

CORRELATIONAL STUDY OF EMBEZZLEMENT AND ECONOMIC CONDITIONS IN  
NEW ENGLAND

by

Patricia Conn Ryan

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Dissertation

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Business Administration

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Liberty University, School of Business

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## **Abstract**

This research study was conducted to contribute to the body of knowledge related to embezzlement, a classification of occupational fraud. According to the Association of Certified Fraud Examiners (ACFE, 2020), it is estimated that losses from occupational fraud represent 5% of revenue each year and that 86% of occupational fraud included asset misappropriation or embezzlement. The purpose of this quantitative research study was to investigate the relationship between economic indicators and incidents of embezzlement. The study population included all incidents of embezzlement reported in New England between 2004 and 2018. Archival data were collected from various governmental sources for both the embezzlement incidents and the economic indicators. The data analysis process included statistical analysis of the data over time, known as time-series analysis. The statistical analysis indicated that economic indicators do not help predict incidents of embezzlement. The findings of this study may impact the way organizational leaders and accounting professionals assess risk related to embezzlement. Vigilance of fraud risk, regardless of economic conditions, may help organizational leaders protect against losses from embezzlement.

*Key words:* Embezzlement, asset misappropriation, occupational fraud, economic indicators

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**Approvals**

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Date

### **Dedication**

This study is dedicated to my husband. Thank you for all the support and encouragement throughout this journey. I am lucky to have you by my side. I also want to dedicate this study to my children, Tori and Robby. I hope seeing me work towards this goal sets an example for you to work towards your future goals.

## **Acknowledgments**

Thank you to my dissertation chair, Dr. Washington, for both your reviews and encouraging words. Thank you to Dr. Hartl for the additional reviews and feedback. Thank you to Dr. Lowes and Dr. Moore for administrating the process. Thank you to my family, friends, and colleagues who have supported and motivated me along the way. I would also like to thank my mentors, Barbara and Paul, for always believing in me.

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## **Section 1: Foundation of the Study**

Any organization may be susceptible to fraud. Organizations lose about five percent of their revenue due to fraud each year (Association of Certified Fraud Examiners, 2020).

According to the ACFE 2020 survey, 86% of occupational fraud involves misappropriation of assets or embezzlement (ACFE, 2020). Losses due to embezzlement range from nominal amounts to multiple millions of dollars (Elder & Yebba, 2017; Friedman, 2018; Kennedy, 2018). This study examined the relationship between the number of embezzlement incidents and the economic indicators in the New England region.

### **Background of the Problem**

Occupational fraud negatively impacts the performance of businesses. Occupational fraud is the use of employment to commit fraud against the organization in which they are employed (Association of Certified Fraud Examiners [ACFE], 2018). Every organization, including for-profit, not-for-profit, and governmental, is vulnerable or potentially vulnerable to occupational fraud. It is estimated that five percent of annual revenues are lost to occupational fraud each year (ACFE, 2018). The ACFE estimates that embezzlement or asset misappropriation accounts for approximately 86% of occupational fraud occurrences (ACFE, 2020). The Federal Bureau of Investigation (FBI) defines embezzlement as the “unlawful misappropriation or misapplication” of an asset that was entrusted to an individual (Federal Bureau of Investigation [FBI], n.d.a). Embezzlement negatively impacts all types of organizations and individuals (Archambeault et al., 2014; Chan & Owusu, 2017; Doroghazi, 2019; Elder & Yebba, 2017; Kennedy, 2018; Kramer, 2015; Mccollum, 2017; Thornhill et al., 2016).

Vousinas (2019) noted that fraud incidents have increased as a result of the global financial crisis and economic recession. Detotto and Otranto (2012) noted that embezzlement

and financial crimes are leading indicators of a downturn in business and economy cycles in Italy. Geppert (2016) found no correlation between the economic conditions of the United States (recession or expansion) and the number of discovered and reported embezzlement cases. There is a gap in the research related to the correlation of economic conditions and embezzlement cases within a smaller macroeconomic environment. A study has not been conducted to investigate the correlation of macroeconomics of a region within a country and the number of embezzlement cases in the region. Additional research to expand upon the knowledge of the relationship between economic conditions and the number of discovered and reported embezzlement cases in the New England region of the United States is warranted.

### **Problem Statement**

The general problem addressed was the negative impact of embezzlement on businesses resulting in losses for organizations. The Association of Certified Fraud Examiners estimates that organizations lose approximately five percent of their revenue due to fraud (ACFE, 2018). According to the ACFE 2020 report, it is estimated that approximately 86% of occupational fraud is committed through asset misappropriation. The Federal Bureau of Investigation defines embezzlement as the “unlawful misappropriation or misapplication” of an asset that was entrusted to an individual (Federal Bureau of Investigation [FBI], n.d.a). Employee theft is a significant problem for both large and small organizations. Kennedy (2018) noted that the majority of asset misappropriation in small businesses is committed by lower-level employees, but the financial fraud committed by upper-level employees has a greater negative impact on the organization. Embezzlement can range from small amounts of cash taken from the register to multiple million-dollar fraud schemes (Elder & Yebba, 2017; Friedman, 2019; Kennedy, 2018). Fraud negatively impacts organizations throughout the world (ACFE, 2018). The specific

problem addressed was the negative impact of embezzlement on businesses in New England resulting in losses to businesses in the region.

### **Purpose Statement**

The purpose of this quantitative correlational study was to expand the body of knowledge by examining the relationship between the economic condition (the independent variable) and the number of discovered and reported cases of embezzlement (the dependent variable). The larger problem was explored through correlation analysis of economic indicators and embezzlement cases within New England. The New England region is considered the six states in the northeastern United States, including Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont (Federal Reserve Bank Boston [Boston Fed], n.d.a). The quantitative correlational study utilized archival data from two databases to analyze the correlation. The embezzlement data are archival data from an FBI database. The FBI Uniform Crime Reporting (UCR) Program collects crime data from law enforcement agencies across the United States through the National Incident-Based Reporting Systems (NIBRS). The economic indicators information is archival data from the Federal Reserve Bank of Boston.

As existing literature has researched the correlation of fraud and embezzlement and the economic condition of a country (Detotto & Otranto, 2012; Geppert, 2016), further research into the correlation between embezzlement and economic indicators within a smaller region is needed. The economic position of the region and the United States as a whole can differ due to the rate of growth or decline of the economic indicators in comparison to other states and/or regions in the nation (Sullivan, 2020). This study investigated the correlation between the number of embezzlements discovered and reported through the FBI database with four economic

indicators including payroll employment, unemployment, wages and salary disbursements, and home prices within the New England region.

### **Research Questions**

The research questions relate directly to economic conditions in New England and their relationship to the number of embezzlement cases in the region. The primary research question is: is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions? The economic conditions for New England are reported using the following economic indicators: payroll employment, unemployment, wages and salary disbursements, and home prices. The specific research questions related to these four economic indicators in New England follow:

RQ1: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by payroll employment levels?

RQ2: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by unemployment levels?

RQ3: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by wages and salary disbursement levels?

RQ4: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by changes in housing prices?



## Hypotheses

H1<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by payroll employment levels.

H1<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by payroll employment levels.

H2<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by unemployment levels.

H2<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by unemployment levels.

H3<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by wages and salary disbursement levels.

H3<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by wages and salary disbursement levels.

H4<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by housing prices.

H4<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by housing prices.

### **Nature of the Study**

The quantitative method using correlational design was chosen for this study. This study investigated the correlation between archival data including embezzlement cases and economic conditions in New England. The quantitative method with a correlational design was deemed appropriate for this study. Below is a discussion of the three research methods, considered research designs, and the suitability for this study of both.

### ***Discussion of Design***

Correlational research design is a form of quantitative research that can utilize data already available through databases, lists, and charts (Raines, 2013). This study used archival data from the FBI and the Federal Reserve Bank of Boston. Correlational design is ideal when the researcher has no control over the variables (Lappe, 2000). This study described the relationship among the variables including the incidents of embezzlement and economic indicators, it did not assume a cause and effect relationship between the two phenomena (Abbott & McKinney, 2012; Lappe, 2000). A quantitative correlational design is appropriate for this study because the data utilized in this study were archival data that the researcher had no influence over and the data were used to investigate the relationship between two or more variables (Creswell, 2014; Lappe, 2000).

Researchers utilize a quantitative descriptive design to provide a description of the tendencies, beliefs, and opinions of a population by studying a sample of that population (Creswell, 2014). Data are collected through surveys including questionnaires or structured

interviews of the population (Creswell, 2014). The survey collects the population's responses about their experiences or beliefs using numerical referents in order to analyze the data and establish patterns (Abbott & McKinney, 2012). Descriptive design was not selected for this study because this study did not seek to provide a description of a population's tendencies, beliefs, experiences, or opinions.

In an experimental design, the researcher has control over the conditions and manipulation of independent variables to cause changes in the dependent variable (Abbott & McKinney, 2012). An experimental design includes randomly assigning subjects to a control group and another group to identify how they react to different stimuli (Abbott & McKinney, 2012). Experiments allow the researcher to control the environment and deduce a theoretical pattern showing a cause-and-effect relationship (Abbott & McKinney, 2012). A quasi-experimental design differs in that subjects are not randomly assigned to the control and non-control groups (Creswell, 2014). This study utilized archival data and the researcher had no control over the variables, so the experimental and quasi-experimental designs were not appropriate for this study.

### ***Discussion of Method***

A quantitative method was chosen for this study as the relationship between the number of discovered and reported embezzlement cases and economic indicators was explored. Quantitative research is appropriate when exploring the relationship among variables (Creswell, 2014). Quantitative studies utilize objective measures such as surveys, controlled experiments, or data sets. Quantitative research uses statistical analysis of quantifiable variables to analyze data (Creswell, 2014). The variables, incidents of embezzlement and economic indicators, can be

measured and were analyzed using statistical procedures, making a quantitative research method appropriate for this study.

A qualitative method seeks to better understand society and experiences through the observation and interaction of individuals (Creswell & Poth, 2018). Qualitative research is interpretive, experiential, situational, and personalistic, focusing on personal experiences in described situations (Stake, 2010). Qualitative researchers utilize methods such as interviews, observations, and personal artifacts (Creswell, 2014). The qualitative research method was not selected for this study as the researcher had no interaction with individuals and the quantitative method is appropriate when analyzing data (Creswell, 2014).

Mixed methods research utilizes a combination of quantitative and qualitative research tools and interactions. Mixed methods leverage the strengths of both qualitative and quantitative research approaches to provide a complete picture of the phenomenon, and to avoid bias of one method (Denscombe, 2008). Mixed methods utilize qualitative methods to gather the observed group's perspective through dialogue during the research process and quantitative methods are used to analyze the data collected (Mertens, 2007). Mixed methods research was not selected for this study as the researcher did not integrate both qualitative (open-ended) and quantitative (close-ended data) in addressing the research questions (Johnson et al., 2007).

### ***Summary of the Nature of the Study***

A quantitative method with a correlational design was selected for this study. The quantitative method was selected due to the researcher looking to identify a relationship between two or more variables. Both qualitative and mixed methods designs were not selected as the researcher had no interaction with individuals. Correlational design is a non-experimental quantitative method form of research that investigates the relationship between two or more

variables (Creswell, 2014). Correlation can determine if there is a relationship between variables with different measures, indicating that changes in one variable are associated with changes in another variable (Abbott & McKinney, 2012). The descriptive design and the experimental or quasi-experimental designs were not selected because the researcher has no interaction or influence over the variables being studied. The quantitative method with a correlational design is appropriate because the researcher has no influence over these variables and the independent and dependent variables have different measures.

### **Theoretical Framework**

The three theories chosen for this correlational quantitative study are the white-collar crime theory, fraud triangle theory, and agency theory. The white-collar crime theory was developed by Sutherland (1940) to expand criminology to include the study of crime committed by the upper socioeconomic class. The fraud triangle theory was developed by Cressey (1953) to theorize why individuals participate in the white-collar crime classified as embezzlement. The agency theory was defined by Jensen and Meckling (1976) and focused on the desire for utility maximization of both the principal and the agent.

#### ***White-Collar Crime Theory***

White-collar crime theory was developed by Sutherland in 1940 to classify criminal activity committed by individuals in the upper socioeconomic class (Sutherland, 1940). Prior theory related to criminal activity revolved around the notion that crime evolves out of poverty and the sociopathic and psychopathic conditions of poverty (Sutherland, 1940). Examples of white-collar crime include bribery, false advertising and salesmanship, misappropriation or embezzlement of assets, misrepresentation of financial statements and performance, misapplication of funds, and tax fraud. Embezzlement unlike other white-collar crimes involves

the violation of trust between an employee and employer (Sutherland, 1941). White-collar crime had been previously overlooked as criminal behavior, but is a violation of criminal law.

White-collar crime involves a violation of criminal law and a violation of trust in the course of occupational activities (Sutherland, 1941). White-collar criminals use their role in business to take advantage of the trust bestowed upon them to misrepresent the value of assets and misuse power. Building and maintaining trust is necessary for individuals to commit a white-collar crime or financial fraud (Carey & Webb, 2017). Victims of such crimes believe in the abilities and integrity of the individual who is defrauding them and believe that the individual is acting in the best interest of the victim (Carey & Webb, 2017).

Embezzlement is the focus of this quantitative study. Embezzlement is considered a white-collar crime as described by Sutherland (1940). The violation of trust created by white-collar crimes creates distrust which impacts society and industries based on the foundation of trust (Sutherland, 1940). The violation of trust by individuals holding a financial role, such as an accountant or financial advisor, impacts the trust society has for these individuals and these positions.

### ***Fraud Triangle Theory***

The fraud triangle theory was developed through studying cases of embezzlement by Cressey in 1953 to theorize why people in positions of trust violated that trust while others do not (Cressey, 1971). The fraud triangle requires that three elements be present in order for fraud to occur: pressure, opportunity, and rationalization (Cressey, 1971). The pressure to commit fraud is through the trust violator's perceived presence of a "non-shareable problem" (Cressey, 1971, p. 34). In embezzlement, the opportunity is present through the position of trust an individual holds within an organization or relationship. Cressey (1971) also noted that

rationalization of why the violator commits fraud is always present before the fraud occurs. The fraud triangle theory has been studied since its development and is foundational to the study of fraud.

Cressey (1971) noted that the pressure or non-shareable problem can result from a number of different sources. These items can arise from personal choices or through external factors impacting the economic conditions, such as a recession, war, or natural disasters. This quantitative study examined the correlation between the economic indicators and the number of cases of embezzlement.

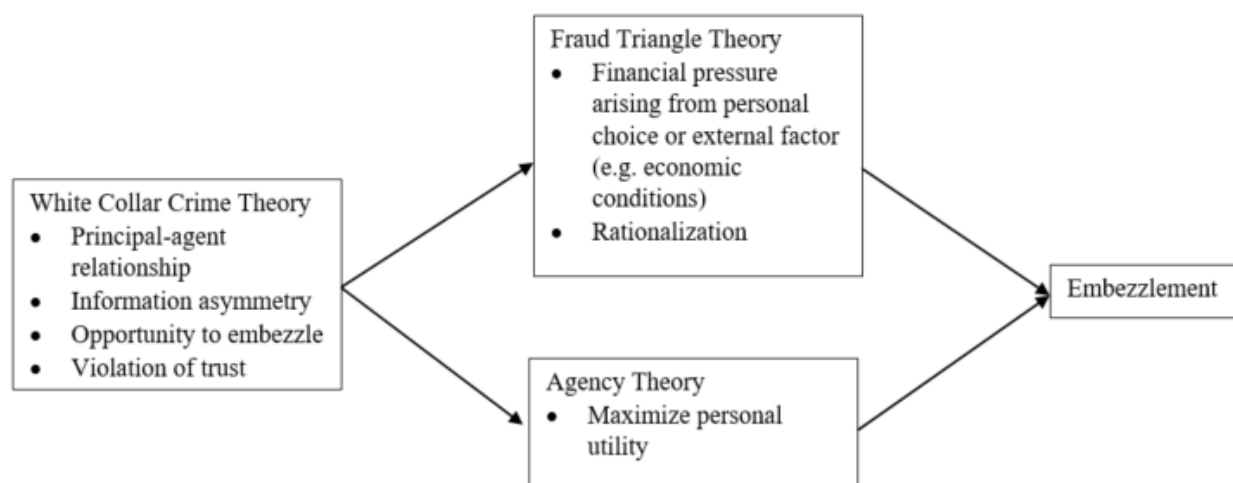
### ***Agency Theory***

Jensen and Meckling (1976) defined an agency relationship between two or more individuals where one or more (the principal(s)) engage the other (agent) to perform service on their behalf. Agency theory proposes that both parties involved would prefer to maximize their utility, resulting in the agent not always acting in the best interest of the principal (Jensen & Meckling, 1976). The principal seeks agents in order to utilize their knowledge, expertise, or skills. There are many principal-agent relationships in business, including, employer-employee, investor-management, auditee-auditor, client-lawyer, taxpayer-accountant, among others. In these relationships, there is an information asymmetry gap between the two parties (Shapiro, 2005). In looking at management's relationship with the organization, Jensen and Meckling (1976) proposed that agency costs were generated as management's claim to the corporation's profits decreased and goal divergence emerged. Agency costs include management making decisions that increase their personal utility versus the utility of the organization and the owners/shareholders.

In order to minimize agency costs, organizations work towards achieving goal congruence through incentive alignment (Nyberg et al., 2010). Bosse and Phillips (2016) noted that self-interest is bounded by the agent's perceived level of fairness. If management perceives that they are not being compensated or treated fairly, they are inclined to negatively reciprocate to enforce fairness (Bosse & Phillips, 2016). Behaviors to maintain fairness could include making a decision outside of the risk level optimal for owners/shareholders or occupational fraud such as misappropriation or embezzlement of assets. Agency theory suggests acts such as occupational fraud occur due to being motivated by self-interest and not due to perceived pressure by the perpetrator.

**Figure 1**

*Relationship between Theories And Embezzlement*



### ***Relationships Between Theories and Variables***

The three theories selected for this correlational quantitative study are interrelated in their support for theories related to occupational fraud, including embezzlement. All three theories support that occupational fraud, including embezzlement, occurs in the course of business and as part of an agent-principal relationship. The relationship between the victim and criminal in



occupational fraud can be described as a principal-agent relationship as covered under agency theory. The three theories also require that the individual committing the crime be in a position of trust and that their actions betray the trust bestowed upon them. The white-collar crime theory developed by Sutherland (1940) brings attention to crime committed by the upper socioeconomic class in the course of occupational activities. The fraud triangle theory examines the factors that are present when individuals (agents) commit fraud, specifically embezzlement, in the course of occupational activities.

The fraud triangle requires that three elements be present in order for fraud to occur, pressure, opportunity, and rationalization (Cressey, 1971). Pressure arises from the need for an individual to maintain a reputation or social status, which is impacted by personal choices or through external factors such as economic conditions (Cressey, 1971). The fraud triangle theory suggests that the economic conditions could influence embezzlement due to added pressure. Agency theory suggests that the agent engaged by the principal is motivated by self-interest and inclined to make decisions that impact their personal utility versus the best interest of the principal (Jensen & Meckling, 1976). Under agency theory, acts of embezzlement are not a result of pressure or non-shareable problem as described by Cressey, but a result of management or employee motivation to maximize their own personal utility. This would suggest that the economic condition does not influence the number of embezzlement cases, but embezzlement would occur regardless of the state of the economy.

### ***Summary of the Research Framework***

Three theories are considered in this correlational quantitative study, including white-collar crime theory, fraud triangle theory, and agency theory. All three theories recognize that occupational fraud occurs as a violation of a trust relationship. Embezzlement is a type of

occupational fraud. Cressey (1971), the researcher behind the fraud triangle theory, suggested that pressure is a key factor present when fraud occurs. This pressure can be caused by various factors, with one being poor economic conditions. This suggests that economic conditions will influence cases of embezzlement. The agency theory suggests that agents are motivated by self-interest and inclined to make decisions in their personal best interest and not the best interest of the organization or shareholders. Under agency theory, decisions are made to maximize personal utility and not due to pressures suggested by the fraud triangle theory. This suggests that occupational fraud will occur regardless of the pressures created by poor economic conditions. This study examined if there is a correlation between economic conditions and cases of embezzlement.

### **Definition of Terms**

The following terms are defined relative to their use within the research.

*Asset misappropriations*: the misuse or theft by an employee of the employer's resources (ACFE, 2018). Asset misappropriation is identified as the most common type of occupational fraud and can include the theft of cash, inventory, or other assets (ACFE, 2018).

*Association of Certified Fraud Examiners (ACFE)*: is the world's largest anti-fraud organization (ACFE, n.d.b). The ACFE provides education and training on fraud and white-collar crimes to help members in fraud prevention and detection (ACFE, n.d.b).

*Economic indicators*: are measures of economic activity. Economic indicators are utilized to measure the current and future economic well-being of a nation or region, which can influence economic policy (Bureau of Economic Analysis, n.d.; Boston Fed, n.d.b).

*Embezzlement*: is the "unlawful misappropriation or misapplication" of an asset that was entrusted to an individual (FBI, n.d.a).

*Federal Bureau of Investigation (FBI)*: is a branch of the United States government with both intelligence and law enforcement responsibilities (FBI, n.d.c). The FBI has the authority and duty to investigate crimes assigned to the agency and to provide support services to other enforcement agencies (FBI, n.d.c).

*Federal Reserve Bank of Boston*: is part of the Central bank of the United States, focused on promoting development and financial stability in New England and the nation (Boston Fed, n.d.b). The Federal Reserve Bank of Boston conducts economic research and reports on the economic indicators for New England (Boston Fed, n.d.b).

*Fraud triangle*: was developed by Cressey to explain the factors that lead to committing embezzlement; these include, the pressure created by a non-shareable financial problem, opportunity, and rationalization (Cressey, 1971).

*New England*: is the region made up of the six states located in the northeastern United States of America including Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

*Occupational fraud*: is the use of one's employment, including roles as officers, directors, and employees, to commit fraud against the organization by which they are employed (ACFE, 2018). Embezzlement and asset misappropriation are examples of occupational fraud.

### **Assumptions, Limitations, Delimitations**

Assumptions are items that the researcher relies on as accurate without verification (Ellis & Levy, 2009). Limitations are factors the researcher cannot control that may impact the validity of the study (Ellis & Levy, 2009). Delimitations are factors the researcher can control in order to limit the scope of the study (Ellis & Levy, 2009). This study is bounded by various assumptions, limitations, and delimitations.

### ***Assumptions***

This study utilized archival data from a variety of sources. Law enforcement agencies throughout the United States report crime data to the FBI through the Uniform Crime Reporting (UCR) systems and the National Incident-Based Reporting System (NIBRS). Included in the crime data for property crimes are discovered and reported embezzlement cases. It is assumed that the crime data collected and entered into the databases were properly recorded. It is assumed that embezzlement crime data has been correctly coded by the reporting agencies and correctly entered into the UCR system to be reflected in the NIBRS data. It is assumed that the information provided by the NIBRS is complete and true. Another source of archival data is the Federal Reserve Bank of Boston. Economic indicator data were collected from the Federal Reserve Bank of Boston. It is assumed that the data collected from this source are complete and accurate.

