant relationship between assets, liabilities, EBIT, and financial distress as assessed using Altman's Z′′-score.

Theoretical Framework

The theoretical framework in quantitative research provides the criteria and perspective that the researcher uses in testing hypotheses about the relationships among the study variables (Creswell & Creswell, 2018). According to Smith (2020), theoretical frameworks for accounting research can be associated with theories developed in other disciplines. This study's theoretical framework was the agency theory of the firm, as defined by Jensen and Meckling (1976). According to the agency theory, a business's managers should be judged by how well they maximize the value they create for the firm's shareholders. As agents of the firm's shareholders, managers exercise power and control over the firm using information that the shareholders do not have. Firms incur monitoring costs, including financial reporting costs, to mitigate the misalignment of the firm's management's goals with those of the shareholders.

Investors rely on financial information. Financial reporting is an effective way to inform a firm's shareholders about how well the firm's managers are creating value (Muttakin et al., 2020). Financial reporting, through financial statements, provides information to shareholders (and other interested parties) about a public firm's assets, liabilities, stockholders' equity, income, and cash flows (FASB, 1984). Financial statement users might assess a public firm's book value (from an owner's perspective) based on information reported on the firm's balance sheet using an equation: assets minus liabilities equals owner's equity (Akins, 2018; Kieso et al., 2020). For U.S public companies implementing ASC 842, total assets and liabilities are affected by capitalizing operating leases because the public companies record right-to-use assets and related

liabilities on their balance sheets (FASB, 2019d). Under ASC 840, the lease accounting standard that preceded ASC 842, public companies were not required to record assets and liabilities related to operating leases on their balance sheets (FASB, 2019c). Implementing a new lease accounting standard that required the capitalization of operating lease right-of-use assets and related liabilities presented the opportunity to use two multiple linear regression (MLR) models to examine the relationship between assets, liabilities, and Altman's Z′′-score.

Assets and liabilities were not the only financial statement data elements that might be affected by implementing ASC 842. Along with assets and liabilities, Fafatas and Fischer (2016) estimated that the EBIT-to-assets ratio, which is a measure of a public firm's profitability, might be adversely affected by capitalized operating leases. Morales-Díaz and Zamora-Ramírez (2018), in studying the impact of IFRS 16 on the financial statements of European countries, also came to similar conclusions as those of Fafatas and Fischer. I examined the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score to assess how those relationships might be affected by capitalized operating leases. My examination required computing Altman's Z′′-score for financial statements prepared under the old and new lease accounting rules.

Operational Definitions

Earnings before interest and taxes (*EBIT*): Earnings before interest and taxes is the income an entity receives (cash, accounts receivable, or gain on the sale of an asset) during a fiscal period (monthly, quarterly, or annually) minus expenses (including the cost of goods sold and sales and administrative expenses) and losses on the sale of an

asset that the entity incurred resulting directly or indirectly from business operations (FASB, 1984). EBIT represents earnings before accounting for interest earnings or losses and taxes on the total earnings.

Equity or net assets: Equity is that which belongs to a business owner after subtracting total liabilities from total assets and net assets as equaling total assets minus total liabilities (FASB, 1985).

Lease: A lease is a contract (a) that gives the right to use and control an asset for a specified period in exchange for a specified amount of rent or (b) that conveys ownership of an asset if the economic value of the asset is substantially consumed during the contract period (FASB, 2016). A lease is either a sales-type lease or an operating lease. A sales-type lease is a lease contract that conveys from the asset's owner (lessor) to the entity controlling and using the asset (the lessee) the right to keep the asset (FASB, 2019d). An operating lease is a lease contract that only conveys the right to use and control an asset to the lessee for a certain period; on completion of the contract term, the asset is returned to the lessor (FASB, 2019d).

Net worth: Net worth is measured by subtracting total liabilities from total assets (Altman, 1993).

Retained earnings: Retained earnings are the total amount of a public firm's reinvested earnings or losses during its existence (Altman, 1993).

Assumptions, Limitations, and Delimitations

Assumptions

I made two assumptions that might affect this study. Assumptions are facts researchers take for granted about the study, the data gathered and evaluated, and how the data were sourced (Theofanidis & Fountouki, 2019). The first assumption was that not all U.S. public retail companies would qualify for the smaller reporting company (SRC) exclusion announced in FASB (2019). The second assumption was that enough public retail companies would adopt FASB (2019d) following U.S. generally accepted accounting principles prescribed in FASB (2019a) to allow me to select at least the minimum number of samples required for the study from the SEC's EDGAR database. Both of my assumptions were met. I chose the financial statements of 106 companies for inclusion in my research.

Limitations

I identified three limitations that might affect this study. Limitations are potential conditions related to the study's design that are out of the researcher's control and might adversely affect the study (Theofanidis & Fountouki, 2019). One limitation of this study was that it involved analysis of secondary data, specifically financial statements retrieved from the SEC's EDGAR, for which there was no guarantee of accuracy or quality. Another limitation was that the public retail companies in the study might not have implemented FASB (2019b) in the same manner. A final limitation was that there might not have been enough public retail companies that adopted FASB (2019b) to meet the

minimum sampling requirement. None of the conditions mentioned in this paragraph had a negative effect on my study.

Delimitations

I recognized three delimitations related to this study. Delimitations are the limits researchers impose on their studies to mitigate risks that might adversely affect obtaining the research objective (Theofanidis & Fountouki, 2019). The delimitations of this study were associated with data quality, data consistency, and adequate sample size. First, to minimize the risk that erroneous data might impact the analysis, I queried the SEC's EDGAR database for relevant amended financial statements that might have been filed. Had relevant amended financial statements been found, I would have assessed how they might impact the study. Next, to mitigate the risk of not meeting the minimum sample requirement, I drew 106 samples. Recognizing that all public retail companies might not implement FASB (2019d) similarly, I used financial statement data consistent with the implementation option employed by most cases in the sample. Finally, if enough public retail companies had not adopted FASB (2019d) to meet the minimum sampling requirement, I would have conducted a census of related data found in the SEC's EDGAR database.

Significance of the Study

Investors and lenders rely on data presented in financial statements to inform their investment and lending decisions. The leaders of public companies of all sizes use debt or equity financing to fund their growth, supplement their operational cash needs, and lease financing to acquire property and equipment (Chen & Kieschnick, 2018; Cotei & Farhat,

2017). Many use bankruptcy prediction models (BPMs) to assess a company's potential for financial distress and bankruptcy (Altman, 2018). Financial distress indicators for public U.S. companies in the retail sector might be adversely affected by the requirement to capitalize operating leases (Durocher, 2008; Fafatas & Fischer, 2016). This study might be valuable to business managers because it involved examining how implementing ASC 842 as required by FASB (2019d) affected an indication of financial distress. Business managers of U.S. public companies in the retail sector might benefit from data on how capitalizing operating leases might affect signs of their companies' financial distress as measured using Altman's Z′′-score. Data on how capitalizing operating leases might impact indications of a company's financial distress might also be helpful to business managers in their decisions concerning equipment and property acquisition.

This study contributes to positive social change by providing information that adds to the financial literacy of individual investors in public companies in the retail sector. According to Fairfax (2018), various reports on financial literacy in the United States found significant gaps and deficiencies in the financial literacy of both investors and the public. Improving financial literacy in the United States can help investors and the economy (President's Advisory Council on Financial Capability, 2013). Investors affect the economy through their investments. They decide how much and where they invest. Investors rely on financial statement data to inform their investment decisions. Investors who understand financial statement data and analysis are in a position to make informed investment decisions. In this study, I discuss financial statement data and

analysis. I provide an example of how to use Altman's Z′′-score to assess a company's financial distress. I also show how capitalizing operating leases affect both financial statement-based ratios and Altman's Z′′-score.

A Review of the Professional and Academic Literature

A logical starting point for my research is a review of the professional and academic literature. Researchers use a literature review to identify information that is relevant to their study (Snyder, 2019). Through literature reviews, researchers identify conceptual or theoretical frameworks that can underpin their research projects, research methods and designs that might be appropriate for their research questions, and tools that might be suitable for data collection and evaluation. Snyder (2019) noted that systematic literature reviews are common in the social sciences. According to Massaro et al. (2016), a structured literature review should include a body of academic literature to inform research questions and unveil possible research directions. In the paragraphs that follow, I explain the considerations I made as I designed my review of the professional and academic literature.

Information about the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score might benefit retail sector investors. The relationship between assets, liabilities, and financial distress drives lender and investor decisions about the creditworthiness of a business and its viability as an investment (Altman et al., 2019; Shakespeare, 2020). Recent changes in lease accounting rules in ASC 842 have the potential to impact creditworthiness and investment decisions by altering the levels of reported assets and liabilities and thereby affecting key lending and

investment metrics (Joubert et al., 2017). Altman's Z-score is a metric that, since its introduction in 1968, investors and lenders have often used to determine the viability of a business and the risk of financial distress (Altman et al., 2019). The Z-score can serve as a proxy for the impact of accounting rules on a company's creditworthiness and investment worthiness (Joubert et al., 2017). While Altman's Z-score was designed for manufacturing firms, Altman's Z′′-score was designed to include nonmanufacturing firms (Altman et al., 2019). Therefore, I chose Altman's Z′′-score as the dependent variable in examining the relationship between assets, liabilities, EBIT, and financial distress.

A change in the lease accounting standards presented an opportunity to understand leasing and why it is crucial to examine the relationship between assets, liabilities, EBIT, and financial distress. The new lease accounting standard requires public companies in the United States to record operating lease assets and liabilities on their balance sheets (FASB, 2019d). Leasing is an important form of financing that companies use to acquire equipment and property (Cotei & Farhat, 2017). Financial distress indicators for public U.S. companies in the retail sector might be susceptible to adverse effects because of the requirement to capitalize operating leases (Durocher, 2008; Fafatas & Fischer, 2016). I chose U.S. public retail sector companies as my study population to assess how they might be affected by the requirement to capitalize operating leases.

In this literature review, I discuss financial reporting, financial distress, bankruptcy prediction, leases, and lease accounting from the lens of the agency theory of the firm. Financial reporting should provide investors and lenders with information about

the assets a firm uses, the liabilities it owes, and its prospective future cash flows (van Kints & Spoor, 2019). Investors and lenders rely on financial statement information to aid their decisions about investing in or lending to these companies (Shakespeare, 2020). An understanding of financial reporting can add to the financial literacy of investors in U.S. public companies in the retail sector. Information about bankruptcy, bankruptcy prediction, and financial distress might prove helpful to those who invest in the U.S. public retail sector. I reviewed bankruptcy and financial distress prediction literature, including BPMs. The review provided context about the relationship between assets, liabilities, EBIT, and financial distress for retail sector investors.

Leasing is an important form of financing that companies use to acquire equipment and property (Cotei & Farhat, 2017). Information about leases and how they are accounted for might help investors in the U.S. public retail sector understand the implications of the new lease accounting standard. The literature review provided evidence that the U.S. retail sector is relying on operating leases and possibly is affected by the new lease accounting standard, which provided a focus for this study. The literature review also supported my choice of the agency theory of the firm as a suitable theoretical framework for this study. I also reviewed the literature to inform critical decision-making about the research method and design and data collection instrument.

This literature review was organized into 13 sections. In the first four sections, I introduced the firm's nature and the agency theory of the firm. I also introduced the stakeholder theory of the firm and explained why the agency theory of the firm was appropriate for this study. I discussed the agent-principal relationship and the agency

problem in the following two sections. Then, I addressed the applicability of this literature to the business problem. The following four sections focused on introducing financial distress and bankruptcy prediction, leases and lease accounting, concerns about the new lease accounting standard, and the development of lease accounting. In the final two sections of the literature review, I reviewed the literature supporting the study hypothesis and selection of the independent variables and the dependent variable.

The search parameters for the literature review emphasized peer-reviewed articles published during and since 2017. Google Scholar and the Walden University Library Thoreau Multi-Database Search were the sources queried for the literature review. I also obtained information from authoritative associations, boards, and government entities' websites. The keywords used to find the documents comprising the literature review included *accounting information systems*, *Altman's Z-score*, *bankruptcy*, *bankruptcy prediction*, *bankruptcy prediction model*, *corporate governance*, *enterprise risk management*, *financial risk management*, *financial statements*, *lease*, *lease accounting*, *management control systems*, *qualitative research*, *quantitative research*, and *theory of the firm*. See Table 1 for a tally of the references used in this study.

Table 1

References Used in This Study

Reference source	No. of references	No. of references published during and since 2017	No. of peer-reviewed references	% 5 years or less	% peer reviewed
Associations, boards, and government entities	33	20	33	61	100
Dissertations	1	1		100	
Journal articles	131	113	121	86	92
Media	2	2		100	
Reference books	19	17		93	
Total	186	153	154	82	83

The Nature of the Firm

I derived the theoretical framework for this study from an economic theory. The economic theory addressed the firm's relationships with the firm's managers and investors (Smith, 2020). An understanding of the nature of the firm is elemental to understanding the agency theory of the firm. Coase's (1937) definition of the firm provided a foundation for Jensen and Meckling's (1976) later development of the agency theory of the firm. Investors and lenders provide financing that enables firms to operate. Where firms are in financial distress, the funding provided by investors and lenders might be at risk of loss if those distressed firms seek bankruptcy protection.

It is appropriate to define just what a firm might be since investors and lenders provide financing to the firm. Coase (1937) represented the firm from the perspective of

practical and realistic assumptions based on economic theory. Coase's definition considers the economic system in which the firm exists, which is a system governed by a market design based on supply and demand. Within the market, price is affected by the supply and demand for goods and services. According to Coase, the firm results from a configuration of interactions that becomes apparent with a public firm's resources being directed by the firm's management. The firm's within-firm costs to produce its goods and services are moderated by how well its managers use its assets and moderate its liabilities. Firms, through their managers, seek to identify and optimize the prices relevant to their ability and capacity to organize production to generate earnings. Relevant prices include the transactional cost of identifying prices and contracting for goods and services, acquiring assets, incurring liability (debt), and raising capital by selling equity. The firm's existence is a function of its management's administration of interactions and relationships. These interactions and relationships are directed by managers applying the firm's ability, capacity, and resources to produce goods and services.

The Agency Theory of the Firm

The agency theory of the firm has its foundation in research that preceded its introduction in 1976. Coase's (1937) study on the nature of the firm laid a foundation for Jensen and Meckling's (1976) development of the agency theory of the firm. The theory of the firm evolved from Coase defining the firm in terms of the market, price, supply and demand, centralized management, and contract and transaction costs. In the context of this study, the firm is an entity in which investors invest and to which lenders lend.

The agents of the public firm acquire the assets and incur the liabilities associated with generating the firm's revenues. The agents also devise and implement strategies designed to mitigate threats that might cause financial distress for the firm (The Treadway Commission of Sponsoring Organizations [COSO], 2017; Viscelli et al., 2017). In this section, I discuss the agency theory of the firm and why it was chosen as the theoretical framework to support this study of the relationship between assets, liabilities, EBIT, and financial distress (assessed using Altman's Z´´-score) in the U.S. public retail sector firms.

The agency theory of the firm focuses on managers and their responsibilities. Jensen and Meckling (1976) extended the centralized management element of Coase's definition of the firm in developing their agency theory to address how managers might be motivated to manage the firm. They also included components of agency, finance, and property rights theory. As described by Jensen and Meckling, the agency theory of the firm suggests that a public firm's managers are empowered under contract as agents of the firm's owners (principals). As agents, the managers have a fiduciary responsibility to the firm's principals to maximize the firm's value. The firm's managers assess the risks associated with financial distress and implement strategies designed to mitigate financial distress risks (Valaskova et al., 2018). Managers decide which assets the firm acquires and how much liability (debt) the firm should incur. Managers also decide whether to lease or buy the firm's assets to produce earnings. They are also responsible for developing and implementing the firm's earning strategy.

Managers are responsible for their firm's financial reporting. Managers must develop, implement, and report on internal controls over financial reporting (Abbott et al., 2019; Sarbanes-Oxley Act of 2002). Implementing the new lease accounting standard, ASC 842, will require managers to record right-of-use assets and liabilities on their firms' balance sheets (FASB, 2019d). Where lease accounting is concerned, internal controls must mitigate several risks. In meeting the requirements of ASC 842, managers must design and implement internal controls to ensure that all leases are appropriately identified, classified, and valued. By ensuring that the leases they report are classified and valued correctly, managers mitigate risks associated with misstating the associated assets and liabilities. Managers must also guarantee the completeness of the footnote disclosures related to leases and the values they report on the balance sheets.

The relationship between a firm's managers and its owners is not without some tension levels. Jensen and Meckling (1976) noted that a natural tension in the agency-principal relationship is that the agent's actions (because of agent self-interest) might not align with the principal's interests. This tension is mitigated through contract and monitoring mechanisms implemented by the principals. These contracts can include equity ownership as part of the firm's manager's compensation package. The intent of awarding equity to a company's agents aligns agent interests with those of the principals. A consequence of granting equity to a public firm's agents is the effect on the firm's ownership structure. Agent self-interest might influence the managers' financing decisions, and those decisions might not be in the best interest of the outside owners of the firm's debt and equity.

There is a property rights element of the agency theory. The property rights element of the agency theory of the firm introduced in Jensen and Meckling (1976) concerns the firm's ownership structure. Here they described the ownership structure from the perspective of the firm's managers and the firm's investors. The ownership structure accounts for equity owned by the firm's managers and the equity and debt held by outside investors.

The firms incur monitoring costs. Monitoring costs include costs associated with financial audits, financial reporting, and corporate governance (Jensen & Meckling, 1976). The contract and monitoring costs, described as agency costs, inherently fail to add to the firm's value. Agency costs are also incurred through equity and debt financing and bankruptcy costs. These costs rise as the level of equity or debt financing rises.

The Stakeholder Theory of the Firm

A discussion about theories of the firm is incomplete without including another theory, the stakeholder theory of the firm. The stakeholder theory also has its roots in the Coase (1937) definition of the firm. As a theoretical framework for examining the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score, the stakeholder theory might apply more to how stakeholder relationships might mitigate the effects of financial distress (Chiu & Walls, 2019; Kane et al., 2005). Like the Jensen and Meckling (1976) agency theory of the firm, the stakeholder theory of the firm, as described by Donaldson and Preston (1995), developed from the centralized management element of Coase's definition of the firm. The

stakeholder theory provides a framework to evaluate the firm other than the agency theory of the firm.

The firm has many stakeholders. According to Donaldson and Preston (1995), the stakeholder theory of the firm suggests that a public firm's managers have a duty to all parties considered to be stakeholders (owners of the firm and other parties that have a stake in the firm). These parties have various cooperative and competing interests and contribute value to the firm. The parties include employees, suppliers (including lessors), customers, the government, and the greater society in which the firm operates. From the perspective of the lessor stakeholders, the new lease accounting standard will have no tangible effect on their balance sheets because they would continue to account for leases (for the most part) as under the former standard.

The stakeholder theory is different than the agency theory. In the agency theory of the firm, a public firm's management is expected to maximize firm value (managing assets, liabilities, and implementing earnings strategy) while also accounting for the interests of all the firm's stakeholders (such as managing agency costs) and not just those of the stockholders (Jensen & Meckling, 1976). In the stakeholder theory of the firm, a public firm's management (and, by extension, the firm) is judged by its stakeholders and society on an expected behavior basis driven by a principle-based standard of behavior (Donaldson & Preston, 1995). The same principle-based standard of conduct is also expected to mitigate the firm's management-versus-stakeholders tension that might arise from the firm's management acting more in its self-interests than the stakeholders' interests.

Some studies have found little evidence that firms operated from an agency theory perspective are more successful than firms governed from a stakeholder theory perspective. In their discussion of the stakeholder theory, Donaldson and Preston (1995) noted that firms operating from a stakeholder (and socially responsible) viewpoint were often as financially successful as those working from an agency theory standpoint. Firms considered by their stakeholders to operate with a high level of social responsibility are less likely to experience financial distress (Zheng et al., 2019). A public firm's positive relationship with its employees (a stakeholder in the firm) can mitigate the impact of financial distress through concessions that the employees are likely to make to help the firm recover (Kane et al., 2005). Chiu and Walls (2019) found that firms that prioritized the stakeholder perspective as a quality in the candidates they consider for the CEO position maintain their ability to mitigate financial distress. Concerning financial distress, though firms governed by the stakeholder theory might diminish situations that could lead to financial distress, no evidence was presented about which theory has primacy over the other.

The Rationale for the Use of the Agency Theory of the Firm

This study's objective was to examine, for public U.S. firms in the retail sector, the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score. As of September 2020, the U.S. retail sector employed over 15 million people (U.S. Bureau of Labor Statistics, 2021) and comprised $40 billion of the $21 trillion U.S. gross domestic product (U.S. Bureau of Economic Analysis, 2020). The operating leases resulted from contracts that the management of these firms entered for

the right to use specific assets. An examination of the relationships between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score from a stakeholder theory perspective would include assessing whether the managers entered operating lease contracts based on behavior expected by all the firms' stakeholders as well as the contracts ’contribution to the firm’s financial viability.

There are different foci in the agency theory of the firm and the stakeholder theory of the firm. While both theories extend from the Coase (1937) definition of the firm, the agency theory holds that the firm's management has a duty to maximize the firm's value and mitigate financial distress risks (Valaskova et al., 2018) for the shareholders. The stakeholder theory suggests that the firm's management also has a duty to optimize the firm's value for all its stakeholders. As noted earlier, these stakeholders include investors, creditors, employees, and others. Value optimization is common to both the stakeholder and agency theories. The agency theory assigns primacy to the shareholders, while the stakeholder theory treats all the firm's stakeholders as equals. Under the agency theory, managers are judged under quantifiable results that assess the firm’s financial performance. Under the stakeholder theory, managers are evaluated based on qualitative results (expected behavior) that address the firm’s corporate responsibility to all its stakeholders and how corporate responsibility contributes to the firm’s financial viability.

A company’s economic well-being can be affected by its level of corporate responsibility. While firms found to exhibit high levels of corporate responsibility have been shown to have lower likelihoods of financial distress (Zheng et al., 2019), an

assessment of capitalizing operating leases from a corporate responsibility perspective is beyond the scope of this study. Examining the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score from an agency theory perspective aligns with quantifying how (or if) capitalizing operating leases might affect a financial distress indicator. An examination of these relationships will also require computing Altman's Z′′-score for the lease accounting standard that was in effect before the requirement to capitalize operating lease assets and liabilities. Table 5 shows financial distress prediction based on the Z′′-score range. This study might answer questions that investors in the U.S. public retail sector might have about whether a public firm's Z′′-score, with the assets and liabilities added to a public firm's balance sheet, remains in the same range as before ASC 842 implementation.

Agent-Principal Relationship

Investors in the U.S. public retail sector have a relationship with the managers of the companies where they invest. This relationship is the agent-principal relationship in which the investors are principals, and the managers are their agents. The firms ' managers develop and implement strategies about how much money to raise from investors and about whether to sell stocks or bonds. The managers also decide whether to buy or lease the assets the firm would use to generate revenue and develop and implement strategies to manage the firm's liabilities.

The agent-and-principal relationship is consensual. Trust is an inherent tenet of the agent-principal relationship. The duties of corporate managers of corporations are governed by the corporate by-laws and their employment contracts (Bartlett & Talley,

2017; Miller, 2018). Trust and loyalty duties for corporate managers also accrue from statutory obligations arising from the state laws enabling incorporation (Bartlett & Talley, 2017). Managers are expected to use their best business judgment to make decisions on behalf of the corporation (Bartlett & Talley, 2017; Miller, 2018). Agents are duty-bound to act in the best interest of principals. Managers must avoid conflicts of interest when working on behalf of the firms they represent. There is a reasonable expectation that managers apply their skills to the best of their abilities as they perform their duties. By using their best business judgment, managers ensure they are informed about the issues requiring their decisions and guidance. Managers also ensure they make logical decisions based on the best information they have at the time.