### ***Limitations***

This correlational analysis is limited by the completeness and correctness of the archival data entered into the databases utilized for embezzlement and economic indicator data. One of the limitations of this correlational analysis is that not all law enforcement agencies in New England report to the UCR. Embezzlement cases reported to law enforcement agencies who do not report were excluded from the cases of discovered and reported embezzlement used in this study. Federal law does not require state and local law enforcement agencies to report data to NIBRS (FBI, n.d.d). Reporting rates vary among the six New England states. Another limitation is that organizations may be unaware of embezzlement or choose to not report embezzlement. In the 2020 Report to the Nations by the ACFE, the average duration of a fraud scheme was 14 months. It is unknown how many frauds go unreported or undetected (ACFE, 2018).

The economic indicator data are also limited to accurate reporting by individuals and organizations. There is a limitation related to individuals who may be working without properly reporting wages earned. This could impact a variety of economic indicator data related to payroll employment, wages, and unemployment. Another limitation may exist related to individuals who have reported unemployment, but are not actively seeking employment or waiting to be recalled to a job in which they were laid off and improperly included in the statistics related to unemployment (U.S. Bureau of Labor Statistics, n.d.).

### ***Delimitations***

The delimitations of this study include both time and the geographic region being studied. The study included analysis of data for the years 2004 through 2018. The crime data are generally made available for the prior year in the fall of the subsequent year, so data are only available through 2018 at the time of this study. The scope of this study is bounded by the New England region. Economic activity and embezzlement cases discovered and reported in other areas of the United States are outside of the scope of this study.

### **Significance of the Study**

This study addressed gaps in the current body of literature specific to the study of the correlation between the economic conditions and the number of embezzlement cases. Past research has focused on different areas of fraud and embezzlement or the correlation between the macroeconomic state of a nation and the cases of embezzlement (Cressey, 1971, ACFE, 2018; Detotto & Otranto, 2012; Geppert, 2016; Kennedy, 2018). This study has a narrow focus on the economic conditions of the New England region of the United States and the number of discovered and reported cases of embezzlement in that region. The biblical implications of this research relate to stewards of organizational resources violating their trust for personal gain. This

topic of study is relevant to the field of accounting as many accountants are stewards of organizations' financial resources and many are tasked with protecting those resources. Having an understanding of the correlation between the economic conditions and the cases of embezzlement can impact investigations into studying smaller regions and considerations on fraud risk and controls.

### ***Reduction of Gaps in the Literature***

Fraud and embezzlement have been studied for years, starting in the 1930s with Sutherland bringing attention to white-collar crime (ACFE, 2018; Cressey, 1971; Kennedy, 2018; Sutherland, 1940). In 2019, Vousinas noted that the global financial crisis and economic recession have led to an increase in the number of fraud incidents. In Italy, it was found that the presence of increased embezzlement and financial crimes were leading indicators of a downturn in the economic cycles and businesses (Detotto & Otranto, 2012). In the United States, a study completed by Geppert (2016) found there was no correlation between the number of discovered and reported cases of embezzlement and the economic condition determined by a recession or expansion. Detotto and Otranto and Geppert researched the correlation between embezzlement and financial crimes and the economy of a nation. A study has not been conducted to investigate the correlation of macroeconomics of a region within a country and the number of embezzlement cases in the region. The economic condition of a region can differ from the nation as a whole, with leading or lagging economic conditions. This study examined the correlation between cases of embezzlement and the economic conditions of the New England region of the United States.

### ***Implications for Biblical Integration***

Individuals act as stewards of God's resources to help His purpose for the cultivation of earth and society. Individuals are entrusted by God to be stewards of resources and manage them

properly (Grudem, 2016). The allocation of resources by organizations helps further the refinement of the materials created by God and supports the growth and flourishing of society (Keller & Alsdorf, 2014). Financial leaders need to deal with organizational finances with integrity, providing both transparency and financial accountability (Rodin, 2013). Business profits stewarded properly provide for innovation, returns to investors, and the ability to pay employees well (Keller & Alsdorf, 2014).

Embezzlement involves those entrusted as stewards of resources utilizing their position for personal gain. The acts of embezzlement and fraud are violations of the Seventh Commandment, “Thou shall not steal.” Throughout the Bible, there are references to displaying righteousness through life and work, as well as avoidance of greed or love of money. King Solomon noted in Proverbs, “A greedy man stirs up strife, but the one who trusts in the Lord will be enriched” (*English Standard Bible*, 2001, Proverb 28:25). Cressey (1971) theorized that embezzlement resulted from the pressure created through various methods including maintaining a reputation and lifestyle beyond what the embezzler can afford. This pressure can be magnified by economic conditions (Cressey). The idolization of money and physical possessions violates intentions for individuals to be stewards of God’s resources and to have one idol. “Keep your life free from love of money, and be content with what you have, for he has said, “I will never leave you nor forsake you” (*English Standard Bible*, 2001, Hebrews 13:5).

### ***Benefit to Business Practice and Relationship to Cognate***

Accountants are entrusted with financial resources and protecting those financial resources throughout organizations and society. Asset misappropriation is the most frequent type of occupational fraud according to the ACFE (2018). Individuals who complete the financial reporting of an organization have a duty to maintain accurate and fairly represented information

in the financial statements (Sarbanes-Oxley Act 2002). The misappropriation of assets by these individuals or others within the organization leads to inaccurate reporting and a lack of trust in the industry. Both accounting fields of internal and external audit work to ensure that controls are in place to minimize the risk of asset misappropriation, which are required for all public companies (Sarbanes-Oxley Act 2002). Although not required by the Sarbanes-Oxley Act, non-public companies can help deter fraud through the implementation of internal controls. Internal audit works to help an organization reach its objectives by evaluating and improving the “effectiveness of risk management, control and governance processes” (The Institute of Internal Auditors [The IIA], n.d.). Embezzlement and asset misappropriation impact the accounting fields of financial reporting, external and internal auditing, forensic accounting, and fraud examination.

### ***Summary of the Significance of the Study***

Additional research is warranted to identify if there is a correlation between the economic conditions within a region of a larger nation and the number of embezzlement cases. This study focused on the New England region of the United States, which has not previously been done. Current research investigates the correlation between embezzlement and the economic state on a macroeconomic national level (Detotto & Otranto, 2012; Geppert, 2016). Embezzlement negatively impacts the ability of businesses and individuals to effectively manage God’s resources to cultivate earth and society. Many different accounting fields are impacted by embezzlement. Stewards of the financial resources of many organizations are accountants who have a duty to uphold ethical standards and work to protect the resources in which they have been entrusted. This study adds to the body of knowledge related to embezzlement. The study results may influence the assessment of fraud risks and controls and identify potential differences that may need to be considered when operating in various regions.



## **A Review of the Professional and Academic Literature**

This study examined the correlation between economic conditions as measured through economic indicators and embezzlement, a common form of occupational fraud. This section provides a review of literature that relates to the main concepts associated with the proposed research. This literature review includes five sections. The first section discusses the theories that are relevant to this study. The second section provides a discussion of occupational fraud. The third section discusses the misappropriation of assets and embezzlement. The fourth section discusses the prevention and detection of fraud. The fifth section discusses economic indicators and fraud and the economy.

### ***Discussion of the Theories***

The purpose of this study is to understand if there is a relationship between cases of embezzlement and economic indicators in New England. Three theories are included in the framework of this study: white-collar crime theory, fraud triangle theory, and agency theory. The white-collar crime theory is fundamental in identifying embezzlement and other crimes that violate a position of trust as criminal activity. The fraud triangle theory identifies three key elements that need to be present for embezzlement or fraud to occur. The agency theory identifies that personal utilization maximization is present in a principle-agent relationship, leading to a conflict of goals between the two parties. A discussion of these three theories is provided.

**White-Collar Crime Theory.** White-collar crime theory was developed by Sutherland to bring attention to crime committed in relation to doing business by the upper socioeconomic class (Sutherland, 1940). Sutherland noted that the crime data collected and studied was biased. Data collected had focused on crime committed by individuals in lower socioeconomic classes,

emphasizing that crime evolves out of poverty and the sociopathic and psychopathic conditions of poverty (Sutherland, 1940). Sutherland theorized that white-collar crime goes unreported and unpunished due to the socioeconomic status of the criminal and therefore theories of criminology are biased (Sutherland, 1940). Sutherland (1941) noted that losses due to white-collar crime probably exceed the losses related to crime committed by the lower socioeconomic class, such as burglary, robbery, and larceny. White-collar crime had historically been excluded as criminal behavior, but is a violation of criminal law.

White-collar crime includes a variety of schemes that violate trust. Sutherland (1940) identified examples of white-collar crime, such as false advertising and salesmanship, bribery, misrepresentation of financial statements or financial performance, misappropriation or embezzlement of assets, misapplication of funds, and tax fraud. White-collar crime categories range from anti-trust transgression to environmental violations used to increase the economic benefit of the persons involved (Gottschalk, 2017). As the business environment and regulations have changed over the years, the classification of actions as white-collar crime has expanded and grown in complexity (Berghoff & Spiekermann, 2018). Advances in technology and the development of new laws, such as environmental protection laws and the Foreign Corrupt Practices Act of 1977, expand the classifications of actions that are included as white-collar crime.

White-collar criminals take advantage of the trust conferred upon an individual or organization in the misuse of power and misrepresentation of financial information. The majority of white-collar crime involves the violation of the trust of a party external to the organization, which includes customers, investors, and the government (Sutherland, 1941). Carey and Webb (2017) noted building and maintaining trust is necessary to commit a white-collar crime or

financial fraud. Victims of fraud believe that the person defrauding them is acting in their best interest (Carey & Webb, 2017). Embezzlement differs from other types of white-collar crime and involves the violation of trust between the employee and employer (Sutherland, 1941).

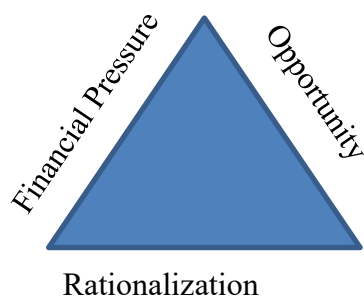
Sutherland originally identified embezzlement as a white-collar crime and a violation of employer trust, and it has been expanded to include the violation of investors' or patrons' trust, such as in financial services, non-profit or religious organizations. Embezzlement is also known to involve all levels of individuals throughout an organization, from employees through executives, including a variety of socioeconomic classes.

Since Sutherland brought attention to crime committed by the upper socioeconomic class, research has occurred related to crimes that fall into the category of white-collar crime, understanding of such criminal activity, and the treatment of such crime (Baer, 2018; Berghoff & Spiekermann, 2018; Craig, 2019; Cressey, 1971; Dervan & Podgor, 2016; Gottschalk, 2017; Piquero, 2018). Piquero (2018) noted that victims of white-collar crime suffer financial, physical, and emotional harm, which requires increased attention from the federal governments in the treatment of such cases as crime. Baer (2018) noted that while there is increased attention on fraud offenses from a criminal law perspective, there needs to be additional attention given to the development of a graded system to identify the different severity of fraud offenses. As the business environment changes, actions that are classified as fraud also change (Berghoff & Spiekermann, 2018; Dervan & Podgor, 2016). A greater understanding of the factors that lead individuals to participate in white-collar crime has been the focus of several authors (Craig, 2019; Cressey, 1971; Gottschalk, 2017; White, 2019). Cressey (1971) studied the factors that lead to individuals participating in embezzlement, which set the foundation for another theory related to white-collar crime, the fraud triangle theory.

**Fraud Triangle Theory.** The fraud triangle theory was developed out of Cressey's study of cases of embezzlement in 1953 (Cressey, 1971). Cressey studied the elements of cases of embezzlement to better understand how and why people in positions of trust violated the trust bestowed upon them to misappropriate assets (Cressey, 1971). Cressey (1971) theorized that three elements must be present for embezzlement to occur, pressure, opportunity, and rationalization. The pressure is present in the form of a "non-shareable" financial problem as identified by the violator (Cressey, 1971, p. 34). Pressure is also known as incentive or motivation (Gottschalk, 2017; Schuchter & Levi, 2016). An opportunity arises through the position of trust held by the individual or group of individuals. Kramer and Seda (2017) noted the fraudster has a perceived opportunity, which includes access to commit the fraud and the belief that they can do so without getting caught. Lastly, Cressey (1971) noted that all cases studied identified rationalization of the action before the fraud was committed. The fraud triangle theory has been a foundation of the study and understanding of fraud since it was developed.

**Figure 2**

*The Fraud Triangle*



Source: Cressey, 1971.

The fraud triangle theory has been identified as an important model to help in the fight against fraud. Both the Association of Certified Fraud Examiners (ACFE) and the Public

Company Accounting Oversight Board (PCAOB) have included the fraud triangle as a model for understanding and identifying fraud (ACFE, n.d.a, Public Company Accounting Oversight Board [PCAOB], n.d.). Auditors and fraud examiners consider the three elements identified by Cressey when trying to prevent and detect fraud (ACFE, n.d.a, PCAOB, n.d.). Cressey (1971) noted that pressure or a non-shareable problem can arise from personal choices, such as living beyond one's means, or through external factors impacting economic conditions, such as a recession, war, or natural disasters. Schuchter and Levi (2016) noted that pressure is the most important condition for fraud to occur. It was noted that the pressure is often caused by conditions within the organization and it is the “fraud trigger” for the occurrence of white-collar crime (Schuchter & Levi, 2016). Money or financial gain is the most common reason for committing fraud (Kramer & Seda, 2017; KPMG, 2016). Pressure can also be non-financial in nature, such as the challenge of beating the system or revenge for the actions of others (Kramer & Seda, 2017). An opportunity arises through holding positions of trust and building and maintaining trust (Carey & Webb, 2017). The rationalization for fraud can develop in a variety of ways. One of the most notable reasons for rationalizing the fraud is through the culture of the organization and the impact of the external environment (Dupont & Karpoff, 2019; Lokanan, 2018; Vousinas, 2019; White, 2019).

Expansion and limitation of the foundational fraud triangle have been the subject of multiple studies (Dupont & Karpoff, 2019; Huber, 2017; Lokanan, 2018; Schuchter & Levi, 2016; Vousinas, 2019; Wolfe & Hermanson, 2004). Huber (2017) criticized the use of the fraud triangle for all classes of fraud. The foundation of the theory was the study of embezzlement cases, so Huber (2017) noted that the fraud triangle has limited applicability to other types of fraud. Wolfe and Hermanson (2004) developed the fraud diamond, with the addition of

capability to the fraud triangle. Their study argued that although pressure, opportunity, and rationalization may be present in many instances, fraud will not occur if the individual does not possess the traits and abilities to successfully perpetrate the fraud (Wolfe & Hermanson, 2004). Vousinas (2019) expanded upon this model further to add ego. Vousinas (2019) noted that the ego of the fraudster is instrumental in their belief that they can hide the fraud or compel others to follow along. Dupont and Karpoff (2019) noted the importance of trust in an economic transaction, which provides an opportunity for fraud. The trust triangle establishes the criteria for trust to develop and allow for financial misconduct to result (Dupont & Karpoff, 2019). Schuchter and Levi (2016) noted that the fraud triangle and the other variations of fraud models help understand fraud, but are not universally applicable to white-collar crime.

The fraud triangle is considered the foundation of understanding embezzlement. This study focused on cases of embezzlement and the correlation of the cases with economic indicators. Cressey (1971) noted that pressure can be created through outside economic factors, such as the state of the economy. This suggestion indicates that the state of the economy will have some correlation with cases of embezzlement. This study investigated if a relationship is present as indicated by Cressey's (1971) research and development of the fraud triangle.

**Agency Theory.** Agency theory was developed by Jensen and Meckling in 1976 to explain agency costs associated with the agent-principal relationship. Jensen and Meckling (1976) defined an agency relationship as a relationship between two or more individuals where one or more (the principal) engage another (agent) to perform services on their behalf. Principals seek agents for their expertise, knowledge, and skills. Agency relationships are prevalent throughout businesses, including, but not limited to, employee-employer, shareholder-management, auditee-auditor, and taxpayer-accountant. Shapiro (2005) noted there is an

information asymmetry gap between the principal and the agent. Agency theory proposes that both the principal and the agent are motivated to maximize their personal utility from the arrangement (Jensen & Meckling, 1976). Agency costs associated with the management-owner relationship are generated as management's claims to profits decrease (Jensen & Meckling, 1976). Under agency theory, problems arise when the principal assigns responsibilities to an agent and there is a divergence in preferences, values, and risk between the agent and principal (Gottschalk, 2017).

Managements' perceived level of fairness impacts their motivation towards self-interest (Bosse & Phillips, 2016). Board members work to achieve goal congruence to align goals between management and the organization's shareholders (Nyberg et al., 2010). One of the ways mentioned to limit agency costs and align managerial goals is through the development of a financial compensation package. Nyberg et al. (2010) noted that including outcomes-based contracts or stock options in management's compensation package gives them the motivation to be inclined to make decisions that are optimal from a shareholders' perspective. If management perceives they are not being treated or compensated fairly, they are motivated to negatively reciprocate to enforce fairness (Bosse & Phillips, 2016). Behaviors such as making decisions outside of the preferred risk level of the owners/shareholders or engaging in occupational fraud such as misappropriation or embezzlement of assets may be taken by management or employees to maintain fairness.

Agency theory has been applied to studies related to occupational fraud and the prevention of fraud. The agency costs of information asymmetry are an important element of corporate governance where managers often have more information than the shareholders (Ndofor et al., 2013). Ndofor et al. (2013) noted that the more significant the information

asymmetry the more likely management will commit fraud. This increases the importance of monitoring controls and incentives by principles (Ndofor et al., 2013). On the other hand, Shi et al. (2017) found that stringent external corporate governance decreased managers' likelihood to act in the best interest of the shareholder and increased the likelihood of engaging in fraud. Juric et al. (2018) found that the punishment of Certified Public Accountants for violation of regulations laws due to fraudulent financial reporting was consistent with agency theory. Juric et al. (2018) noted that termination of employment is expected due to the high agency costs related to monitoring the individual. Agency theory is relevant to the business relationships that are violated in the occurrence of occupational fraud, including embezzlement.

Stewardship theory is an alternative to the agency theory introduced by Block in 1993 as a change in the management of organizations (Block, 2013). Block (2013) defined stewardship as choosing to act in the service of the long-run and to act in the service for those with minimal power. The stewardship theory suggests that those who act as stewards (agents) will be motivated to act in the best interest of the principal and not pursue maximizing personal utility (Keay, 2017). This theory rests on the trust and professionalism of the agents and argues that there is a limited need for accountability, but the need for the organizations to foster a sense of responsibility and values (Block, 2013; Keay, 2017). Block (2013) argued that stewards feel accountable for their actions to larger organizations, such as a team, company, or community, and are not motivated by self-interest suggested by agency theory. In this study organizational culture and compensation packages are not considered in the impact on embezzlement, so the stewardship theory was considered, but not appropriate for this study.

Agency theory suggests occupational frauds occur due to motivation to maximize personal utility and not due to perceived pressure by the perpetrator. In this study, the correlation



between cases of embezzlement and economic indicators is being studied. The agency theory is relevant because it suggests that embezzlement and other occupational frauds are not related to pressures such as the state of the economy. Here the agency theory would suggest that there is no correlation between cases of embezzlement and the condition of the economy.

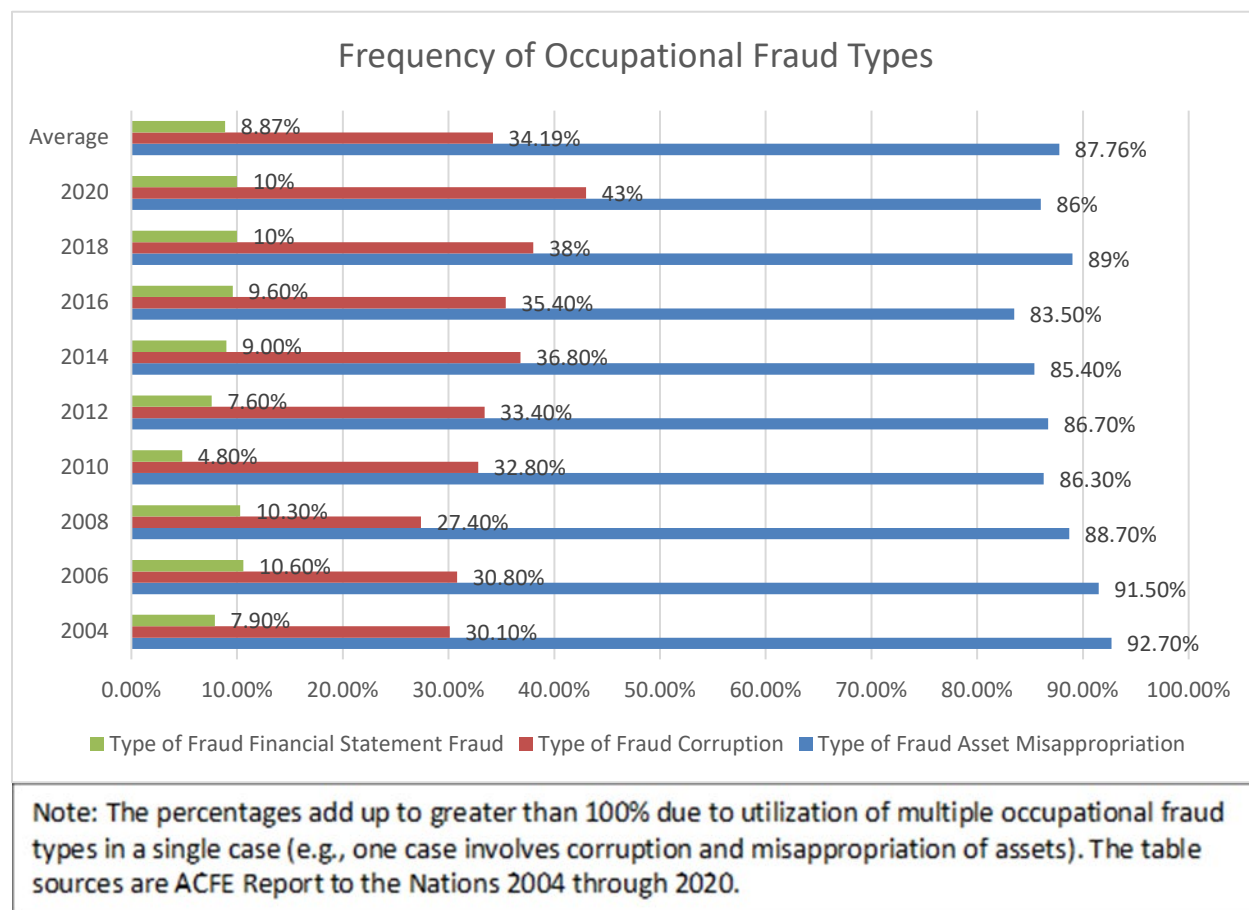
**Summary Discussion of Theories.** In looking at the correlation between embezzlement and the economic conditions of New England, three theories were considered to be relevant. The first theory, white-collar crime theory, brought attention to crime committed by the upper socioeconomic class in the course of doing business (Sutherland, 1940). The second theory, the fraud triangle theory, theorized the elements that need to be present for fraud to occur. This theory specifies that pressure, created through personal choices or external factors, such as economic conditions, has to be present for fraud to occur (Cressey, 1971). The third theory, agency theory, suggests that individuals will work to maximize their own personal utility (Jensen & Meckling, 1976) and may be motivated to commit occupational fraud in the pursuance of utility maximization (Bosse & Phillips, 2016). The agency theory and the fraud triangle theory identify different motivations for occupational fraud. All three theories discussed in this section are relevant to the current study.

### ***Occupational Fraud***

Occupational fraud is a worldwide problem and affects all types and sizes of organizations (ACFE, 2020; Moore, 2018). Occupational fraud is the intentional misuse or misapplication of an employer's resources or assets by an employee (ACFE, 2016). Occupational fraud is most often motivated by the fraudster's desire for personal financial gain and greed (KPMG, 2016). There are three categories of occupational fraud, including asset misappropriation or embezzlement, corruption, and financial statement fraud (ACFE, 2020). The

frequency of each type of occupational fraud is shown below in Table 1. Financial statement fraud occurs least often, followed by corruption and misappropriation of assets. Discussion of financial statement fraud and corruption are included here. Discussion of asset misappropriation and embezzlement are broken out in a separate section due to their significance to this study.

Occupational fraud occurs in a wide variety of industries and organizational types. The ACFE Report to the Nations 2020 included fraud cases across 23 different industries and included for-profit, not-for-profit, and governmental organizations. Certified Fraud Examiners estimate that organizations lose approximately five percent of revenue to fraud each year (ACFE, 2020). When this loss is applied to the 2019 Gross World Product of \$90.52 trillion, it is estimated that globally \$4.5 trillion is lost to fraud each year (ACFE, 2020). In the most recent ACFE report, 21% of cases studied included losses of greater than \$1 million (ACFE, 2020). Occupational fraud that occurs in the financial sector is a breach of public trust and can impact the whole economy (Suh et al., 2018). Losses from occupational fraud negatively impact organizations.

**Table 1***Frequency of Occupational Fraud Types*

**Financial Statement Fraud.** Occupational fraud in the form of financial statement fraud occurs the least often, but results in the largest losses (ACFE, 2020). Financial statement fraud is the intentional misrepresentation of information in the organization's financial reports by misstating or omitting material information (ACFE, 2020). Extremely costly financial statement frauds have been experienced in the United States as well as in organizations worldwide (Albrecht et al., 2015). Finnerty et al. (2016) found that the prior performance of an organization can influence the financial pressure on managers to continue to achieve high performance. Financial statement fraud intends to mislead financial statement users to the financial performance or position of an organization.

Financial statement fraud examples illustrate the magnitude of this type of occupational fraud. Two of the United States largest bankruptcy cases, Enron (\$63.1 billion in assets) and WorldCom (\$103.9 billion in assets), involved financial statement fraud (Akhigbe et al., 2005). Enron's leaders used mark-to-market accounting on long-term contracts to recognize unrealized gains as revenue with disregard to the viability of the contracts (Healy & Palepu, 2003). Enron's management formed shell companies, known as special purpose entities, to shift company liabilities off of the financial statements and appear to have a stronger financial position (Healy & Palepu, 2003). Enron employees altered the financial statements with increases in profits and decreases in liabilities and exposed financial risk (Healy & Palepu, 2003). WorldCom's accountants utilized aggressive accounting practices to inflate profits (Akhigbe et al., 2005). Both of these cases and other financial statement frauds were orchestrated to show better performance to the users of financial statements. Juric et al. (2018) found the most common violation of Certified Public Accountants by the SEC was for overstating revenue and earnings.

Examples of financial statement frauds show the impact this type of occupational fraud can have on the financial market and its influence on regulatory changes. Enron and WorldCom leaders, with others, orchestrated monumental financial statement frauds which impacted the accounting industry and brought attention to the need for change in financial reporting, corporate governance, and internal and external auditing (Thomas, 2002). Congress passed the Sarbanes-Oxley Act of 2002 to provide greater transparency, more reliable financial reporting, and accountability (Coates, 2007). Although Enron and WorldCom's financial statement frauds and the enactment of the Sarbanes-Oxley Act 2002 occurred almost 20 years ago, financial statement frauds still result in the greatest median loss of the occupational fraud categories. The median

loss from financial statement fraud noted in the 2020 ACFE Report to the Nations was \$954,000 (ACFE, 2020).

The Securities and Exchange Commission (SEC) has charged various organizations with accounting fraud in recent years. The SEC charged Mexico-based homebuilding company Desarrolladora Homex in 2017 with overstating revenue by \$3.3 billion and not providing accurate financial results to investors (SEC, 2017). In 2019, Comscore, Inc., and its CEO were charged for fraudulently overstating revenue by about \$50 million (SEC, 2019a). Another company Iconix Brand Group and top executives were charged with accounting fraud for recognizing fictitious revenue and failing to recognize \$239 million in impairment expenses (SEC, 2019b). The Iconix financial statement fraud was orchestrated to meet or beat Wall Street estimates (SEC, 2019b). These recent cases show that companies continue to misstate financial information to misrepresent their performance. Financial statement frauds continue to be costly to investors.

**Corruption.** Corruption is the second most common form of occupational fraud in terms of frequency of occurrence. Corruption involves the misuse of power to influence business transactions, including offenses such as conflicts of interest, bribery, illegal gratuities, and economic extortion (ACFE, 2020). Corruption is included in 43% of fraud cases and results in a median loss of \$200,000 (ACFE, 2020). Corruption was present in every industry and geographic region included in the ACFE study (ACFE, 2020). There has been an increased effort to enforce anti-corruption laws, but there has not been a decrease in corruption since 2014 (Ernst & Young [EY], 2018). Eleven percent of respondents to the Ernst & Young 15<sup>th</sup> Global Fraud Survey noted bribery was a common practice to win contracts in their sector (EY, 2018). Additionally, 38% noted bribery and corruption are common practices in their country (EY,

2018). Corruption is widespread touching various industries and geographic regions. Corruption is especially prevalent in certain industries, including energy and healthcare.

Corruption impacts the energy industry, existing in both nonrenewable energy and clean energy. Corruption was present in 66% of the occupational fraud schemes in the energy industry, which was the highest percentage of any fraud type or industry (ACFE, 2020). The energy industry is known for being a source of corruption (Gennaioli & Tavoni, 2016). Governmental corruption has occurred somewhat regularly in oil exploration and production (Sovacool, 2016). Sovacool (2016) provided a list of major oil corruption cases from Transparency International with losses ranging from \$800 million in Haiti to \$80 billion in Libya. Corruption is also present in the area of clean energy and environmental projects. Gennaioli and Tavoni's (2016) study in Italy showed the introduction of favorable subsidiary policies related to renewable energy can lead to an increase in corrupt practices with inadequate functioning socio-political institutions. Corrupt practices in environmental projects negatively impact environmental quality and social and economic growth (Lapatinas et al., 2019). The energy industry and the communities involved are negatively impacted by the presence of corruption.

Another industry highly impacted by corruption is the health care industry. Corruption was noted as the highest occupational fraud risk in the health care industry with 40% of fraud cases in the industry involving corruption (ACFE, 2020). Transparency International expands the definition of corruption in the healthcare industry to include kickbacks, overcharging, unnecessary treatments, and manipulation of data (The Lancet Global Health, 2020). It is estimated that global healthcare fraud losses are approximately \$455 billion a year (The Lancet Global Health, 2020). Examples of corruption in the health care industry show the magnitude of corruption cases in health care. Two examples of corruption include a Veterans Affairs (VA)

employee fraudulently submitting claims to the VA for \$19 million in one year (U.S. Department of Justice [DOJ], 2020b) and a durable medical equipment company being charged with submitting \$410 million in false claims to Medicare (DOJ, 2020c). Both of these examples specifically involve mischarging federally funded programs, which are funded through taxpayers. Health care fraud impacts the cost of services provided, which influences those seeking the services, the cost of insurance, and the taxpayers when governmentally funded programs are impacted.

**Summary of Occupational Fraud.** Occupational fraud is a global issue and impacts all types of organizations (ACFE, 2018). Occupational fraud is classified into three categories, financial statement fraud, corruption, and asset misappropriation. Over the past 16 years, financial statement fraud has been included in an average of 8.87% of occupational fraud cases reported to the ACFE. This type of fraud does not occur as frequently as corruption, averaging 34.19% of cases, and asset misappropriation, averaging 87.76% of cases, but it results in the greatest losses to organizations. Monumental financial statement frauds, such as Enron and WorldCom, have impacted the economy and led to regulatory changes, including the Sarbanes-Oxley Act of 2002. Corruption, the second most common occupational fraud scheme, is present in every industry and geographic region (ACFE, 2020). Corruption has a negative impact on the economy and influences continued inequality (Neanidis et al., 2017). The United Nations leaders have identified the end of corruption by the year 2030 as one of the goals of sustainable development (Neanidis et al., 2017). Corruption occurs with misappropriation of assets in 26% of cases (ACFE, 2020). Asset misappropriation occurs most frequently, but results in the lowest median loss. Regardless of the fraud scheme type, organizations are negatively impacted by the occurrence of occupational fraud.

### ***Asset Misappropriation and Embezzlement***

Misappropriation of assets is the misuse or misapplication of organizational resources (ACFE, 2020). The term embezzlement is also used to describe the misappropriation of assets. Embezzlement is defined as the “unlawful misappropriation or misapplication” of an asset that was entrusted to an individual (FBI, n.d.a). Misappropriation of assets is the most common form of occupational fraud, occurring in 86% of occupational fraud cases (ACFE, 2020). Misappropriation of assets schemes can involve the misappropriation of cash, inventory, or other assets (ACFE, 2016, 2018, 2020). Misappropriation of cash is broken into three categories of schemes including theft of cash on hand, theft of cash receipts, or fraudulent disbursements (ACFE, 2016, 2018, 2020). Misappropriation of inventory and all other assets are broken down into misuse and larceny (ACFE, 2016, 2018, 2020).

Check and payment tampering, billing schemes, and theft of non-cash assets are the asset misappropriation schemes that occur most frequently and are the costliest (ACFE, 2020). A billing scheme involves causing an employer to issue payment for false purchases, overstated invoices, or personal purchases (ACFE, 2016). Check tampering includes intercepting, forging, or altering a check or electronic payment of an employer and stealing funds (ACFE, 2016). The majority of losses from embezzlement are never recovered (Johnson et al., 2015). Asset misappropriation or embezzlement schemes occur in all types of organizations resulting in losses for the organization involved (ACFE, 2016, 2018, 2020).

**For-Profit.** Occupational fraud in for-profit companies accounted for 70% of the frauds in the 2020 ACFE Report to the Nations. Of the for-profit companies impacted, 44% were private companies and 26% were public companies (ACFE, 2020). Requirements mandated by the Sarbanes-Oxley Act of 2002 may impact the variance in the percentage of cases from public



and private organizations. Public companies are required to implement internal controls to help prevent and detect fraudulent activities within the organization (Sarbanes-Oxley Act 2002). Even with the addition of required internal controls, public companies still are victims of misappropriation of assets.

Two recent examples of misappropriation of asset schemes in public companies include Coca-Cola and J.M. Smucker Company. In 2019 Gronek-Gibbs, a former sales director for Coca-Cola, was found guilty of embezzling over \$750,000 used to fund an extravagant lifestyle (DOJ, 2020a). Gronek-Gibbs' position at Coca-Cola provided the opportunity for the orchestration of a billing scheme. Gronek-Gibbs ordered personal items and services from existing suppliers, followed by electronically altering the quotes, purchase orders, and invoices that were submitted to Coca-Cola for payment (DOJ, 2020a). A false billing scheme occurred at J.M. Smucker Company, resulting in an employee stealing \$4.1 million from the company over the course of 16 years (DOJ, 2015). Kershey, the company's chief airplane mechanic, submitted false invoices to Smucker Company from Aircraft Parts Services, Co. a fictitious company controlled by Kershey (DOJ, 2015). Both of these embezzlement examples show that public companies can be vulnerable to occupational fraud even with mandated internal controls.

The operation environment of small businesses makes them susceptible to fraud. Occupational frauds in small businesses account for 26% of frauds and result in the largest median loss of \$150,000 (ACFE, 2020). Small businesses are considered organizations with less than 100 employees (ACFE, 2020). Small businesses often operate with an environment of trust and have limited resources to dedicate to the prevention of fraud (Kramer, 2015). Moore (2018) finds small businesses are especially impacted by occupational fraud due to insufficient resources to implement internal controls and protections against fraud. Small businesses are

noted as being especially vulnerable and impacted by embezzlement (Kramer & Seda, 2017). Kennedy (2018) found misappropriation of cash on hand to occur most frequently in their study of fraud at small businesses. Asset misappropriation schemes are especially prevalent in small businesses (ACFE, 2020). Billing schemes and payroll schemes are two times more common and check and payment tampering four times more common in small businesses (ACFE, 2020). Kennedy (2018) found lower-level employees committed the majority of asset misappropriation offenses in the small businesses studied, but higher-level employees committed offenses that caused significantly more harm to the business. Small businesses are not able to recover from the losses they endure as well as their larger counterparts, which may result in bankruptcy (Kramer, 2015; Kramer & Seda, 2017).

**Nonprofit and Religious Organizations.** Nonprofit and religious organizations can be more vulnerable to fraud due to fewer resources to allocate to the prevention and detection of fraud (ACFE, 2020; Archambeault et al., 2014). Embezzlement of assets is the most common fraud scheme to occur in nonprofit and religious organizations (Archambeault et al., 2014; Johnson et al., 2015; Robinson-Fish et al., 2020). Leaders of these organizations often focus on their mission and believe that those working for the organization are also passionate about the organization's goals (Johnson et al., 2015; Thornhill et al., 2016). Embezzlement in nonprofit and religious organizations is often not reported to authorities or publicized in order to protect the reputation of the organization (Johnson et al., 2015; Thornhill et al., 2016). It is estimated that 80% of fraud occurrences in churches go unreported (Brotherhood Mutual, 2019). Cases of embezzlement may go unreported due to fear of bad publicity and costs of prosecution (Kramer, 2015). Additionally, the act of embezzlement may be viewed as a temporary flaw in the fraudster's character and members may require forgiveness (Treadwell, 2020). Not punishing or

reporting a perpetrator may give embezzlers the opportunity to move on and embezzle from another organization (Treadwell, 2020). The negative impact of embezzlement on a nonprofit can be significant. Archambeault and Webber (2018) found that more than a quarter of nonprofits they studied did not survive beyond three years after the publication of a fraud occurrence.

Religious organizations lose billions to fraud each year. It was estimated that in 2015 \$50 billion would be stolen from money Christians donate to religious and non-religious organizations worldwide (Johnson et al., 2015). Religious communities are particularly vulnerable to affinity fraud (Johnson et al., 2015). Affinity fraud works to target individuals who share beliefs, such as religion. Religious organizations are founded on an environment of trust and respect, making the likelihood of detection lower (Gottschalk, 2017). Churches collect a significant amount of cash making them susceptible to embezzlement (Thornhill et al., 2016). Churches often lack internal controls due to the cost of implementation (Treadwell, 2020). Johnson et al. (2015) noted that embezzlement cases at religious organizations are often occurring for five to 10 years before they are discovered. It is estimated that \$80 billion in fraud will be committed against churches by 2025 (Brotherhood Mutual, 2019). Misappropriation of assets in and from religious organizations is a serious problem.

**Government.** Government organizations are victims of occupational fraud at the national, state/provincial, and local levels (ACFE, 2020). The median loss resulting from occupational fraud at a government organization was approximately \$100,000 (ACFE, 2020). A variety of misappropriation of asset schemes in government and public administration were found to be the second most common schemes in the industry and presented at an overall higher rate than corruption (ACFE, 2020). The misappropriation of asset schemes noted as most

common in the government sector were billing (18%), expense reimbursement (17%), noncash misappropriation (17%), and payroll schemes (17%; ACFE, 2020). Fraud impacting the government not only impacts the governmental unit involved, but impacts the population of the governing body as well. Losses may influence the funding available for public services and infrastructure.

Examples of embezzlement in government include those occurring internally, but also cases occurring in organizations that are funded by governmental resources. In New York, an admired superintendent, with conspirators, embezzled \$11 million of school district tax funds over multiple years (Elder & Yebba, 2017). The perpetrators were able to use the superior school ratings and reputation to divert attention from financial mishandling (Elder & Yebba, 2017). In Pennsylvania, a financial manager for Steel Valley Authority embezzled approximately \$82,000 by forging checks (DOJ, 2018). The Steel Valley Authority is primarily funded through public funds from the United States Department of Labor (DOJ, 2018). The office manager had a prior record for embezzling in South Carolina and owed restitution of \$141,480.60 (DOJ, 2018). Although most fraudsters are first-time offenders (ACFE, 2020), this case is an example of where completing a background check would have potentially revealed a red flag. These two examples of embezzlement in the government show losses from this type of fraud can be significant.

**Embezzlement Impact.** Misappropriation of assets is the most common form of occupational fraud (ACFE, 2020). Since 2004, embezzlement has occurred in between 83.5% (ACFE, 2016) and 92.7% (ACFE, 2004) of occupational fraud cases. Misappropriation of assets occurs in all types of organizations: for-profit, nonprofit and religious organizations, and governmental. Both public and private for-profit organizations are impacted by occupational

fraud. For-profit organizations experience fraud at a lower rate, which may be due to the increased requirements imposed by regulators, such as the Sarbanes-Oxley Act of 2002. Small businesses, non-profits, and religious organizations are especially vulnerable to fraud due to the operating environment and a high level of trust. Government organizations can also be a victim of embezzlement at all levels of the organization, including national, state, and local governments. The government is also a victim of misappropriation of assets when the funds they distribute are embezzled. Fraud impacting the government also impacts society through taxes and funding of governmental programs. Misappropriation of assets negatively affects not only the organizations involved, but also impacts those with a vested interest in the organization.

**Profile of a Fraudster.** The demographics of a person who commits fraud, also known as a fraudster, varies across occupational fraud types and country. In the ACFE Report to the Nations (2020), it was noted that 53% of perpetrators are between the ages of 31 and 45, 72% of fraudsters were male, and 28% were female. The perpetrator of occupational fraud is most often a first time offender. Approximately 89% of fraudsters have not had a prior conviction for fraud (ACFE, 2020). This may be due to frauds often not being reported to law enforcement for a number of reasons (ACFE, 2018; Kennedy, 2018; Kramer, 2015; Lavery, 2018). Fraudsters hold various positions throughout organizations, with accounting, operations, and upper management being the most common roles held. The majority, 64%, of fraudsters, held a university degree or higher (ACFE, 2020). The profile of a fraudster depends on the type of occupational fraud and the geographic location of the fraud.

**Gender.** The gender disparity varies widely across geographic regions. The largest percentage of female involvement occurs in the United States and Canada with 41% and the lowest level of female involvement occurs in Southern Asia with only four percent (ACFE,

2020). This disparity may be due to the difference in the concentration of females in the workforce in various regions. Occupational fraud perpetrated by males is more predominant at all levels of employment: employee, manager, owner/executive (ACFE, 2020). Females tend to make less than their male counterparts when they partake in a fraud involving collusion (Steffensmeier et al., 2013). The median loss of a fraud conducted by a male was approximately \$150,000, whereas the median loss as a result of occupational fraud by a female was \$85,000 (ACFE, 2020). The median loss tended to increase with the age of the fraudster (ACFE, 2020).

The disparity among female and male perpetrators is high in financial statement fraud and corporate fraud. Steffensmeier et al. (2013) found that women are less likely to be involved with a group orchestrating corporate financial fraud, such as financial statement fraud. Juric et al. (2018) found that Certified Public Accountants charged by the SEC for violation of reporting provisions are more commonly male than female. Female offenders represent one-tenth of the corporate financial fraud offenders (Steffensmeier et al., 2013). Steffensmeier et al. (2013) noted that the involvement of females usually stems from a relationship with another fraud perpetrator or due to their access to information or specialized skills (Steffensmeier et al., 2013). Benson and Gottschalk (2015) found that women only represented five percent of the individuals charged with negligent bookkeeping in their study of gender and crime in Norway. Cumming et al. (2015) and Wahid (2019) suggested that gender diversity, including more female directors, reduces the occurrence and severity of corporate fraud.

Females are more involved in occupational fraud schemes that involve embezzlement (Benson & Gottschalk, 2015; Steffensmeier et al., 2015). In the United States, property crimes include embezzlement in the National-Incident Based Reporting System (NIBRS). Using data from the NIBRS, Campaniello and Gavrilova (2018) found only 30% of property crime was

committed by females in the United States. Campaniello and Gavrilova's (2018) study found that the gender gap in property crimes has lessened over the 20 years of their study increasing from 25% in 1995. In a study of crime data in Norway, women represent 30% of people charged with embezzlement in 2005 (Benson & Gottschalk, 2015). Steffensmeier et al. (2015) found minor differences in the occurrences of embezzlement by gender in the United States. Starting in 2011, compilations of NIBRS data were developed to easily view some of the crime data reported. Table 2 utilizes data from NIBRS and shows the gender disparity in embezzlement is smaller than in other types of property crime or occupational fraud in the United States.

**Table 2**

*Gender of Embezzlement Offender*

Year	Total	Gender of Embezzlement Offender					
	Offenders	Male	Percent	Female	Percent	Unknown	Percent
2011	18,184	9,292	51.1%	8,588	47.2%	304	1.7%
2012	18,520	9,455	51.1%	8,784	47.4%	281	1.5%
2013	19,422	9,843	50.7%	9,353	48.2%	226	1.2%
2014	20,188	10,133	50.2%	9,792	48.5%	263	1.3%
2015	20,580	9,998	48.6%	10,321	50.2%	261	1.3%
2016	20,903	10,293	49.2%	10,313	49.3%	297	1.4%
2017	21,657	10,685	49.3%	10,628	49.1%	344	1.6%
2018	21,475	10,513	49.0%	10,490	48.8%	472	2.2%

Source: National Incident-Based Reporting System compilations 2011-2018.

***Employment Role and Tenure.*** Fraud most often occurs in the accounting and operations departments, representing 14% and 15% of occupational frauds respectively (ACFE, 2020). The median loss resulting from a fraud perpetrated in the accounting department is \$200,000, which is more than double that of one in the operations department (ACFE, 2020). Individuals working in the accounting department may identify more opportunities to commit fraud due to access to

resources and their understanding of internal controls. Frauds occurring at the upper management and executive level occurred 12% of the time and resulted in a median loss of \$596,000 (ACFE, 2020). Juric et al. (2018) found young male senior executives to be more likely to commit financial statement fraud in violation of SEC regulations. In a fraud survey, respondents noted that the majority of fraudsters have been with their employer for over four years and 38% have been with the organization for over 6 years (KPMG, 2016). The ACFE survey had similar responses, noting 45% of perpetrators are with the organization for more than 6 years (ACFE, 2020). Employee tenure can influence the degree of trust and authority an individual has within an organization.