The Agency Problem

As mentioned earlier, there is a natural tension between a firm's agents and its principals. In their discussion of the theory of the firm, Jensen and Meckling (1976) described the agency problem as being a byproduct of the separation between a public firm's owners and its managers. It is crucial for U.S. public retail sector investors to understand the agency problem because it might inform their understanding of the corporation's assets, liabilities, and financial viability. The agency problem centers on how the firm's owners might motivate its managers to act in the firm's (and its stockholders') best interests. Information asymmetry between the firm's managers and the firm's owners arises because of the owner's distance from the day-to-day operations. The firm incurs costs that arise from the governance and monitoring procedures that the firm implements to mitigate manager self-interests. Monitoring costs include expenses related

to corporate governance and costs associated with information asymmetry mitigation. For this study, the firm is synonymous with the corporation. The following sections discuss corporate (firm) governance from a management control perspective and information asymmetry.

Corporate Governance – A Management Control Perspective

U.S. public retail sector investors need to understand the management control aspect of corporate governance. A firm's management is expected to devise and implement strategies to safeguard the corporation's assets and mitigate risks related to liabilities and financial distress. As Hermalin and Weisbach (2017) acknowledged, corporate governance is a crucial and multifaceted topic. A corporation has statutory obligations, arising from state laws enabling incorporation and federal law, to adopt and implement articles of incorporation and by-laws governing its management obligations to shareholders and its board of directors' design as part of its governance structure (Bartlett & Talley, 2017). Understanding corporate governance's role in management control is beneficial in providing U.S. public retail sector investors with information about the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score.

Corporate governance consists of processes and procedures. Corporate governance techniques and methods control the management of the capital invested in corporations and their capital structures (Anicic et al., 2017; Hermalin & Weisbach, 2017). There have been many corporate governance studies about the corporation's board of directors, the chief executive officer's influence over the board of directors, executive

compensation, and shareholder control and relations (Ackert et al., 2019; Hermalin & Weisbach, 2017). The management control aspect of corporate governance introduces some of the tools the corporate governance structure uses to safeguard assets; manage costs, liabilities, and operations; and mitigate risks that might lead to financial distress because of failure to meet corporate goals. The following paragraphs address the management control facet of corporate governance.

Managers are responsible for the health of their companies. Managers devise and implement strategies designed to mitigate risks that might threaten the firm's goals from the strategic perspective of what is best for the firm (COSO, 2017; Viscelli et al., 2017). These threats can include internal risks such as inefficient cost and transaction management and external risks. Managers also develop and deploy management information and control systems. Managers use management information systems to collect data that inform their options to mitigate risks associated with efficient and effective order fulfillment (Ishfaq & Raja, 2018). Managers use the data and information derived from their management information systems to monitor the health of their companies.

Managers design and implement control systems that integrate internal controls over operations and reporting. The processes and procedures that control managing the capital invested in corporations include management control systems (MCS) and accounting information systems (AIS). An MCS incorporates methods, policies, procedures, people, and systems employed by a public firm's management to mitigate risks that might adversely impact its ability to meet its goals (Jukka & Pellinen, 2020).

These methods, policies, procedures, people, and systems (include and implement) internal control over assets, operations, and financial reporting (Abbott et al., 2019). Zopounidis et al. (2020) noted that a corporation's management is responsible for the quality of the corporation's information disclosures to the public. High-quality information disclosures (including financial information and non-financial information related to corporate governance) support a positive corporate reputation and public confidence in the corporation's financial reporting (Enache & Hussainey, 2020). Without well-designed (and implemented) control systems, managers might fail in their duty to mitigate risk and maximize value.

Retail sector managers tailor their MSC design and implementation to ensure the company achieves its cost, inventory availability, and sales goals. According to Deschamps (2019), how an MCS is designed and implemented positively impacts a corporation's achieving its operational and strategic goals. An MCS can include a warehouse management system enabled by point-of-sale (POS) data to inform inventory control and replenishment (Boysen et al., 2021). An MCS can also include customer relationship management (CRM) systems to gather data about their customers' buying behavior and habits (Bradlow et al., 2017). Retail sector managers use the information provided through their MCS to optimize costs and profit margins and improve sales by assuring their companies offer the product their customers want at the prices they are willing to pay.

Companies cannot survive without an accounting information system (AIS). Guragai et al. (2017) stated that an essential element of business operations managed

through corporate governance includes an AIS. An AIS includes people, processes, data processing software, hardware, procedures, and controls integrated and employed to capture financial transaction data and produce financial information (Guragai et al., 2017; Kieso et al., 2020). Methods and systems include operating and production budgeting, management information systems (MISs), management and cost accounting systems (MCAS), and activity-based costing (Pedroso et al., 2020; Vetchagool et al., 2021). Banker et al. (2018) found that managers' decisions in controlling and managing costs are associated with varying degrees of uncertainty, and the effects of those decisions are observable. According to Pedroso et al. (2020), a management accounting system (MAS) enhances a public firm's capacity to benchmark its performance. Al-Attar (2021) also found that an AIS positively affects a public firm's corporate governance structure through its contributions to decision support. Managers rely on the information they receive from these systems to implement strategies to mitigate the risks (including those related to financial distress) their companies face in their operating environments.

The systems that managers rely on to aid their decision-making have evolved. The advent of enterprise resource planning (ERP) systems in the 2000s (Rahman & Zhao, 2020) affected corporate governance by integrating functions of AIS and MCS into one system (Paredes & Wheatley, 2018; Romney & Steinbart, 2018). The integrated functions of an ERP can include accounting, inventory and warehouse management, and human resource management (Romney & Steinbart). ERP systems have supported corporate governance goals by improving financial reporting reliability (Paredes & Wheatley, 2018). ERP systems have supported corporate governance goals in the retail sector by

improving the supply chain's performance and reliability (Adivar et al., 2019). Thanks to ERP systems, managers have a sophisticated tool to manage their firms 'resources.

Managers must understand their business' operating environment to succeed in adding value to their firms. Data are the assets managers use to aid their understanding of their operating environment. A company's managers use data to inform their decisions about strategies they might employ to achieve and maintain financial viability (Appelbaum et al., 2017). Appelbaum et al. (2017) also note that data provide managers the information they need to manage their assets and liabilities and how they might increase their firms' revenue production efficiencies. Information technology (IT) innovations enable businesses to collect, classify, and process volumes of different financial and non-financial data to support management's strategic planning process (Janvrin & Weidenmier Watson, 2017). These IT innovations include applications that enable business analytics (BA), business intelligence (BI), and data mining capabilities. The high-quality information produced using BA enhances a public firm's capabilities to respond to rapid changes in its market environment (Ashrafi et al., 2019; Torres et al., 2018). The information obtained from BA, BI, and data analytics applications provides decision support by informing managers about opportunities their firms might capitalize on and threats and risks they need to mitigate.

Managers need data to help them identify opportunities their firms might capitalize on and threats and risks they need to mitigate. Information produced from data gathered through BI applications helps a public firm's managers increase their understanding of their firm's operating environment and helps managers adapt the

company's operations accordingly (Knabke & Olbrich, 2018). According to Appelbaum et al. (2017), BI applications integrated with a public firm's MCS provide management and performance measurement information for predicting possible outcomes of decisions managers might make in responding to their operating environment. Amani and Fadlalla (2017) acknowledged that BA and BI are enabled through data mining applications and that artificial intelligence (AI) enhances data mining applications. Data collected and processed in a public firm's ERP, along with business intelligence (BI) applications (Appelbaum et al., 2017) and data mining (Amani & Fadlalla, 2017), enhance decision support capabilities and inform corporate governance. With the information provided through BA and BI applications, managers improve business operational capabilities and business strategy development and implementation (Fink et al., 2017; Torres et al., 2018). Without the knowledge managers gain from data, managers might not successfully capitalize on opportunities or mitigate their firms' risks.

Corporate governance is costly. The costs associated with corporate governance are included in the monitoring costs a firm incurs to mitigate risks associated with the firm's management's goals with those of the shareholders (Jensen & Meckling, 1976). ElKelish (2018) found that firms incorporated in countries (like the U.S.) with strong regulatory environments in which the corporations operate also have strong corporate governance structures. ElKelish also noted that strong corporate governance structures sustain high agency costs, and these higher costs mitigate risks associated with corporate governance better than lower cost governance structures. A corporate governance structure supported by effective control systems is worth the cost of those systems if they

accurately and reliably perform the functions for which they were designed. Control systems implement controls over assets, operations, and reporting.

Information Asymmetry

Given that some investors in the retail sector rely on information about a firm's assets, liabilities, and earnings as they assess a firm's financial viability, it might be prudent to address the information asymmetry element of the agency problem. The following paragraphs present a discussion on information asymmetry. The information asymmetry discussion considers sources of and relationships to information asymmetry. Sources of information asymmetry might include business and risk mitigation strategies, debt and equity financing, and asset acquisition. The final paragraphs in this discussion introduce how financial reporting mitigates information asymmetry for investors and other interested parties.

Business and Risk Mitigation Strategies as a Source of Information Asymmetry

Managers develop and implement strategies to acquire the assets, monitor the liabilities, and generate earnings in the firm's operating markets. While acting on behalf of the firm's owners, managers are responsible for devising and implementing business strategies designed to achieve and maintain competitive advantage (Wolf & Floyd, 2017) and financial viability. They also develop and implement performance management strategies and systems to assess their firm's progress toward obtaining strategic goals (Appelbaum et al., 2017; Rikhardsson & Yigitbasioglu, 2018). Managers gather information about the market in which the firm operates, assess the firm's strengths and

weaknesses, and identify opportunities the firm might take advantage of and threats that might hamper the firm as it seeks to achieve and maintain a competitive advantage.

Managers are expected to maximize a firm's value and mitigate its financial distress risks. While the owners bear the financial risk of the corporation failing to achieve its competitive advantage objectives, its management team primarily manages the risks that might impede its ability to meet its profit-related goals (Bosse & Phillips, 2016; Braumann, 2018). Failure to meet corporate goals and avoid financial distress might adversely affect managers' compensation and employability (Bosse & Phillips, 2016; Valaskova et al., 2018). Managers should identify, monitor, and manage risks that might adversely impact the firm and its ability to achieve its business objectives (COSO, 2017; Valaskova et al., 2018). Managers devise and implement strategies designed to meet the firm's goals while simultaneously mitigating the risks that threaten those goals.

The risks that might adversely impact a firm financially have several forms. These risks can include fraudulent financial reporting, occupational fraud, and supply-chain-related threats. Camfferman and Wielhouwer (2019) discussed the financial risk associated with fraudulent financial reporting and concluded that future research should focus on discovering strategies to mitigate the inevitability of fraudulent financial reporting. Concerning the economic impact of occupational fraud, based on fraud cases investigated for January 2018 through September 2019, fraud committed against organizations (businesses, charities, governments, and nonprofit entities) by their employees accounted for $3.6 billion in losses worldwide (Association of Certified Fraud Examiners [ACFE], 2020). Supply chain management priorities within the retail sector

include assuring a supply chain that is both agile and cost-effective (Tarafdar & Qrunfleh, 2017). Supply-chain risk management (SCRM) requires identifying and assessing risks adversely impacting financial performance (Chen, 2018). Managers design and implement control systems to monitor risk and measure the effectiveness of their mitigation strategies.

Many risks might impair financial performance in the retail sector. These risks include the effects of an obsolete business model (Davis-Sramek et al., 2020), poor pricing strategies (Bradlow et al., 2017), and vulnerability to cyberattacks (Janakiraman et al., 2018). Concerning the effects of an obsolete business model, Davis-Sramek et al. (2020) noted that over 12 years, beginning in 2006, Amazon's revenue grew from $10 billion to $220 billion because of adopting e-commerce. Other retailers had nowhere near Amazon's success for that same period because they failed to appreciate how a business model enabled by e-commerce could have affected them. Bradlow et al. noted that J.C. Penney did not test their assumptions and data about how their customers might react to a new pricing strategy ahead of its implementation. Penney's poor pricing strategy failed to reach its revenue goals (Davis-Sramek et al., 2020). Retail sector managers can use data provided from BA, BI, and CRM applications to mitigate these risks and identify opportunities their firms might capitalize on to meet their financial performance goals

Many companies are vulnerable to cyberattacks. Concerning vulnerability to cyberattack, Janakiraman et al. (2018) shared that in 2013, the personally identifiable information (PII) of over 100 million people was compromised because of a data breach at a large retailer. Avery (2021) found that data breaches harmed profitability. According

to Zadeh et al. (2020), risks associated with cybersecurity threats can be internal and external. Strategies to identify and mitigate cybersecurity threats should be included in a public firm's risk management strategies (COSO, 2017; Zadeh et al., 2020). These strategies should mitigate insider threats using access controls, separation of duties, and cyber awareness training. Managers should also implement controls designed to minimize external threats using firewalls to block malware and software to detect and counter malware that enables unintended access to their data.

Information asymmetry derives from strategy development and the risk assessment and mitigation process. Corporate strategy and tactics might address asset acquisition, liability management, identifying market expansion opportunities, and mitigating threats to financial wellbeing. Managers should assess risks from the perspective of the firm's capacity to accept, ignore, or mitigate them; and develop controls and strategies to address risks according to their assessment of the firm's risk appetite and as integrated elements of their corporate strategy (COSO, 2017; Viscelli et al., 2017). Enterprise risk management (ERM) should integrate corporate strategy and tactics to reach the firm's performance goals (COSO, 2017). The corporate governance structure should promote a culture that understands how crucial risk management is and embraces behaviors and values consistent with understanding and managing the firm's risks. The firm's risk appetite and risk management strategy should be communicated to all ranks in the firm (Braumann, 2018; COSO, 2017). Managers might have different risk appetites other than those of the owners, and their different appetites might contribute to the information-asymmetry problem between managers and owners (Jankensgård, 2019).

Mangers have more information on the courses of action they considered in these processes and how they evaluated and chose the courses of action. Investors and debtholders usually learn of the courses of action after the managers have decided on them. These choices are typically disclosed if included in an agenda of the firms' shareholders' meetings or through financial statement disclosures. The data and detailed information used to support the choices made by the managers are generally not disclosed.

Information Asymmetry, Debt and Equity Financing Costs, and Asset Acquisition

Financial reporting has a vital role in mitigating information asymmetry by providing information on the relationship between assets, liabilities, EBIT, and financial health to investors in the U.S. public retail sector. Financial reporting should provide investors and lenders with information about the assets a firm uses, the liabilities it owes, and its prospective future cash flows (van Kints & Spoor, 2019). Since the Securities Act of 1933 was enacted, U.S. public corporations must provide financial information to investors to use in their investment decisions (Miller, 2018). The Securities Act of 1933 prescribes rules governing the initial sale of stock (and other securities) to the public and includes corporate stocks and bonds in its definition of securities. The Securities Act of 1933 requires specific information to be disclosed to investors for securities (that do not meet the exemption provisions) that are offered to the public. Corporations offering non-exempt securities to the public must register the offering with the SEC. The securities registration statements must include information about the securities that are being offered; the corporation's assets and liabilities; the corporation's officers, their

compensation, and their securities interests in the corporation; how the corporation intends to use the money received from the offering; and any risks that might impair investor returns (including those associated with litigation).

The Securities Act of 1933 mandates the information investors initially receive to inform their investment decisions. The Securities Exchange Act of 1934 requires public corporations to periodically provide information to the SEC (Miller, 2018). The Securities Exchange Act of 1934 established the SEC and empowered it to enforce the Securities Act of 1933 and the Securities Exchange Act of 1934. As authorized by the Securities Exchange Act of 1934, the SEC generates and enforces regulations governing securities and the securities market. The Securities Exchange Act of 1934 requires securities brokers, dealers, exchanges, and national securities dealer associations to register with the SEC and empowers the SEC to monitor exchange markets. The Securities and Exchange Act of 1934 requires corporations to file quarterly and annual financial reports with the SEC. The Act also provides a legal remedy for investors who might be victims of securities fraud. The Act also prohibits corporate officers and managers from trading their shares of their corporation's securities based on information not available to the public.

Though the Securities Act of 1933 and the Securities and Exchange Act of 1934 mandate the minimum information that corporations should provide investors, the mandates do not fully mitigate the effects of asymmetric information on a public firm's cost of capital. While financial reporting does not provide all the information their users might want, it includes information about assets, liabilities, earnings, and cash flow that

investors use to assess the financial health of the companies in which they invest. Public companies of all sizes use debt or equity financing to acquire assets, fund their growth, and supplement their operational cash needs (Begenau & Salomao, 2019; Orlova et al., 2020). Information asymmetry contributes to the firm's cost of capital in the form of the risks premiums investors impose because of uncertainty about the returns their investments might produce and the likelihood of financial distress (Abel, 2018; Valaskova et al., 2018). Where an investor senses that the risk of financial distress associated with an investment is low, then that investor might have greater confidence in earning a return on her or his investment without requiring a higher risk premium (Kim, 2018). According to Ackert et al. (2019), reduced investor information asymmetry led to lower capital costs. Therefore, financial reporting is effective mitigation of investor information asymmetry.

Financial statements do not provide all the information investors might want about the corporations where they invest. Despite the impact of asymmetric information between investors and corporate managers, new debt and equity investments during 2020 in U.S. corporations included $2.4 trillion in bond issues and $335.1 billion in stock issues (Board of Governors of the Federal Reserve System, 2021). Elliott et al. (2020) found that the quality of the information that corporate managers provide to investors mitigates the effect of information asymmetry on the cost of capital. However, Boulton and Campbell (2016) found that where managers' information to investors provided an overly optimistic view (in the investor's opinion) of how the firm might perform, investors still might require a higher risk premium. Given the investments corporations

need to finance their operations and growth, it behooves them to produce high-quality financial reports.

Among the decisions that a public firm's managers make regarding the assets the company might need to carry out its operations is to build or buy the assets using debt or equity financing or lease the assets using operating capital. According to Cuypers et al. (2021), the build, buy, or lease decisions are governed by how specific an asset might be to the firm's business operations and the transaction costs associated with its acquisition. Several studies (Cotei & Farhat, 2017; van Kints & Spoor, 2019) also stated that companies with high debt tend to lease their assets. Once managers decide to lease assets, they still must choose between using financing leases, operating leases, or a combination of both. Under ASC 842, operating lease right-of-use assets and related liabilities are added to the firms' balance sheets (FASB, 2019d). The inclusion of right-of-use assets and their associated liabilities might adversely impact the measurement of a public firm's financial distress using Altman's Z′′-score.

Role of Financial Reporting and Audit in Mitigating Information Asymmetry

Financial reporting and audit have significant roles in mitigating information asymmetry between a public firm's managers and those who might make debt and equity investments in a publicly held firm. Commercial lenders make judgments concerning interest rates, bankruptcy and default risks, assurance based on financial statement audits, and reports on the effectiveness of internal controls over financial reporting (Muttakin et al., 2020; Schneider, 2018). Understanding financial reporting's role in mitigating information asymmetry is essential in providing investors in the U.S. public retail sector

information on the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z´´-score.

Financial reporting provides information using general purpose financial statements. General-purpose financial statements are called "general-purpose" because they were designed to address the needs of the broadest possible audience in presenting information about what a firm owns (its assets), owes (its liabilities), shares and classes of stock outstanding, and earnings the firm has retained over its operating life. They also present information on a public firm's income and cash flows. The Securities and Exchange Act of 1934 requires publicly held firms to file quarterly and annual financial reports with the SEC. The primary purpose of financial reporting is to provide helpful information about a company's financial position, cash flows, and financial operations that investors and lenders might use in deciding whether to invest in or lend money to a company (FASB, 2018). Therefore, it is crucial that managers consistently prepare financial statements that comply with accounting standards.

Financial statements are useless if investors cannot rely on them. The information presented in financial statements should be pertinent, and it should dependably depict a public firm's financial position, cash flows, and financial operations (FASB, 2018). A public firm's management must develop and implement internal controls over financial reporting to assure financial statements comply with U.S. generally accepted accounting principles (U.S. GAAP). U.S. GAAP prescribes standards that U.S. firms should use to recognize, measure, record, and report the economic transactions presented in financial statements (FASB, 2019a). In the notes that accompany the financial statements, a public

firm's management must also disclose their evaluation of events that might lead to considerable doubt about whether the firm could continue to operate (FASB, 2019b). Financial information quality and financial reporting mitigate information asymmetry for a public firm's internal and external stakeholders (Abernathy et al., 2018; Elliott et al., 2020). Auditors apply generally accepted auditing standards (GAAS) as they examine records supporting the events recorded and reported in a public firm's financial statements and render an opinion on whether the information in the financial statements adequately represents the firm's financial position, results of operations, and cash flows (Public Company Accounting Oversight Board [PCAOB], 2017c; PCAOB, 2017d). Auditors also render opinions on a public firm's internal controls over financial reporting.

Though financial reporting and audits are designed to mitigate information asymmetry about a firm's assets, liabilities, earnings, and financial health, the mitigation is not perfect. Financial reporting and auditing have imitations that affect their mitigation effectiveness. According to FASB (1984), financial statements do not provide detailed information about each transaction recorded in a public firm's accounting system. Instead, summarized financial information is presented. Another limitation is that financial statements do not provide the firm's current value. Assets and liabilities are usually recorded on a historical cost basis. Historical costs are based on prices at which the assets were acquired, and the liabilities were incurred. Historical costs are preferred because they can be verified. The information reported in financial statements does not present precise measurements of a public firm's financial position, results of operations and cash flows because they include estimates based on manager judgments and models

to prepare the statements (FASB, 2018). Despite their limitations, financial statements that comply with U.S. GAAP provide helpful information to investors and lenders.

A limitation affecting financial statement audits is that audits are not guaranteed to detect fraud. Though audits are not explicitly designed to expose fraudulent reporting, they should include procedures designed to focus on the risk that fraudulent reporting might occur because of management overriding internal controls (PCAOB, 2017b). Instead, auditors consider the risk that financial statements might be substantially misstated, whether caused by error or fraud, as they design their audit procedures (PCAOB, 2017). Where their tests find there is a high likelihood of fraudulent reporting, auditors inform the firm's audit committee of their findings and, in some cases, the SEC and other outside parties (PCAOB, 2017a). Despite the limitations, Elliott et al. (2020) found that high-quality financial reporting led to lower capital costs for the companies that practiced it. Likewise, Palmrose and Kinney (2018) showed a positive link between high-quality financial reporting and high-quality audits. Financial reporting and auditing have effectively mitigated information asymmetry enough to inform equity and debt investment decisions (Akins, 2018; Chan et al., 2017). Investors and lenders rely on high-quality financial reporting. Therefore, financial statements that auditors find are in full compliance with U.S. GAAP are more reliable than those that are not.

Application of the Professional and Academic Literature to the Applied Business Problem

Previous paragraphs introduced the agency theory of the firm as the theoretical framework for this study and discussed how information asymmetry might affect debt

and equity investment decisions. The relationship between assets, liabilities, earnings, and financial distress drives lender and investor decisions about the creditworthiness of a business and its viability as an investment. Financial accounting and auditing were also introduced as effective information asymmetry mitigation to help debt and equity investors decide what and where they might invest. Understanding financial reporting's role in mitigating information asymmetry is vital in providing investors in the U.S. public retail sector information on the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score.

This study's business problem originates from a change in accounting standards that affects a public company's assets and liabilities and might impact its EBIT. The new accounting standard requires public companies to record operating lease assets and liabilities on their balance sheets (FASB, 2019d). It might also adversely impact their financial distress assessment (Joubert et al., 2017). In the following paragraphs, I present discussions about financial distress and bankruptcy prediction, leases and lease accounting, and the development of this study's hypothesis.