***Summary Fraudster Profile.*** The profile of a fraudster can vary greatly across fraud types and geographic regions. Overall there is a greater percentage of male involvement in occupational fraud, representing 72% of perpetrators. This percentage may be impacted by the number of females in the workforce worldwide and the roles that they hold within organizations. In 2019, 47.7% of women participated in the labor force worldwide and 74.4% of men participated in the labor force (Catalyst, 2020). Females are found to have low involvement in corporate fraud and fraud involving collusion (Benson & Gottschalk, 2015; Steffensmeier et al., 2013). In the United States, women have higher involvement in embezzlement cases, being involved in almost 50% of cases (NIBRS, 2011-2018). Frauds can be perpetrated throughout an organization. The departments with the highest level of fraud involvement are accounting, operations, and executive-level/upper management (ACFE, 2020). Employee role and tenure can impact their opportunity to commit occupational fraud and the level of trust bestowed upon the individuals. It is evident that there is no one-size-fits-all for the profile of a fraudster.



### ***Prevention and Detection of Fraud***

Prevention and detection of occupational fraud help safeguard organizations from incurring losses or minimizing losses when fraud occurs. Prevention is the act of having policies and procedures in place that preclude a fraudster from perpetrating a fraud. Detection is the policies and procedures in place to identify a fraud that is occurring or has occurred. As noted in the previous section there is no one-size-fits-all for the profile of a fraudster, so fraud education, prevention, and detection play an important role in identifying and minimizing losses from occupational fraud.

**Prevention.** Prevention of fraud helps organizations protect their resources and utilize resources to support their mission. Individuals who complete the financial reporting of an organization have a duty to maintain accurate and fairly represented information in the financial statements (Sarbanes-Oxley Act 2002). The misappropriation of assets and other occupational fraud within an organization can lead to inaccurate reporting. The Sarbanes-Oxley Act of 2002 requires public companies to establish and maintain internal controls to support fair representation of financial information (SOX, 2002). Although not required, private organizations can implement internal controls to deter occupational fraud. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) provides guidance for organizations for the reduction of fraud with five components of internal control: risk assessment, control environment, control activities, information and communication, and monitoring (COSO, 2013).

A risk assessment involves identifying each risk to the organization and determining how that risk will be managed (COSO, 2013). Enterprise risk management involves the coordination of risk management activities for an organization (COSO, 2017). Identifying and assessing fraud

risk would be included in an organization's risk assessment. The fraud risk of an organization can change as the business develops and as the internal and external environment changes. The Institute of Internal Auditors (The IIA) requires that internal audit assess risk as it relates to the "organization's governance, operations, and information systems regarding the safeguarding of assets" (The IIA, 2016, p. 13). Assessing risk related to safeguarding of assets specifically includes the risk of misappropriation of assets and embezzlement. Identifying areas of potential risk of asset misappropriation is a substantial step in trying to determine how to protect the organization against possible losses.

The control environment is the "attitude and actions of the board and management regarding the importance of control within the organization" (The IIA, 2016, p. 22). The control environment starts with the tone at the top and the organization's commitment to integrity and ethical values (COSO, 2013). Integrity is acting with a sense of strong moral values and honesty. Having a strong sense of integrity and ethics throughout the organization encourages employees to follow company policies and discourages them from engaging in fraud, such as misappropriation of assets (Mustafa Bakri et al., 2017). In financial statement fraud, poor tone at the top, a key element of the control environment, was identified as a primary risk factor for 22% of cases (ACFE, 2020). Tran and Le (2018) and Suh et al. (2018) found that the control environment has the greatest impact on fraud in an organization.

Internal controls include any action taken to manage risk and help an organization achieve its objectives and goals (The IIA, 2016). Internal controls are also an important element in reducing the possibilities for embezzlement and other occupational fraud schemes (Tran & Le, 2018). For example, separation of duties is a control activity to minimize the threat of embezzlement. Separation of duties requires different individuals to be responsible for

authorization, custody, and recording of transactions related to organizational assets (Reinstein & Taylor, 2017). Separation of duties may be difficult for small businesses to achieve if they do not have enough employees to successfully divide the responsibilities. Effective implementation of internal controls reduces the opportunity for individuals to commit occupational fraud, such as misappropriation of assets (Suh et al., 2019).

Internal control weaknesses contribute to the occurrence of occupational fraud. The lack of internal controls was present in 32% of cases studied by the ACFE in their most recent report (ACFE, 2020). In KPMG's survey, weak internal controls contributed to approximately 60% of fraud cases (KPMG, 2016). This was more prevalent in small businesses, occurring in 43% of cases (ACFE, 2020). Small businesses often do not have enough resources available to properly implement internal controls to protect against fraud (Moore, 2018). Kramer and Seda (2017) noted that a lack of internal controls and an environment of trust make small businesses especially susceptible to embezzlement. Due to the lack of resources, organizations may decrease fraud risk through education of employees on fraud prevention, detection, and identifying red flags (Robinson-Fish et al., 2020). Deficiencies in internal controls increase the opportunities for fraudsters to commit occupational fraud (Zakaria et al., 2016). Management overriding of existing controls was a driver for occupational fraud more frequently in large companies, including those with over 100 employees (ACFE, 2020). Forty-four percent of fraudsters had the authority to override existing controls in the cases included in the KPMG study (KPMG, 2016).

Monitoring activities and information and communication are the remaining components of internal control. Monitoring involves reviewing controls over time to ensure that they still are functioning properly and are supporting the organization's objectives (COSO, 2013). Monitoring also involves assessing changes to the internal and external environment and determining if such

changes influence the risk assessment (COSO, 2013). A change to the economic conditions can influence company performance and the pressure or incentives to engage in fraud. Fraud is less likely to occur in organizations with strong internal controls and monitoring (KPMG, 2016).

Clear communication of the roles and accountabilities employees have related to risk management at all levels of an organization helps instill a risk culture (Weekes-Marshall, 2020). Information and communication involve the flow of information internally and externally if needed to support the function of internal controls (COSO, 2013).

**Detection.** Detection of a fraud scheme is important to minimize losses incurred by the scheme. The average occupational fraud scheme lasts about 14 months before being detected (ACFE, 2020). The longer the fraud scheme goes uncovered the greater the potential loss. Fraud schemes lasting less than six months had an average median loss of \$50,000 (ACFE, 2020). Fraud schemes lasting over 60 months had a median loss of \$740,000 (ACFE, 2020). The earlier the detection, the more likely the losses from the fraud scheme will be minimized.

The most common method of detecting fraud is through tips. About 43% of cases included in the ACFE 2020 report were detected through tips (ACFE, 2020). Of those 33% came through the organization's whistleblower hotline, which is an anonymous reporting channel to report concerns (ACFE, 2020). Latan et al. (2019) noted that an employee determines to submit a tip based on their perceived level of threat and level of wrongdoing involved. Latan et al. (2019) noted that whistleblowers may choose to not submit information if they fear harassment or intimidation at the workplace. Lee et al. (2020) found that consideration of a country's history and culture is important in developing whistle-blowing regulations. In the United States, the Sarbanes-Oxley Act of 2002, requires that public companies establish a method for complaints regarding accounting and auditing matters to be confidentially and anonymously submitted. It is

also required that employees of publicly traded companies are protected against retaliation if they provide evidence of fraud (Sarbanes-Oxley Act of 2002). Whistleblower protection laws also exist in every state and Washington D.C. in the United States, protecting state employees and some business employees from retaliation (West & Bowman, 2019). It is important for individuals to feel protected from retaliation in order to report misconduct.

Johansson and Carey (2016) found that organizations with an anonymous reporting channel detect a higher number of frauds than those without a way to anonymously report. Without the presence of a hotline, fraud schemes continued for approximately 4 months longer than one with anonymous reporting available (ACFE, 2020). Additionally, the median loss nearly doubled at organizations without a hotline (ACFE, 2020). Johansson and Carey (2016) recommended implementing anonymous reporting for detecting all types of fraud, including asset misappropriation. Whistleblower hotlines are not required at private organizations, so many small businesses, religious organizations, and non-profits do not use this fraud detection method. Johansson and Carey (2016) noted that small organizations would benefit from the implementation of an anonymous reporting channel. Kummer et al. (2015) noted that whistleblower policies are affordable and easily implemented by small organizations. They recommend the implementation of anonymous reporting at non-profits to detect fraud (Kummer et al., 2015). Implementation of an anonymous reporting channel can also deter fraudsters due to the risk of being reported (Johansson & Carey, 2016). Anonymous reporting hotlines can help minimize losses due to fraud at all types of organizations.

Other means of identifying occupational fraud include internal audits, management reviews, and external audits. Internal audits and management reviews are also common methods for detecting occupational fraud. An internal audit was noted as the method for detection in 15%

of the cases and management review was cited in 12% of cases included in the ACFE report (ACFE, 2020). Understanding signs of fraud throughout the organization, not just those in internal audit, is an important element of fraud prevention and detection (Han, 2016).

Management must understand signs of fraud and what to look for in the organization. Very few frauds are identified through an external audit. External auditors identify four percent of fraud, which is lower than discovering the fraud by accident at five percent (ACFE, 2020). External auditors perform procedures to provide reasonable assurance the financial statements are prepared following generally accepted accounting principles (Jizi et al., 2016). Many frauds do not result in a material misstatement of the financial statements and auditors use sampling to perform their testing, so external auditors rarely detect fraud (Jizi et al., 2016). Fraud training throughout an organization could potentially benefit the organization by identifying areas of risk, red flags to look for, and making sure everyone is aware of the reporting mechanisms available.

**Summary of Prevention and Detection of Fraud.** Prevention and detection of occupational fraud are important considerations to protect against or minimize losses caused by fraud. Prevention includes putting policies and procedures in place that will inhibit or deter a potential fraudster. Prevention measures that involve internal controls are required to be taken by public companies in the United States and have been adopted by others as a best practice. The COSO internal control framework includes five elements: risk assessment, control environment, control activities, information and communication, and monitoring (COSO, 2013). It was found that the control environment is a critical component in fraud prevention (Joon Bae Suh et al., 2018; Mustafa Bakri et al., 2017; Tran & Le, 2018). It is important to have methods in place for fraud detection if fraud prevention is unsuccessful and fraud does occur. Fraud detection is the process of identifying fraud that has occurred or is occurring. A recommended fraud detection

method is the use of an anonymous reporting channel (ACFE, 2020; Johansson & Carey, 2016). The sooner fraud is detected, the sooner losses incurred can be limited. Fraud prevention and detection are essential to minimizing the negative impact of occupational fraud on organizations. Each study that provides further understanding of occupational fraud has the ability to impact fraud prevention and detection.

### ***Economic Indicators***

Economic indicators are utilized to assess the health of the economy. Economic growth or decline may influence the behaviors of individuals, businesses, and the government (Breedon, 2016). Economic indicators are considered to be leading, coinciding, or lagging. Leading economic indicators are used to predict a turning point in the economy, such as a recession or a recovery (Lahiri & Moore, 1991). Coincident indicators move with the business cycle and lagging indicators follow the business cycle (Zarnowitz, 1992). Leading economic indicators include a variety of measures, some of which are average weekly hours in manufacturing, building permits, money supply, and consumer expectations (Zarnowitz, 1992). Coincident indicators include employees on nonagricultural payrolls, personal income, and index of industrial production, and manufacturing and trade sales (Zarnowitz, 1992). A few lagging indicators include duration of unemployment, prime rate charged by banks, commercial and industrial loans, and ratio of consumer installment debt to income (Zarnowitz, 1992).

The National Bureau of Economic Research (NBER) maintains a timeline of United States business cycles, identifying the dates of the peaks and troughs of the economy (National Bureau of Economic Research [NBER], n.d.a; Chen et al., 2015). The NBER monitors a variety of economic indicators, including Gross Domestic Product (GDP), employment, and income levels (NBER, n.d.a). Since the turn of the century, NBER has identified two complete business

cycles. The first with the peak dated March 2001 and the trough November 2001 and the second with the peak dated December 2007 and the trough June 2009 (National Bureau of Economic Research [NBER], n.d.b). The period between December 2007 and June 2009 is referred to as the Great Recession, including the worse economic conditions since the Great Depression (Blinder, 2015; Rosenfeld, 2018). In February 2020, the NBER marked the end of the longest-running expansion since the start of dating business cycles (NBER, 2020). This period marks the start of a recession. The NBER identifies gross domestic production and employment as the principal conceptual measures of economic activity (NBER, 2020). Economic indicators are important aspects of measuring the macroeconomic activity and well-being of the economy.

**Gross Domestic Product.** Gross Domestic Product (GDP) is one of the most closely watched economic indicators (Bureau of Economic Analysis [BEA], 2015). GDP is defined as “the value of goods and services produced in the United States” (BEA, n.d.a). National economic growth is determined by the increase in production capacity, expressed in terms of GDP, from one time period to another (Mazurek & Mielcová, 2017). Economic growth varies greatly across industries (BEA, n.d.b). GDP information is utilized throughout the economy to prepare forecasts, prepare budgets, and influence policies, including monetary policy (BEA, 2015). The National Income and Product Accounts (NIPA) is an important economic indicator that depends on resources flowing between businesses and individuals (BEA, 2015). Individuals provide labor to produce goods and services, businesses provide compensation for individuals, and individuals are able to purchase goods and services from businesses (BEA, 2015). The key output in the NIPA is GDP. The flow of resources in the economy is a measure of the well-being of the economy.



**Employment and Unemployment.** Employment and unemployment are both economic indicators that are tracked nationally and regionally. Consumer spending reflects individual's beliefs about future employment and income, along with their current financial position (Breedon, 2016). Employment and unemployment influence household economic position and are considered key economic indicators (Song & Shin, 2019). An individual who is employed is someone who has a job. A person is considered unemployed if they do not have a job, are available to work, and are currently seeking employment (U.S. Bureau of Labor Statistics [BLS], n.d.b). The Bureau of Labor Statistics tracks unemployment because of the impact it has on the economy due to decreases in purchasing power and production power in the nation (BLS, n.d.b). Zandi (2018) noted that recessions that have occurred after World War II have been after the economy is operating beyond full employment. The natural rate for unemployment is close to 4.5% (Zandi, 2018). Increases in unemployment impact consumer sentiment, leading to less spending or investing, which in turn causes a greater increase in unemployment (Breedon, 2016; Zandi, 2018). Employment measures are considered to be a leading economic indicator (Mazurek & Mielcová, 2017). Consumer employment and perceived opportunities for employment influence spending behavior, which impacts the health of the economy.

**Personal Income.** Personal income includes all income from production including, compensation, self-employment, government transfers, business transfers, interest, and dividends (BEA, 2015). Personal income is utilized as an economic indicator and to predict future spending (BEA, 2015). Wages and salary disbursements are the largest components of personal income (Sullivan, 2020). The Current Employment Statistics (CES) program with the Bureau of Labor Statistics utilizes business payroll records to track employment, hours, and earnings estimates (BLS, n.d.a). Payroll employment data are published for nonagricultural employment including

both private and government sectors (BLS, n.d.a). Personal income and the outlook of consumers about personal income could influence their sentiment and spending. Consumer sentiment is a leading economic indicator (Rosenfeld, 2018). Multiple studies identify consumer sentiment and spending to be a leading indicator of a change in economic condition (Breedon, 2016; Chen et al., 2015; Rosenfeld, 2018). Chen et al. (2015, p. 4) argued that analysis of trends in Google searches involving “recession,” “foreclosure help,” and “layoff” can be a leading indicator of a recession. Changes in personal income can impact the availability of funds for spending and consumer sentiment influencing the overall economic conditions.

**Housing.** Housing is an important element of the United States economy (Baghestani & Kaya, 2016). Housing activity influences various areas of the economy. The housing sector impacts employment, financing, and demand for construction materials and housing goods (Baghestani & Kaya, 2016). The Federal Housing Finance Agency Home Price Index (FHFA HPI) provides a measurement of the change in single-family home prices in the United States. Demand from potential homeowners and the availability of credit can lead to changes in housing prices (Gelain et al., 2018). Gelain et al. (2018) noted that the influx of inexperienced homebuyers may contribute to large run-ups in the United States housing prices and credit. Blinder (2015) noted that financial illiteracy allowed homebuyers to be deceived by agents in the mortgage industry. Housing prices vary greatly across the United States. Before the 2000s, housing booms and crashes were traditionally focused on local markets (Blinder, 2015). Many factors influence the housing market, including personal income, employment, unemployment, availability, and demand. Housing or shelter is an essential need and an important element of economic well-being. House prices can impact affordability, debt levels, and well-being of people. The housing market is tracked as an important element of the economy.

**New England Economic Indicators.** The Federal Reserve Bank of Boston (Boston Fed) is the regional branch of the United States central bank and monitors economic activity for the region. The Boston Fed works on promoting development and financial stability in New England and the nation (Boston Fed, n.d.b). The Boston Fed conducts economic research and reports on the economic indicators for the six states in New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont (Boston Fed, n.d.b). The Boston Fed utilizes data from the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor Statistics, and the Federal Housing Finance Authority to evaluate the economic activity and condition within New England (Sullivan, 2020).

The Boston Fed provides monthly and quarterly economic data through its New England Economic Indicators database (Boston Fed, n.d.a). Each quarter the Boston Fed provides a snapshot of the New England economic trends and conditions. The quarterly summary focuses on four economic indicators: payroll employment, wages and salary disbursements, unemployment, and home prices. The performance of these economic indicators within the region is compared among the six states in the region and with the performance of these indicators in the United States (Sullivan, 2020). Employment related economic indicators in New England declined sharper than the nation following the recession starting in 2020 (Sullivan, 2021). The growth in home prices can vary between the region and the nation. The 2020 growth in house prices in New England was above the national average for the first time since 2005 (Sullivan, 2021). Economic activity can vary between the region and the United States as a whole.

**Summary of Economic Indicators.** Economic indicators are used to measure activity in the economy and to try to predict the future macroeconomic state. The NBER is responsible for

identifying economic expansions and recessions in the United States (Chen et al., 2015). The NBER utilizes various economic indicators to assess the state of the economy. The gross domestic product is the most commonly tracked economic indicator (BEA, 2015). There are many other economic indicators including employment, unemployment, personal income, housing, and others. The Boston Fed tracks economic indicators for the New England region. They track various economic indicators, but provide focused reports on payroll employment, wages and salary disbursements, unemployment, and home prices (Sullivan, 2020). The macroeconomic conditions of the nation and region impact both businesses and individuals.

**Fraud and the Economy.** Research on the impact the economy has on fraudulent activity has mixed findings. Povel et al. (2007) noted that good financial performance during an economic boom allows for organizations to conceal financial frauds or misrepresentations, which are later discovered when the economy declines. Their study noted that fraud peaks at the end of an economic boom (Povel et al., 2007). Fraud is often discovered when the economy slows down (KPMG, 2016). Agents take advantage of principals who lack financial literacy and perpetrate fraud or near-fraud actions (Blinder, 2015). Deception in the home mortgage market encouraged buyers to take on mortgages they could not afford, which supported the growth of the housing bubble and contributed to the housing crash in 2008 (Blinder, 2015). Detotto and Otranto's (2012) study in Italy found during times of business cycle expansion, crime levels decrease, and during a recession, crime levels increased. Embezzlement and fraudulent insolvency appear to be leading indicators of a downturn in the business cycle (Detotto & Otranto, 2012).

Svare (2009) noted that the recession has increased the focus on fraud risk for a variety of organizations. Incentives or pressures may arise when financial performance is threatened by economic conditions (Huang et al., 2017). During the economic recession lasting from December

2007 to June 2009 in the United States, approximately one-third of executives surveyed by KPMG expected fraud or misconduct to increase in their organizations (DeMarco, 2009). Management's expectation for an increase in misappropriations of assets was the highest with 25% of executives expecting it to increase, while 60% noted they expected it to remain constant (DeMarco, 2009). Girgenti, from KPMG, noted that economic pressure can lead management and employees to sometimes rationalize taking advantage of the opportunity to commit fraud (DeMarco, 2009). Karpoff (2020) noted the environment created by the COVID-19 pandemic and economic shutdown of 2020 is conducive to increases in fraud. The changes in product and service demands and information asymmetry due to the pandemic influence firm incentives to commit fraud (Karpoff, 2020). The ACFE noted 79% of survey respondents have identified an increase in fraud in the wake of the pandemic (ACFE, 2020a). Consistent with Karpoff (2020), Svare (2009), and DeMarco (2009), Vousinas (2019) noted that there has been an increase in fraud incidents following the global financial crisis and economic recession.

Bagchi and Bandyopadhyay (2016) studied the impact of a recession on on-the-job crime. Bagchi and Bandyopadhyay (2016) found that the relationship between workplace deviance and the state of the economy is dependent on how severe the recession is. Rosenfeld (2018) found that as consumers become more confident in the state of both the economy and their personal financial health, they are less likely to commit a crime for economic gain. Geppert (2016) found that there was no correlation between the number of reported embezzlement cases and the economic condition of the United States, determined by expansion and contractions identified by NBER.

***Variables in the Study.*** This research aims to examine the relationship between incidents of embezzlement and economic indicators in New England. The independent variables for the

study are unemployment, payroll employment, wages and salary disbursement, and home prices in New England. Unemployment and payroll employment are measured by the U.S. Bureau of Labor Statistics (Sullivan, 2020). Statistics for monthly unemployment and employment data are available each month for regions and states (BLS, n.d.c). Wages and salary disbursements are measured by the U.S. Bureau of Economic Analysis (Sullivan, 2020). Data measured for wages and salary disbursement are tracked every quarter for New England. The Federal Housing Finance Authority measures the change in home prices (Sullivan, 2020). The FHFA publishes the home price index quarterly. The data for these economic indicators are broken out for the region by the Federal Reserve Bank of Boston.

The dependent variable is the incidents of embezzlement. The cases of embezzlement are recorded by the National Incident-Based Reporting System (NIBRS) maintained by the FBI. The Uniform Crime Reporting (UCR) Program has been responsible for collecting, publishing, and archiving data to establish uniform crime statistics since 1930 (FBI, n.d.b). The crime data collected by law enforcement agencies for each incident is reported in the NIBRS (FBI, n.d.b). Data from the NIBRS of the UCR system has been utilized in various peer-reviewed studies involving crime including Bierie (2017), Campaniello and Gavrilova (2018), Roberts and Roberts (2016), and Steffensmeier et al. (2015).

***Summary of Fraud and the Economy.*** The state of the economy can influence organizational and individual decisions. There are conflicting findings related to fraud and the state of the economy. Some note that economic expansion allows for fraud to be concealed and is revealed when the economy begins to slow (KPMG, 2016; Povel et al., 2007). Others note that occupational crime increases when the economy is not performing well (DeMarco, 2009; Detotto & Otranto, 2012; Huang et al., 2017; Vousinas, 2019). Geppert (2016) found that there was no

correlation between embezzlement and the United States business cycles. Further investigation is needed into whether there is a correlation between the economy and occupational fraud, such as embezzlement. This study investigated if there is a correlation between economic indicators and the number of incidents of embezzlement in New England. The study included economic indicators of unemployment, payroll employment, wages and salary disbursement, and home prices in New England as independent variables. These economic indicators are tracked nationally and broken out for the New England region by the Boston Fed. The study included incidents of embezzlement in New England as the dependent variable. The incidents of embezzlement were from the NIBRS maintained by the FBI. This study looked at a smaller macroeconomic level, the New England region, which has not been done before.

### ***Summary of the Literature Review***

This literature review discussed significant topics related to this study. The literature review included five main subsections. The first section discussed the three theories applicable to this study. The second section discussed the significance of occupational fraud and the negative impact it has on organizations. The third section discussed the misappropriation of assets and embezzlement. The fourth section discussed important elements of prevention and detection of fraud. The fifth section covered economic indicators, current studies related to fraud and the economy, and the variable in the study.

### **Summary of Section 1 and Transition**

Section 1 provided a foundation for this study. This section included the background of the problems, problem statement, and purpose statement. The nature of the study was also discussed including details of the method and design. Section 1 provided the research questions and hypotheses. The theoretical framework provided a discussion of the theories relevant to this

study. Section 1 also included the assumptions, limitations, delimitations, and significance of the study. The literature review provided an understanding of the theories related to the study, the significance of occupational fraud and embezzlement, the importance of prevention and detection of fraud, and discussion of economic indicators.



## **Section 2: The Project**

The focus of this quantitative study is to examine the relationship between the number of incidents of embezzlement and economic indicators in New England. Based on the literature review, there have been mixed findings related to the relationship between fraud and the economy (DeMarco, 2009; Detotto & Otranto, 2012; Geppert, 2016; Huang et al., 2017; Povel et al., 2007; Vousinas, 2019). There has not been a study of this nature on the macroeconomic level of a region. The focus on the New England region makes this study unique in comparison to previous research.

The focus of Section 2 is the discussion of the project elements required to perform this study. This section begins with a restatement of the purpose statement. Then this section details the role of the researcher, the participants, the research method and design, the population and sampling, the data collection, the data analysis, and the reliability and validity. Section 2 details the elements of the project.

### **Purpose Statement**

The purpose of this quantitative correlational study is to expand the body of knowledge by examining the relationship between the economic condition (the independent variable) and the number of discovered and reported cases of embezzlement (the dependent variable). The larger problem is explored through correlation analysis of economic indicators and embezzlement cases within New England. The New England region is considered the six states in the northeastern United States, including Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont (Federal Reserve Bank Boston [Boston Fed], n.d.a). The quantitative correlational study utilized archival data from two databases to analyze the correlation. The embezzlement data are archival data from an FBI database. The FBI Uniform

Crime Reporting (UCR) Program collects crime data from law enforcement agencies across the United States through the National Incident-Based Reporting Systems (NIBRS). The economic indicators information is archival data from the Federal Reserve Bank of Boston.

As existing literature has researched the correlation of fraud and embezzlement and the economic condition of a country (Detotto & Otranto, 2012; Geppert, 2016), further research into the correlation between embezzlement and economic indicators within a smaller region is needed. The economic position of the region and the United States as a whole can differ due to the rate of growth or decline of the economic indicators in comparison to other states and/or regions in the nation (Sullivan, 2020). This study investigated the correlation between the number of embezzlements discovered and reported through the FBI database with four economic indicators including payroll employment, unemployment, wages and salary disbursements, and home prices within the New England region.

### **Role of the Researcher**

The researcher held multiple roles in this non-experimental quantitative study. The researcher first identified the problem and conducted a literature review related to the topic of study. The researcher determined the research method and design used in this study. The role of the researcher includes defining the participants, the population, and the sample. The researcher has identified the variables that were used in this correlational design study. The researcher has identified the third-party sources of data relevant to this study. The researcher used archival data and had no influence over the data collected. The researcher's responsibilities include collecting, organizing, and protecting data used in the study. The researcher assessed the validity and reliability of the data collected. The researcher processed and analyzed the data gathered. The

researcher was objective throughout the research process to not influence the results or data (Brewerton & Millward, 2001). The researcher presented and communicated research findings.

### **Research Methodology**

The quantitative method with the correlational design was selected to address the research questions and hypotheses in this study. This study examined the relationship between variables using archival data. A discussion of the selected method and design is provided below.

#### ***Discussion of Fixed Design***

A non-experimental correlational research design was selected for this study. The correlational design allows the researcher to investigate the relationship between two phenomena (Walliman, 2018). This study did not assume a cause and effect relationship between phenomena included in the study (Abbott & McKinney, 2012; Lappe, 2000). Correlational design can utilize data already available through databases, lists, and charts to examine the relationship between variables (Raines, 2013). This study included an analysis of archival data from the FBI and the Federal Reserve Bank of Boston to identify if there is a relationship between cases of embezzlement and economic indicators in New England. This study utilized archival data in which the researcher has no influence over to investigate the relationship between variables, making quantitative non-experimental correlational design appropriate for this study (Creswell, 2014; Lappe, 2000).

Correlation research determines if there is a relationship between the variables (Abbott & McKinney, 2012). The correlational design allows for assessing relationships between variables with different operational measures (Abbott & McKinney, 2012). This study measured the relationship between variables with different measures. The researcher identified if a relationship was present and the strength of the relationship (Delost & Nadder, 2014). If a

relationship exists, it can be reviewed for the strength of correlation and the direction. A positive correlation indicates that the two variables move in the same direction (Walliman, 2018). A negative correlation indicates that the variables move in the opposite direction, meaning as one increases the other decreases (Walliman, 2018). No variable association indicates that there is not a relationship between the variables (Walliman, 2018). The correlational design does not indicate a cause and effect relationship (Abbott & McKinney, 2012). Researchers are able to use the correlation to predict the relationship between variables (Abbott & McKinney, 2012).

### ***Discussion of Quantitative Method***

The quantitative method was chosen for this study to explore the relationship between embezzlement incidents and economic indicators. Creswell (2014) noted that the quantitative method is appropriate when examining relationships among variables. Objective measures including surveys, controlled experiments, and data sets are utilized in quantitative research. This study utilized archival data, making non-experimental quantitative research appropriate for this study. Statistical procedures were applied to analyze the relationship between the cases of embezzlement and economic indicators. Statistical analysis of quantifiable variables is applied in quantitative research (Creswell, 2014).

### ***Summary of Research Methodology***

A quantitative research method with a correlational research design was selected for this study. A quantitative research method was determined to be appropriate because this study investigated the relationship between variables of embezzlement cases and economic indicators. The use of archival data in this study makes a non-experimental quantitative design appropriate. The correlation between these phenomena was identified for the strength and direction of any relationship.

## **Participants**

The research questions and related hypotheses regarding incidents of embezzlement and economic indicators were studied using publicly available sources and archival data. The National Incident-Based Reporting System is the main source of embezzlement incidents in New England. The Federal Reserve Bank of Boston is the main source of economic indicator data for New England. The Boston Fed data for New England is based on the data from various United States Departments, including the Bureau of Labor Statistics, Bureau of Economic Analysis, and Federal Housing Finance Agency. Data collected for this study were not confidential, personal, or sensitive in nature.

## **Population and Sampling**

This study investigated the correlation between incidents of embezzlement and various economic indicators in New England. The population and sample need to be defined to complete this study. A discussion of the population and sample selection is provided below.

### ***Discussion of Population***

This correlational study investigated the correlation between embezzlement incidents and economic indicators in New England. The population included embezzlement incidents reported through law enforcement agencies that participate in the NIBRS from the FBI in New England. New England is made up of six states, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The NIBRS is part of the Uniform Crime Reporting (UCR) system the FBI uses to collect crime data across the United States (FBI, n.d.d). Detailed crime data are available through the NIBRS system for researchers to use to help provide a greater understanding of crime in the United States. Crime data are classified into different categories. Embezzlement is included in the property crime category (FBI, n.d.a). Embezzlement reported to

a New England law enforcement agency participating in the NIBRS represents the relevant population from which the sample was determined to address the research questions.

### ***Discussion of Sampling***

The sample utilized includes embezzlement incidents reported in New England, which includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Nonprobability sampling was utilized to determine the sample. Nonprobability sampling uses logical reasoning in the determination of the sample (Loseke, 2017). The type of nonprobability sampling applied was convenience sampling. Convenience sampling involves gathering data based on data availability (Loseke, 2017). Data publicly available for the New England region were incorporated in the sample. State NIBRS crime data are available online for the years 2004 through 2018. The sample utilized is 100% of embezzlements reported to NIBRS for the six New England states for the years 2004 through 2018. The sample signifies 100% of the sample population that meets the inclusion criteria.

The sample covers 15 years of embezzlement incidents in the New England region. Time series analysis is appropriate for this quantitative study with data observations being equally spaced over the 15 years (Box et al., 2016). Time series analysis should contain enough observations to have a proper estimation of parameters (Yaffee & McGee, 2000). In time series analysis at least 50 and preferably 100 data points are used (Box et al., 2016). Statistical literature does not contain power computation methods for time series analysis (McLeod & Vingilis, 2008). The embezzlement data were organized monthly for research questions one and two, yielding a sample size of  $n=180$ . The embezzlement data were organized quarterly for research questions three and four, yielding a sample size of  $n=60$ . The sample results in meeting

the minimum recommended criteria of 50 data points (Yaffee & McGee, 2000) for all four research questions.

**Inclusion Criteria.** The embezzlement in the region of New England is the focus of this study. New England is made up of six states, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The United States Census Bureau (n.d.) estimated the July 2019 population broken down by the six states to be as follows, Connecticut (3,565,287), Maine (1,344,212), Massachusetts (6,892,503), New Hampshire (1,359,711), Rhode Island (1,059,361), and Vermont (623,898). Based on the estimated state populations, the estimated population of New England was 14,844,972 as of July 2019. The criteria for inclusion in the study were based on being located in the New England region and participating in the NIBRS through the FBI. Law enforcement agencies from all six states participate in reporting crime incidents to the NIBRS. Table 3 shows the NIBRS participation percentages for law enforcement agencies for each state in New England as of 2018.

**Table 3**

*New England States 2018 Participation Rate in NIBRS Reporting*

State	NIBRS 2018 Participation Rate
Connecticut	90%
Maine	21%
Massachusetts	86%
New Hampshire	98%
Rhode Island	96%
Vermont	100%

Source: National Incident-Based Reporting System

**Exclusion Criteria.** The region of New England is the focus of the quantitative study. Jurisdictions outside of the six New England states were excluded from this study. There are 44

states located in the United States outside of New England. Property crime data, including reported embezzlements, reported to the NIBRS for these states were excluded. Additionally, embezzlement crimes reported to law enforcement agencies located in New England that do not participate in the NIBRS were excluded.

### ***Summary of Population and Sampling***

The population and sample of embezzlement incidents were defined for this study. The population includes embezzlement incidents in New England reported to the NIBRS system. Nonprobability convenience sampling was utilized by collecting data from publicly available governmental sources. The sample includes 100% of the population meeting the inclusion criteria. The sample incorporates 15 years of embezzlement data collected by law enforcement agencies participating in the NIBRS. The time period included in the study results in a total of 180 months and 60 quarters of embezzlement data for New England. The sample size meets the sample recommendation for time series analysis by Yaffee and McGee (2000) of 50 data points for all research questions.

### **Data Collection and Organization**

The data necessary to address and analyze the research questions and corresponding hypotheses were collected from multiple governmental sources. Data and statistics from large, well-known governmental organizations are expected to be authoritative (Walliman, 2018). Discussion of the data collection techniques, collection instrument, and organization techniques is provided below.



### ***Data Collection Plan***

Data for this study were collected from public governmental sources. Each variable was gathered and analyzed for the years 2004 through 2018. Detail of the data collection of the five variables in the study is described below.

**Embezzlement Incidents.** The number of embezzlement incidents in the six New England states was needed to complete this study. The embezzlement data are publicly available through the FBI. The FBI Uniform Crime Reporting program collects crime data from law enforcement agencies throughout the United States in the NIBRS. The data for the individual states that report information to the NIBRS is available online through the Crime Data Explorer for years 2004 through 2018. Within the NIBRS Crime Data Explorer, the incident-based data by state and year were downloaded from the “Documents & Downloads” section. Each of the six states required the data to be downloaded for each year included in the study. This resulted in 15 state master folders per state for a total of 90 master folders. The original files were saved to an external hard drive.

Within each master folder, two files were used to determine the number of embezzlement incidents. The incident file includes the date the crime was reported, but it does not include the offense type. The offense file includes a listing of all offenses for each incident that was reported, but excludes the date. The information from both the incident and offense files was needed to determine which incidents involved embezzlement and when the incident occurred. An incident may include more than one offense. For example, an incident could include both offenses for embezzlement and impersonation. Embezzlement is considered a property crime by the FBI (FBI, n.d.a). The offense type ID for embezzlement is 37 according to the offense type

listing included in each state master folder. A detailed process for collecting the embezzlement data are below.

The original NIBRS incident file and NIBRS offense file for each state and year were copied into a folder for the specific state and year. The original master folders were saved and not changed in any way. To identify the offenses that include embezzlement the researcher utilized the data filter Excel function to sort by offense type ID 37. The resulting data were copied into a worksheet in the NIBRS incident file. The VLOOKUP function was utilized to match the incident id number for the embezzlement offense to the incident id number in the incident file data. If the incident id matches, offense type ID 37 resulted, and if there was no match, the result was #N/A. The data filter function was used to then identify all incidents with offense code for embezzlement.

The next step involves sorting by date of the incident. The embezzlement data for this study was required to be monthly for research questions 1 and 2 and quarterly for research questions 3 and 4. On the updated incident worksheet a column was inserted to the right of the incident date and the column was titled month. The researcher utilized the Excel function MONTH to determine the month of the incident. This results in a numeric form of the month with January: 1, February: 2, and so on. An additional worksheet was added to the file to show the cases of embezzlement per month. On this file, each month was listed numerically and the Excel COUNTIFS function was used to count the number of embezzlement occurrences in a month. The researcher tested the data to verify it is properly identifying the month of the incident.

After this process was completed for each state and each year, the information was utilized to determine the number of embezzlement incidents for New England. This includes

information for all six states. A new Excel file was created for each of the years. The summary worksheet for each state was copied into the new file. This allows for the data to be combined to have a total amount for New England. After each worksheet was copied an additional worksheet was added for New England. The researcher utilized the Excel mathematical function of addition to add the amounts for each month from the six state tabs. The embezzlement data by year and month were brought into another Excel file to include all 15 years of data. For research questions three and four the researcher arranged the data quarterly by using the SUM function to add months 1 to 3, 4 to 6, 7 to 9, and 10 to 12.

**Economic Indicators.** Data related to economic indicators in New England needed to be collected to complete this study. There are four economic indicators needed to address the research questions. The four economic indicators are payroll employment, unemployment rate, wages and salary disbursements, and housing prices. The economic indicators were collected from the Federal Reserve Bank of Boston. The Boston Fed collects economic data from the federal source for the six New England states. The economic data for this study is from the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Federal Housing Finance Agency. The source of payroll employment and unemployment rate data is the U.S. Bureau of Labor Statistics. The wages and salaries levels of personal income come from the U.S. Bureau of Economic Analysis. The home price index comes from the Federal Housing Finance Agency. All economic data were downloaded from the New England Economic Indicators Interactive database maintained by the Boston Fed. The downloaded files were saved as an Excel file for each variable. The files were saved to an external hard drive.

### ***Instruments***

This study did not include a specific instrument for the collection of data. Data for this study includes archival data from various governmental sources. All of the data that was collected is publicly available through governmental sources. The governmental agency that provides the data for embezzlements is the Federal Bureau of Investigations. The New England economic indicators are provided by the Federal Reserve Bank of Boston. The Federal Reserve Bank of Boston collects economic data on the six New England states from numerous governmental sources. The economic data for this study is from the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Federal Housing Finance Agency. Microsoft Excel was used to collect and store the data.

### ***Data Organization Plan***

All of the data were organized by date and variable. Each variable was organized in an Excel file. The embezzlement incidents had two files. One file was organized by month and year. The second file was organized by quarter and year. The process for organizing the embezzlement data is described in the collection of data section above. All of the economic indicators have a separate file. The payroll employment and unemployment rate data were organized by month and year. The wages and salaries levels and the home price index were organized by quarter and year. The data downloaded from the Federal Reserve Bank of Boston website were organized in this manner. The economic indicator data were updated to include only the years 2004 through 2018 for this study.

### ***Summary of Data Collection and Organization***

Discussion of the data collection instruments, techniques, and organization was provided. Data collected to address the research questions were publicly available archival data. The data

were collected from various governmental sources including the Federal Bureau of Investigations, U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Federal Housing Finance Agency. These are all well-known governmental sources and considered authoritative (Walliman, 2018). The procedures for collecting the data were detailed, so that another researcher could perform the data collection process. The data were stored and organized in Excel files. The files were stored on an external hard drive.

### **Data Analysis**

The researcher investigated the relationship between multiple variables over time. Statistical analysis was used to test the research hypothesis. The data utilized is secondary data publicly available from governmental sources. Data observations were collected over a 15 year period of time at equal intervals making time series analysis appropriate (Box et al., 2016). An autoregressive-integrated-moving average with explanatory variables (ARIMAX) time series model was used to assess the correlation of variables with observations made over time. The ARIMAX model is an extension of the ARIMA time series model. The researcher used the ARIMAX model to identify the patterns in time-series data and quantify the impact of the explanatory variables. A discussion of the variables in the study and the analysis that was completed to test the hypotheses is provided below.

### ***The Variables***

This study includes five variables. Data were collected to measure movement in embezzlement cases and economic indicators in New England. There are two types of variables in quantitative research, continuous and discrete (Kaliyadan & Kulkarni, 2019). ARIMAX factors in explanatory independent variables for a single dependent variable. The table below provides a listing of variables relevant to this study, including their classification and type.

**Table 4***Variables Included in the Study*

Variable	Classification	Type
Payroll employment	Independent	Continuous
Unemployment rate	Independent	Continuous
Wages and Salary Disbursement	Independent	Continuous
Housing Prices	Independent	Continuous
Incidents of Embezzlement	Dependent	Discrete

**Economic Indicators.** There are four economic indicator variables included in this study. The four economic indicators are payroll employment, unemployment rate, wages and salary disbursements, and housing prices. All four variables are independent and continuous. The independent variables were included in the ARIMAX model as the explanatory variables. The models quantified the impact of these economic indicators on the dependent variable cases of embezzlement. The monthly payroll employment and unemployment rate data were used to address research questions one and two. The quarterly wages and salaries levels and the home price index were used to address research questions three and four. Due to different frequencies of the independent variable data, a minimum of two statistical models needed to be used to address all of the research questions.

**Embezzlement Incidents.** Embezzlement incidents represent the dependent variable of the study. The statistical model identified patterns in embezzlement incident data and quantify the impact of the independent variables. The data used for the embezzlement incidents were collected from the FBI NIBRS database. The embezzlement data were organized monthly for

research questions one and two. The embezzlement data were organized quarterly for research questions three and four.

### ***Hypotheses 1 and 2 Testing***

The first null hypothesis proposed is there is no significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition determined by payroll employment levels. The second null hypothesis is there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by unemployment levels. Both payroll employment levels and unemployment levels are reported at monthly intervals. The data analysis plan is described below.

The researcher first plotted the series of data against time to visualize the data (Yaffee & McGee, 2000). This allowed for visual examination for outliers, missing data, or non-stationarity (Yaffee & McGee, 2000). Time series analysis requires that there are no missing values in the series (Yaffee & McGee, 2000). The researcher confirmed that there are no missing data points. The time plot included the incidents of embezzlement over the 15 years. This process included embezzlements being plotted at monthly intervals. The researcher utilized a histogram and box-plot to evaluate for outliers. The researcher addressed the extreme outlier. The plot of the data indicated if logarithms of the data, differencing, were needed to address seasonality or stationarity (Harvey, 1993).

The stationarity needed to be addressed before the ARIMAX ( $p, d, q, n$ ) model could be developed. The order of integration, identified as  $I(d)$ , was identified and assessed. The researcher reviewed the autocorrelation function plot (ACF) for signs of stationarity. An Augmented Dickey-Fuller test and Phillips-Perron test were utilized to assess if stationarity

exists. The tests revealed the data were nonstationary, the researcher made it stationary by taking the difference. After the first difference was taken, the Augmented Dickey-Fuller test and Phillips-Perron tests were run again to verify if the data are stationary. If it is not, a second differencing may be run. This process continued until the transformed time series data were statistically determined stationary. The series is stationary if  $I(0)$  and is designated as ARIMAX  $(p,0,q,n)$ . If  $d=1$ , then the series requires differencing to make it stationary and is given an ARIMAX  $(p,1,q,n)$  designation. The same differencing level was applied to the dependent variable and the explanatory variables. Once the differencing scheme has been determined, the researcher completed the test for white noise to determine if an ARIMA model was appropriate. It was determined that an ARIMA was appropriate for the time-series data.

The researcher ran a Granger's causality test to determine if the time-series data of the payroll employment levels and unemployment levels are useful in predicting embezzlement incidents. The Granger causality test was performed on the dependent and independent variables in their current form. The explanatory variables must not receive significant causality from the dependent variable (Andrews et al., 2013). The reverse Granger causality test was completed to determine if the dependent variable displayed a causal relationship with the explanatory variables. If the dependent variable displays a causal relationship with an explanatory variable, the variable needed to be removed from the model. The explanatory variables were removed from the ARIMAX model. It was determined that the test for multicollinearity was not necessary.

Due to the removal of the explanatory variables, the researcher proceeded to develop an ARIMA model for the dependent variable. The autoregressive AR term ( $p$ ) was identified and assessed. Autoregression is the extent to which data are anticipated to be related over time



(Yaffee & McGee, 2000). The autoregressive processes represent lags in the time series. The order  $p$  is the highest number of significant lags in the series. The moving average (MA) component,  $q$ , was then assessed. Component  $q$  is a function of current and past shocks around a mean or intercept (Yaffee & McGee, 2000). Correlograms were generated to visualize the relationship between lagged variables in the time series. This includes plots of the autocorrelation function (ACF) and partial autocorrelation function (PACF) which were utilized to assess the seasonality of the time series (Yaffee & McGee, 2000). If no autocorrelation is shown, the time series is referred to as white noise (Hyndman & Athanasopoulos, 2018). If a significant correlation is present, it can be reduced by adjusting the combination of autoregressive (AR) and moving average (MA) terms. The residuals were checked to determine if the residuals show autocorrelation. Lastly, the residuals were plotted to check for normality.

### ***Hypotheses 3 and 4 Testing***

The third null hypothesis proposed is there is no significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition determined by wages and salary disbursement levels. The fourth null hypothesis is there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by housing prices. Both wages and salary disbursement levels and housing prices are reported at quarterly intervals. The ARIMAX model analysis included both explanatory variables. The data analysis plan for hypotheses three and four followed the same steps as detailed above for hypotheses one and two. The difference here is related to the time interval and the explanatory independent variables. The differences in the data plan are noted below.

The researcher plotted the series of data against time to visualize the data (Yaffee & McGee, 2000). The time plot charted the incidents of embezzlement over the 15 years on a quarterly basis to correspond with the time interval of the explanatory variables. The researcher utilized a histogram and box-plot to evaluate for outliers. The stationarity of the quarterly embezzlement incidents was assessed using the Augmented Dickey-Fuller test and the Phillip-Perrons test. Differencing took place to address the non-stationarity of the data. This process repeated until the Augmented Dickey-Fuller test and the Phillip-Perrons test results noted that data were stationary. Depending on the number of differencing schemes, the explanatory variables have the same differencing scheme applied.