Financial Distress and Bankruptcy Prediction

Financial statement ratios, potential financial distress, and the potential of corporate bankruptcies are essential aspects for investors to evaluate the quality of investments. Fairfax (2018) noted that the U.S. securities market relies on investor financial literacy and investors' ability to understand financial disclosures. The common belief among regulators is that financial literacy protects investors (and the securities markets) more efficiently than government regulation can (Fairfax, 2018). According to

Fairfax, various reports on financial literacy in the United States found significant gaps and deficiencies in the financial literacy of both investors and the public. Given these findings and the objective of contributing to financial literacy, the following subsections discuss financial statement ratios, financial distress, and BPMs.

Financial Statement Ratios

Investors and lenders rely on financial reporting. Financial reporting is a valuable source of information for investors and other financial statement users about the assets, liabilities, earnings, and cash flows of the companies they are interested in (Mankin et al., 2017; Shakespeare, 2020). Financial statement analysis is a popular technique that includes using ratios comprised of financial statement information to assess liquidity, profitability, and how efficiently a company uses its internal investments (Deo, 2019; Kieso et al., 2020). For example, some lenders rely on earnings-based debt covenants with their debtors to mitigate risks associated with the debtors 'ability to repay the lenders (Bizjak et al., 2019; Paik et al., 2019). Earnings-based debt covenants restrict the amount of debt a firm can hold because of the effect debt has on the EBIT-to-debt ratio. Other lenders rely on debt-based debt covenants that limit the amount of debt a firm might have in its capital structure (Wang, 2017) since higher debt negatively impacts a public firm's debt-to-equity ratio. Financial statement ratio analysis (and the information used to record the financial details comprising financial statement ratios) is limited because of the accounting standards that were in effect when the information was captured in the accounting system (Rondós Casas et al., 2018; Zeller et al., 2016). Another limitation of financial statement ratio analysis is the attempt to use financial statement ratios to

compare the performance of firms in different industries (Kieso et al., 2020). Investors and lenders can use financial statement analysis to aid their understanding of financial statement data.

Financial ratio analysis is a way for investors to understand balance sheets, earnings, and cash flow information. Despite their limitations, financial statement ratio analysis is still useful for examining the relationships between different financial statement elements (Kieso et al., 2020) and ratio analysis used been used since as early as the late 1900s (Mankin et al., 2017). In 1919, the du Pont Company introduced a financial analysis technique using three ratios to measure profitability (Mankin et al., 2017). Dun & Bradstreet also developed and popularized ratio analysis with its taxonomy of 14 financial statement ratios (first published in 1933) designed to measure efficiency, profitability, and solvency (Mankin et al., 2017). Each January, Dun & Bradstreet (D&B) publishes a desk-top edition containing statistics and financial ratios derived from a Dun & Bradstreet database consisting of millions of financial statements for firms in SICs 0100 through 8999 (Dun & Bradstreet, 2016). Using a reference like the D&B desk-top edition, financial statement users can compare financial ratios in the financial statements they analyze against ratios for SICs related to those financial statements.

Financial statements have been analyzed using financial ratios for over 100 years. Given the popularity of financial ratio analysis and the availability of data sources that provide critical business ratios, there remains a lack of consensus about which categories of financial ratios (as well as the ratios themselves) might be the best predictors of financial performance (Arroyave, 2018; Ashraf et al., 2019). Recent research by Mankin

et al. (2017) and Zeller et al. (2016, 2017) attempted to define financial ratio taxonomies that might be used in financial reporting and financial statement analysis. Recognizing that the FASB and the International Accounting Standards Board already require the earnings per share ratio to be calculated and reported in financial statements, Mankin et al. suggested a taxonomy of an additional 19 financial ratios firms should be required to calculate and report. Concerning the taxonomy of financial statement ratios for financial statement analysis, Zeller et al. used a taxonomy of 58 financial statement ratios identified in extant research. They examined ten years of financial statement data submitted to Standard & Poor's Compustat database by manufacturing and retail firms. Manufacturing firms reported 39 of the 58 financial statement ratios for eight or more of the ten years studied (Zeller et al., 2016). Retail firms reported 23 of the 58 financial statement ratios for eight or more of the ten years studied (Zeller et al., 2017). Though Mankin et al. (2017) and Zeller et al. (2016, 2017) did not reach a consensus on which financial ratios should comprise a taxonomy, they indicated some valuable ratios that investors might use to evaluate a public firm's economic performance. Mankin et al. included the net income to sales and the net income to total assets ratios in their taxonomy of financial ratios that should be mandatory for companies to report. Zeller et al. also found that the net income to sales and the net income to total assets ratios were among the financial statement ratios submitted most by retail and manufacturing companies to the Standard & Poor's Compustat database. Despite the lack of consensus on which financial ratios are the best ones to use, financial statement users rely on them to help them understand relationships between financial statement data.

Financial Distress

Investors need to understand what constitutes financial distress because the money investors provide public companies could be at risk of being lost due to financial distress. According to Altman et al. (2019), corporate bankruptcy can be attributed to financial distress brought about by insufficient earnings and too much debt. Altman et al. described several conditions that indicate a firm is in financial distress. Companies are in financial distress when they cannot pay their liabilities (debts) as they become due. For example, before filing for bankruptcy protection under Chapter 11 on May 15, 2020, the J. C. Penney Company failed to make two payments associated with its long-term liabilities due in April 2020 and May 2020 (Isidore & Meyersohn, 2020). A public firm's insolvency, or inability to pay its debt as they become due, could result from temporary conditions that affect a company's cash flow, such as reduced earnings. Where instances of insolvency are chronic, severe financial distress might exist. Another indicator of financial distress is when a company defaults on loan covenants (other than payment). For example, a default on a public firm's loan covenant concerning the total liabilities the firm may carry might hamper its ability to renegotiate its debt (Zhu & Gippel, 2017). If the firm's creditors demand payment in full of the outstanding debt, and the firm cannot pay, the firm might seek bankruptcy protection (Altman et al., 2019). Bankruptcy protection is granted to a financially distressed firm after it seeks bankruptcy protection in Federal court and formally requests relief from its debts under Chapter 7 or Chapter 11 of the U.S. Bankruptcy Code (Altman et al., 2019). A public firm's creditors may also file in Federal court to force a financially distressed firm into involuntary bankruptcy

(Altman et al., 2019). Once bankruptcy protections are in effect, the debtor can suspend payments to its creditors until the bankruptcy is settled. Under Chapter 7, the Code provides for liquidating the firm's assets under court supervision and distributing the proceeds to the firm's creditors (Altman et al., 2019). Under Chapter 11, the Code allows for the firm's reorganization under court supervision (Altman et al., 2019). Because financial distress can lead to corporate bankruptcy, investors can benefit from information about how to assess the financial health of U.S. public companies in the retail sector using Altman's Z′′-score.

Bankruptcy Prediction Models

Investors must understand the tools they can use to assess the creditworthiness of a business and its viability as an investment. From 1989 through 2017, over 2,200 U.S. corporations, each with liabilities that exceeded $100 million, filed for bankruptcy protection under Chapter 11, and the total liabilities were $3.5 trillion (Altman et al., 2019). In 2020, 30 retail industry establishments filed for Chapter 11 bankruptcy protection (Valinsky, 2020). Based on the data I retrieved from SEC's EDGAR database, 12 filers' liabilities totaled $24 billion. According to Valinsky (2020), many of the 2020 retail industry bankruptcy filers worked to mitigate conditions (such as poor market performance) that indicated they might be close to financial distress. Most of the filers attributed the coronavirus pandemic (and the measures taken to abate the virus's spread) as the event that led to their seeking bankruptcy protection. Though businesses recognize the risks (including those associated with a pandemic's effects) that might impair their goals, they devise and implement mitigation strategies for those risk scenarios they

consider are more likely to occur (Kim, 2020; Pagach & Wieczorek-Kosmala, 2020). In other words, no matter how well-designed corporate risk mitigation strategies might be, managers do not implement strategies to address all possible risks the corporation might face.

Corporate financial distress can affect a wide range of stakeholders. Typically, corporate financial distress precedes corporate bankruptcy (Altman et al., 2019). According to Altman et al. (2020), signs of financial distress are evident at least five years before a distressed firm seeks bankruptcy protection. A public firm's bankruptcy can lead to devasting economic consequences for its debtors, employees, investors, and other stakeholders (Tanaka et al., 2019). For firms liquidated under Chapter 7, employees lose their jobs the firm provided, creditors might recover a fraction of the debt owed them, and equity holders might receive no value for the equity they held. Suppose the liquidated firm was a retail store that helped draw customers to other businesses. Those businesses might also suffer negative financial impacts because the retailer is no longer there to attract customers (Benmelech et al., 2019). If a firm is under Chapter 11 bankruptcy protection, unsecured creditors might receive stock in the reorganized firm (Jacoby & Janger, 2018). Though some investors might not lose their entire investment in bankrupt firms, other stakeholders suffer losses that affect their financial interests.

Investors and lenders rely on financial statement data to inform their decision to invest or loan. Many use BPMs to assess a company's financial distress (Alaka et al., 2018; Kazmi & Malhotra, 2019). Alaka et al. (2018) noted that BPM development used artificial intelligence (AI) or statistics-based procedures. Artificial neural network (ANN)

BPMs and support vector machine (SVM) BMPs use AI procedures. Statistics-based BPMs, multiple discriminant analysis (MDA), and logistics regression (LR) BPM development use statistical techniques. Variables comprised of financial ratios based on financial statement data are standard in AI-based and statistics-based BPMs (Barboza et al., 2017; Ben Jabeur, 2017). The Altman's Z′′-score model (an MDA statistical model) is easy to use (Altman et al., 2019). The Altman's Z′′- score model was chosen for this study because an investor only needs simple computational tools (such as a calculator or an electronic spreadsheet), financial statement data, and the Z′′-score ranges to assess financial distress.

BPMs are useless if they are not reliable. Accuracy is an essential requirement for BPMs (Alaka et al., 2018). According to Alaka et al. (2018), artificial intelligence (AI) based BPMs were more accurate at predicting bankruptcy than statistical-based BPMs. Statistical BPMs (LR and MDA) achieved a prediction accuracy of up to 80% for LR and 78% for MDA. AI-based BPMs (ANN and SVM) exceeded statistics-based BPMs accuracy levels, with ANN BPMs achieving up to 84% accuracy and SVM BPMs achieving up to 83% accuracy (Alaka et al., 2018). In a study of BPMs, Jones et al. (2017) also concluded that BPMs based on AI techniques were better predictors than non-AI-based BPMs. Despite being less accurate than AI-based BPMs, I chose a statistical BPM for my study.

Statistical BPMs are reliable. The BPM (Altman's Z′′-score) chosen for this study predicted financial distress with a 78% accuracy rate (Altman et al., 2017). Whether a BPM is AI-based or statistical-based, BPM prediction accuracy usually does not extend

beyond 1 year and begins declining in the second year because the BPMs were built based on single-year financial data (Altman et al., 2020; du Jardin, 2017). Using a modeling process that collectively incorporated AI, LR, and MDA-based BPMs to analyze financial statement data ranging from one to three years, du Jardin (2017) found his process could extend BPM accuracy to 5 years. The collective or ensemble modeling process also resulted in greater BPM accuracy than traditional AI, LR, and MDA-based BPMs (du Jardin, 2018). Because Altman's Z´´-score is reliable and easy to compute, I chose it as the dependent variable in my study.

Leases and Lease Accounting

The relationship between assets, liabilities, and financial distress drives lender and investor decisions about the creditworthiness of a business and its viability as an investment. Recent changes in lease accounting rules in ASC 842 might impact creditworthiness assessments and investment decisions by altering reported assets and liabilities and thereby affecting key lending and investment metrics (Joubert et al., 2017). Understanding leasing and how leases are accounted for might help investors in the U.S. public retail sector recognize the implications of the new lease accounting standard on retail sector firms.

The new lease accounting standard became effective for most U.S. public companies for reporting periods ending after December 2018. The new lease accounting standard was announced in ASU 2016-02, and it requires public companies to record (capitalize) assets and liabilities associated with operating leases that extend beyond 1 year (FASB, 2019d). Capitalizing operating leases could affect decisions made by

stakeholders such as boards, managers, bankers, and financial analysts (van Kints & Spoor, 2019). In the following sections, I discuss leases and lease accounting. First, I define leases, identify the scope of leases that this study addresses, and provide a brief history of leases. In the next section, I discuss concerns raised by commenters on the new lease accounting requirement. I discuss how lease accounting developed in the final section.

Leases

A new accounting standard requires U.S. public companies to capitalize operating leases that extend beyond 1 year. In the context of this study, a lease is a contract in which a property owner (lessor) gives the right to use his or her property to a business (lessee) for a specified amount of time and a specified amount of rent (Weidner, 2017). Lease contracts can convey an asset to a lessee or the right to use an asset to a lessee. Though asset owners have been leasing their assets to those who wish to use them for centuries, the concept of using leasing to finance asset acquisitions was first apparent in the United States during the 17th century (Sorrentino et al., 2020). Lease contracts that convey an asset to a lessee are financing leases, and lease contracts that give the right to use an asset to a lessee are operating leases (Munter, 2018). Leased assets can include land, buildings, machinery, other goods, mineral rights, and rights to oil and gas. The leased assets relevant to this study are real property and equipment used by lessees in conducting their business operations.

Concerns About the New Lease Accounting Standard

In February 2016, the FASB announced the new lease accounting standard. According to FASB (2016), for reporting periods beginning after December 15, 2018, ASC 842 would replace ASC 840. According to Trifts and Porter (2017), some investors might not be familiar with lease accounting and how the new lease accounting standard might impact the debt (liabilities) recorded on corporate balance sheets. Trifts and Porter, based on a study of the financial statements of the 1,000 largest companies, estimated the new accounting standard would require them to record close to $742 billion of operating lease liability on their balance sheets. Fafatas and Fischer (2016) estimated that the U.S. retail sector might record an additional $203 billion on their balance sheets and found that profitability ratios would be adversely affected because of the increased liabilities.

Several concerns were raised by respondents who sent comment letters to the FASB. Comiran and Graham (2016) studied the 1,400 comment letters that the FASB received during the comment period. According to Comiran and Graham, over 80% of the respondents against adopting the new lease accounting standard were concerned that it would cause their cost of capital to increase. They were also worried about the expenses they would incur to implement and administer the provisions of the new standard. The following paragraphs discuss the cost of capital concerns.

The impact that capitalizing operating lease liabilities might have on corporate debt covenants was a concern of some respondents who provided comment letters to the FASB. Comiran and Graham (2016) found that several respondents were concerned about how recording liabilities associated with operating leases on their balance sheets

might affect their ability to comply with existing debt covenants. Due to an accounting rule change, public companies were required to classify mandatorily redeemable preferred stock (MRPS) as a liability instead of equity on their balance sheets (Hanlon, 2019). Many firms chose to renegotiate their MRPS contracts instead of defaulting on their debt covenants (Hanlon, 2019). Comiran and Graham found that many respondents with debt covenants were concerned that renegotiating their debt covenant might be expensive. However, in a study about whether lenders consider operating lease liability in debt covenant provisions, Graden (2018) found that lenders who require debt covenants account for operating lease liabilities. Despite the respondents' concerns, their ability to comply with their existing debt covenants might not be affected by capitalizing operating lease liabilities.

Many firms lease the property they use to operate their businesses. Leasing is a form of financing used to acquire property, plant, and equipment (Cotei & Farhat, 2017). Caskey and Ozel (2019) found that companies with high financial risks and companies that generally need to expand their operating capacity for varying lengths of time tend to use operating leases to meet their needs. Despite the impact operating lease liabilities might have on balance sheets, Lim et al. (2017) found that operating lease-related liabilities might not adversely impact a public firm's ability to obtain debt financing since banks and bond pricing account for operating lease-related liabilities. This study evaluated the relationship between assets, liabilities, EBIT, and Altman's Z′′-score. The examination of these relationships required computing Altman's Z′′-score for financial

statements prepared under ASC 840's requirements and those of ASC 842 to assess how the Z′′-score changed because of the new lease accounting standard.

The Development of Lease Accounting

Investors and lenders rely on financial information. Financial reporting should provide investors and lenders with information about the assets a firm uses, the liabilities it owes, and its prospective future cash flows (van Kints & Spoor, 2019). During the early decades of the 20th century, there were no consistent rules about reporting financing and operating leases in the lessee's financial statements (Morales Diaz et al., 2019). However, as early as 1949, it was known that reporting financial information about assets and liabilities related to leases from the perspective of the lessee's financial statements presented problems the accounting profession needed to resolve (SEC, 1949). One of the issues raised in the SEC's 1949 annual report was how leasing practices in the U.S. expanded since 1945 (SEC, 1949). The SEC noted that the practice of a lessee selling an asset to a lessor and then leasing the same asset from the lessor (a sale and leaseback transaction) reflected neither the asset nor the liability related to the lease payments for the asset on the lessee's balance sheet (SEC, 1949). The SEC addressed its concerns about leaseback transactions and long-term leases (lease periods of three or more years) by requiring footnote disclosures accompanying the balance sheets corporations submit to the SEC to comply with the Securities and Exchange Act of 1934 (SEC, 1949). In October 1949, the American Institute of Accountants, which would change its name to the American Institute of Certified Public Accountants (AICPA), adopted a similar stance on disclosures related to leaseback transactions and long-term leases in its *Accounting*

Research Bulletin. Although compliance with the SEC disclosure requirement was mandatory, compliance with the Institute's guidelines was not, the organization noted.

SEC reporting requirements did not settle how leases should be recorded in financial statements. Though the SEC prescribed footnote disclosures about long-term leases in the filings public companies were required to submit to the SEC, no mandatory disclosure was required in public company financial statements (Myers, 1962). In a report he authored for the AICPA, Myers (1962) recommended capitalizing long-term leases and leaseback transactions on the balance sheet because the underlying economic events of these types of lease transactions represented financing transactions and created property rights. Concerning operating leases, Myers concluded such leases did not require capitalization since they were not considered as creating property rights. Though Myers recommended capitalizing financing leases and long-term leases, the AICPA adopted Myers's recommendation regarding financing leases and operating leases in September 1964 with the publication of Accounting Principles Board (APB) Opinion Number 5: Reporting of Leases in Financial Statements of Lessee (FASB, 1964). In other words, financing leases were recognized on corporate balance sheets, and long-term and operating leases were not.

While financing leases were reported on corporate balance sheets, how to account for long-term lease contracts was still not settled. After FASB (1964) was published, Birnberg (1965) argued for capitalizing long-term lease contracts. Birnberg noted that though leases were contracts where the future benefits have not been realized, and a current contractual obligation exists (executory contracts), both the future benefit and

obligation should be recognized in the financial statements. Birnberg also argued for improved consistency in the information presented in footnote disclosures concerning executory contracts. While the AICPA did not adopt Birnberg's recommendations about recognizing assets and liabilities related to long-term leases on the balance sheet, it did issue Accounting Principles Board Opinion Number 31: Disclosure of Lease Commitments by Lessees in June 1973 (FASB, 1973) to improve the quality of footnote disclosures concerning leases. While FASB (1973) did not prescribe disclosure requirements, it did suggest that disclosures should include information on the total rent expense, rental commitments for non-cancellable leases, and information that would support an assessment of how the leases might impact a public firm's financial position. Though the requirement to provide footnote disclosure still did not settle the question about accounting for long-term leases, it was a step toward providing information about lease commitments.

The question of how to account for long-term leases was settled in November 1976, with the issuance of Statement of Financial Accounting Standards (SFAS) Number 13: Accounting for Leases. SFAS 13 required companies to report assets and liabilities related to financing leases and long-term leases on their balance sheets (FASB, 1976). Unlike FASB (1964), SFAS 13 provided explicit rules that would be applied to classify leases. According to SFAS 13, lessees classify leases based on the terms of the lease contracts as either capital leases or operating leases. In July 2009, SFAS 13 was added to the FASB Codification as ASC 840 – Leases (FASB, 2014). To be classified as a capital lease (also known as a finance lease and a sales-type lease), at least one of the following

conditions prescribed in ASC 840 (formerly SFAS 13) must be met at the beginning of the lease (FASB, 1976; FASB, 2019c):

a. ownership of the leased asset transfers from the lessor to the lessee at the end of the lease term,
b. the lease contract contains an option for the lessee to buy the leased asset,
c. the duration of the lease covers 75% or more of the asset's economic life unless the lease begins near the end of the asset's economic life, or
d. the fair value of the leased asset is 90% or more of the present value of the sum of the lease payments.

ASC 840 did not require recognition of an asset nor liability on the balance sheet for operating leases. Instead, operating lease liability is disclosed in the financial statement notes (FASB, 2019c). The accounting treatment for operating leases was still unresolved.

The question of capitalizing operating leases was finally resolved in the second decade of the 21st century. The Sarbanes-Oxley Act of 2002 provided the impetus to change the lease accounting rules (Weidner, 2017). The Sarbanes-Oxley Act of 2002 required the SEC to study the extent of off-balance-sheet financing (which included operating leases). In July 2005, the SEC published the study, and among other findings, the SEC found that operating leases represented over $1 trillion in off-balance-sheet financing (Weidner, 2017). As a result of the study, the SEC requested the FASB address accounting treatment for off-balance-sheet financing issues like liabilities related to operating leases. In 2016, the FASB responded by publishing ASU 2016-02 Leases (Topic 842) for public comment.

The FASB settled the question concerning capitalizing assets and liabilities related to operating leases with ASC 842. Like ASC 840, lessees classify leases based on the terms of the lease contracts. Under ASC 842, the lessee classifies a lease as either an operating lease, a direct financing lease, or a capital lease (FASB, 2019d). If a lease does not qualify for classification as a direct financing lease or a capital lease, then ASC 842 classifies it as an operating lease (FASB, 2019d). A lease is classified as a direct financing lease if the lessee agrees to residual value guarantees, and the lessee will probably pay the lessor rent for the leased asset along with the money required to satisfy the residual value agreement (FASB, 2019d). To be classified as a capital lease, also known as a finance lease and a sales-type lease, at least one of the following conditions specified in ASC 842 must be met at the beginning of the lease (FASB, 2019d):

a. ownership of the leased asset transfers from the lessor to the lessee at the end of the lease term,
b. the lease contract contains an option for the lessee to buy the leased asset,
c. the term of the lease covers a substantial portion of the asset's economic life unless the lease begins near the end of the asset's economic life,
d. the fair value of the leased asset is less than the present value of the sum of the lease payment, or
e. the leased asset is specialized such that it could be used for no other purpose than that of the lessee.

Because of ASC 842, investors can see lease-related assets and liabilities for leases that extend beyond 1 year on U.S. public company balance sheets.

Development of Study Hypothesis

Once the new lease accounting standard was implemented, I had the opportunity to examine the relationship between assets, liabilities, EBIT, and Altman's Z′′-score from the perspective of both lease accounting standards. A new lease accounting standard requiring public companies to record operating lease (right-of-use) assets and the related liabilities on their balance sheets (FASB, 2016; FASB, 2019d) might adversely impact their financial distress assessment (Joubert et al., 2017). Information about the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score can help U.S. public retail sector investors evaluate the creditworthiness of a business and its viability as an investment. Under ASC 840, the lease accounting standard replaced by ASC 842, public companies were not required to record assets and liabilities related to operating leases on their balance sheets (FASB, 2019c). Because of ASC 842, investors can see a firm's lease-related assets and liabilities on its balance sheet and its lease-related footnote disclosures.

Several researchers, including Comiran and Graham (2016), expressed concern that capitalizing operating leases might adversely affect financial distress indicators. Comiran and Graham predicted that capitalizing operating leases would adversely impact several measures of firms' performance by causing a decrease in their return-on-assets (ROA) ratios, an increase in their leverage ratio, and a decrease in their Altman's Z-score. According to Fafatas and Fischer (2016), the U.S. retail sector might record an additional $203 billion on its balance sheets. Joubert et al. (2017) estimated how a similar standard, IFRS 16, might affect another lease-intensive industry (airline) and found that

financial distress, as measured by Altman's Z-score, was negatively affected. Financial distress could lead to bankruptcies within the retail sector. This study examined data presented in financial reports, specifically the balance sheets and income statements, of a sample of U.S. public retail companies.