Once the differencing scheme has been determined, the researcher completed the test for white noise to determine if an ARIMA model was appropriate for the time-series data. It was determined that an ARIMA was appropriate. Next, the researcher followed the same steps to develop the ARIMAX model that was performed for hypotheses one and two. The Granger causality test was run to determine if there was reverse causality (Andrews et al., 2013). Insignificant independent variables were identified and removed from the model. It was determined that wages and salary disbursement levels and housing prices did not require testing for multicollinearity. The removal of the explanatory variables resulted in a strictly ARIMA model for quarterly embezzlements. The regression model was run. The check for white noise of the residuals was completed to determine if the residuals show autocorrelation. The residuals were plotted to check for normality.

### ***Summary of Data Analysis***

The researcher worked to develop two ARIMAX models to address the research questions. The ARIMAX factors in explanatory independent variables for a single dependent

variable. The ARIMAX models quantified if there is any impact the explanatory independent variables including payroll employment, unemployment, wages and salary disbursements, and housing price levels have on embezzlement incidents. The two ARIMAX time series models included the data collected at the same time intervals. Hypotheses one and two include payroll employment and unemployment which are measured monthly and were included in one model. Hypotheses three and four include wages and salary disbursements and housing levels which are measured quarterly and were included in the other model.

### **Reliability and Validity**

Reliability and validity refer to the determination of accuracy and credibility of research findings (Creswell, 2014). Reliability is present when a study can be repeated and result in consistent findings (Scott & Morrison, 2006). Validity is present when meaningful results are drawn from the analysis (Creswell, 2014). A discussion of the reliability and validity of this study is included below.

#### ***Reliability***

Reliability refers to the ability to replicate the study and produce the same results (Salkind, 2010). The researcher provided details related to data collection and analysis, so that another researcher could perform the study and draw the same conclusions. This quantitative study utilized publicly available archival data to address the research questions. Secondary data provides access to data that were collected over an extended time period (Vartanian, 2011). The archival data collected related to embezzlement and economic indicators span a period of 15 years.

The archival data sources that were utilized include large well-known governmental agencies, which are considered authoritative (Walliman, 2018). The FBI published the

embezzlement data. The Federal Reserve Bank of Boston published the economic indicator data for New England. The sources of the economic indicators include the U.S. Bureau of Economic Analysis, U.S. the Bureau of Labor Statistics, and the Federal Housing Finance Agency.

Utilizing archival data provided the researcher with access to large amounts of data that would not be economically or practically feasible to collect (Vartanion, 2011). The data collected did not require coding to be included in the analysis. The raw data were available on the organization's websites for the reader to access. The researcher had no influence over the data.

### ***Validity***

Validity in quantitative research refers to the research utilizing data to support the construct it is intended to measure (Salkind, 2010). Threats to validity can influence the conclusion of the research (Creswell, 2014). There are three areas of validity that need to be addressed: internal validity, external validity, and statistical conclusion validity (Creswell, 2014). Consideration of these three areas of validity is included below.

Internal validity refers to the factors related to collecting data for an experiment (Creswell, 2014). This research study is a non-experimental quantitative study. Although this is not an experimental study, the threat of instrumentation is still present. The use of secondary data does not provide the researcher with control over the data collection instruments (Vartanion, 2011). Instrumentation is a threat to internal validity with potential changes in the collection of economic indicators and embezzlement crime. The threat related to instrumentation is thought to be minimal because the majority of federally funded data collections utilize the knowledge of experts to ensure the instrument is developed to include the proper constructs and measures to understand the issue being studied (Pienta et al., 2011). The researcher utilized data collected

through instruments designed by large well-known governmental agencies, which are considered to be authoritative.

External validity threats are present when the researcher draws incorrect inferences and generalizes results beyond the study (Creswell, 2014). The researcher used a time-series analysis to investigate the relationship between embezzlement and select economic indicators in New England. The study described the correlation among the variables including the number of cases of embezzlement and economic indicators; it did not assume a causation relationship between the two phenomena (Abbott & McKinney, 2012; Lappe, 2000). The population included embezzlement incidents that were reported to law enforcement participating in the FBI NIBRS crime collection process in New England. The sample included 100% of the population for the years 2004 through 2018. The results of this study may not be explanatory for years before 2004. The population and sample include embezzlement incidents in New England. The results of this study were related to the New England region included. Generalizing the results of this study to regions outside of New England should be done with care.

Statistical conclusion validity refers to accurate conclusions being drawn from the data (Creswell, 2014). The researcher analyzed the correlation between economic indicators and embezzlement for 15 years. Time series analysis has been utilized by researchers to look at changes in crime and economic conditions over time (Detotto & Otranto, 2012; Greenberg, 2001; Nordin & Almén, 2017; Shin, 2017). Power computation methods are not included in statistical literature for time series analysis (McLeod & Vingilis, 2008). A minimum of 50 data observations and preferably 100 data observations should be included in a time series analysis (Box et al., 2016). There are 180 data observations for research questions one and two and 60 data observations for research questions three and four. All four questions meet the minimum of

50 data observations recommended (Box et al., 2016; Yaffee & McGee, 2000). The number of data points and time series analysis is appropriate for this study

### ***Summary of Reliability and Validity***

Consideration of the reliability and the validity of this study were discussed. The ability to replicate the study and achieve the same results influences the study's reliability (Scott & Morrison, 2006). The researcher utilized publicly available archival data from large governmental sources that the researcher has no control over. Validity is present when meaningful results are drawn from the analysis (Creswell, 2014). Validity was addressed from three aspects: internal validity, external validity, and statistical construct validity. Reliability and validity are important considerations in the interpretation of quantitative research results (Creswell, 2014).

### **Summary of Section 2 and Transition**

Section 2 provided a discussion of the necessary components for the completion of the project. This section began with a restatement of the purpose statement. The roles of the researcher and participants were defined. A discussion of the research method and research design was provided. Explanation of the population and sample selection for the study were included. Details of data collection instruments, techniques, and organization were incorporated. Data analysis was detailed including a discussion of the variables that were used in the study and the analytical model used to test the hypotheses of the study. Lastly, the reliability and validity of the study were considered as it relates to this quantitative study.

Section 3 includes the results of the study and the application to professional practice. This section highlights the data collected and encompass the data analysis findings. Section 3 contains the application to professional practice, recommendations for action, and

recommendations for further study. The researcher's reflection on the experience with the research process and a summary are also be included.

### **Section 3: Application to Professional Practice and Implications for Change**

This study was completed to determine if there was a relationship between the economic indicators selected and embezzlement incidents in New England. Section 3 first provides an overview of this study. Next, the details and results of this quantitative research study are presented. The relationship of the research findings to the research questions, the theoretical framework, the literature, and the study problem are provided. The application of the study to professional practice and application strategies are included. Next, recommendations for further study are given. Lastly, the researcher provided reflections on the study, including personal, professional, and biblical perspectives.

#### **Overview of the Study**

The purpose of this quantitative study was to investigate the relationship between economic indicators and embezzlement incidents. After completing a literature review about the study topic, a gap in the research was identified related to embezzlement and the macroeconomic conditions of a region. The specific problem studied was the negative impact of embezzlement on businesses in New England resulting in losses to businesses. To analyze this problem, the researcher developed four quantitative research questions about the influence of economic indicators in New England on the number of embezzlement cases. The four economic indicators included in the study were payroll employment, unemployment rate, wages and salary disbursements, and the home price index.

The researcher designed a quantitative correlational analysis study to investigate if the economic indicators selected helped predict embezzlement incidents in the region. Understanding the impact of economic indicators on embezzlement may help organizations better assess risk associated with misappropriation of assets and design controls to mitigate risk.



Archival data were collected for the economic indicators and embezzlement incidents to address the research questions. The researcher worked to develop two autoregressive integrated moving average with explanatory variable models (ARIMAX). The economic indicators were identified as the explanatory variables. Embezzlement incidents were the dependent variable. The Granger causality test was utilized to determine if the economic indicators improved the prediction of embezzlement incidents. The researcher found the economic indicators did not improve the prediction of embezzlement incidents.

### **Presentation of the Findings**

Time-series analysis was used to analyze the relationship among the different time-series variables. Time-series data were collected for five variables. The dependent variable was embezzlement incidents in New England. The explanatory or independent variables were payroll employment, unemployment rate, wages and salary disbursements, and home price index. Time-series data for each of the variables was collected to incorporate in the analysis. Data were collected for five variables over a 15 year period of time. The starting time period was January 2004 and the ending time period is December 2018. Multivariate time-series examines the relationships among numerous time-series (Box et al., 2016). The data for the explanatory variables included in the study are published at different time intervals, monthly and quarterly. The payroll employment and unemployment rate are published monthly. The wages and salary disbursements and home price index are published quarterly. The researcher investigated the relationship between multiple variables over time using time-series analysis.

Time-series analysis requires that data observations be collected at consecutive equal time periods (Yaffee & McGee, 2000). Two time-series models were needed to address the research questions. The dependent variable was investigated first to determine the autoregressive

integrated moving average (ARIMA) model before adding explanatory variables. The two separate ARIMA models were developed. One model addressed research questions one and two and related hypotheses. The second model addressed research questions three and four and the related hypotheses. Statistical analysis was performed to determine the inclusion of explanatory variables. Two autoregressive integrated moving average with explanatory variables (ARIMAX) analysis models are required to address the research questions and to incorporate the explanatory variables collected at different time intervals in the study.

Time-series analysis is used when observations are collected continually over time periods (Tabachnick & Fidell, 2013). Time-series analysis assumes weak stationarity, data collected at equal time intervals, and a minimum of 30-50 data observations (Yaffee & McGee, 2000). Stationarity or unit root in time-series analysis is present when “the mean and variance remain consistent over time” (Yaffee & McGee, 2000, p. 77). The stationarity of the data was determined during the data analysis. The embezzlement data were collected over equal periods, monthly and quarterly. The data collected over 15 years, meets the minimum data observations for time-series analysis. The researcher investigated the relationship between embezzlement and various economic indicators over time. Time-series analysis was determined to be appropriate for this study.

### ***Descriptive Statistics***

This section describes the data used to address the research questions. This study used archival data from 2004 to 2018 to test the hypotheses related to each research question. The embezzlement incident data for the New England states were collected from the National Incident-Based Reporting System (NIBRS). The total number of embezzlement incidents in New England for the 2004 to 2018 period was 20,726. The frequency of explanatory variable

reporting required the embezzlement data to be organized both monthly and quarterly. The data for each state was organized into monthly incidents and then quarterly incidents to perform data analysis. Table 5 presents the frequency of embezzlement incidents by New England state.

**Table 5**

*Embezzlement Incidents by State*

Location	Number of Incidents (n)	Percent of Total
Connecticut	4,271	21%
Maine	821	4%
Massachusetts	8,186	39%
New Hampshire	2,559	12%
Rhode Island	3,590	17%
Vermont	1,299	6%
New England	20,726	100%

Source: National Incident-Based Reporting System data for years 2004-2018.

The state with the most incidents was Massachusetts with 8,186 incidents, representing 39% of the total embezzlement incidents reported during the period. The state with the lowest number of incidents was Maine, reporting 4% of the total embezzlement incidents in New England. This low rate in Maine is reflective of limited participation by Maine agencies in the NIBRS.

Table 6 presents the frequency of embezzlement incidents by year. The year with the most incidents was 2008 with 1,604 incidents representing 7.74% of the total incidents. The year with the lowest number of incidents was 2004 for 3.84% of embezzlement incidents included in the study. This study used time-series analysis for embezzlement over a 15-year period of time.

**Table 6***Embezzlement Incidents by Year*

Year	Number of Incidents (n)	Percent of Total
2004	795	3.84%
2005	1189	5.74%
2006	1347	6.50%
2007	1471	7.10%
2008	1604	7.74%
2009	1552	7.49%
2010	1363	6.58%
2011	1399	6.75%
2012	1407	6.79%
2013	1356	6.54%
2014	1513	7.30%
2015	1495	7.21%
2016	1498	7.23%
2017	1418	6.84%
2018	1319	6.36%
Total	20,726	100%

Source: National Incident-Based Reporting System data for years 2004-2018.

Archival economic indicator data for New England was also collected for the years 2004 to 2018. The archival data were collected from the Federal Reserve Bank of Boston. The economic indicators are the explanatory variables of the statistical model. Data on the four economic indicators, payroll employment, unemployment rate, wages and salary disbursement, and home price index, were collected. The Federal Reserve Bank of Boston presents the regional data for New England collected from the following federal agencies: U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Federal Housing Finance Agency. The data were stored in Microsoft Excel files. The economic indicator data collected included additional years

that were not included in the study. The data for years before 2004 and after 2018 were removed from the files, so that only the 15 year period included in the study was collected. The original files were saved for review. Time-series analysis requires data to be collected at equal time intervals (Yaffee & McGee, 2000). The economic indicator data were collected monthly for payroll employment and unemployment rate. The economic indicator data were collected quarterly for wage and salary disbursement and the home price index. Time-series analysis requires that the monthly and quarterly variables be separated into different models. The reporting frequency of the economic indicator data required the analysis of the research questions using two statistical models.

The first ARIMAX model included the data for variables collected monthly. This includes the dependent variable of monthly embezzlement (EMBEZMO) and explanatory variables: payroll employment (PREMPL) and unemployment rate (UNEMP). The descriptive statistics for data collected for the monthly variables are shown in Table 7.

**Table 7**

*Descriptive Statistics for Monthly Variables*

	EMBEZMO	PREMPL	UNEMP
N= Valid	180	180	180
N= Missing	0	0	0
Mean	115.14	7072.027	5.638
Median	117.00	7035.500	4.950
Std. Deviation	21.404	205.2878	1.582
Range	163	724	5.3
Minimum	49	6772.2	3.3
Maximum	212	7496.2	8.6

The lowest number of monthly embezzlement incidents occurred in February 2004. The highest number of incidents occurred in May 2009. The lowest payroll employment was recorded in November 2009. The highest payroll employment was recorded in December 2018. The lowest unemployment occurred in the last quarter of 2018, with 3.3% unemployment for October, November, and December of 2018. The highest unemployment rate occurred at the end of 2009 and beginning of 2010, with 8.6% unemployment for December 2009, January 2010, and February 2010. Changes in employment levels influence consumer sentiment and behavior (Breedon, 2016; Zandi, 2018). Payroll employment and unemployment rate are two employment measures that are considered leading economic indicators (Mazurek & Mielcová, 2017).

The second ARIMAX model included the dependent variable of quarterly embezzlement (EMBEZQ) and explanatory variables: wages and salary disbursement (WSD) and home price index (HPI). These explanatory variables were included in a second model due to the interval of data observation. Both explanatory variables are measured quarterly. The descriptive statistics for data collection related to the variables included in the second model are in Table 8.

**Table 8**

*Descriptive Statistics for Quarterly Variables*

	EMBEZQ	WSD	HPI
N= Valid	60	60	60
N= Missing	0	0	0
Mean	345.43	398808.55	540.8890
Median	350	384716.00	535.80
Std. Deviation	53.694	52296.153	35.90369
Range	304	190017	119.19
Minimum	172	311739	489.06
Maximum	476	501756	608.25

The lowest number of quarterly embezzlements were reported in the first quarter of 2004. The largest number of quarterly embezzlements were reported in the second quarter of 2009. The lowest level of wage and salary disbursements and the home price index were both recorded in the first quarter of 2004. The largest level of wage and salary disbursements and the home price index were recorded in the fourth quarter of 2018. Wage and salary disbursement and home price index fluctuate with the economic conditions and business cycles. The highest values in 2018 are reflective of the long economic expansion that started in 2009 (NBER, 2020).

### ***Hypotheses 1 and 2***

The first and second research question investigates the relationship between economic indicators collected monthly and monthly embezzlement incidents. Both payroll employment and unemployment are reported every month. Exploration of the correlation of these explanatory variables and embezzlement incidents was completed.

RQ1: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by payroll employment levels?

RQ2: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by unemployment levels?

H1<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by payroll employment levels.

H1<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by payroll employment levels.

H2<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by unemployment levels.

H2<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by unemployment levels.

A time-series analysis was determined to be appropriate to address research questions one and two. The monthly explanatory variables, payroll employment and unemployment rate, were included in the first time-series analysis. The specific time-series analysis model selected to address the research questions was autoregressive integrated moving average with explanatory variables (ARIMAX). The quantitative analysis included multiple steps and statistical tests. The dependent variable, monthly embezzlement incidents, data were first reviewed for missing data, outliers, and stationarity. Once stationary, the data were tested for white-noise. Then Granger causality tests were completed to test for causality between the dependent variable and each of the explanatory variables. The time-series model was developed based on the results of the prior statistical tests. The researcher completed data analysis using SAS Studio Software with the exception of the Granger causality tests. The researcher used RStudio Software to complete the Granger causality tests. Each step and statistical procedure with results are provided to support the findings.

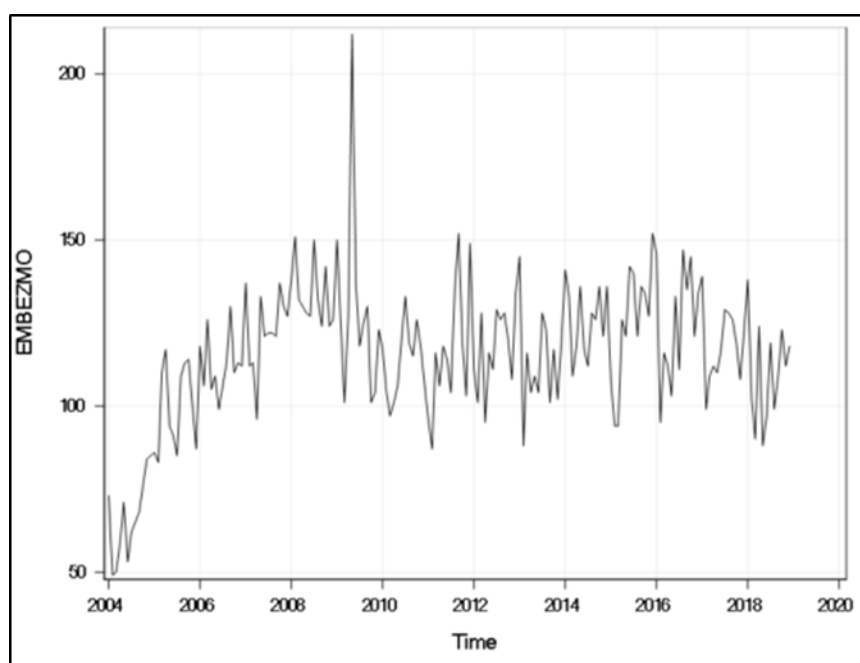


The first step in time-series analysis is to visualize the data. The monthly embezzlement incident data were first plotted against time to visualize the data. Visualization of the data allows for the examination of outliers, missing data, or non-stationarity (Yaffee & McGee, 2000).

Figure 3 presents the graph of monthly embezzlement incidents in New England plotted against time. The series graph indicated there was an outlier in the data collected.

**Figure 3**

*Series Plot Monthly Embezzlement Incidents between January 2004 and December 2018.*



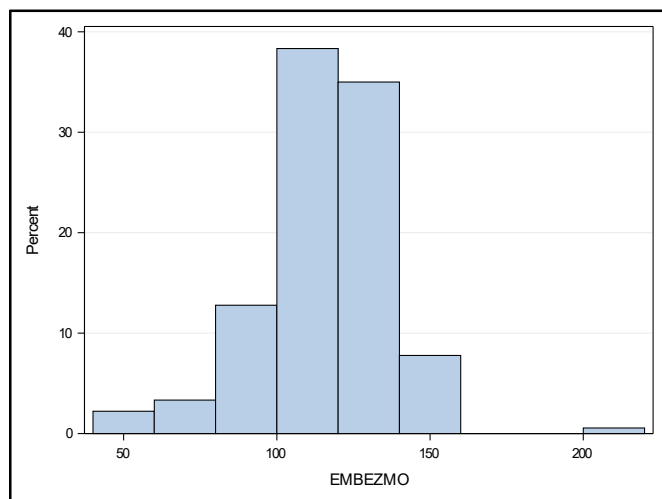
Source: National Incident-Based Reporting System data for years 2004-2018.

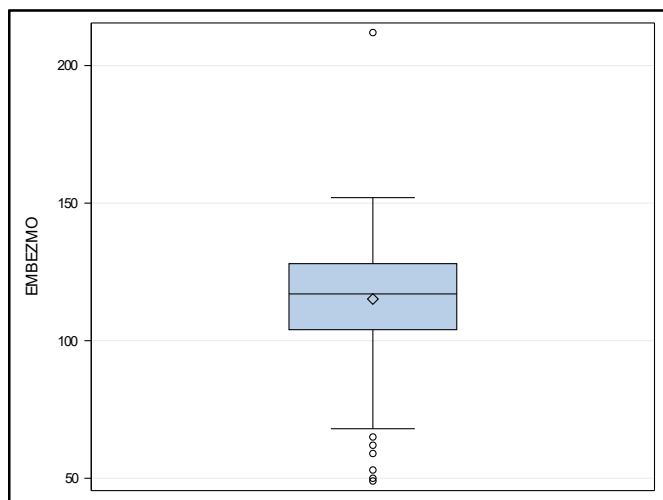
The appearance of outliers in the series plot was further investigated through a review of the histogram and the box-plot. The histogram, shown in Figure 4, indicated that there was an outlier to the right. The box-plot, shown in Figure 5, indicated there were outliers in the data. Outliers influence data analysis, so outliers are addressed before completing the analysis. The researcher used a box plot to identify any extreme outliers. Extreme outliers are high or low values of the variable that misrepresent statistics (Hyndman & Athanasopoulos, 2018;

Tabachnick & Fidell, 2013). Time-series analysis is sensitive to extreme outliers. The presence of an extreme outlier can skew the results. The extreme outliers were identified and addressed before moving forward with the analysis (Tabachnick & Fidell, 2013). A value that is three times the interquartile range above the upper quartile or below the lower quartile is considered an extreme outlier (Mishra et al., 2019). Using three times the interquartile range rule, the researcher determined the upper limit of an extreme outlier to the right to be 200 and the lower limit of an extreme outlier to the left to be 32. There was one extreme outlier at 212 embezzlement incidents, relating to data point number 65 for May 2009. The researcher assessed the extreme outlier.

**Figure 4**

*Histogram of Monthly Embezzlement Incidents*



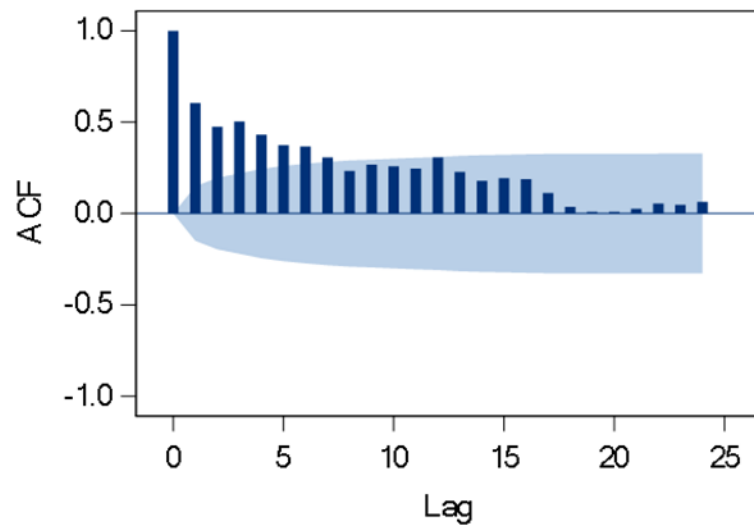
**Figure 5***Box-Plot of Monthly Embezzlement Incidents*

The first step taken in reviewing the outlier was to determine if there was incorrect data entry (Tabachnick & Fidell, 2013). The researcher reviewed the data for May 2009 and noted that Rhode Island had a large number of embezzlement incidents in comparison to the other New England states and other months in Rhode Island. The researcher went back to the raw data from the NIBRS to determine if there was an error in the incident count for Rhode Island in May 2009. There was not an error in the data count for Rhode Island. The researcher reviewed the other states' original data for May 2009 to verify recorded amounts. The raw data supported the number of incidents included in the data set. This supported there was not a data entry error. Noting there was not a data entry error, the researcher took additional steps to analyze the extreme outlier.