Investors and lenders rely on the information they find in financial statements. Financial reporting provides valuable information about a company's financial position, cash flows, and financial operations that investors and lenders might use in deciding whether to invest in or lend money to a company (FASB, 2018). The financial statements used in financial reporting are designed to address the needs of the broadest possible audience in presenting information about what a firm owns (its assets), owes (its liabilities), shares and classes of stock outstanding, and earnings the firm has retained over its operating life. They also present information about a public firm's income and cash flows (FASB, 2018). Financial statements include the balance sheet, the income statement, and the statement of cash flows (FASB, 2019b). The financial statements relevant to this study are the balance sheet and the income statement.

The balance sheet presents financial data at a point in time. The balance sheet, also known as the statement of financial position, shows the information on a company's assets, liabilities, and stockholder's equity at the end of a reporting period (Kieso et al., 2020). The balance sheet, or statement of financial position, is based on the following formula: assets equal liabilities plus stockholder's equity. The income statement (sometimes referred to as the statement of income or the statement of earnings) presents

information on the results of a company's operation over a specific period (Kieso et al., 2020). The income statement shows a company's revenues, expenses, gains, and losses.

This study's hypothesis was prompted by concerns raised in previous studies. Comiran and Graham (2016), Fafatas and Fischer (2016), and Joubert et al. (2017) all were concerned about how ASC 842 might impact a public company's assets and liabilities. ASC 842 might also affect a public company's EBIT (Fafatas & Fischer, 2016). Retail sector investors might lack information on the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score. Assets, liabilities, and EBIT are elements in the ratios used to compute Altman's Z′′-score. The relationship between assets, liabilities, EBIT and financial distress as measured using Altman's Z′′-score was examined to assess how capitalized operating leases might have affected those relationships. An examination of these relationships required computing Altman's Z′′-score for ASC 840 and ASC 842. For example, in this study, I sought answers to questions about whether a public firm's Z′′-score, with the assets and liabilities added to a public firm's balance sheet, remained in the same range as under ASC 840 or moved to a lower range under ASC 842 (see Table 8). I state my hypotheses below:

H_0: There is no statistically significant relationship between assets, liabilities, EBIT, and financial distress as assessed using Altman's Z′′-score.

H_1: There is a statistically significant relationship between assets, liabilities, EBIT, and financial distress as assessed using Altman's Z′′-score.

The independent variables in this quantitative study, using a correlational design, were assets, liabilities, and EBIT. The dependent variable was Altman's Z′′-score. This study's independent variables (assets, liabilities, and EBIT) were taken from the financial statement data reported under ASC 840, the year immediately preceding ASC 842 implementation, and from financial statement data reported for the first year that the companies in the study implemented ASC 842. The dependent variable was the Altman's Z′′-score computed from the financial statement ratios that included the asset, liability, and EBIT data retrieved from the financial statements. MLR analysis, using IBM SPSS software, was performed to assess the strength of the correlation between the independent and dependent variables. MLR is a parametric statistical test that evaluates how strongly quantitative independent and dependent variables in a case are correlated (Green & Salkind, 2017). I used MLR analysis to assess the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score.

Measurement

I chose the agency theory of the firm as this study's theoretical framework. As described by Jensen and Meckling (1976), the agency theory of the firm suggests that a public firm's managers are empowered under contract as agents of the firm's owners. As agents, the managers are expected to maximize the firm's value. The firm's managers decide which assets the firm acquires and how much liability (debt) the firm should incur. They also develop and implement the firm's earning strategy. Investors and lenders rely on financial statement information to assess a public company's financial performance and aid their decisions about whether to invest in or lend to the company. By design, the

financial statements address the needs of the broadest possible audience. These statements present information about what a public company owns (its assets), owes (its liabilities), how many shares and classes of outstanding stock, and earnings the public company has retained over its operating life. Financial statements also present information about a public firm's income and cash flows. Altman's Z′′-score is a tool that investors and lenders can use to assess a company's financial distress. Some retail sector investors might lack sufficient information on the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score.

The new lease accounting standard affected the assets and liabilities reported on U.S. public company balance sheets. With ASC 842 implementation beginning in 2019, a public company's total assets and liabilities include right-of-use assets and the related liabilities associated with operating lease contracts (exceeding 12 months) on their balance sheets (FASB, 2019d). The lease accounting standard that preceded ASC 842, ASC 840, did not require operating lease right-to-use assets and the related liabilities to be recognized in public company balance sheets (FASB, 2019c). In this quantitative study, I used a correlational design to examine the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score. The independent variables were assets, liabilities, and EBIT. The dependent variable was Altman's Z′′-score. In the following paragraphs, I discuss this study's independent variables (assets, liabilities, EBIT) and the dependent variable (Altman's Z′′-score).

Independent Variable - Assets

The dollar value of the assets recorded on the balance sheets is one of the independent variables examined in this study. In the context of this study, assets are the measurable resources a business uses in its operations to generate revenue (FASB, 1984). The right-of-use assets a public company uses associated with operating lease contracts that extend beyond 1 year were measured at the present value of their rental payments and recorded as a separate asset category on the public firm's balance sheet (FASB, 2019d). Total assets data comprised the denominator of three of the financial statement ratios used to compute Altman's Z′′-score. The asset data used in this study were taken from balance sheets reported under ASC 840 rules, where total assets did not include right-of-use assets related to operating leases (FASB, 2019c), and the year ASC 842 is implemented to reflect right-of-use assets associated with operating leases in its total assets (FASB, 2019d). Because of ASC 842, the total assets that the companies that implemented it increased on their balance sheets.

Previous studies have shown how capitalizing operating leases might affect financial health indicators in several business sectors. In research on how capitalizing operating leases might affect the profitability measures of the U.S. retail public companies, Fafatas and Fischer (2016) projected that the ten companies with the highest operating lease commitments (as of 2014) would add over $203 billion in right-of-use assets (and related liabilities) to their balance sheets. In analyzing financial statements, the recorded assets are used as components in the ratios (as either the denominator or the numerator) used to measure liquidity, activity, profitability, and coverage. One of the

liquidity measures used in financial statement analysis is working capital, which is the net of current assets minus current liabilities. Another liquidity measure is the working capital ratio, computed as working capital divided by total assets. The recognition of right-of-use assets is expected to adversely affect the working capital ratio.

Independent Variable – Liabilities

The dollar value of the liabilities recorded on the balance sheets is another of the independent variables examined in this study. In the context of this study, liabilities are the measurable obligations a business incurs in its operations to generate revenue (FASB, 1984). The liabilities a public company incurs associated with operating lease contracts that extend beyond 1 year are measured at the present value of their rental payments and recognized as a separate liability category on the public firm's balance sheet (FASB, 2019d). Fafatas and Fischer (2016) projected that the 10 U.S. public retail companies with the highest operating lease commitments (as of 2014) would add over $203 billion in liabilities (and related right-of-use assets) to their balance sheets. In analyzing financial statements, the recorded liabilities are used as components in ratios (as either the denominator or the numerator) that measure liquidity and coverage. One of the coverage measures used in financial statement analysis is the debt to asset ratio, computed as total liabilities divided by total assets (Giner et al., 2019). The recording of operating lease liabilities is expected to adversely affect the debt to asset ratio (Giner et al., 2019). The total liabilities amount is a denominator in one of the financial statement ratios used to compute Altman's Z′′-score. The liability data used in this study were taken from balance sheets reported under ASC 840, where total liabilities did not include liabilities

related to operating leases (FASB, 2019c), and the year ASC 842 is implemented to reflect liabilities associated with operating leases in its total assets (FASB, 2019d). For U.S. public companies that implemented ASC 842, the liabilities they reported on their balance sheets increased.

Independent Variable – Earnings Before Interest and Taxes

The dollar value of EBIT recorded on the income statements is the final independent variable examined in this study. EBIT is reported on the income statement as the net revenue from operations minus the cost of goods sold and operating expenses. According to Fafatas and Fischer (2016), capitalizing operating leases should not impact EBIT since lease expenses would be the same as under the prior standard. Morales-Díaz and Zamora-Ramírez (2018), on the other hand, found that EBIT might be adversely affected. EBIT is a numerator in one of the financial statement ratios used to compute Altman's Z′′-score. The EBIT data used in this study were taken from income statements reported under ASC 840 (for the year before ASC 842 implementation) and for the year ASC 842 was implemented.

Dependent Variable – Altman's Z′′-score

This study examined a sample of balance sheets and income statements prepared under ASC 840 for the year immediately before ASC 842 implementation and for the year ASC 842 was implemented by U.S. public companies in the retail sector. The dependent variable is the Altman's Z′′-score. Altman's Z′′-score is an accounting-based BPM designed to use the balance sheet and income statement data. Altman's Z′′-score is ratio-scaled and a refinement of the Altman Z-score BPM introduced in 1968. According

to Hayes et al. (2010), Altman's Z′′-score is an appropriate instrument for assessing financial distress for companies in the retail sector.

Altman (1968) introduced an accounting-based BPM designed to use financial ratios in a multi-discriminate analysis (MDA) model. Altman described MDA as a statistical technique that presents data in groups based on theoretical deduction. Altman studied 66 publicly traded U.S. companies, half of them in financial distress or bankruptcy and the other half healthy. The MDA model Altman developed determined linear relationships inherent in the bankrupt and non-bankrupt manufacturing companies. Altman used, as variables, five financial ratios derived from the sample companies' balance sheets and income statements. The financial ratios Altman chose measure liquidity (X1), profit accumulated over the life of a company (X2), how well a company's assets are in generating profit (X3), a company's solvency in relation to the percentage of the market value of its stock that is comprised of a company's total debt (X4), and how well a company's assets are used to generate revenue (X5). The variables were associated with coefficients derived from several computer runs of the sample data. Altman also tested the discriminating ability and relative contributions of each variable. See Table 2 for variables means, tests of significance, and relative contribution of each variable in computing Altman's Z-score. The following equation resulted:

$$Z = .012X1 + .014X2 + .033X3 + .006X4 + .999X5$$

where:

X1 = working capital/total assets (WC/TA),

X2 = retained earnings/total assets (RE/TA),

X3 = earnings before interest and taxes/total assets (EBIT/TA),

X4 = market value equity/book value of total debt (MVE/TL), and

X5 = sales/total assets (S/TA) (Altman, 1968).

Table 3 shows financial distress prediction based on Altman's Z-score ranges.

Table 2

Variables Means, Tests of Significance, and Relative Contribution of the Variable for Altman's Z-Score

Variable	Mean bankrupt [a]	Mean Nonbankrupt [a]	F ratio [b]	Scaled vector	Relative contribution
X1	-0.061	0.0414	32.60[c]	3.29	5
X2	-0.0626	0.0355	58.86[c]	6.04	4
X3	-0.0318	0.0154	26.56[c]	9.89	1
X4	0.041	2.477	33.26[c]	7.42	3
X5	1.5	1.9	2.84	8.41	2

Note. [a] n = 33. [b] $F_{1.60}$ (0.001) = 12.00; $F_{1.60}$ (0.01) = 7.00; F_{160} (0.05) = 4.00. [c] Significant at the 0.001 level. Adapted from *Corporate Financial Distress and Bankruptcy (2nd ed)*, by E. I. Altman, (1993), p. 181-203. Copyright 1993, John Wiley & Sons. Adapted with permission.

Table 3

Financial Distress Prediction Based on Z-Score Range

Financial distress prediction	Z-score ranges
Bankruptcy likely within 2 years	<1.81
Distressed	1.81 – 2.99
Healthy	>2.99

Note. Adapted from "Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy" by E. Altman (1968), *Journal of Finance*, *23*(4), p. 606, https://doi.org/10.1111/j.1540-6261.1968.tb00843.x#. Copyright 1968, American Finance Association. Adapted with permission.

Along with Altman's Z-score model developed for public manufacturing firms, Dr. Altman created a model for private firms in 1968 (Altman, 1993). According to Altman (1993), four of the five variables (X1, X2, X3, and X5) remained the same as those in the Altman's Z-score model. Altman also explained that the changed X4 variable, and the recalculated coefficients, resulted in Altman's Z′-score:

$$Z' = .717X1 + .847X2 + 3.107X3 + .420X4 + .998X5$$

where:

X1 = working capital/total assets (WC/TA),

X2 = retained earnings/total assets (RE/TA),

X3 = earnings before interest and taxes/total assets (EBIT/TA),

X4 = book value equity/book value of total debt (BVE/TL), and

X5 = sales/total assets (S/TA) (Altman, 1993).

The Altman Z′-score model was updated to the Altman's Z′′-score in 1983 (Altman, 1993). Because of the popularity of his 1968 model, which successfully predicted financial distress for 15 years, Dr. Altman received several queries concerning the model's limited applicability in predicting financial distress for non-manufacturing and non-publicly traded businesses (Altman, 1993; Altman et al., 2017). Using the same data that he used to create his original model, Altman changed the numerator in the X4 variable in the original model to total assets minus total liabilities. Altman also eliminated the X5 variable, tested the relative contributions of each variable, and updated the coefficients associated with the X1, X2, X3, and X4 variables. See Table 4 for variables

means, tests of significance, and relative contributions of the variables related to Altman's Z′′-score. The Z′′-score model is:

$$Z'' = (6.56 * X1) + (3.26 * X2) + (6.72 * X3) + (1.05 * X4)$$

where:

X1 = working capital/total assets (WC/TA),

X2 = retained earnings/total assets (RE/TA),

X3 = earnings before interest and taxes/total assets (EBIT/TA), and

X4 = book value of net worth/book value of total liabilities (NW/TL) (Altman, 1993).

Table 5 shows financial distress prediction based on Altman's Z′′-score ranges.

Table 4

Variables Means, Tests of Significance, and Relative Contribution of the Variable for Altman's Z′′-Score

Variable	Mean bankrupt	Mean nonbankrupt	Univariate *F* ratio	Scaled vector	Relative contribution
X1	-0.061	0.0414	32.6	0.267	4
X2	-0.0626	0.0355	58.8	0.205	1
X3	-0.0318	0.0154	26.6	0.304	3
X4	0.494	2.684	25.8	0.224	2

Note: Multivariate F = 19.01; $F_{4.61}$ (0.01) = 7.00. Adapted from *Corporate Financial Distress and Bankruptcy* (2nd ed.), by E. I. Altman, (1993), p. 181-203. Copyright 1993, John Wiley & Sons. Adapted with permission.

Table 5

Financial Distress Prediction Based on Z′′-score Range

Financial distress prediction	Z′′-score ranges
Bankruptcy likely within 2 years	<1.10
Distressed	1.10 – 2.60
Healthy	>2.60

Note. Adapted from *Corporate Financial Distress and Bankruptcy* (2nd ed.), by E. I. Altman, (1993), p. 181-203. Copyright 1993, John Wiley & Sons. Adapted with permission.

Researchers have studied Altman's Z′′-score to learn its effectiveness in predicting recidivism for domestic companies and financial distress for domestic and international companies. Altman et al. (2009) sampled populations that filed Chapter 11 bankruptcy between 1996 and 2003 to test recidivism probabilities, and Altman's Z′′-score was an effective tool for predicting recidivism (filing bankruptcy again) after emerging from Chapter 11 bankruptcy. In a similar study, Altman (2014) sampled populations that filed Chapter 11 bankruptcy between 1993 and 2009 to test recidivism probabilities and confirmed similar results as Altman et al. (2009) for a larger sample tested using Altman's Z′′-score. In 2010, Hayes et al. (2010) studied retail sector firms that filed for bankruptcy in either 2007 or 2008. Hayes et al. matched the bankrupt firms in their study with peer firms that had not filed for bankruptcy. According to Hayes et al., Altman's Z′′-score predicted financial distress in 90% of the firms included in the study. Altman et al. (2017) tested financial statement information for public companies from 31 countries, including country-level analysis. They tested the coefficients and variables

used in Altman's Z′′-score (Altman et al., 2017). Altman et al. found that Altman's Z′′-score, an MDA BPM, predicted financial distress with a 78% accuracy rate and concluded that it was still a valid financial statement-based BPM. Therefore, I decided that Altman's Z′′-score is an appropriate dependent variable for this study.

Transition

Investors and lenders rely on financial statement information that companies provide to decide whether to invest in or lend to these companies. A new lease accounting requirement for public companies to record operating lease assets and liabilities on their balance sheets (FASB, 2019d) might adversely impact their financial distress assessment (Joubert et al., 2017). With ASC 842 implementation in 2019, a public company's total assets and liabilities will include right-of-use assets and the related liabilities associated with operating lease contracts (exceeding 12 months) on their balance sheets (FASB, 2019d). According to Fafatas and Fischer (2016), the U.S. retail sector might record an additional $203 billion on its balance sheets.

The theoretical framework in quantitative research provides the criteria and perspective that the researcher uses in testing hypotheses about the relationships among the study variables (Creswell & Creswell, 2018). The theoretical framework governing this study is the agency theory of the firm. As agents of the firm's shareholders, the firm's managers exercise power and control over the firm using information that the shareholders do not have. Firms incur monitoring costs, including financial reporting costs, to mitigate the risk of misalignment of the firm's management's goals with those of the shareholders. Monitoring costs include costs associated with corporate governance

and the management systems used to support the corporate governance structure. Financial reporting, through financial statements, provides information to shareholders (and other interested parties) on a public firm's assets, liabilities, stockholders 'equity, income, and cash flows (FASB, 1984). This quantitative study, using a correlational design, examined the relationships between assets, liabilities, EBIT, and Altman's Z´´-score for U.S. public companies in the retail sector.

In Section 1, I introduced background information on the problem, a statement of the problem, the study's purpose and nature, the research question, and the hypothesis. I also introduced the theoretical framework guiding the research and operational definitions, assumptions and limitations, the significance of the study, and a review of the professional and academic literature. In Section 2, I extend the discussion of the information introduced in Section 1 by introducing more information about the study. I discuss the role of the researcher and describe the research method and the research design. I also discuss the study population, the minimum and maximum sample size, and the statistical tests that I used to analyze the study data. Finally, in Section 3, I present the study findings, including descriptive statistics. I also discuss the study's application to professional practice, the implications for social change, and recommendations for action and further research.

Section 2: The Project

In Section 2, I provide an overview of the project. I begin by reiterating the purpose of the study. After doing so, I discuss my role as the researcher and describe the research method and design. Information about the study population, the sample size and sampling technique, data collection and analysis, and study validity is also included.

Purpose Statement

The purpose of this quantitative study, using a correlational design, was to examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. The independent variables were assets, liabilities, and EBIT. The dependent variable was Altman's Z′′-score. The study population consisted of U.S. companies in the retail sector that, under the Securities Act of 1934, must submit financial statements to the U.S. SEC's EDGAR system. Within EDGAR, 30 SIC codes ranging from SIC 5200 through SIC 5990 identify distinct business types within the retail sector (U.S. SEC, 2019). The social change implications of this study include providing information that enhances the financial literacy of individual investors in public companies in the retail sector. Furthering investor financial literacy can promote economic well-being and improve their understanding of investing in the financial markets (Dewi et al., 2020). This study might show investors how an accounting rule change, capitalizing operating leases, affects financial statement information.

Role of the Researcher

A researcher's role is an important one. A researcher aims to further knowledge or understanding of what is already known (Saunders et al., 2019). According to Saunders et

al. (2019), my goal as a researcher is to observe and interpret the realities that define the research subject or test theories and measure relationships about the facts that define the research subject. The research design and instrument are critical to assessing qualitative and quantitative research quality. The instrument and design used in qualitative research is the researcher, while for quantitative research, the instrument is the analytical model used by the researcher to evaluate relationships in quantitative data (Saunders et al., 2019). In both instances, the quality of the research determines if the learning obtained from the research is believable. As a researcher, I am responsible for acquiring and applying my skills in the research methods I choose for the studies I conduct. In studies involving human subjects, I must respect subjects as individuals, protect their privacy, and assure that whatever benefits accrue from the research are equitably distributed as prescribed in the Belmont Report (U.S. Department of Health, Education, and Welfare, 1979). Research can benefit society only if it is reliable and valid in the case of quantitative research or dependable, credible, transferable, and trustworthy in the case of qualitative research (Creswell & Creswell, 2018; Cypress, 2017). In other words, I am responsible for the quality of my research and its potential to benefit society.

As a researcher, I acknowledge that information is derived from data and facts, and information leads to knowledge. According to Cresswell and Cresswell (2018), a researcher must understand how knowledge is perceived, legitimized, and discovered. In my researcher role, I must also understand the research methods available to me and how to apply them (Stone, 2018). It is not enough for me to know that I can choose either a quantitative, qualitative, or mixed-method to conduct my study. I must also realize where

each method might be appropriate for my research. Qualitative and quantitative study methods are based on different ontological and epistemological perspectives, and sometimes, it might be appropriate to use both methods in a study (Creswell & Creswell, 2018). Researchers are expected to use their understanding of what constitutes knowledge to inform their choice of research methods (Creswell & Creswell, 2018). For example, I would use a qualitative study design to obtain knowledge from an experiential perspective. For experimental or semi-experimental studies, I would use a quantitative study method.

As a researcher, I am responsible for skillfully conducting my research so that those who use my research can rely on the information my study provides. Creswell and Creswell (2018) described reliability and validity as the assurance of the consistency and diligence employed in conducting the research. Qualitative research is judged based on dependability, credibility, transferability, and trustworthiness (Cypress, 2017; Saunders et al., 2019). Quantitative researchers need to assure the reliability and validity of their studies as these are critical aspects of research quality (Creswell & Creswell, 2018; Cypress, 2017). For correlational research designs, validity is also demonstrated by the researcher's skill in analyzing research data correctly to assess statistical significance in testing hypotheses about the population under study (Stone, 2018). Regardless of which research method I use, I am responsible for the reliability and validity of my research. Other than as a consumer, I was not involved in the U.S. public retail sector nor in a relationship with the FASB.

Participants

This study had no human participants. Instead, this study consisted of secondary data sourced from SEC's EDGAR, an official financial statements database. I sampled the financial statements from a population of 277 public U.S. companies in SIC codes 5200 through 5990 (retail industry) that filed annual financial reports on Form 10-K in the SEC's EDGAR system for reporting periods beginning after December 2018. The sample size was optimized based on the population size and the probability of incorrectly accepting or rejecting the null hypothesis (Faul et al., 2009). Power analysis was used to calculate the optimal sample size to draw from the population under study (Faul et al., 2009). Based on research conducted by Durocher (2008) on Canadian public companies and Fafatas and Fischer (2016) on U.S. public companies, the retail industry would be sensitive to the capitalizing of operating leases because of the increase in assets and liabilities reported on the companies' balance sheets. Therefore, I chose U.S. public retail companies to study the relationship between assets, liabilities, EBIT, and Z′′-score.

Research Method and Design

Research Method

This study's research problem is that some investors in the U.S. public retail sector might lack sufficient information about the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. Regardless of which method (qualitative method, quantitative method, or mixed methods) a researcher uses, the intent is to produce quality research. The researcher must mitigate the risks of providing unreliable information by choosing an appropriate research method that

addresses the research problem (Creswell & Creswell, 2018). The first step toward achieving research quality is to select an appropriate research method (Blair et al., 2019). The research method should be determined based on the research question, what is known about the research problem, and the information that will comprise the study (Creswell & Creswell, 2018). The literature review informs the researcher's understanding of the investigated problem (Saunders et al., 2019). Based on the knowledge gained from the literature review, the quantitative researcher develops a hypothesis, assesses the data needed to conduct the research, and chooses an appropriate research method (Smith, 2020). I found a quantitative method is suitable for examining the relationship between assets, liabilities, EBIT, and Z′′-score.

If I conduct a qualitative, quantitative, or mixed-method study, I must use strategies to mitigate researcher bias. Qualitative researchers mitigate bias through reflective journaling (Cypress, 2017). They also enhance the quality of their research through data saturation and triangulation (Smith, 2020). Quantitative researchers mitigate bias by choosing the proper method to analyze and interpret the study data (Stone, 2018). Validity and reliability strategies enhance quantitative research quality (Creswell & Creswell, 2018). Concerning mixed-methods studies, Lamprecht and Guetterman (2019) recommended that researchers choose this method based on their purposeful introspection in identifying and mitigating validity threats from qualitative and quantitative perspectives. In other words, mixed-methods researchers must think about how to minimize the effects of their personal biases for the qualitative portion. Simultaneously,

they must identify and mitigate risks associated with the quantitative segment of their research.

The objective of this study was to examine the relationship between assets, liabilities, and Altman's Z′′-score for U.S. public companies in the retail sector. I examined quantitative information derived from a financial statements sample to assess if a statistically significant relationship existed between the variables under study. A correlational design was best suited to accomplish the research objective (see Gravetter & Forzano, 2018). The social change implications of this study include providing information that adds to the financial literacy of individual investors in public companies in the retail sector. Adding to investor financial literacy can promote economic well-being and enhance understanding of investing in the financial markets (Dewi et al., 2020). This study might also show retail sector investors how an accounting rule change, capitalizing operating leases, affects financial statement information.

Research Design

After choosing the quantitative method for my study, my next task was to select an appropriate research design. A research design is a plan that a researcher devises for assembling and evaluating data to achieve research objectives (Saunders et al., 2019). A coherent research design aligns the hypothesis, rules governing variable assignment, and data collection and analysis to the research question and theoretical framework (Smith, 2020). Aligning the research question with the purpose of the study occurs by defining the unit of analysis, or in other words, the study population (Creswell & Creswell, 2018;

Smith, 2020). Therefore, I chose a research design based on the type of data I used to answer my research question.

There are several designs available to choose from for quantitative studies. Quantitative research designs are correlational, descriptive, experimental, or quasi-experimental (Bloomfield & Fisher, 2019; Creswell & Creswell, 2018). Researchers using correlational designs examine relationships between independent and dependent variables in a sample to test hypotheses about whether relationships might exist and the significance of the relationships in both a sample and a population (Ghauri et al., 2020). Researchers are not seeking to discover or examine causal relationships between independent and dependent variables using correlational designs (Bloomfield & Fisher, 2019). Without influencing or manipulating the variables of interest, researchers using descriptive designs seek to discover and portray the characteristics of a sample and a population (Bloomfield & Fisher, 2019). Researchers using experimental and quasi-experimental designs seek to examine causal relationships between independent and dependent variables in a sample (Bloomfield & Fisher, 2019). Experimental designs are executed in controlled environments, while quasi-experimental designs are not (Bloomfield & Fisher, 2019). I determined that a correlational design was appropriate for examining the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score.

Population and Sampling

Population

The study population consisted of 277 public U.S. companies in 28 unique SIC codes within the retail industry (SIC codes 5200 through 5990) that filed annual financial reports on Form 10-K in the SEC's EDGAR system for reporting periods beginning after December 15, 2018. I analyzed the financial statements to identify any companies within the population that might qualify for the SRC exclusion, announced in ASU 2019-10, that delays the ASC 842 effective date by 1 year (FASB, 2019). Samples consisting of the financial statements for the year ASC 842 was implemented and for the year preceding ASC 842 implementation were selected from the remaining companies that did not qualify for the SRC exclusion.

Sampling

My study targeted financial statements of a population of 277 U.S. public retail sector companies in 28 unique SIC codes that were filed as of December 2019. A researcher may choose to examine an entire population or a portion of a population (Saunders et al., 2019). For a study population consisting of 50 or fewer cases, Saunders et al. (2019) recommended examining the entire population. Because the study population exceeded 50 companies, I sampled the population to select the companies I included in the study. After I chose the companies, I retrieved the financial statements for those companies from SEC's EDGAR database. See Table 6 for a list of the SIC codes (and the number of companies within those codes) that comprise the study population

I had several sampling methods that I could have used to select the companies in my study. A researcher may choose a non-probability-based sampling method or a probability-based sampling method to choose a sample from the study population (Ghauri et al., 2020; Gravetter & Forzano, 2018). For non-probabilistic sampling, researchers can use one of two techniques: purposive sampling or convenience (also known as accidental or haphazard) sampling (Ghauri et al., 2020). Even though purposive and convenience samples can be analyzed statistically, both Creswell and Creswell (2018) and Hochbein and Smeaton (2018) agree that researchers cannot make inferences about the study population using statistical analyses. When it is impractical or impossible to select a probabilistic sample from a population, researchers use non-probability-based sampling methods (Creswell & Creswell, 2018). Since it was practical and possible for me to select a probabilistic sample, and because I wanted to learn what inferences I could make about my study population, I did not choose a non-probability-based sampling method.

I chose a probability-based sampling method for my study. The choice of sampling method should align with the research purpose (Ghauri et al., 2020). A probability-based sampling method enables a researcher's efficient examination of the study population (Saunders et al., 2019). In probability-based sampling methods, each item in the study population has a chance for selection, which mitigates bias in sample selection (Creswell & Creswell, 2018). According to Gravetter and Forzano (2018), there are several techniques that researchers can use when conducting probability-based sampling. The probability-based sampling techniques that a researcher might use include simple, stratified random, proportionate stratified random, systematic, and cluster

sampling (Gravetter & Forzano, 2018). According to Gravetter and Forzano, stratified random, proportionate stratified random, systematic, and cluster sampling are variants of simple random sampling. These techniques are used based on the researcher's assessment of how best to sample the study population effectively and efficiently (Gravetter & Forzano, 2018). For instance, a researcher might divide a population into subgroups and use simple random sampling to select samples from each group (Gravetter & Forzano, 2018). As noted by Gravetter and Forzano, researchers might choose cluster sampling techniques to sample geographically separated populations. Systematic random sampling is applied when a researcher uses an arbitrary starting point to select the first sample and then selects each subsequent sample based on a predetermined interval (Gravetter & Forzano, 2018). Using proportionate stratified random sampling, a researcher stratifies the population and selects samples based on the proportion of the population represented in each stratum (Gravetter & Forzano, 2018). Because I wanted to ensure the likelihood of choosing representative samples from each of the 28 SICs found in the study population, I decided on proportionate-stratified random sampling (see Tables 7 and 8 for the two population strata). I also chose this probability-based sampling method for my correlational design study because I wanted to learn what inferences I could make about my study population

I used software to aid in deciding the sample size that I selected for my study. Faul et al. (2009) created G*Power Version 3.1.9 software that allows quantitative researchers to calculate a statistically sound a priori sample size. I conducted a power analysis to determine the appropriate sample size for the study. An a priori power

analysis, assuming a medium effect size (p^2= .13) and alpha set at .05, identified that a minimum sample size of financial statements of 94 companies was required to achieve a power of .80 (see Figure A1). Increasing the sample size to 188 would increase the power to .99. Therefore, I sought between 94 to 188 U.S. public retail company financial statements.

I chose the medium effect size to calculate the sample size range for my study. The medium effect size was based on an analysis of Das and Swain (2018), where financial statement data were used to build regression models to examine the relationships between the dependent and independent variables. Using MLR analysis enabled by IBM SPSS software, Das and Swain (2018) achieved effect sizes of .26, .10, .21, and .01 for the four models they created in their study. Each of the models contained four independent variables. This study used MLR analysis enabled by IBM SPSS software to examine two regression models with three independent variables. Effect sizes greater than or equal to .13, and less than .23 are medium effect sizes for regression (Aberson, 2019). A medium effect size (p^2 = .13) is appropriate for this study.

Table 6

Study Population by Standard Industrial Code

Standard Industrial Classification Code	Standard Industrial Classification Code title	Companies
5200	Building Materials, Hardware, Garden Supply	7
5211	Lumber & Other Building Materials Dealers	7
5311	Department Stores	8
5331	Variety Stores	12
5400	Food Stores	4
5411	Grocery Stores	10
5412	Convenience Stores	1
5500	Auto Dealers & Gasoline Stations	19
5531	Auto & Home Supply Stores	4
5600	Apparel & Accessory Stores	9
5621	Women's Clothing Stores	6
5651	Family Clothing Stores	13
5661	Shoe Stores	6
5700	Home Furniture, Furnishings & Equipment Stores	7
5712	Furniture Stores	3
5731	Radio, TV & Consumer Electronics Stores	4
5734	Computer & Computer Software Stores	3
5735	Record & Prerecorded Tape Stores	1
5810	Eating & Drinking Places	13
5812	Eating Places	52
5900	Miscellaneous Retail	22
5912	Drug Stores and Proprietary Stores	8

5940	Miscellaneous Shopping Goods Stores	8
5944	Jewelry Stores	3
5945	Hobby, Toy & Game Shops	2
5960	Non-store Retailers	12
5961	Catalog & Mail-Order Houses	18
5990	Retail Stores, NEC	15
	Total companies in the study population	277

Table 7

Strata 1 of Study Population by Standard Industrial Code

Standard industrial classification code	Standard industrial classification code title	Companies
5200	Building Materials, Hardware, Garden Supply	7
5211	Lumber & Other Building Materials Dealers	7
5311	Department Stores	8
5400	Food Stores	4
5412	Convenience Stores	1
5531	Auto & Home Supply Stores	4
5600	Apparel & Accessory Stores	9
5621	Women's Clothing Stores	6
5661	Shoe Stores	6
5700	Home Furniture, Furnishings & Equipment Stores	7
5712	Furniture Stores	3
5731	Radio, TV & Consumer Electronics Stores	4
5734	Computer & Computer Software Stores	3
5735	Record & Prerecorded Tape Stores	1

5912	Drug Stores and Proprietary Stores	8
5940	Miscellaneous Shopping Goods Stores	8
5944	Jewelry Stores	3
5945	Hobby, Toy & Game Shops	2
	Total companies in Strata 1	91

Table 8

Strata 2 of Study Population by Standard Industrial Code

Standard industrial classification code	Standard industrial classification code title	Companies
5331	Variety Stores	12
5411	Grocery Stores	10
5500	Auto Dealers & Gasoline Stations	19
5651	Family Clothing Stores	13
5810	Eating & Drinking Places	13
5812	Eating Places	52
5900	Miscellaneous Retail	22
5960	Non-store Retailers	12
5961	Catalog & Mail-Order Houses	18
5990	Retail Stores, NEC	15
	Total companies in Strata 2	186

Ethical Research

It is my duty as a researcher to conduct my study ethically. The ethics requirements are designed to protect human subjects. Researchers should obtain informed consent from human research subjects, safeguard the information obtained from human subjects in the research project, and provide scientifically accurate reporting of the research results (American Psychological Association, 2017). These ethics requirements accrued from the ethical principles of respect for persons, beneficence, and justice prescribed in the Belmont Report. Concerning research involving human subjects, researchers must respect them as individuals, protect their privacy, and assure that whatever benefits accrue from the study are equally distributed (U.S. Department of Health, Education, and Welfare, 1979). Along with protecting research subjects, the ethics requirements are also designed to promote quality research.

In obtaining informed consent from a human subject, the researcher applies the respect-for-persons ethical principle. The researcher explains the purpose of, and any potential benefits and risks that might accrue from, the study using language that the potential subject understands. If the researcher offers inducements to their potential research subjects, the inducements should be appropriate so that subjects might avoid feeling pressured into participating in the study. The researcher also assures the potential human subject is advised that if consent is given to the researcher, the subject may withdraw from the study at any time and without penalty. If the research subject is a minor or is impaired in his or her ability to comprehend, then the researcher must seek informed consent from the subject's parent or guardian. According to the American

Psychological Association (2017), the researcher should document receipt of the subject's consent or, where applicable, consent from the subject's parent or guardian. This study did not require human subjects.

Publicly accessible financial statement information retrieved from the SEC's EDGAR system comprises the research data for this project. Using publicly available data, I avoid violating the ethical requirement of safeguarding study data since the data are not identifiable to human subjects. Standard 8.05 also allows dispensing with informed consent if reporting the study data would not lead to financial harm (American Psychological Association, 2017). The information obtained in this research project will be stored electronically in a password-protected folder on a password-protected personal computer for up to five years and then destroyed. The researcher completed the Collaborative Institutional Training Initiative (CITI Program) Basic Course for Doctoral Student Researchers on April 8, 2021. The Walden University Institutional Review Board approved this study on November 19, 2021. The approval number is 11-19-21-0749902.

Data Collection Instruments

This quantitative study used a correlational design and examined the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score. The independent variables are assets, liabilities, and EBIT. The dependent variable is Altman's Z′′-score. The independent variables and the dependent variable are ratio-scaled. The ratio-scaled data in this study consisted of secondary data sourced from the financial statements of public U.S. companies that filed annual financial reports on Form 10-K in the SEC's EDGAR system for reporting periods beginning after December 15,

2018. Financial statement data sets for January 2018 through December 2019 were downloaded from the SEC's EDGAR system. The study population consisted of 277 public U.S. companies in 28 unique SIC codes (5200 through 5990) within the retail industry.

The Submissions data set for the 277 U.S. public retail sector companies were extracted from the financial statement data sets and uploaded into a Microsoft Access database. A file was created within the Microsoft Access database. See Table 7 for a summarization of the file by SIC code that shows the number of companies within each SIC code. The study population was further stratified. See Table 8 and Table 9.

I used a random number generated file to assist in selecting the companies comprising the samples from the two strata of the study population. At least 33 samples were drawn from Strata 1, and at least 66 were selected from Strata 2. After I chose the samples, I queried EDGAR for the financial statements of each of the companies in the sample. I used a Microsoft Excel workbook to collect the financial statement data relevant to the study's independent and dependent variables.

Data Collection Technique

I used archival financial statement data sourced from the SEC's EDGAR system for this study. According to Smith (2020), there are advantages and disadvantages associated with archival (secondary) research of financial statements. Benefits include data accessibility and data verifiability if data can be accessed without difficulty and at little or no cost (Smith, 2020). Archived financial statement data in SEC's EDGAR system are free and accessible to the public through the internet (SEC, 2017).

Disadvantages associated with archival data include the possibility that archived financial statement data might be dated, incomplete, and there might be errors in the data due to how they were in-put into the archive (Smith, 2020). Financial statement data sourced from the SEC's EDGAR database are submitted to the SEC quarterly and annually (SEC, 2021). Therefore, they are current and appropriate for my study.

I randomly selected 106 U.S. public retail companies and downloaded their financial statements from SEC's EDGAR system. In a comparative study of BPMs, Arroyave (2018) used Excel spreadsheets as data collection and analysis tools. I also used Microsoft Excel workbook as a data collection and analysis tool. The study's independent variable data (assets, liabilities, and EBIT) and the data required for computing the dependent variable (Altman's Z´´-score) were manually entered into a Microsoft Excel workbook. I examined each company's Form 10-K to ensure that the companies did not qualify for the SRC exclusion announced in ASU 2019-10 (FASB, 2019). I also took steps to ensure that each Form 10-K selected for the study met the criteria for inclusion in the study. For example, I included the companies that were not eligible for the SRC exemption. Companies that qualified for the exemption were excluded from the study.

An advantage of using a Microsoft Excel workbook is that it can be designed to mitigate data entry errors. The Excel workbook for this study includes a separate worksheet for each company selected from the population. The worksheets contain the collected financial statement data that comprised the study's independent variables and the formula used to compute the dependent variable, Altman's Z´´-score. I designed the workbook to minimize data entry errors by creating templates to assure uniformity. I

confirmed that the formulas used to compute the Altman's Z′′-score were correct in the data collection worksheets. I designed the data collection worksheets so that the financial statement data that comprised the study variables were entered once. Each company worksheet containing the study variables derived from their Form 10-K was linked to a worksheet containing the data used for the ASC 840 and ASC 842 MLR models. To mitigate the disadvantage of manually entering erroneous data into the worksheets, I, as advised in Tabachnik et al. (2019), proofread the manually entered data in the company worksheets against the Form 10-Ks I downloaded from SEC's EDGAR system.

I purchased the license for the Microsoft Access and Microsoft Excel applications used for this study. The raw data collected in this study are stored in a password-protected hard drive. Figure A2 in Appendix A is a diagram of the data collection procedures.

Data Analysis

This quantitative study used a correlational design to examine the relationship between assets, liabilities, EBIT, and financial distress using Altman's Z′′-score. The independent variables are assets, liabilities, and EBIT. The dependent variable is Altman's Z′′-score. The independent variables and the dependent variable for financial statements prepared under ASC 842 were compared against the same variables for financial statements prepared under ASC 840. The independent variables and the dependent variable used in this study are ratio-scaled. Parametric statistical tests are appropriate for evaluating ratio-scaled variables (Smith, 2020). Multiple regression analysis is suitable for assessing relationships between ratio-scaled independent and

dependent variables (Darlington & Hayes, 2017; Smith, 2020). Taseva (2020) evaluated the relationships between five ratio-scaled independent variables and one ratio-scaled dependent variable using multiple regression analysis. The independent and dependent variables were drawn from the financial statements of 100 financially distressed companies. Since this study will also examine the relationship between three ratio-scaled independent variables and a ratio-scaled dependent variable, which comprises financial statement data, I also used multiple regression analysis.

I used MLR to examine the relationship between the independent and dependent variables. MLR is a parametric statistical test that evaluates how strongly quantitative variables in a sample are correlated (Green & Salkind, 2017). I also used MLR to test the study hypotheses. The MLR equation is:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3,$$

where:

Y = the dependent variable,

b_0 = the regression constant,

b_1, b_2, and b_3 = regression coefficients, and

X_1, X_2, X_3 = independent variables (Darlington & Hayes, 2017).

MLR analysis uses a mathematical technique called ordinary least squares (OLS) to compute the regression constant (b_0) and the regression coefficients (b_1, b_2, and b_3) to produce a linear regression model that best fits the dependent variable (Y) and independent variable (X_1, X_2, X_3) data. For each of the companies sampled from the study population of public U.S. retail companies, I used financial statement data to compute the

dependent variable, Altman's Z′′-score, for financial statements prepared under ASC 840 and ASC 842. The independent variables were the values of total assets, total liabilities, and EBIT from those financial statements. These data were the variables analyzed in IBM SPSS to produce an MLR model based on ASC 840 and one on ASC 842. Because this study examined the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score, an MLR model based on financial statements prepared under ASC 840 rules, and an MLR model based on financial statements prepared under ASC 842 were created. Applying the MLR equation to the variables in this study yields the following:

$$\text{Altman's Z''-score} = b_0 + b_1\text{*assets} + b_2\text{*liabilities} + b_3\text{*EBIT}.$$

IBM SPSS software was used to analyze the study data using MLR models. IBM SPSS MLR output included the following tables: Model Summary, analysis-of-variance (ANOVA), and Coefficients (Green & Salkind, 2017). The Model Summary Table consists of the MLR model's multiple correlation coefficient symbolized as *R* (Darlington & Hayes, 2017). The multiple correlation coefficient is a statistic that measures how well the model fits the data, and larger *R* values indicate better fitting models (Darlington & Hayes). The Model Summary Table also provides R^2, another statistic, which is a measure of the percentage of the total variance in *Y* (the dependent variable) supported by all the regressors (independent variables) in the model (Darlington & Hayes, 2017).

The ANOVA table provides another helpful set of statistics about the companies selected for this study. These statistics include the sum of squares, degrees of freedom

(*df*), the mean squared, the *F*-ratio used in hypothesis testing, and the significance or *p*-value associated with the *F*-ratio (Green & Salkind, 2017). The sum of squares statistics includes the sum of the squared regressors plus the sum of the squared residuals, which, when added together, comprises the regression model (Darlington & Hayes, 2017). The *df* statistics combine the regression *df* plus the residual *df* to equal the total *df*. The *df* total corresponds with the sample size minus one, the regressor *df* corresponds to the number of regressors (independent variables) that comprise the model, and the residual *df* is *df* total minus the regressor *df* (Darlington & Hayes, 2017). The mean square statistics adjust the sum of the squared regressors and the sum of the squared residuals by dividing them by their related *df* statistics. The *F*-ratio is determined by dividing the regression mean square by the residual mean square (Darlington & Hayes, 2017).

The coefficients table provides the following statistics: unstandardized coefficients with standard error, standardized coefficients, *t*-value, and significance or *p*-value (Green & Salkind, 2017). The unstandardized coefficients with standard error statistics present values for b_0 (the regression constant) and the regression coefficients (b_1, b_2, and b_3) along with their corresponding standard error values (Darlington & Hayes, 2017). The standard error values estimate how much the regression coefficients vary within the sample (Darlington & Hayes, 2017). The regression coefficients quantify the magnitude of the variables they are associated with were used in producing an estimate of *Y*, and the associated standard error affects the associated *p*-value in hypothesis testing about the variable's correlation to *Y* (Darlington & Hayes, 2017). The effect of the standard error is represented by the *t*-value, which is computed by dividing the regression

coefficient by the standard error (Darlington & Hayes, 2017). These statistics are used in hypothesis testing.

There are assumptions that the data must pass to be effective in MLR analysis. The data assumptions applicable to testing the correlation strength of the ratio scaled variables in this study require small to medium bivariate correlations, linearity, homoscedasticity, normality, and independence (Darlington & Hayes, 2017; Jupiter, 2017). According to Leone et al. (2019), data used in accounting studies are likely to contain outliers. Outliers violate homoscedasticity and can adversely affect the reliability of inferences drawn from the test data. I analyzed SPSS output for indicators of assumption violations and outliers. Multicollinearity was assessed by examining correlation coefficients presented in the coefficients table. Outliers, normality, linearity, homoscedasticity, and independence of residuals were evaluated using the normal probability plot (P-P) of the regression standardized residuals and the scatterplot of the standardized residuals.

Study Validity

Study validity is a research study component that helps people have confidence in its reliability. One of the attributes that a research study strives to achieve is validity (Saunders et al., 2019; Smith, 2020). Researchers should design and conduct their research to ensure study validity (Creswell & Creswell, 2018). Saunders et al. (2019) noted that validity has the following elements: external validity, internal validity, and measurement validity. In my quantitative study, I used a correlational design to examine the relationship between assets, liabilities, EBIT, and financial distress as measured using

Altman's Z′′-score. In the following paragraphs, I present discussions of threats to external validity, internal validity, measurement validity, and statistical conclusion validity, including how the researcher will address them. I also describe the extent to which and rationale for justifying if, and if so why, research findings can be generalized to larger populations and applied to different settings.

External Validity

One of the elements of a study's validity is external validity. Saunders et al. (2019) define external validity as the magnitude to which a study's findings might apply to each applicable circumstance. This study consists of archival data sourced from an official financial statement database. A study using archival data usually has external validity since the data are derived from observed events or transactions (Smith, 2020). However, a threat to the study's external validity arises because the data were not explicitly designed to meet the study's objectives (Saunders et al., 2019). Smith (2020) also notes that financial statement data might adversely affect the study's external validity because of concerns about accounting changes and, in the case of financial distress prediction, defining which measures to use. I mitigated threats to the study's external validity by assuring the data collected from the financial statements met study requirements. For example, only financial statements that were not excluded under ASU 2019-10 (FASB, 2019) were included in the study. I used Altman's Z′′-score to measure financial distress. Since Alman's Z′′-score is the study's dependent variable, I carefully collected the financial statement data relevant for computing the Z′′-score.

Internal Validity

Another element of a study's validity is internal validity. Internal validity is found in how hypotheses can be tested in causal research designs through the researcher's ability to manipulate independent variables (Saunders et al., 2019; Smith, 2020). Saunders et al. (2019) noted that internal validity is reached when a researcher can accurately show causality between an independent and dependent variable. Smith (2020) described two internal validity threats that might impact this study if the study used a causal design: instrumentation and selection. The instrumentation threat arises when study procedures are not consistently applied to all cases in the study. The selection threat occurs when the study cases are not randomly selected. I consistently applied study procedures to all samples in the study to mitigate internal validity threats. I also used probability sampling to choose the companies for analysis from the target population. This quantitative study used a correlational design to assess relationships between the independent and dependent variables. Internal validity and related threats would not apply to a correlational design study because there would be no variable manipulation. A correlational design does not apply to predicting causality.