There is a variety of methods for addressing the outlier once data entry is verified. The second step in reviewing the outlier is to determine if the outlier can be removed from the data (Tabachnick & Fidell, 2013). Time-series analysis requires no missing values (Yaffee & McGee, 2000), so removing the outlier is not an option in this study. The second option for addressing

the outlier is to transform the variable to reduce the impact of the outlier. The researcher transformed the variable by taking the natural log of the variable (Tabachnick & Fidell, 2013). The box plot was run a second time using the transformed variable to determine if the transformation reduced the outlier. The box plot showed the point was still an extreme outlier. The researcher determined that winsorization would be used to modify the outlier (Kwak & Kim, 2017). To winsorize the extreme outlier, the researcher relocated the largest observation to its nearest neighboring point (Dixon, 1980). The extreme outlier is noted as data point 65 with a value of 212. The next highest data point is case number 93 with a value of 152. To winsorize data point 65, the value was changed to 152. The data set with the winsorized extreme outlier was used going forward in the analysis of the monthly data.

The visualization of data also helps determine if the data are stationary. The graph of the monthly embezzlement incidents was visually reviewed for stationarity. The trend and correlation analysis of monthly embezzlement incidents was completed to determine stationarity. The researcher reviewed the autocorrelation function plot (ACF) for stationarity. A stationary time-series shows a large spike at lag 1 on the ACF (Nau, 2014). The researcher noted based on visual inspection of the ACF shown in Figure 6 that stationarity needs to be further explored.

**Figure 6***Autocorrelation Function Plot of EMBEZMO*

A statistical test was used to confirm if stationarity exists. A stationary time-series has a constant mean and variance over time (Tabachnick & Fidell, 2013). The monthly embezzlement data were tested for stationarity using the Augmented Dickey-Fuller unit root test and the Phillips-Perron unit root test. The stationarity of the dependent variable data, monthly embezzlement incidents, was first addressed. The null hypothesis for the unit root test is that the time-series data are non-stationary (Yaffee & McGee, 2000). The alternative hypothesis is the time-series data are stationary (Yaffee & McGee, 2000). The time-series data needs to be zero mean stationary for the Granger causality test performed later in the analysis (Granger, 1969). The p-values for the zero mean tests were above the significance level of .05. The results fail to reject the null hypothesis and differencing is needed. The results of both the Augmented Dickey-Fuller test and the Phillips-Perron test are included in Table 9.

**Table 9***Stationarity Test for EMBEZMO*

Type	Lags	Unit Root Tests							
		Augmented Dickey-Fuller				Phillips-Perron			
		Rho	Pr <	Tau	Pr <	Rho	Pr <	Tau	Pr <
		Rho			Tau	Rho			Tau
Zero Mean	0	-1.7736	0.3576	-0.87	0.3400	-1.7736	0.3576	-0.87	0.3400
	1	-0.5780	0.5524	-0.41	0.5326	-1.0302	0.4668	-0.63	0.4445
	2	-0.0184	0.6777	-0.02	0.6754	-0.5093	0.5671	-0.39	0.5400
	3	0.0827	0.7010	0.10	0.7149	-0.3966	0.5920	-0.33	0.5651

The researcher took the difference of the monthly embezzlement data to address non-stationarity. Both the Augmented Dickey-Fuller unit root and the Phillips-Perron unit root tests were completed on the differenced data to determine stationarity. The p-values of results of the stationarity test on the differenced data were below .05, so the null hypothesis was rejected and the data were determined to be differenced stationary. The first-order difference was included in the ARIMAX model,  $d=1$ . The results of the unit root test for the differenced dependent variable are included in Table 10.

**Table 10***Stationarity Test for Differenced Variable EMBEZMO(1)*

Type	Lags	Unit Root Tests							
		Augmented Dickey-Fuller				Phillips-Perron			
		Rho	Pr <	Tau	Pr <	Rho	Pr <	Tau	Pr <
		Rho			Tau	Rho			Tau
Zero	0	-243.039	0.0001	-19.62	<.0001	-243.039	0.0001	-19.62	<.0001
Mean	1	-554.310	0.0001	-16.62	<.0001	-231.780	0.0001	-20.27	<.0001
	2	-1683.31	0.0001	-11.98	<.0001	-209.597	0.0001	-22.57	<.0001
	3	1644.115	0.9999	-9.79	<.0001	-202.245	0.0001	-23.93	<.0001

The stationarity of the two explanatory variables, payroll employment and unemployment rate, were also assessed. The same level of differencing was applied to all explanatory variables in the model (Andrews et al., 2013). The researcher confirmed the differenced explanatory variables were stationary using the augmented Dickey-Fuller test and the Phillips-Perron test. From this point forward in building the model data included the differenced dependent and explanatory variables.

Analysis was completed to test for white noise to determine if an ARIMA model is appropriate for the series. The null hypothesis for the check for white noise is there are no autocorrelations of the “series up to a given lag are significantly different from zero” (SAS Institute Inc. [SAS], 2016). The alternative hypothesis for the white noise test is there are autocorrelations between lags in the time-series. Table 11 shows the results of the white noise test. The p-values in Table 11 for the autocorrelations through lag 24 are shown as <0.0001, which means the series is not white noise. The white noise null hypothesis was rejected. An ARIMA model is appropriate for the time-series data of embezzlement incidents (SAS, 2016).

**Table 11***Autocorrelation Check for White Noise of Differenced EMBEZMO*

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	37.75	6	<.0001	-0.366	-0.204	0.137	-0.008	-0.082	0.075
12	51.15	12	<.0001	0.024	-0.143	0.063	0.013	-0.101	0.186
18	54.41	18	<.0001	-0.042	-0.060	0.028	0.074	-0.001	-0.069
24	57.36	24	0.0001	-0.016	-0.018	-0.015	0.035	-0.040	0.103

Next, the Granger causality tests were performed. The Granger causality tests were performed using RStudio statistical software. Granger causality test is used to “measure the degree to which two series are related” (Granger, 1969). The Granger causality test requires that each variable be a stationary time-series with zero means (Granger, 1969). The zero mean stationarity was determined by the Augmented Dickey-Fuller test and Phillips-Perron test described above. Granger causality test is used to determine if one variable will improve the prediction of the dependent variable. The test was performed to determine causality between the dependent variable and the independent variables. Feedback of the explanatory variable on the dependent variable was determined with the reverse causality tests (Andrews et al., 2013). The number of lags selected for the Granger causality test was six.

The Granger causality between embezzlement and payroll employment was tested first. The null hypothesis for the Granger causality test was payroll employment does not Granger cause monthly embezzlement incidents. The alternative hypothesis was payroll employment does Granger cause monthly embezzlement incidents. The results of the Granger causality test are



presented in Table 12. The p-values fail to reject the null hypothesis that payroll employment does not Granger cause monthly embezzlement incidents. This means that the explanatory variable payroll employment does not improve the predictability of monthly embezzlement incidents. Payroll employment should not be included as an explanatory variable for the ARIMAX model used to predict monthly embezzlement incidents.

The reverse Granger causality was also tested to see if monthly embezzlement incidents Granger cause payroll employment. The null hypothesis for the reverse Granger causality test was monthly embezzlement incidents do not Granger cause payroll employment. The alternative hypothesis is monthly embezzlement incidents do Granger cause payroll employment. The F test resulted in a statistically significant p-value for lags 1 through 5. The results of the F test are shown below in Table 12. The results indicate that embezzlement incidents Granger cause payroll employment. Reverse causality confirms the need to remove the variable from the model.

**Table 12**

*Granger Causality Test for Explanatory Variable Payroll Employment*

Null Hypothesis		PREMPL(1) does not Granger cause EMBEZMO(1)		EMBEZMO(1) does not Granger cause PREMPL(1)	
Lags	Res. Df	F-stat	Pr(>F)	F-stat	Pr(>F)
1	176	.9631	.3278	4.8779	.0285*
2	174	2.0248	.1352	4.3333	0.01459*
3	172	1.8099	.1472	3.5699	.01541*
4	170	1.6368	.1673	2.9273	.02259*
5	168	1.1172	.3533	2.315	.04603*
6	166	1.2546	.2815	1.7159	.1204

\* Significant at .05 level  
(1) Differenced variable

The Granger causality between monthly embezzlement and the unemployment rate was tested. The null hypothesis for the Granger causality test was unemployment rate does not Granger cause monthly embezzlement incidents. The alternative hypothesis was unemployment rate does Granger cause monthly embezzlement incidents. The results of the Granger causality tests are in Table 13. The p-values fail to reject the null hypothesis that the unemployment rate does not Granger cause monthly embezzlement incidents. This means that the explanatory variable unemployment rate does not improve the predictability of monthly embezzlement incidents and should be removed from the model.

The reverse Granger causality was also tested to see if monthly embezzlement incidents Granger cause the unemployment rate. The F test for the null hypothesis monthly embezzlement incidents do not Granger cause unemployment rate also resulted in p-values greater than .05. The results of the Granger causality tests are in Table 13. The test failed to reject the null hypothesis indicating that monthly embezzlement incidents do not help predict the unemployment rate.

**Table 13**

*Granger Causality Test for Explanatory Variable Unemployment*

Null Hypothesis		UNEMP(1) does not Granger cause EMBEZMO(1)		EMBEZMO(1) does not Granger cause UNEMP(1)	
Lags	Res. Df	F-stat	Pr(>F)	F-stat	Pr(>F)
1	176	.1307	.7181	.9653	.3272
2	174	.601	.5494	.713	.4916
3	172	.3748	.7713	1.0308	.3804
4	170	.3114	.8701	1.0274	.3948
5	168	.2662	.931	1.0496	.3905
6	166	.806	.5666	.7341	.6229

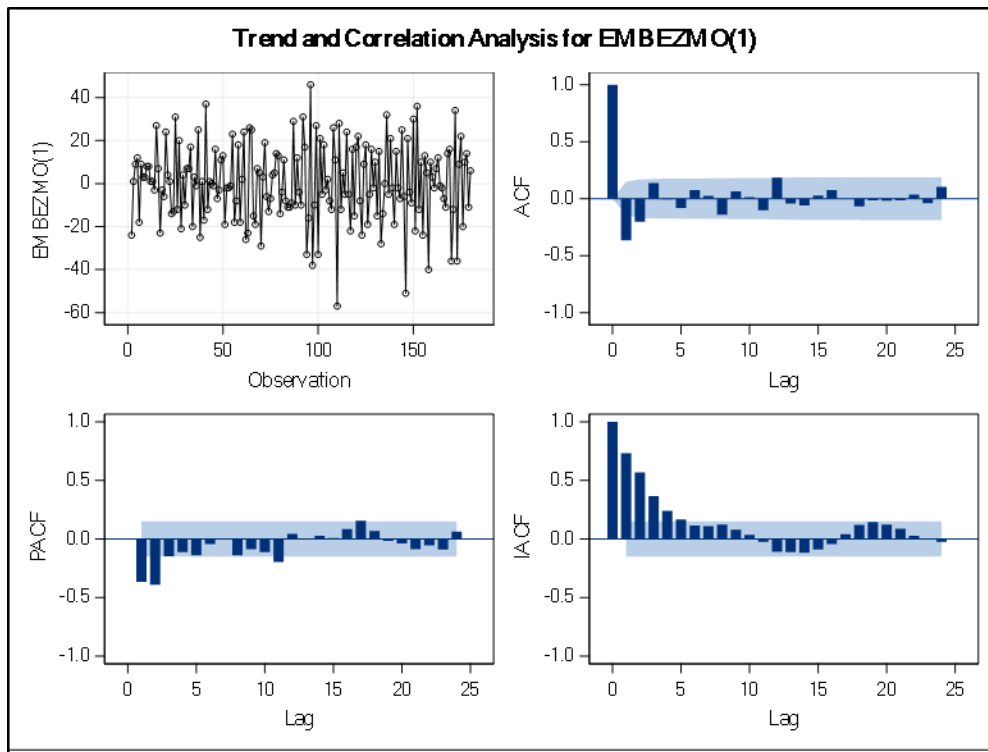
(1) Differenced variable

Based on the Granger causality tests, monthly embezzlement incidents are better predicted based on past data of embezzlement incidents alone and not correlated to the economic indicators of payroll employment and unemployment rate. The explanatory variables are removed from the model. The multicollinearity of the explanatory variables does not need to be explored due to the removal of the variables from the model. The resulting removal of the explanatory variables changes the model to strictly an ARIMA model versus an ARIMAX model.

The ARIMA ( $p, d, q$ ) model is developed to predict the incidents of monthly embezzlement based on the weighted sum of the previous values of incidents of embezzlement and the weighted sum of the last forecast errors (Nau, 2014). The differencing of 1 was taken of the monthly embezzlement incident data to achieve stationarity, so the integrated “I” term of the model is  $d=1$ . The autoregressive “AR” and moving average “MA” terms are determined to complete the model. To determine the AR and MA terms the researcher tried some of the standard combinations of  $p$  and  $q$  values, with consideration of the plots of the autocorrelations and partial autocorrelations of the differenced embezzlement data (Nau, 2014). Figure 7 shows the trend and correlation analysis for the differenced data, including the autocorrelation and partial autocorrelation plots. The autocorrelation (ACF) plot shows a significant spike at lag 1 and is followed by two smaller spikes. The significant spike at lag one indicates that the model should include at least one MA term (Nau, 2014). The partial autocorrelation (PACF) plot shows less significant spikes at lags 1 and 2. This indicates that the model may also include an AR term (Nau, 2014).

**Figure 7**

*Trend and Correlation Analysis for Differenced Monthly Embezzlement Data*



Based on the significant spike on the ACF plot the first models tested were ARIMA (0,1,1) with and without a constant. These models resulted in a significant MA term, but the autocorrelation check for residuals noted the residuals were not white noise, indicating the need for exploration of additional models. The researcher explored additional ARIMA models by first adding MA terms. The research then built AR terms into the models. Sixteen models were tested. For each model, the researcher recorded the AIC statistic and the t value of the highest order AR and MA terms. ARIMA (0,1,2) produced the lowest AIC statistic, but the MA term was insignificant at the 95% confidence level. The large spike on the ACF plot indicated that an MA term should be part of the ARIMA model. ARIMA (1,1,2) resulted in a slightly higher AIC statistic with a significant MA term. Table 14 shows the ARIMA models that were tested. The

descriptive statistic AIC is included for each model and the significance of the highest order AR, MA, and constant model terms.

**Table 14**

*ARIMA Model Statistics and Highest Order Term Significance*

ARIMA Model	AIC	AR		MA		Constant	
		t value	Approx. Pr> t	t value	Approx. Pr> t	t value	Approx. Pr> t
(0,1,1)	1479.243			14.22	<.0001*		
(0,1,1) +constant	1480.290			14.57	<.0001*	0.99	0.3225
(0,1,2)	1478.423			1.90	0.0574		
(0,1,2) +constant	1479.339			1.94	0.0527	1.05	0.2927
(0,1,3)	1478.493			-1.26	0.2071		
(0,1,3) +constant	1479.475			-1.24	0.2162	1.02	0.3086
(1,1,1)	1479.194	1.37	0.1716	12.41	<.0001*		
(1,1,1) +constant	1480.125	1.41	0.1598	12.91	<.0001*	1.05	0.2956
(1,1,2)	1478.450	-1.39	0.1649	2.27	0.0235*		
(1,1,2) +constant	1479.391	-1.38	0.1674	2.26	0.0239*	1.04	0.2995
(1,1,3)	1480.153	-0.41	0.6810	-0.42	0.6722		
(1,1,3) +constant	1481.127	-0.41	0.6794	-0.39	0.6952	1.02	0.3084
(2,1,1)	1479.234	-1.45	0.1464	0.67	0.5058		
(2,1,1) +constant	1480.259	-1.40	0.1609	8.38	<.0001*	1.00	0.3184
(2,1,2)	1480.012	-0.62	0.5326	0.95	0.3437		
(2,1,2) +constant	1481.000	-0.58	0.5611	0.96	0.3349	1.01	0.3116

\*Significant at 95% confidence interval.

The selection of an ARIMA model considers the descriptive statistics, the significance of the AR and MA terms, and the check for residuals. Nau (2014) noted the highest order AR and MA in an ARIMA model should have coefficients significantly different from zero. The t-statistics for the highest order AR and MA coefficients should be greater than two and have a p-

value of less than .05 (Nau, 2014). The model with the lowest Akaike' Information Criterion (AIC) is often the best model for forecasting (Hyndman & Athanasopoulos, 2018). Hyndman and Athanasopoulos (2018) recommend focusing on the AIC when selecting a model used for prediction. The researcher took the AIC, significance of terms, and residuals into consideration of selecting a model. The model selected for predicting embezzlement incidents was ARIMA (1,1,2). This model had an AIC slightly higher than ARIMA (0,1,2), but was selected due to the significance of the highest order MA term. The ACF plot indicated there should be at least one MA term. The AR term adds little to the model based on the significance of the highest order term. Table 15 shows the maximum likelihood estimation for the ARIMA (1,1,2) model.

**Table 15**

*Maximum Likelihood Estimation for Differenced Monthly Embezzlement Incidents*

Maximum Likelihood Estimation					
Parameter	Estimate	Standard Error	T Value	Approx Pr >  t	Lag
MA1,1	0.15468	0.30825	0.50	0.6158	1
MA1,2	0.47926	0.21157	2.27	0.0235*	2
AR1,1	-0.46211	0.33278	-1.39	0.1649	1

\*Significant at 95% confidence interval.

Based on the AIC value, the significance of the model terms, and the test of residuals, the ARIMA (1,1,2) was considered the best fit. The highest order autoregressive term is AR1,1. The highest order moving average term MA1,2 is significant with a t value of 2.27 and a p-value of less than .05. This means there is a relationship between the current value and the random shocks at lag 2 (Tabachnick & Fidell, 2013). The magnitude of the relationship is -0.47926. The model terms are listed in Figure 8. The model could be used to predict monthly embezzlement incidents.

**Figure 8**

*ARIMA (1,1,2) Model for Variable EMBEZMO*

Model for variable EMBEZMO	
Period(s) of Differencing	1
<i>No mean term in this model.</i>	
Autoregressive Factors	
Factor 1:	1 + 0.46211 B**(1)
Moving Average Factors	
Factor 1:	1 - 0.15468 B**(1) - 0.47926 B**(2)

The researcher checked the residuals of the model for autocorrelation. The test for residuals indicates if the residuals are white noise or if a more complex model needs to be developed (SAS, 2016). Table 16 shows the check for the white noise residuals for ARIMA (1,1,2) model. The test statistic p is greater than .05 for all lags, so we accept the no-autocorrelation hypothesis at a high level of significance. This means the residuals are white noise and the model is suitable.

**Table 16**

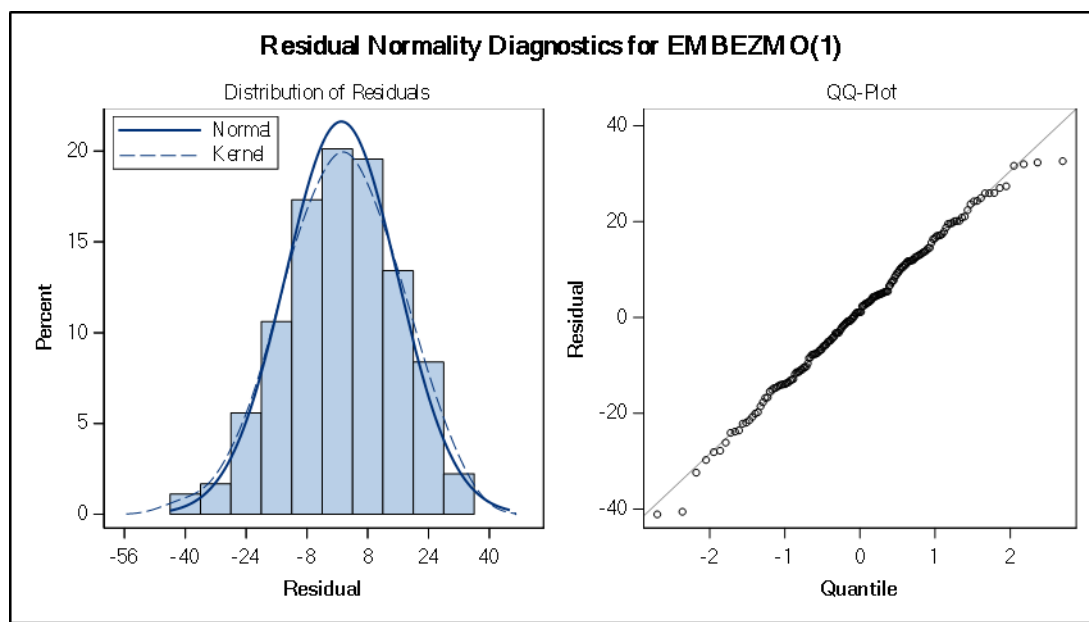
*Check for White Noise of Residuals for ARIMA (1,1,2) Model*

Autocorrelation Check of Residuals									
To									
Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	1.59	3	0.6626	-0.012	-0.016	0.048	0.021	-0.067	0.029
12	14.76	9	0.0978	-0.030	-0.125	0.008	0.038	0.013	0.224
18	20.91	15	0.1398	0.060	0.038	0.073	0.098	-0.007	-0.104
24	28.22	21	0.1341	-0.103	-0.081	-0.048	0.035	0.025	0.119
30	33.10	27	0.1938	0.023	-0.068	0.053	0.088	-0.022	-0.081

The residuals are also plotted to check for normality. The distribution of residuals shows the residuals follow the normal distribution curve with a small deviation. The distributions of residuals on the Q-Q plot show the residuals are approximately normally distributed, with a few points deviating at the tails of the plot. Figure 9 includes the residual normality diagnostics.

**Figure 9**

*Residual Normality Diagnostics for EMBEZMO (1)*



**Summary.** The researcher completed a detailed time-series analysis to address research questions one and two and the related hypotheses. The development of the time-series analysis model involved data collection, data preparations, and a series of statistical analyses. The researcher identified monthly embezzlement incidents as the dependent variable. Payroll employment and the unemployment rate were identified as the explanatory independent variables. The researcher collected monthly data for the dependent and independent variables over a period of 15 years for this study. The detail of all steps and statistical analysis was included above.



Statistical analysis determined if the economic explanatory variables of payroll employment and unemployment rate improved the prediction of embezzlement incidents in the model. The Granger causality test was used to determine if the explanatory variables would improve the prediction of embezzlement. The statistical test determined that both explanatory variables do not improve the prediction of embezzlement incidents at the 95% confidence level. The results of the Granger causality tests are presented in Table 12 and Table 13. The researcher concluded to remove both explanatory variables from the autoregressive integrated moving average (ARIMA) model. The researcher developed an ARIMA model for the prediction of monthly embezzlement incidents.