Validity of Statistical Findings

A final element of a study's validity is measurement validity. Aberson (2019) recommended that statistical conclusion validity depends on how adequately the researcher understands the relationships between significance criterion, statistical power, sample size, and population effect size in any given statistical model. Significance criteria are the level of risk the researcher is willing to accept in determining if the null

hypothesis should be rejected. Statistical power addresses the level of risk the researcher is willing to accept in deciding if the null hypothesis should be accepted or rejected. Incorrect rejection of a null hypothesis is a Type 1 error, and incorrect acceptance of a null hypothesis is a Type 2 error (Smith, 2020). The significance level for this correlational design study is alpha set at .05, and the statistical power is .80. The significance level and statistical power applied in this study, according to Aberson, results in a Type 2 to Type 1 error ratio of 4 to 1. Aberson defined the effect size as representing a small, medium, or large chance that the null hypothesis might be false and recommends that a medium effect size might be appropriate. I used a medium effect size of .13 in this correlational design study. The study's effect size is suitable for regression analysis. Aberson noted that the optimal sample size is a function of the significance criterion, statistical power, and the population effect size. An optimal sample size mitigates the risk of a Type 1 error. A minimum sample size of 94 U.S. public companies in the retail sector is optimal for this study.

The independent and dependent variables used in this study are ratio-scaled. Parametric statistical tests are appropriate for evaluating ratio-scaled variables (Smith, 2020). Multiple regression analysis is suitable for evaluating relationships between ratio-scaled independent and dependent variables (Darlington & Hayes, 2017; Smith, 2020). MLR is a parametric statistical test that assesses how strongly quantitative variables in a sample are correlated (Green & Salkind, 2017). MLR was used to evaluate this study's independent and dependent variables and test the hypotheses. The data assumptions applicable to testing the correlation strength of the ratio scaled variables in this study

require small to medium bivariate correlations, linearity, homoscedasticity, normality, and independence (Darlington & Hayes, 2017; Jupiter, 2017). Violations of the MLR data assumptions can threaten MLR statistical validity conclusions. I analyzed IBM SPSS output for indicators of assumption violations and applied statistical techniques (bootstrapping) using IBM SPSS software.

Generalizability of the Findings

In this study, I produced information about the relationship between assets, liabilities, EBIT, and financial distress as measured using Altman's Z′′-score for U.S. public retail companies that might apply to U.S. public companies in sectors besides the retail industry. All U.S. public companies will be required to implement ASC 842 (FASB, 2019d), including those exempted by ASU 2019-10 (FASB, 2019) from the ASC 842 implementation date announced in ASU 2016-02 (FASB, 2016). Leasing is an important form of financing that companies use to acquire equipment and property (Cotei & Farhat, 2017). The managers of U.S. public companies that have not implemented ASC 842 might use this study's findings to inform them of the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score for their companies.

I focused my research on U.S. public retail companies. Fafatas and Fischer (2016) estimated that the U.S. retail sector might record an additional $203 billion in assets and liabilities (related to operating leases) on their balance sheets. In a study of the possible impact of capitalizing operating leases on profitability in the retail industry, Fafatas and Fischer used data from Compustat that showed ten public companies with the highest

operating lease obligations totaling $203.1 billion as of 2014. Along with four companies in the retail sector, one company operated in the air courier services, two in the air transportation, and three in the telecommunications sectors. While the retail industry carried $92.1 billion in lease obligations, the air courier services, air transportation, and telecommunications sectors held $15.4 billion, $34.9 billion, and $60.8 billion. Various studies (Durocher, 2008; Fafatas & Fischer, 2016; Joubert et al., 2017) identified these sectors as sensitive to capitalizing operating leases. The managers of U.S. public companies in these sectors that have not implemented ASC 842 might use my study's findings to inform them of the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score for their companies.

Transition and Summary

The purpose of this quantitative study, using a correlational design, was to examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. The independent variables were assets, liabilities, and EBIT. The dependent variable is Altman's Z′′-Score. This study used secondary data sourced from financial statements. The financial statements of between 94 and 106 U.S. public retail companies were sampled from a population of 277 public U.S. companies in Standard Industrial Classification (SIC) codes 5200 through 5990 (retail industry) that filed annual financial reports on Form 10-K in the SEC's EDGAR system for reporting periods beginning after December 2018. MLR tests were used to evaluate this study's dependent and independent variables and test the study hypotheses. The data assumptions applicable to testing the correlation strength of the ratio scaled variables in this study

require the variables to be multivariately normally distributed in the population, the samples are randomly selected from the population, and the scores on the variables are independent of other scores on the same variables (Green & Salkind, 2017). Meeting these data assumptions allows people to rely on the statistical validity of the study conclusions.

In Section 2, I discussed the role of the researcher and described the research method and the research design. I also introduced information about the study population, the minimum and maximum sample size, and the statistical tests that the researcher might use to analyze the study data. In Section 3, I present the study findings, including descriptive statistics. I also present the study's application to professional practice, implications for social change, recommendations for action, and recommendations for further research.

Section 3: Application to Professional Practice and Implication for Change

Introduction

In this quantitative study, using a correlational design, I examined the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. The independent variables were assets, liabilities, and EBIT, and the dependent variable was Altman's Z′′-score. The study data were analyzed using two MLR models. One of the MLR models (ASC 840 financial reporting) consisted of variables comprised of data from financial statements prepared under FASB (2019c) rules. The other MLR model (ASC 842 financial reporting) consisted of variables consisting of data from financial statements prepared under FASB (2019d) rules. The null hypothesis was rejected for both models, and the alternative hypothesis was accepted.

Presentation of the Findings

This section discusses testing assumptions and presents results using descriptive and inferential statistics. In delivering the study results, I engage with relevant theory. I employed bootstrapping, using 1,000 samples, on each MLR model to address the possible influence of assumption violations. Thus, the bootstrapped 95% bias-corrected and accelerated (BCa) confidence intervals are presented where appropriate. For financial statements prepared under the former lease accounting standard, the ASC 840 financial reporting MLR model indicated a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score, $F(3,100) = 8.165$, $p < .001$, $R^2 = .202$. The null hypothesis was rejected. For financial statements prepared under the new lease accounting standard, the ASC 842 financial reporting MLR model indicated a statistically

significant relationship between assets, liabilities, EBIT, and Altman's Z´´-score, $F(3,100) = 3.682$, $p = .015$, $R^2 = .102$. The null hypothesis was rejected.

Tests of Assumptions

Multicollinearity

Multicollinearity is a condition that occurs when an MLR model's independent variables provide overlapping information (Mendenhall & Sincich, 2020). Because of the overlapping information, multicollinearity's presence limits the precision of the unstandardized beta coefficients produced in MLR (Menden & Sinich, 2020). I evaluated multicollinearity for each model using the Pearson's correlation of the study variables (see Table 10 for the ASC 840 financial reporting model and Table 11 for the ASC 842 financial reporting model), the tolerance statistic, and variance inflation factor (VIF) produced in the MLR analysis. According to Dorestani and Aliabadi (2017), the correlation coefficient ranges between -1 and +1, and 0 indicates no correlation. The Pearson's correlation of each model's variables indicated a strong correlation between assets and liabilities. For the ASC 840 financial reporting model, the correlation was .962. For the ASC 842 financial reporting model, the correlation was .972. Correlation between independent variables equal to or exceeding 90% indicates that multicollinearity might be present (Tabachnick et al., 2019).

Table 9

Pearson's Correlation Statistics for the ASC 840 Financial Reporting Model

	Z′′-score	Assets	Liabilities	EBIT
Z′′-score		-0.143	-0.166	0.043
Assets	-0.143		0.962	0.773
Liabilities	-0.166	0.962		0.858
EBIT	0.043	0.773	0.858	

Note. a = .05, significance (2 tailed).

Table 10

Pearson's Correlation Statistics for the ASC 842 Financial Reporting Model

	Z′′-score	Assets	Liabilities	EBIT
Z′′-score		-0.029	-0.044	0.140
Assets	-0.029		0.972	0.693
Liabilities	-0.044	0.972		0.768
EBIT	0.140	0.693	0.768	

Note. a = .05, significance (2 tailed).

The tolerance statistic measures the independence of each independent variable from each of the other independent variables (Darlington & Hayes, 2017). The tolerance statistic ranges from 0 to 1, where 0 represents total independence and 1 represents complete dependence or singularity (Darlington & Hayes, 2017). The VIF is computed by dividing 1 by the tolerance statistic (Darlington & Hayes, 2017; Pituch & Stevens, 2016). According to Pituch and Stevens (2016), a VIF value greater than 10 indicates multicollinearity. The VIF values in each model showed that the assets and liabilities

residuals are highly correlated. Thus, violation of the assumption about multicollinearity was confirmed in the ASC 840 financial reporting model and the ASC 842 financial reporting model. Table 11 presents the collinearity statistics for the ASC 840 financial reporting model, and Table 12 shows the collinearity statistics for the ASC 842 financial reporting model.

Table 11

Collinearity Statistics for the ASC 840 Financial Reporting Model

	Tolerance statistic	Variance inflation factor
Assets	0.0643	15.5569
Liabilities	0.0420	23.7970
EBIT	0.2261	4.4221

Note. a = .05.

Table 12

Collinearity Statistics for the ASC 842 Financial Reporting Model

	Tolerance statistic	Variance inflation factor
Assets	0.0490	20.4017
Liabilities	0.0388	25.7872
EBIT	0.3614	2.7673

Note. a = .05.

Outliers, Linearity, Normality, Homoscedasticity, and Independence of Residuals

This section describes how I evaluated outliers, linearity, normality, homoscedasticity, and independence of residuals. Outliers are data or instances that are unusual when compared to the rest of the data or instances that comprise the MLR model (Cohen et al., 2003; Tabachnick et al., 2019). The assumptions about linearity, normality, homoscedasticity, and independence of residuals are related to the random error between the independent variables used in the MLR model. Linearity assumes that no error exists in the values of any combination of the independent variables used to estimate the dependent variable (Mendenhall & Sincich, 2020), allowing the regression model to compute a line that most likely fits the data (Darlington & Hayes, 2017). Similarly, normality assumes that the mean random error in the data is 0, and homoscedasticity assumes that the error for all levels of the independent variables in the model is constant (Mendenhall & Sincich, 2020). For the independence of residuals assumption to be true, there must be no relationship between the error component of the independent variables used in the model (Darlington & Hayes, 2017). There were no severe assumptions violations. However, 1,000 bootstrap samples were computed to combat any influence of assumption violations, and 95% confidence intervals based upon the bootstrap samples are reported where appropriate.

Outliers. I identified three outliers in each model with extreme values for the asset and liabilities independent variables compared to the other cases in the MLR models. Two other outliers, samples with extreme values for the Z′′-score for the dependent variable, were identified using the case-wise diagnostic option in the SPSS

MLR analysis. Once all outliers common to both models were removed, each MLR model contained 101 cases representing 101 U.S. public retail sector companies (SEC's SICs 5200 through 5990).

Linearity and Normality. I evaluated the linearity and normality assumptions for each of the study's MLR models (the ASC 840 financial reporting model and the ASC 842 financial reporting model) by examining the standardized residual's normal probability plot (P-P). The tendency of the points to lie in a reasonably straight line, diagonal from the bottom left to the top right, provides supportive evidence that the linearity and normality assumptions were not seriously violated (Pallant, 2020). The examinations indicated there was no significant violation of the linearity assumption. Figure A3 presents the probability plot for the ASC 840 financial reporting model, and Figure A4 shows the probability plot for the ASC 842 financial reporting model.

Homoscedasticity. I evaluated homoscedasticity for each MLR model using statistical tests for heteroskedasticity and scatterplots of the standardized residuals. The statistical tests for heteroskedasticity included the *F* Test, the modified Breusch-Pagan test, and White's test. The scatterplot of the standardized residuals for the ASC 840 financial reporting model (see Figure A5) and the scatterplot of the standardized residuals for the ASC 842 financial reporting model (see Figure A6) were also examined. No violation of the assumption about homoscedasticity was evident in either model.

Independence of Residuals. I evaluated the independence of residuals for each MLR model using the Durbin-Watson statistic. According to Mendenhall and Sincich (2020), the Durbin-Watson statistic ranges from 0 to 4, with 2 indicating that the

residuals are independent. For the ASC 840 financial reporting model, the Durbin-Watson statistic was 1.927, and for the ASC 842 financial reporting model, the Durbin-Watson statistic was 1.958. Based on each model's Durbin-Watson statistic, no violation of the assumption about the independence of residuals was evident in either model.

Descriptive Statistics

There were 106 companies selected for this study. Each company's financial statements contained operating leases that were accounted for under the former lease accounting standard, ASC 840, and under the new lease accounting standard, ASC 842. I created two MLR models, ASC 840 financial reporting and ASC 842 financial reporting, from the financial statement data. After accounting for extreme values and outliers, each MLR model contained 101 cases representing 101 U.S. public retail sector companies. Assets increased from ASC 840 financial reporting (M = \$719.04 million, SD = \$1,160.78 million) to ASC 842 financial reporting (M = 878.13 million, SD = \$1,418.09 million). Liabilities increased from ASC 840 financial reporting (M = \$558.63 million, SD = \$963.01 million) to ASC 842 financial reporting (M = \$717.62 million, SD = \$1,234.88 million). EBIT decreased from ASC 840 financial reporting (M = \$89.30 million, SD = \$204.32 million) to ASC 842 financial reporting (M = \$85.15 million, SD = \$207.50 million). Z''-score decreased from ASC 840 financial reporting (M = 3.37, SD = 2.78) to ASC 842 financial reporting (M = 2.24, SD = 2.01). Table 13 presents descriptive statistics of the study variables for the ASC 840 financial reporting model, and Table 14 presents descriptive statistics of the study variables for the ASC 842 financial reporting model.

Table 13

Descriptive Statistics for the ASC 840 Financial Reporting Model

	Range	Minimum	Maximum	Mean	Standard error	Standard deviation	Variance
Assets	$6,737.19	$22.61	$6,759.80	$719.04	$115.50	$1,160.78	$1,347,403.68
Liabilities	$4,579.78	$8.32	$4,588.10	$558.63	$95.82	$963.01	$927,380.50
EBIT	$1,646.95	$(93.95)	$1,553.00	$89.30	$20.33	$204.32	$41,745.03
Z′′-Score	13.33	-2.72	10.61	3.37	0.28	2.78	7.72

Note. N = 101. Dollars in millions.

Table 14

Descriptive Statistics for the ASC 842 Financial Reporting Model

	Range	Minimum	Maximum	Mean	Standard error	Standard deviation	Variance
Assets	$8,681.31	$36.09	$8,717.40	$878.13	$141.10	$1,418.08	$2,010,945.62
Liabilities	$6,582.94	$20.86	$6,603.80	$717.62	$122.87	$1,234.88	$1,524,919.68
EBIT	$1,654.31	$(70.01)	$1,584.30	$85.15	$20.65	$207.50	$43,057.38
Z′′-Score	9.12	-1.41	7.71	2.24	0.20	2.01	4.05

Note. N = 101. Dollars in millions.

Tests of Means

I used univariate analysis to compare the ASC 840 MLR model data and the ASC 842 MLR model data. According to Tabachnick et al. (2019), ANOVA and *t*-tests are forms of univariate analysis that can be used to determine if there are statistically significant differences between the means of paired variables. In a study to examine the impact of implementing IFRS 16 on financial ratios, Raoli (2021) used a paired samples *t*-test to examine paired variables composed of financial ratios from financial statements

prepared before IFRS 16 implementation and after IFRS 16 implementation. In a study about accountants' judgment concerning IFRS 16, Hunter (2017) used a within-subjects one-way ANOVA to examine the means of a paired variable. Implementing a new lease accounting standard that required the capitalization of operating lease right-of-use assets and related liabilities presented the opportunity to use two MLR models to examine the relationship between assets, liabilities, and Altman's Z′′-score.

I performed a one-way repeated measures ANOVA to determine if there were statistically significant differences in the means of the variables in the ASC 840 financial reporting model and the ASC 842 financial reporting model, given that the variables in both models respectively represent the old and new lease accounting standards. See Table 15 for the results of the repeated-measures ANOVA. There were statistically significant changes in means for assets, liabilities, and Z′′-scores based on ASC 842 financial reporting than those based on ASC 840 financial reporting. There were no statistically significant changes in EBIT based on ASC 842 financial reporting than those based on ASC 840 financial reporting. According to Fafatas and Fischer (2016), capitalizing operating leases should not impact EBIT because lease expense would be the same as under the prior standard. The data indicate that implementing ASC 842 had no significant effect on EBIT.

Table 15

Results of Repeated Measures Analysis of Variance

	F	*df*	*p*	n^2
Assets	16.782	1, 100	< .001	.144
Liabilities	15.338	1, 100	< .001	.133
EBIT	00.465	1, 100	.497	.005
Z′′-score	48.167	1, 100	< .001	.325

Note. a = .05.

Inferential Results

I conducted preliminary analyses to assess whether the assumptions about multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were true. I used standard MLR, alpha set at .05 (two-tailed), to examine the relationship between assets, liabilities, EBIT, and Altman's Z′′-score in ASC 840 financial reporting and ASC 842 financial reporting MLR models. The independent variables were assets, liabilities, and EBIT, and the dependent variable was Altman's Z′′-score. The null hypothesis was that there is no statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score. Except for the violation of the multicollinearity assumption in each MLR model, no serious violations were noted (see Tests of Assumptions section).

ASC 840 Financial Reporting Model

For financial statements prepared under the former lease accounting standard, the ASC 840 financial reporting model indicated that there is a statistically significant

relationship between assets, liabilities, EBIT, and Altman's Z′′-score, $F(3,100) = 8.165$, $p < .001$, $R^2 = .202$. The null hypothesis was rejected. The $R^2 = .202$ value indicated that approximately 20.2% of the variations in Altman's Z′′-score are accounted for by the linear combination of the predictor variables (assets, liabilities, and EBIT). In the final model, each predictor variable was statistically significant with EBIT $t = 4.556$, $p < .001$, accounting for a higher percentage of the model, followed by liabilities $t = -3.851$, $p < .001$. Assets $t = 2.304$, $p < .030$, contributed the least to the model (see Table 16 for this model's coefficient analysis summary for predictor variables). The final predictive equation was

Alman's Z′′-score = 3.643 + .002 (Assets) - .005 (Liabilities) + .012 (EBIT).

Table 16

Coefficient Analysis for ASC 840 Financial Reporting Model

					Bootstrap BCa 95% confidence interval	
	B	*p*	*sr*	sr^2	lower	upper
(Constant)	3.643	0.000			3.070	4.225
Assets	0.002	0.023	0.209	.044	0.000	0.007
Liabilities	-0.005	0.000	-0.349	.122	-0.007	-0.004
EBIT	0.012	0.000	0.413	.171	0.006	0.026

Note. $a = .05$. Dependent variable: Z′′-Score. Bootstrap results are based on 1000 bootstrap samples. Bootstrap confidence intervals are bias-corrected and accelerated (BCa).

EBIT. The data indicate a 95% certainty that the interval ranging from .006 to .026 for the unstandardized coefficient of .012 for EBIT is one of all possible intervals that might overlap with the true population regression parameter. The positive slope for EBIT (.012) as a predictor of Altman's Z′′-score indicated there was about a .012 increase in Altman's Z′′-score for each 1-point increase in EBIT. In other words, Altman's Z′′-score tended to increase as EBIT increased. The squared semi partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from EBIT was .171, indicating 17.1% of the variance in Altman's Z′′-score was accounted for by EBIT when assets and liabilities were controlled.

Liabilities. The data indicate a 95% certainty that the interval ranging from -.007 to -.004 for the unstandardized coefficient of -.005 for liabilities is one of all possible intervals that that might overlap the true population regression parameter. The negative slope for liabilities (-.005) as a predictor of Altman's Z′′-score indicated there was about a -.005 decrease in Altman's Z′′-score for each 1-point increase in liabilities. In other words, Altman's Z′′-score tended to decrease as liabilities increase. The squared semi partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from liabilities was .122, indicating that 12.2% of the variance in Altman's Z′′-score was accounted for by liabilities when assets and EBIT were controlled.

Assets. The data indicate a 95% certainty that the interval ranging from 0.0001 to 0.0068 for the unstandardized coefficient of .002 for Assets is one of all possible intervals that might overlap the true population regression parameter. The positive slope for assets

(.002) as a predictor of Altman's Z′′-score indicated there was about a .002 increase in Altman's Z′′-score for each 1-point increase in assets. In other words, Altman's Z′′-score tends to increase as assets increase. The squared semi-partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from EBIT was .044, indicating that 4.4% of the variance in Altman's Z′′-score was accounted for by assets when EBIT and liabilities were controlled.

ASC 842 Financial Reporting Model

For financial statements prepared under the new lease accounting standard, the ASC 842 financial reporting model indicated that there is a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score, $F(3,100) = 3.682$, $p = .015$, $R^2 = .102$. The null hypothesis was rejected. The $R^2 = .102$ value indicated that approximately 10.2% of the variations in Altman's Z′′-score were accounted for by the linear combination of the predictor variables (assets, liabilities, and EBIT). In the final model, each predictor variable (except assets) was statistically significant with EBIT $t = 3.237$, $p = .002$, accounting for a higher percentage of the model, followed by liabilities $t = -2.360$, $p = .020$. Assets $t = 1.685$, $p = .095$, contributed the least to the model (see Table 17 for this model's coefficient analysis summary for predictor variables and Figure A8). The final predictive equation was

Alman's Z′′-score = 2.248 + .001 (Assets) - .002 (Liabilities) + .005 (EBIT).

Table 17

Coefficient Analysis for ASC 842 Financial Reporting Model

					Bootstrap BCa 95% confidence interval	
	B	*p*	*sr*	sr^2	lower	upper
(Constant)	2.248	0.000			1.761	2.795
Assets	0.001	0.095	0.162	.026	0.000	0.009
Liabilities	-0.002	0.020	-0.227	.052	-0.005	-0.001
EBIT	0.005	0.002	0.311	.097	-0.002	0.012

Note. a= .05. Dependent variable: Z′′-Score. Bootstrap results are based on 1000 bootstrap samples. Bootstrap confidence intervals are bias-corrected and accelerated (BCa).

EBIT. The data indicate a 95% certainty that the interval ranging from -.002 to .012 for the unstandardized coefficient of .005 for EBIT is one of all possible intervals that might correspond with the true population regression parameter. The positive slope for EBIT (.005) as a predictor of Altman's Z′′-score indicated there was about a .005 increase in Altman's Z′′-score for each 1-point increase in EBIT. In other words, Altman's Z′′-score tends to increase as EBIT increases. The squared semi-partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from EBIT was .097, indicating that 9.7% of the variance in Altman's Z′′-score are accounted for by EBIT when assets and liabilities were controlled.

Liabilities. The data indicate a 95% certainty that the interval ranging from -.005 to -.002 for the unstandardized coefficient of -.002 for liabilities is one of all possible intervals that might overlap the true population regression parameter. The negative slope for liabilities (-.002) as a predictor of Altman's Z′′-score indicated there was about a -.002 decrease in Altman's Z′′-score for each 1-point increase in liabilities. In other words, Altman's Z′′-score tends to decrease as liabilities increase. The squared semi-partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from liabilities was .052, indicating that 5.2% of the variance in Altman's Z′′-score are accounted for by liabilities when assets and EBIT were controlled.

Assets. The data indicate a 95% certainty that the interval ranging from -0.0002 to 0.0086 for the unstandardized coefficient of .001 for Assets is one of all possible intervals that might correspond with the true population regression parameter. The positive slope for assets (.001) as a predictor of Altman's Z′′-score indicated there was about a .001 increase in Altman's Z′′-score for each 1-point increase in assets. In other words, Altman's Z′′-score tends to increase as assets increases. The squared semi-partial coefficient (sr^2) that estimated how much variance in Altman's Z′′-score was uniquely predictable from EBIT was .026, indicating that 2.6% of the variance in Altman's Z′′-score was accounted for by assets when EBIT and liabilities were controlled.

Analysis Summary

In this study, I examined the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score using the agency theory of the firm. I used standard MLR to examine the relationship between assets, liabilities, EBIT, and

Altman's Z′′-score in ASC 840 financial reporting and ASC 842 financial reporting MLR models. Assumptions surrounding MLR were assessed, and except for the assumptions related to multicollinearity, no serious violations were noted. The ASC 840 financial reporting model indicated there is a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-Score, $F(3,100) = 8.165$, $p < .001$, $R^2 = .202$. The ASC 842 financial reporting model indicated that there is a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-Score, $F(3,100) = 3.682$, $p = .015$, $R^2 = .102$. For each model, the null hypothesis was rejected. Each predictor variable (except for Assets in the ASC 842 financial reporting model) was statistically significant. See Appendix B for IMB SPSS output for the ASC 840 financial reporting model and Appendix C for IBM SPSS output for the ASC 842 financial reporting model.

Theoretical Discussion of the Findings

Based on the study data, the retail sector is sensitive to the liabilities added to balance sheets due to implementing ASC 842. The study data confirm Durocher (2008) and Fafatas and Fischer (2016) concerns about the liabilities that ASC 842 would add to the balance sheets of the U.S. retail companies in the public sector. The aggregate right-of-use assets and liabilities added to the balance sheets of the 101 companies examined in this study were $166.4 billion and $177.7 billion, respectively. These assets and liabilities constituted 18.8% and 24.5%, respectively, of the aggregate assets and liabilities of the companies included in this study. The magnitude of the right-of-use assets and liabilities added due to ASC 842 is consistent with the predictions made by Durocher and Fafatas and Fischer. See Table 18.

Table 18

Aggregate Right-of-Use (ROU) Assets and Liabilities Added to Balance Sheets

	ASC 840	ASC 842	Change	% change	ROU	ROU %
Assets	$726.2	$886.9	$160.7	22.1	$166.4	18.8
Liabilities	$564.2	$724.8	$160.6	28.5	$177.7	24.5
EBIT	$90.2	$86.0	$(4.2)	-4.6		

Note. Dollars are in billions.

Some researchers were concerned about how ASC 842 might affect financial statement ratios. Giner et al. (2019) predicted that ASC 842 might adversely affect the total liabilities over total assets, or leverage, ratio. The aggregate leverage ratio under ASC 840 was 0.777, and under ASC 842, the ratio was 0.817, representing a 5.2% improvement. While this study's findings did not support Giner et al.'s prediction about the leverage ratio, their prediction about liquidity ratios was consistent with this study's findings. Aggregate liquidity measured using the current assets over current liabilities ratio under ASC 840 was 1.157, and under ASC 842, it was 1.087, representing a -6.1% change. See Table 19 for how ASC 842 affected various financial statement ratios.

Table 19

Changes in Selected Financial Ratios

	ASC 840	ASC 842	Change	% change
Current assets over current liabilities	1.157	1.087	(0.07)	-6.1
Current liabilities over net worth	1.492	1.658	0.17	11.1
EBIT over total assets	0.124	0.097	(0.03)	-21.9
EBIT over total liabilities	0.160	0.119	(0.04)	-25.8

Net worth over total liabilities	0.287	0.224	(0.06)	-22.1
Retained earnings over total assets	0.367	0.280	(0.09)	-23.7
Total liabilities over net worth	3.483	4.471	0.99	28.4
Total liabilities over total assets	0.777	0.817	0.04	5.19
Working capital over total assets	0.052	0.033	(0.02)	-37.8

This study's data show that capitalizing operating leases wound affect financial distress measurement. Joubert et al. (2017) found that capitalizing operating leases right-of-use assets and liabilities might lower Alman's Z-score. Like the Altman's Z-score measures in Joubert et al., the Altman's Z′′-scores in this study were (for the most part) also negatively affected. The financial statement ratios that comprised the Altman's Z′′-score model variables all declined from those computed under the ASC 840 rules to those calculated under the ASC 842 rules. The aggregate Z′′-scores, calculated in Table 20, showed that the Z′′-score decreased by 24.8%. The aggregated Z′′-score decrease indicated that adding right-of-use assets and liabilities in the U.S. public retail sector resulted in an overall financial distress assessment from Healthy to Distressed.

The 101 Z′′-scores computed under ASC 842 were generally lower than those calculated under ASC 840. The Healthy and Distressed categories decreased, and the Bankrupt Within Two Years category increased. One of the firms fell from the Healthy category to the Bankrupt Within Two Years category. The Z′′-scores of 79 firms decreased. For 22 firms in the study, the Z′′-scores computed under ASC 842 were higher than those calculated under ASC 840. One firm's score advanced from Distressed to Healthy, and another firm's score advanced from Bankrupt Within Two Years to Distressed. See Table 21 for the changes in individual Z′′-scores.

Table 20

Computation of Aggregate Z′′-scores Under ASC 840 and ASC 842

	ASC 840	ASC 842	Change	% change
Total assets	$726.2	$886.9	$160.7	22.1
Total liabilities	$564.2	$724.8	$160.6	28.5
EBIT	$90.2	$86.0	$(4.2)	-4.6
Retained earnings	$266.5	$248.2	$(18.3)	-6.9
Net worth	$162.0	$162.1	$0.1	0.1
Current assets	$279.8	$292.0	$12.2	4.4
Current liabilities	$241.8	$268.7	$26.9	11.1
Working capital	$38.0	$28.9	$(9.1)	-24.0
X1 - Working capital over total assets	0.052	0.033	(0.02)	-37.8
X2 - Retained earnings over total assets	0.367	0.280	(0.09)	-23.7
X3 - EBIT over total assets	0.124	0.097	(0.03)	-21.9
X4 - Net worth over total liabilities	0.287	0.224	(0.06)	-22.1
6.56 X1	0.343	0.213	(0.13)	-37.8
3.26 X2	1.196	0.912	(0.28)	-23.7
6.72 X3	0.835	0.652	(0.18)	-21.9
1.05 X4	0.301	0.235	(0.07)	-22.1
Z′′-score	2.68	2.01	(0.66)	-24.8

Note. Dollars in billions. Companies with Z′′-scores that exceed 2.60 are considered healthy, those with Z′′-scores between 1.10 and 2.60 are considered distressed, and those with Z′′-scores less than 1.10 are expected to be bankrupt within two years.

Table 21

Changes in Z′′-score Ranges

	ASC 840	ASC 842	Change	% Change	Change within Z′′-score range	
					Decrease	Increase
Healthy	51	39	-12	-23.5	32	7
Distressed	34	28	-6	-17.6	19	9
Bankruptcy likely within 2 years	16	34	18	112.5	28	6
Total	101	101			79	22

I used two MLR models to examine the relationship between assets, liabilities, EBIT, and financial distress as measured using the Altman's Z′′-score. Both models indicated there is a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score. However, both models' correlation between the Assets and Liabilities variables exceeded 90%. The resulting multicollinearity in each model limited their efficacy for making inferences beyond the values of the predictor variables that fall within the range of the predictor variables used in this study (Mendenhall & Sincich, 2020). Because of redundancy, multicollinearity's presence limits the precision of the unstandardized beta coefficients produced in MLR (Menden & Sinich, 2020). Despite the multicollinearity in each model, the models appear to confirm that as liabilities increase, Altman's Z′′-score decreases. See Figure A7 for the relevance range for the ASC 840 financial reporting model and Figure A8 for the relevance range for the ASC 842 financial reporting model.

Applications to Professional Practice

Investors in the U.S. public retail sector might find information on the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score helpful in making their investment decisions. Business managers of U.S. public companies in the retail sector might benefit from data on how capitalizing operating leases might affect indications of their companies' financial distress as measured using Altman's Z′′-score. Data on how capitalizing operating lease might impact signals of a company's financial distress might also be helpful to business managers in their decisions concerning equipment and property acquisition.

The implementation of ASC 842 created a unique opportunity to examine the relationship between assets, liabilities, EBIT, and Altman's Z′′-score. Comiran and Graham (2016) suggested that after ASC 842 is implemented, it might be helpful to assess the effects of capitalizing operating leases. The MLR models (one based on ASC 840 financial reporting, and one based on ASC 842 financial reporting) used in this study showed that there is a statistically significant relationship between assets, liabilities, EBIT, and Altman's Z′′-score. For the relevant range of the independent variables used in this study, as assets and EBIT increase, so does Altman's Z′′-score. Conversely, as liabilities increased, the Altman's Z′′-score decreased.

This study provided information about the impact of implementing ASC 842 on the Altman's Z′′-Scores for 101 U.S. public sector retail companies. While implementing ASC 842 decreased Altman's Z′′-scores for 78% of the 101 companies examined, the Altman's Z′′-scores for 22% of the companies increased. I confirmed that implementing

ASC 842 resulted in additional right-of-use assets and liabilities on the U.S. public retail companies that were studied of $166.4 billion and $177.7 billion, respectively. I also confirmed that there was no statistically significant effect on EBIT because of implementing ASC 842.

Managers of U.S. public retail companies that were allowed to delay implementing ASC 842 can use the information presented in this study to assess how ASC 842 might affect their companies. The data obtained in my research implied that the aggregate effect on the U.S. public retail sector might be a decreased Altman's Z′′-score based on the companies examined. Thanks to ASC 842's requirement that operating lease right-of-use assets and liabilities be capitalized on balance sheets, the comparability intent announced in ASU 2016-02 is met.

Implications for Social Change

This study contributed to positive social change by providing information that adds to the financial literacy of individual investors in public companies in the retail sector. Fairfax (2018) reported that individual and institutional investors are necessary for our economy and are expected to use financial statements to inform their investment decisions. Fairfax also reported that individual investors held over 35% of the securities market. Fafatas and Fischer (2016) concluded that investors who might be interested in investing in the retail sector might benefit from the information resulting from the implementation of ASC 842. Along with capitalizing operating lease right-of-use assets and liabilities on balance sheets, ASC 842 requires related qualitative and quantitative footnote disclosures. Because investors will no longer be limited to footnote disclosures

for information about a firm's leasing activity, the transparency intent announced in ASU 2016-02 is met.

Investors need to understand what constitutes financial distress because the money they provide public companies could be at risk of being lost due to financial distress. Improving financial literacy in the United States can help investors and the economy (President's Advisory Council on Financial Capability, 2013). Using data found on the balance sheet and income statement, investors in the U.S. public retail sector can, with no more than a calculator or spreadsheet and the Z′′-score range values, use the Altman's Z′′-score model as a tool to assess financial distress. This capability enables investors to calculate Altman's Z′′-scores for U.S. public retail sector companies (and other U.S. public nonmanufacturing companies) and use those scores to help them decide the levels of investment risk they might be willing to take. This study provided an example of using Altman's Z′′-score to assess a company's financial distress. It also showed how capitalizing operating leases affected financial statement-based ratios and Altman's Z′′-score.

Recommendations for Action

Investors expect returns on the money they invest in public companies. As described by Jensen and Meckling (1976), the agency theory of the firm suggests that a public firm's managers are empowered under contract as agents of the firm's owners (principals). As agents, the managers have a fiduciary responsibility to the firm's principals to maximize the firm's value. The firm's managers decide which assets the firm acquires and how much liability (debt) the firm should incur. Managers decide whether to

lease or buy the firm's assets to produce earnings. They also develop and implement the firm's earning strategy. Managers must also assess the risks associated with financial distress and implement strategies designed to mitigate financial distress risks (Valaskova et al., 2018). This study shows how assets, liabilities, EBIT, and financial distress, as measured using Altman's Z′′-score, are related.

Altman's Z′′-score increased as assets and EBIT increased. Altman's Z′′-score decreased as liabilities increased. A key recommendation is for business managers to apply this study's findings represented in the MLR equations 'coefficients to optimize their asset acquisition or earnings strategies relative to how assets, liabilities, and EBIT affect Altman's Z′′-score. This study might be helpful to the FASB in support of its post-implementation review relating to ASC 842. This study might also be disseminated in *The Accounting Review*, a publication of the American Accounting Association.

Recommendations for Further Research

In this quantitative study, I used a correlational design to examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score. Based on research results reported by Durocher (2008) and Fafatas and Fischer (2016), I focused on firms in the U.S. public retail sector. Durocher also found that the balance sheets of other lease-intensive business sectors might be adversely impacted by implementing a new lease accounting standard that required the capitalization of operating lease right-of-use assets and related liabilities. Implementing ASC 842 presented me with the opportunity to use two MLR models. The ASC 840 financial reporting model and the ASC 842 financial reporting model contained the study variables

representing the old and new lease accounting standards. A similar study design might examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score for other lease-intensive business sectors.

A future study in U.S. public sectors other than the retail sector on the relationship between assets, liabilities, EBIT, and financial distress measured using Altman's Z′′-score using an ASC 840 financial reporting MLR model and an ASC 842 financial reporting MLR model might face the same limitations as those mentioned in this study. The study limitations included one associated with secondary data, such as the financial statements retrieved from the SEC's EDGAR, which was that there was no guarantee of the accuracy or quality of the data. To mitigate the risk that erroneous data might impact the study, a researcher should query the SEC's EDGAR database for amended financial statements that might have been filed that could affect the analysis. Another limitation was that all public retail companies in the study might not implement ASC 842 similarly. A mitigation for this limitation might be for the researcher to use financial statement data consistent with the implementation option employed in most cases in the study. A final limitation was that there might not be enough public retail companies that adopted ASC 842 to meet the minimum sampling requirement. This limitation might be mitigated by conducting a census of the study population instead of sampling.

Reflections

Though I have over 45 years of work experience, I have no private sector experience to draw from that would inform how I might identify a business problem. I started my doctoral journey with over 22 years as an accountant in the Federal

government. Before becoming a civil servant in the Federal government, I served 21 years in the U.S. military in accounting and finance. I found that seeking a Doctor of Business Administration degree allowed me to begin with no preconceptions about what I needed to do to assure my success. Thankfully, Walden University's Doctor of Business Administration (DBA) is structured so that, if applied, a student can achieve the goal of becoming a DBA. That structure included excellent classroom instruction, the DBA doctoral study research handbook, and the DBA residencies.

There were several process steps that I needed to achieve that would enhance my ability to complete this program. First, I needed to identify a business problem and link theory to professional practice. Research led me to identify a business problem associated with implementing a new lease accounting standard, develop a research question and hypothesis, and find a suitable theoretical framework for the study. Further research led to recognizing that I needed to identify a practical design for the study. Finally, the process culminated in conducting a quantitative doctoral study using a correlational design, MLR, and univariate testing to analyze the data. Because I had no preconceptions about my business problem, I focused my study as narrowly as possible. Through this program, I mitigated the impact of my lack of private sector experience.

Conclusions

Investors expect returns on the money they invest in public companies. Public companies of all sizes use debt or equity financing to fund their growth, supplement their operational cash needs (Chen & Kieschnick, 2018), and lease financing to acquire property and equipment (Cotei & Farhat, 2017). Investors and lenders rely on data

presented in financial statements to inform their decision to invest or loan. Investors in the U.S. public retail sector might find information on the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score helpful in making their investment decisions. Business managers of U.S. public companies in the retail sector might benefit from data on how capitalizing operating leases might affect indications of their companies' financial distress as measured using Altman's Z′′-score. The purpose of this quantitative study, using a correlational design, was to examine the relationship between assets, liabilities, EBIT, and financial distress assessed using Altman's Z′′-score.

Implementing a new lease accounting standard that required the capitalization of operating lease right-of-use assets and related liabilities allowed me to use two MLR models to examine the relationship between assets, liabilities, and Altman's Z′′-score. One of the MLR models (ASC 840 financial reporting) consisted of variables comprised of data from financial statements prepared under FASB (2019c) rules. The other MLR model (ASC 842 financial reporting) consisted of variables consisting of data from financial statements prepared under FASB (2019d) rules. This study provided information about the impact of implementing ASC 842 on the Altman's Z′′-scores for 101 U.S. public sector retail companies. I confirmed that implementing ASC 842 resulted in additional right-of-use assets and liabilities on the U.S. public retail companies studied of $166.4 billion and $177.7 billion, respectively.

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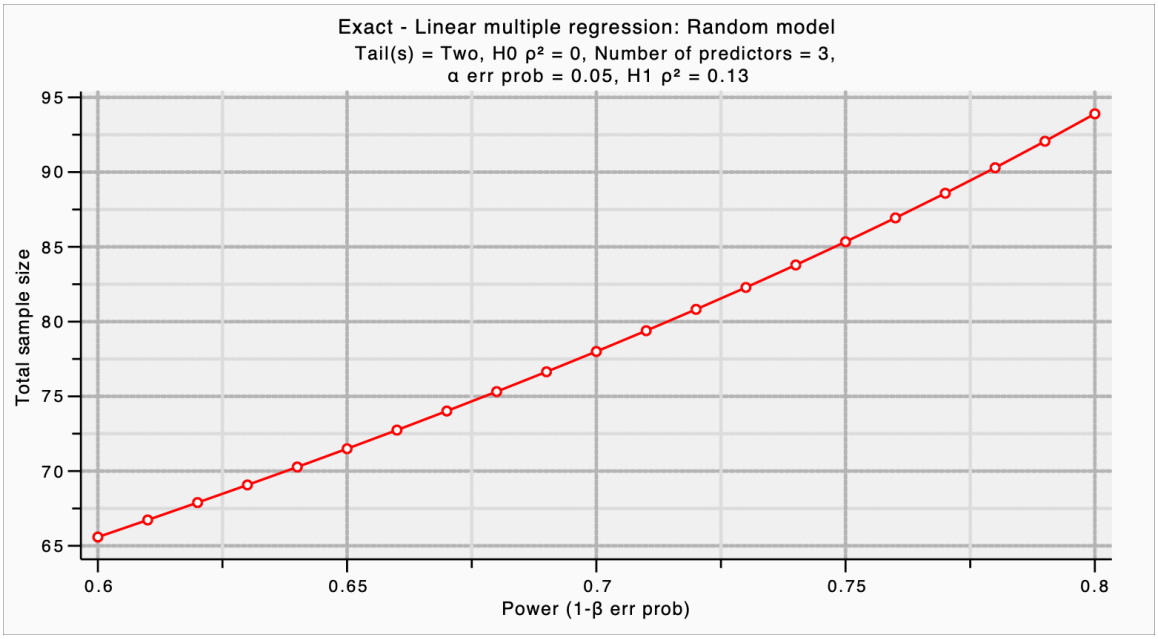
Appendix A: Figures

Figure A1

Sample Size Based on A Priori Power Analysis



Note. Output from G*Power Version 3.1.9 (Faul et al., 2009).

Figure A2

Data Collection Procedures

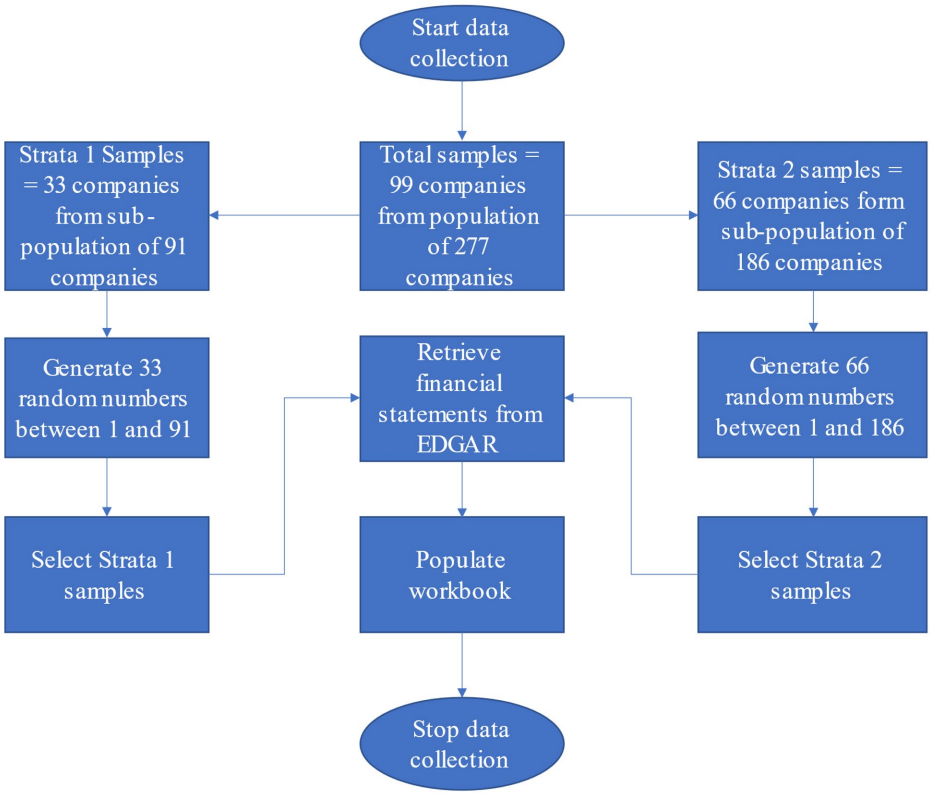


Figure A3

Normal Probability Plot of Regression Standardized Residual for ASC 840 Financial Reporting Model

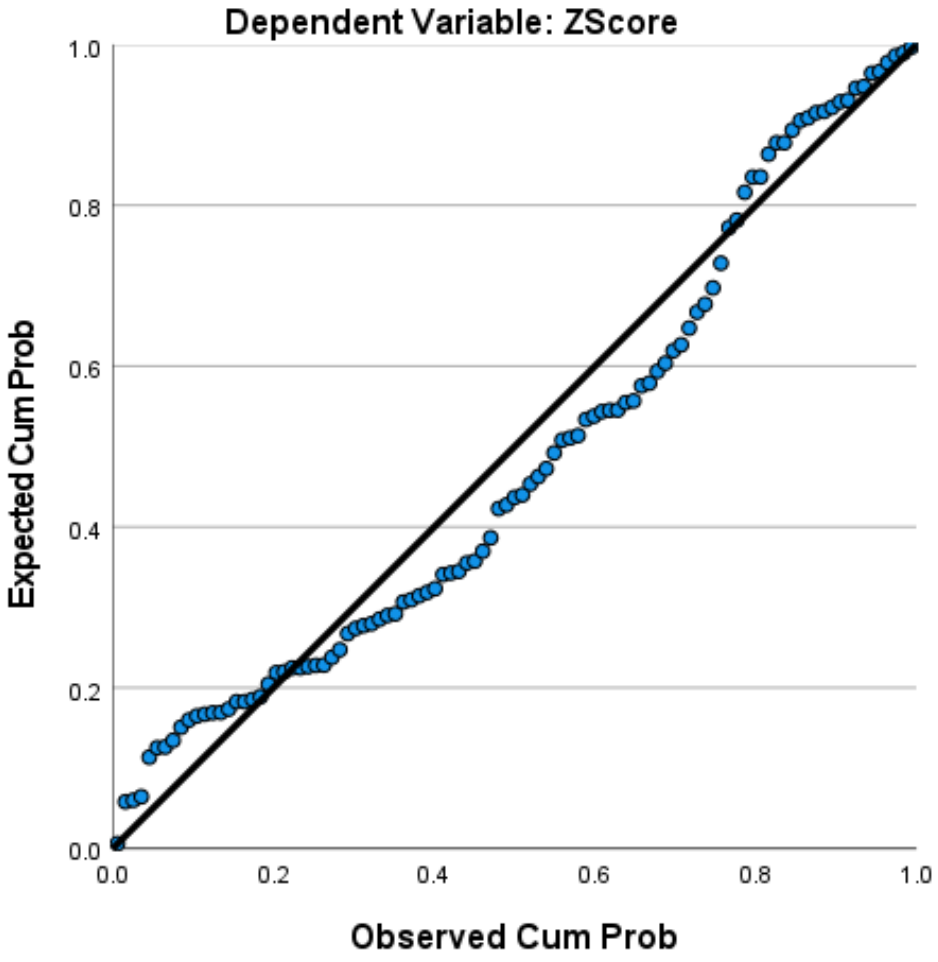


Figure A4

Normal Probability Plot of Regression Standardized Residual for ASC 842 Financial Reporting Model

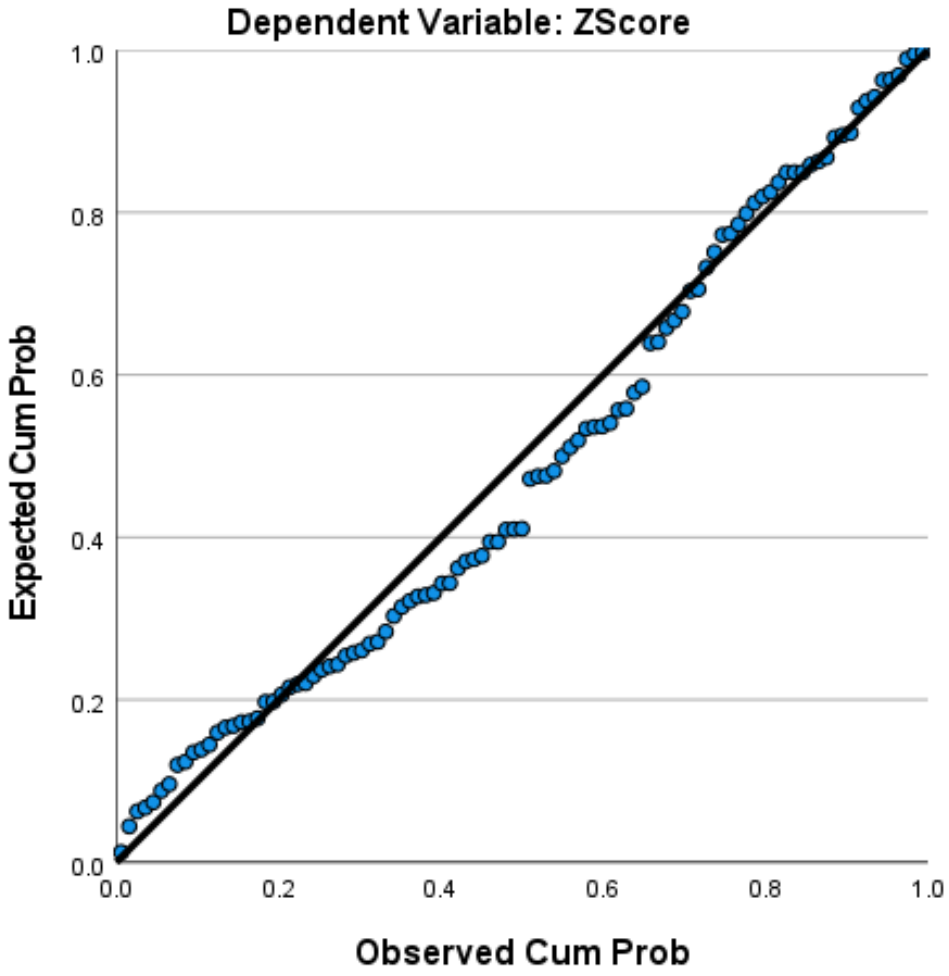


Figure A5

Scatterplot of Regression Standardized Residual for ASC 840 Financial Reporting Model

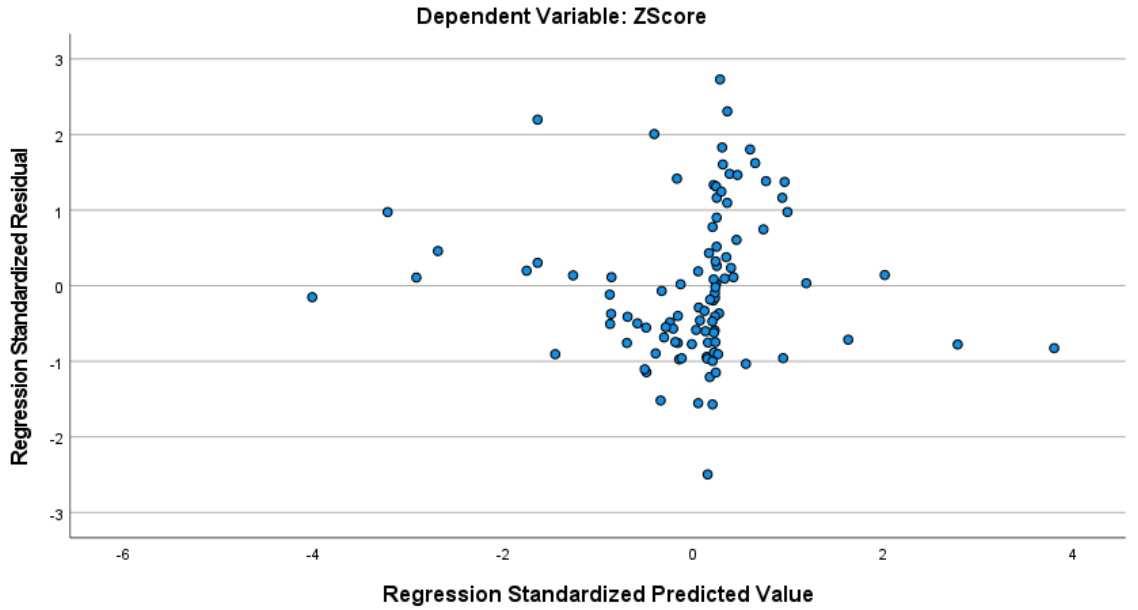


Figure A6

Scatterplot of Regression Standardized Residual for ASC 842 Financial Reporting Model

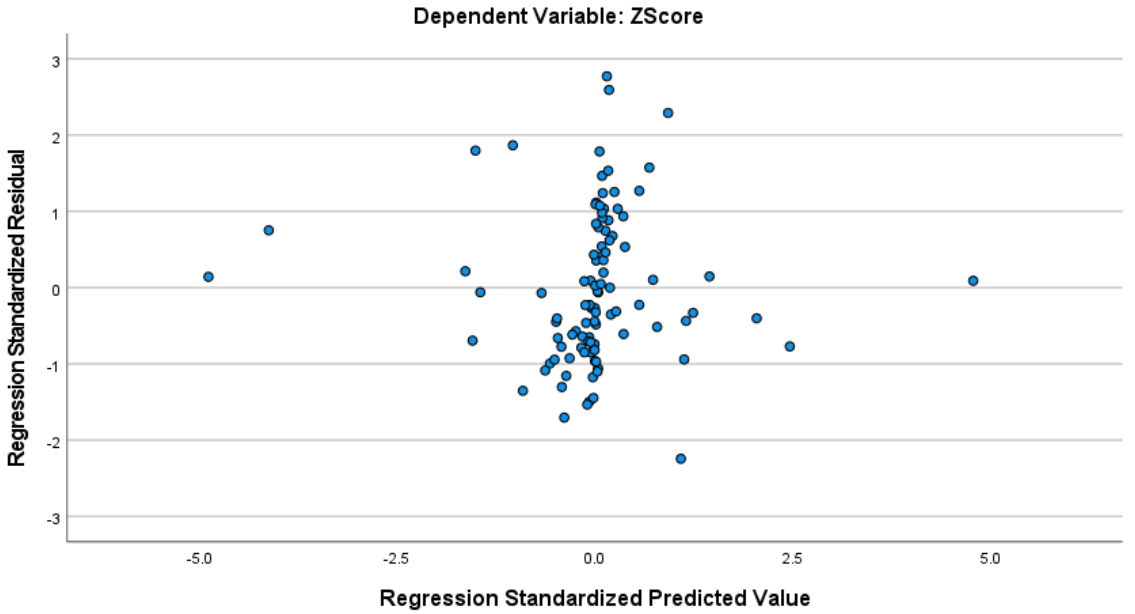
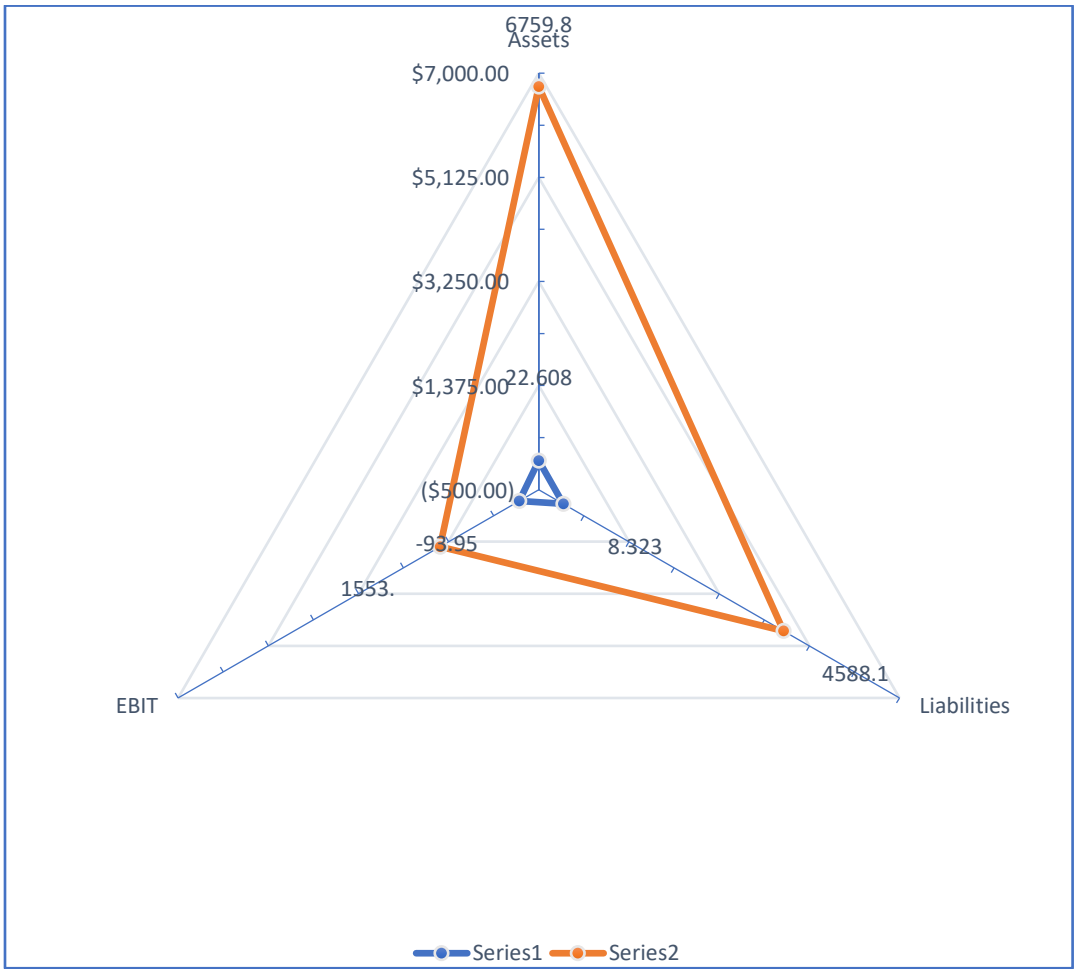


Figure A7

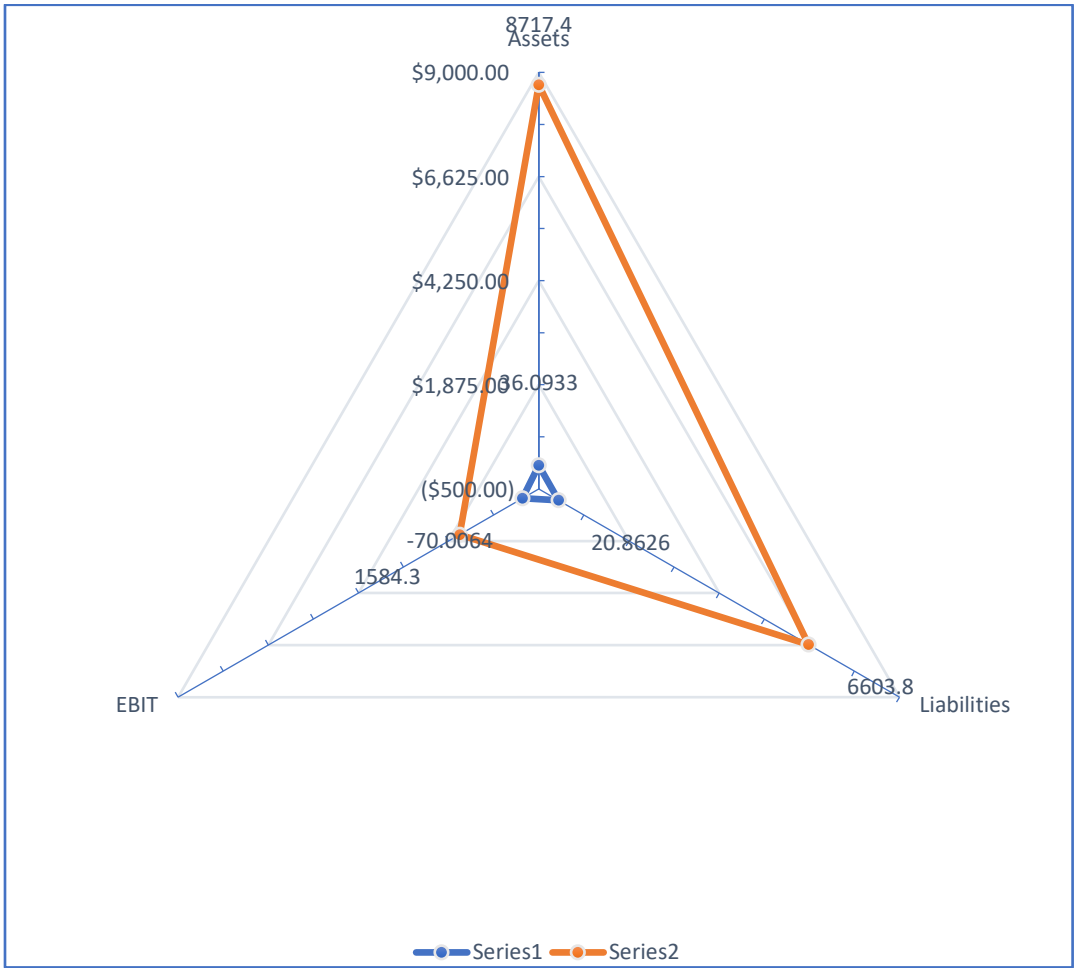
Relevant Range for the ASC 840 Financial Reporting Model



Note. Dollars in millions. Series 1 represents minimum values. Series 2 represents maximum values.

Figure A8

Relevant Range for the ASC 842 Financial Reporting Model



Note. Dollars in millions. Series 1 represents minimum values. Series 2 represents maximum values.

Appendix B: Selected SPSS Output for ASC 840 Financial Reporting Model

White Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
15.094	9	.088

a. Dependent variable: Z´´-score

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Assets + Liabilities + EBIT + Assets * Assets + Assets * Liabilities + Assets * EBIT + Liabilities * Liabilities + Liabilities * EBIT + EBIT * EBIT

Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
.702	1	.402

a. Dependent variable: ZScore

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Predicted values from design: Intercept + Assets + Liabilities + EBIT

F Test for Heteroskedasticity[a,b,c]

F	df1	df2	Sig.
.693	1	99	.407

a. Dependent variable: Z´´-score

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Predicted values from design: Intercept + Assets + Liabilities + EBIT

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
ASC 840	.449[a]	.202	.177	2.52051720920	1.927

a. Predictors: (Constant), EBIT, Assets, Liabilities

b. Dependent Variable: Z´´-score

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
ASC 840	Regression	155.615	3	51.872	8.165	.000[b]
	Residual	616.242	97	6.353		
	Total	771.857	100			

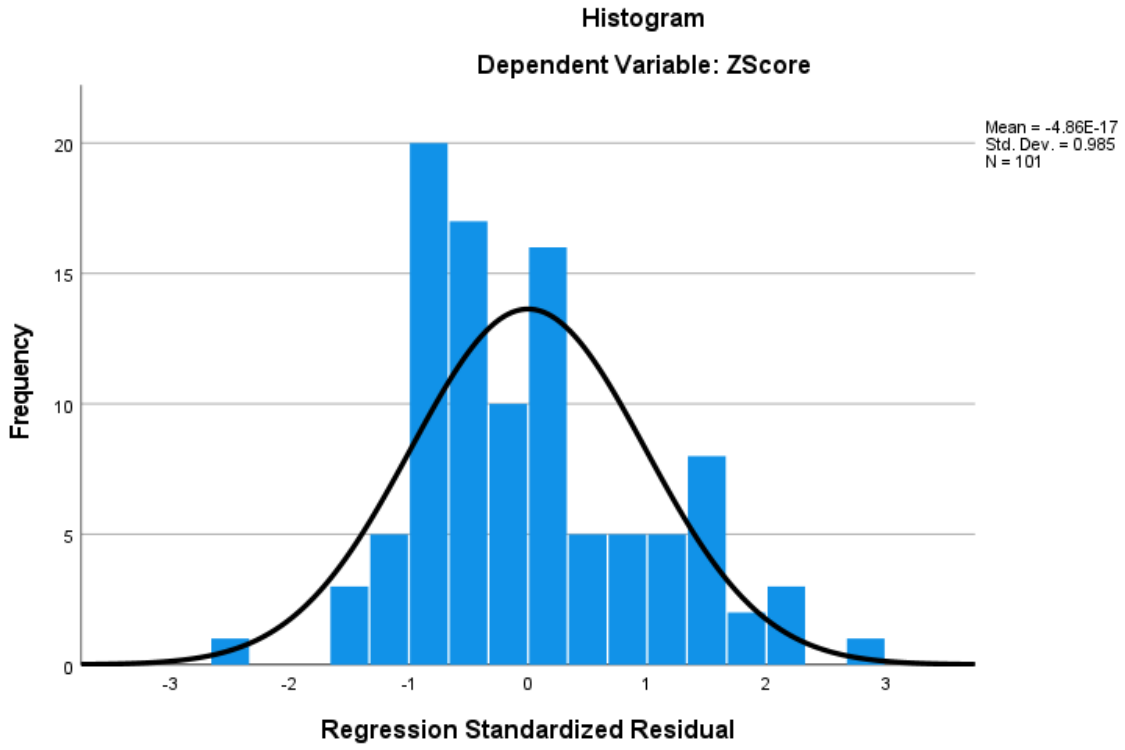
a. Dependent Variable: Z´´-score

b. Predictors: (Constant), EBIT, Assets, Liabilities

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1.62808895	8.117954254	3.369945788	1.247457297	101
Residual	-6.28970289	6.880387306	.0000000000	2.482421558	101
Std. Predicted Value	-4.007	3.806	.000	1.000	101
Std. Residual	-2.495	2.730	.000	.985	101

a. Dependent Variable: ZScore


Histogram
Dependent Variable: ZScore
Mean = -4.86E-17
Std. Dev. = 0.985
N = 101
Frequency
20
15
10
5
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual

Appendix C: Selected SPSS Output for ASC 842 Financial Reporting Model

White Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
10.104	9	.342

a. Dependent variable: ZScore

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Design: Intercept + Assets + Liabilities + EBIT + Assets * Assets + Assets * Liabilities + Assets * EBIT + Liabilities * Liabilities + Liabilities * EBIT + EBIT * EBIT

Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
.042	1	.838

a. Dependent variable: ZScore

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Predicted values from design: Intercept + Assets + Liabilities + EBIT

F Test for Heteroskedasticity[a,b,c]

F	df1	df2	Sig.
.041	1	99	.840

a. Dependent variable: ZScore

b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Predicted values from design: Intercept + Assets + Liabilities + EBIT

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
ASC 842	.320[a]	.102	.074	1.937234192	1.958

a. Predictors: (Constant), EBIT, Assets, Liabilities

b. Dependent Variable: ZScore

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
ASC 842	Regression	41.449	3	13.816	3.682	.015[b]
	Residual	364.029	97	3.753		
	Total	405.478	100			

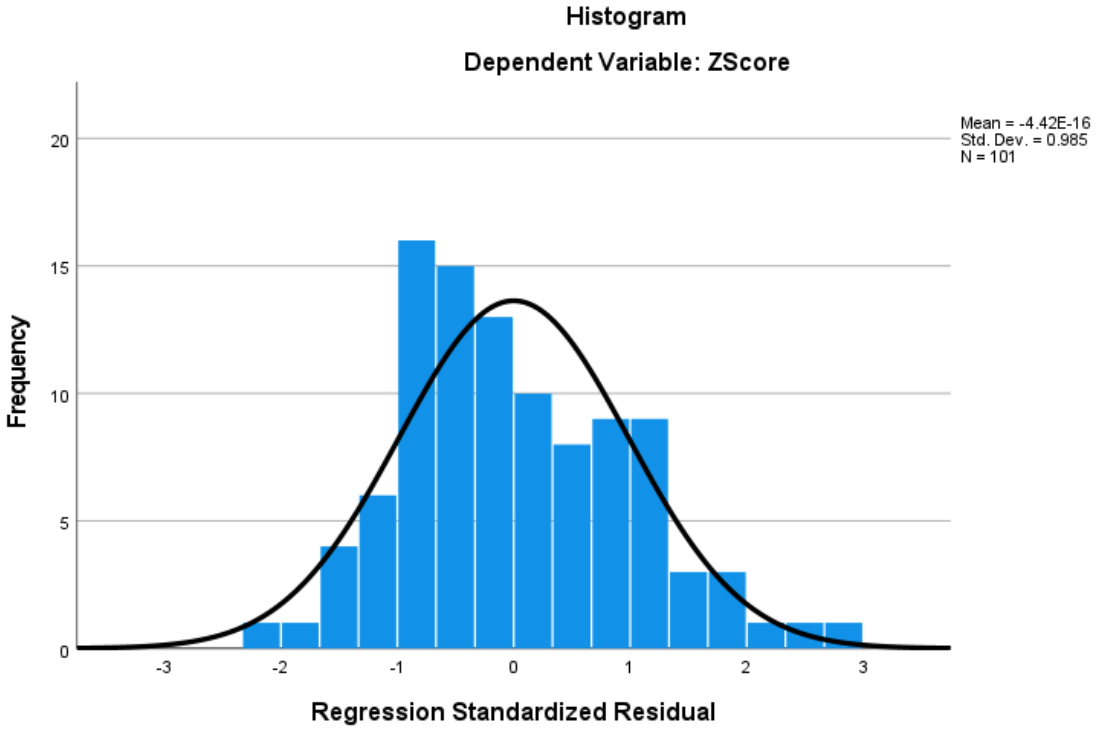
a. Dependent Variable: ZScore

b. Predictors: (Constant), EBIT, Assets, Liabilities

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.9034609795	5.318020821	2.239358343	.6438073281	101
Residual	-4.34778643	5.371480942	.0000000000	1.907954409	101
Std. Predicted Value	-4.882	4.782	.000	1.000	101
Std. Residual	-2.244	2.773	.000	.985	101

a. Dependent Variable: ZScore


Histogram
Dependent Variable: ZScore
Mean = -4.42E-16
Std. Dev. = 0.985
N = 101
Frequency
20
15
10
5
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual

Appendix D: Permission Received to Adapt Copyright Material

Altman, E. I. (1968). Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy. *Journal of Finance*, *23*(4), 589–609. https://doi.org/10.1111/j.1540-6261.1968.tb00843.x#

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