### ***Hypotheses 3 and 4***

The third and fourth research questions investigate the relationship between economic indicators collected quarterly and quarterly embezzlement incidents. Both wage and salary disbursement levels and the home price index are reported quarterly. Exploration of the correlation of these explanatory variables and quarterly embezzlement incidents was completed.

RQ3: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by wages and salary disbursement levels?

RQ4: Is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions in the region determined by changes in housing prices?

H3<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by wages and salary disbursement levels.

H3<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by wages and salary disbursement levels.

H4<sub>0</sub>: There is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by housing prices.

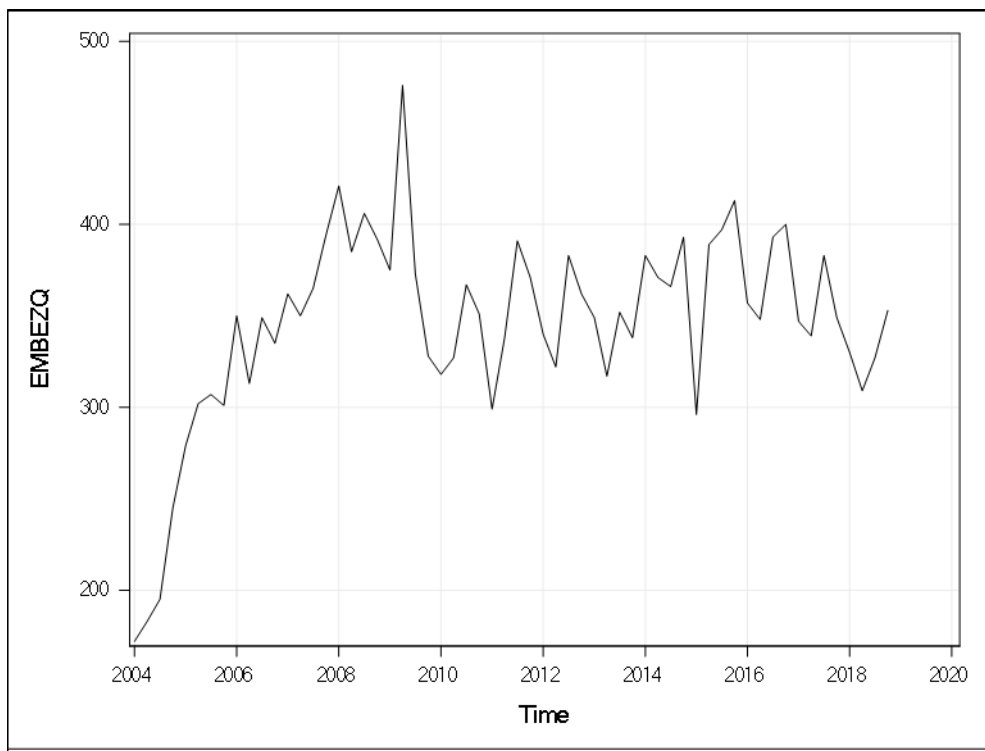
H4<sub>a</sub>: There is a significant statistical relationship between the number of discovered and reported acts of embezzlement in New England and the economic condition of the region determined by housing prices.

A time-series analysis was determined to be appropriate to address research questions three and four. The quarterly explanatory variables, wages and salary disbursement, and home price index, were included in the first time-series analysis. An autoregressive integrated moving average with explanatory variables (ARIMAX) model was the specific time-series analysis model selected. The quantitative analysis included multiple steps and statistical tests. The dependent variable, quarterly embezzlement incidents, data were first reviewed for missing data, outliers, and stationarity. Once stationary, the data were tested for white-noise. Then Granger causality tests were completed to test for causality between the dependent variable and each of the quarterly explanatory variables. The time-series model was developed based on the results of the prior statistical test results. The researcher completed data analysis using SAS Studio Software with the exception of the Granger causality tests. The researcher used RStudio Software to complete the causality tests. Each step, the statistical procedures, and the results are provided as support for the findings.

The first step in time-series analysis is to visualize the data. The researcher plotted quarterly embezzlement incident data against time to visualize the data. This process allows for the review of possible outliers, missing data, or non-stationarity (Yaffee & McGee, 2000). Figure 10 presents the graph of quarterly embezzlement incidents in New England plotted against time. The series graph indicated that there was an outlier in the data collected.

**Figure 10**

*Series Plot Quarterly Embezzlement Incidents between January 2004 and December 2018.*



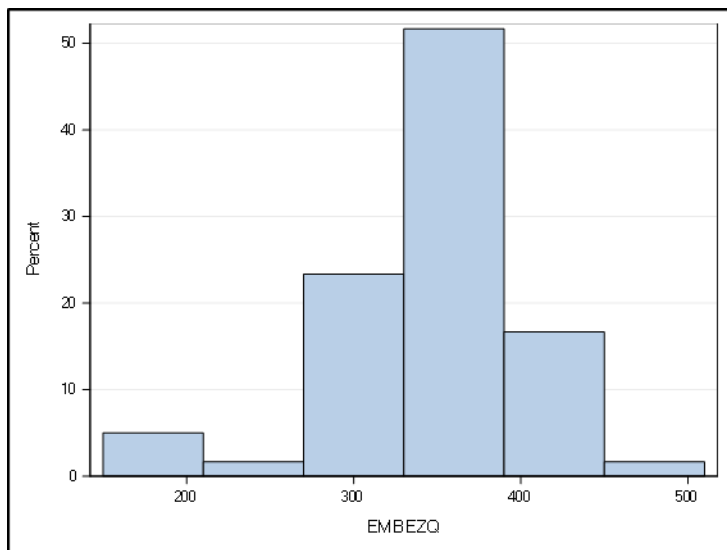
Source: National Incident-Based Reporting System data for years 2004-2018.

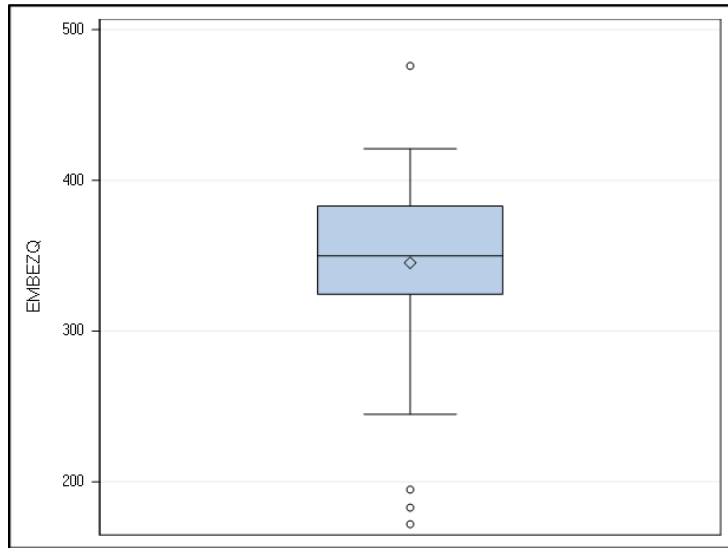
The series graph indicated that there might be outliers in the data collected. The researcher used a histogram and box plot to identify any outliers. The histogram in Figure 11 does not clearly indicate the presence of outliers. The box plot shown in Figure 12 shows four points as outliers. Outliers can influence the results of the data analysis and must be addressed before completing the time-series analysis (Tabachnick & Fidell, 2013). The researcher used the

three times interquartile range rule to identify if there were any extreme outliers. An extreme outlier is a value greater than three times the interquartile range above the upper quartile or below the lower quartile (Mishra et al., 2019). Using three times the interquartile range rule, the researcher determined the upper limit of an extreme outlier to the right to be 562 and the lower limit of an extreme outlier to the left to be 144. The researcher noted there were no extreme outliers and continued with the analysis without adjustments for outliers.

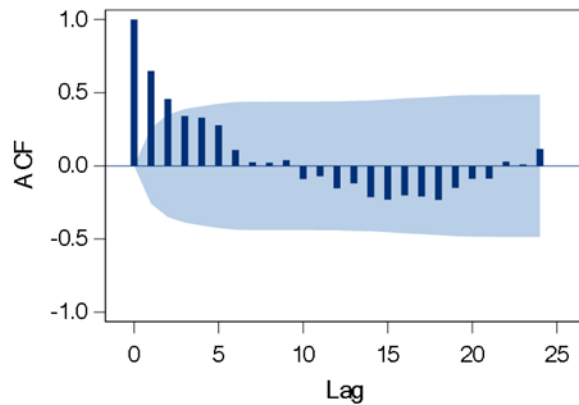
**Figure 11**

*Histogram of Quarterly Embezzlement Incidents*



**Figure 12***Box Plot of Quarterly Embezzlement Incidents*

The visualization of data also helps determine if the data are stationary. The researcher visually reviewed the graph of the quarterly embezzlement incidents for stationarity. To determine stationarity the trend and correlation analysis was completed. The researcher reviewed the autocorrelation function plot (ACF) for stationarity. The researcher noted based on visual inspection of the ACF in Figure 13 that the data were not stationary. A stationary ACF plot shows a large spike at lag 1.

**Figure 13***Autocorrelation Function Plot of EMBEZQ*

A statistical test was used to determine if stationarity exists. The dependent variable stationarity needs to be addressed before moving forward with the model or assessing the independent variables. A stationary time-series has a constant mean and variance over time (Tabachnick & Fidell, 2013). The quarterly embezzlement data were tested for stationarity using the Augmented Dickey-Fuller unit root test and the Phillips-Perron unit root test. The null hypothesis for the augmented Dickey-Fuller test and the Phillip-Perron unit root test is that the time-series data are non-stationary (Yaffee & McGee, 2000). The alternative hypothesis is the time-series data are stationary (SAS, 2018; Yaffee & McGee, 2000). The time-series data needs to be zero mean stationary for the Granger causality test performed later in the analysis (Granger, 1969). The p-values for the zero mean tests were above the significance level of .05. The results fail to reject the null hypothesis and it is determined the time-series is non-stationary. The results of both the Augmented Dickey-Fuller test and the Phillips-Perron test are included in Table 17. The time-series will need to be stationary to move forward with the analysis.

**Table 17***Stationarity Test for EMBEZQ*

Unit Root Tests									
Type	Lags	Augmented Dickey-Fuller				Phillips-Perron			
		Rho	Pr <	Tau	Pr <	Rho	Pr <	Tau	Pr <
			Rho		Tau		Rho		Tau
Zero Mean	0	0.0231	0.6845	0.03	0.6879	0.0231	0.6845	0.03	0.6879
	1	0.1545	0.7149	0.24	0.7519	0.1255	0.7081	0.17	0.7330
	2	0.1978	0.7252	0.38	0.7912	0.1895	0.7234	0.30	0.7692
	3	0.1982	0.7252	0.50	0.8212	0.2398	0.7357	0.44	0.8054

Differencing of the dependent variable was used to address the non-stationarity. The researcher took the first difference of the quarterly embezzlement data to address non-stationarity. Both the Augmented Dickey-Fuller and the Phillips-Perron unit root tests were completed on the differenced data to determine stationarity. The p-value results of the stationarity test on the differenced data were below .05. The null hypothesis was rejected and the data were determined to be differenced stationary. The results of both unit root tests for the differenced quarterly embezzlement incident data are included below in Table 18.

**Table 18***Stationarity Test for Differenced Variable EMBEZQ(1)*

Unit Root Tests									
Type	Lags	Augmented Dickey-Fuller				Phillips-Perron			
		Rho	Pr <	Tau	Pr < Tau	Rho	Pr <	Tau	Pr <
		Rho				Rho			
Zero	0	-74.3207	<.0001	-10.05	<.0001	-74.3207	<.0001	-10.05	<.0001
Mean									
	1	-115.299	0.0001	-7.41	<.0001	-72.6042	<.0001	-10.14	<.0001
	2	-542.769	0.0001	-6.77	<.0001				
	3	-2493.06	0.0001	-5.35	<.0001				

The first-order difference was included as the integrated component of the ARIMAX model,  $d=1$ . The level of differencing applied to the dependent variable was also applied to the explanatory variables in the model (Andrews et al., 2013). The first level differencing was also applied to the wages and salary disbursement and housing price index data. The stationarity of the differenced explanatory variables was tested with the augmented Dickey-Fuller test and the Phillips-Perron test. Both variables were determined to be differenced stationary. The differenced dependent and explanatory variables were used from this point forward in building the model.

The researcher completed the test for white noise to determine if an ARIMA model is appropriate for the time-series data. The null hypothesis for the check for white noise is there are no autocorrelations of the series up to a given lag that are significantly different from zero (SAS, 2016). The alternative hypothesis for the white noise test is there are autocorrelations between lags in the time-series. Table 19 shows the results of the white noise test. The p-values in Table 19 for the autocorrelations through lag 12 are less than .05, which means the series is not white



noise at the 95% significance level. The white noise null hypothesis was rejected. An ARIMA model is appropriate for the time-series data of the quarterly embezzlement incidents.

**Table 19**

*Autocorrelation Check for White Noise of Differenced EMBEZQ(1)*

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	14.16	6	0.0279	-0.286	-0.127	-0.104	0.138	0.262	-0.151
12	27.03	12	0.0077	-0.167	0.048	0.206	-0.212	0.166	-0.175

Next, the researcher performed the Granger causality tests. The researcher utilized RStudio statistical software to complete the Granger causality tests. Granger causality test is used to measure if an explanatory variable will improve the prediction of the dependent variable (Granger, 1969). Zero mean stationarity is required for the Granger causality test (Granger, 1969). The zero mean stationarity was determined by the Augmented Dickey-Fuller test and Phillips-Perron test described above. The tests determined causality between the dependent variable and the explanatory variables. The number of lags selected for the Granger causality test was three.

First, the Granger causality between embezzlement (EMBEZQ) and wages and salary disbursement (WSD) was tested. The null hypothesis for the Granger causality test was wages and salary disbursements do not Granger cause embezzlement incidents. The alternative hypothesis was wages and salary disbursements do Granger cause embezzlement incidents. The results of the Granger causality test are presented in Table 20. The p-values fail to reject the null hypothesis that wage and salary disbursements do not Granger cause embezzlement incidents. This means that the explanatory variable wage and salary disbursements do not improve the

predictability of quarterly embezzlement incidents. Wage and salary disbursements should not be included as an explanatory variable for the ARIMA model used to predict quarterly embezzlement incidents.

The reverse Granger causality was tested to see if embezzlement incidents Granger cause wage and salary disbursements. The null hypothesis for the reverse Granger causality test was embezzlement incidents do not Granger cause wage and salary disbursements. The alternative hypothesis is embezzlement incidents do Granger cause wage and salary disbursements. The p-values fail to reject the null hypothesis that quarterly embezzlement incidents do not Granger cause wage and salary disbursements. The results of the F test are shown in Table 20.

**Table 20**

*Granger Causality Test for Explanatory Variable Wages and Salary Disbursement*

Null Hypothesis		WSD(1) does not Granger cause EMBEZQ(1)		EMBEZQ(1) does not Granger cause WSD(1)	
Lags	Res. Df	F-stat	Pr(>F)	F-stat	Pr(>F)
1	56	0.8796	.3524	1.0326	0.314
2	54	1.7868	0.1776	0.5603	0.5744
3	52	1.4898	0.2289	1.2306	0.3086

(1) Differenced variable

The Granger causality between quarterly embezzlement incidents (EMBEZQ) and the home price index (HPI) was tested. The null hypothesis for the Granger causality test was the home price index does not Granger cause embezzlement incidents. The alternative hypothesis was home price index does Granger cause embezzlement incidents. The F test resulted in a statistically significant p-value for lags 1 and 2. Both are statistically significant to the 90% level, with lag 1 being slightly outside of the 95% significance level. This means that the explanatory variable of the home price index may improve the predictability of embezzlement incidents. The

researcher explored adding this explanatory variable to the model. The results of the F test are in Table 21.

The reverse Granger causality was tested to see if embezzlement incidents Granger cause the home price index. The F test for the null hypothesis embezzlement incidents do not Granger cause home price index also resulted in p-values greater than .05. The test failed to reject the null hypothesis indicating that embezzlement incidents do not help predict the home price index. Detection of reverse Granger causality requires the explanatory variable to be removed from the model (Andrews et al., 2013). Reverse causality is not present, so the inclusion of the home price index was explored. The results of the F test are in Table 21.

**Table 21**

*Granger Causality Test for Explanatory Variable Home Price Index*

Null Hypothesis		HPI(1) does not Granger cause EMBEZQ(1)		EMBEZQ(1) does not Granger cause HPI(1)	
Lags	Res. Df	F-stat	Pr(>F)	F-stat	Pr(>F)
1	56	4.0045	0.05032**	0.1214	0.7289
2	54	2.6119	0.08301**	0.2666	0.767
3	52	1.3895	0.2571	1.5514	0.2131

\*\* Significant at 90% confidence level.

(1) Differenced variable

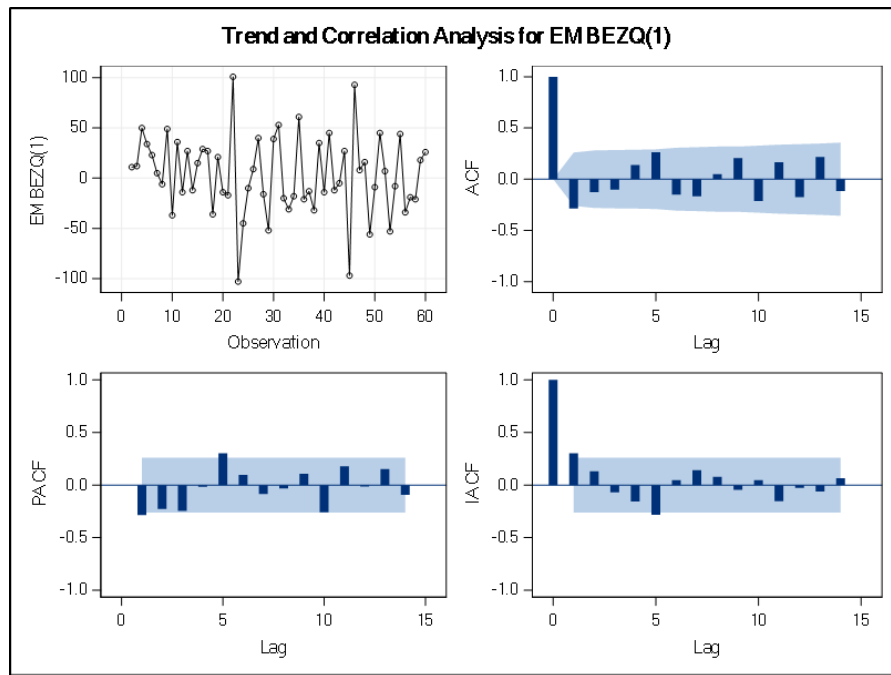
Based on the Granger causality tests, one of the two explanatory variables, wages and salary disbursements, was removed from the model. The home price index was determined to Granger cause embezzlement at the first and second lag at a 90% confidence level. The home price index explanatory variable was included in the ARIMAX model to determine if the variable improves the predictability of quarterly embezzlement incidents. The resulting ARIMAX model included only one explanatory variable, so the multicollinearity of the

explanatory variables did not need to be explored. An ARIMA ( $p, d, q$ ) model is developed first to predict the quarterly incidents of embezzlement based on the prior values of quarterly embezzlement. After the ARIMA model is developed, the ARIMAX ( $p, d, q, n$ ) model was developed to determine if the explanatory variable improves the predictive capability of the model.

The ARIMA ( $p, d, q$ ) model is developed to predict the quarterly incidents of embezzlement. The first difference was taken of the quarterly embezzlement incident data to achieve stationarity, so the integrated “I” term of the model is  $d=1$ . To determine the AR and MA terms the researcher considered the plots of the autocorrelations and partial autocorrelations of the differenced embezzlement data (Nau, 2014). Figure 14 shows the trend and correlation analysis for the differenced data, including the autocorrelations and partial autocorrelation plots. The autocorrelation (ACF) plot shows a significant spike at lag 1 indicating that the model should include at least 1 MA term (Nau, 2014). The partial autocorrelation (PACF) plot shows a spike right above the significance level, indicating that there may be an AR term included in the model (Nau, 2014). Different combinations of AR and MA terms were tested to determine the best ARIMA model.

**Figure 14**

*Trend and Correlation Analysis for Differenced Quarterly Embezzlement Data*



A review of the autocorrelation and partial autocorrelation plots helps determine the starting point for building an ARIMA model. One criterion in the selection of the model is the significance of the highest order AR and MA terms. Nau (2014) noted the highest order AR and MA terms' t-statistic should be greater than two and have a p-value of less than .05. Based on the ACF and PACF plots, the first model tested was ARIMA (0,1,1) with and without constant. Both models resulted in a significant MA term. The residuals of the model were not white noise indicating that the model needs to be further developed. The researcher added one MA term to the model to further develop the model. The ARIMA (0,1,2) model resulted in no significant terms. The addition of AR terms to the ARIMA model was developed. The different models varied in the significance of the highest order terms. The models ARIMA (1,1,1) without constant and ARIMA (1,1,2) without constant resulted in insignificant MA terms. The large first spike in the ACF plot indicated that an MA term must be included in the model. The ARIMA

(2,1,2) with and without constant resulted in significant highest order AR and MA terms. The constant was determined to be insignificant and increase the AIC statistic, so the model with no constant is determined the better fit. Ten ARIMA models were tested. Table 22 shows the ARIMA models that were tested. The descriptive statistic AIC is included for each model and the significance of the highest order model terms.

**Table 22**

*ARIMA Model Statistics and Highest Order Term Significance*

ARIMA Model	AIC	AR		MA		Constant	
		t value	Approx. Pr> t	t value	Approx. Pr> t	t value	Approx. Pr> t
(0,1,1)	593.5862			3.59	0.0003*		
(0,1,1) +constant	594.5620			3.76	0.0002*	1.01	0.3109
(0,1,2)	595.0398			0.66	0.5109		
(0,1,2) +constant	595.9664			0.69	0.4916	1.03	0.3032
(1,1,1)	595.2197	0.44	0.6600	1.94	0.5280		
(1,1,1) +constant	596.1595	0.47	0.6415	2.10	0.0357*	1.02	0.3067
(1,1,2)	599.9057	3.15	0.0017	-0.03	0.9725		
(1,1,2) +constant	597.6911	4.50	<.0001*	-4.12	<.0001*	0.79	0.4299
(2,1,2)	591.0505	-4.67	<.0001*	-9.08	<.0001*		
(2,1,2) +constant	592.1181	-4.58	<.0001*	-8.98	<.0001*	0.95	0.3411

\*Significant at 95% confidence interval.

The ARIMA (2,1,2) without constant was determined to be the best-fit model. This selection was based on the significance of the AR and MA terms, the descriptive statistic, and the plot of the residuals. Hyndman and Athanasopoulos (2018) recommend using the lowest Akaike' Information Criterion (AIC) when selecting the ARIMA model. The ARIMA (2,1,2) model has the lowest AIC statistic. The highest order AR and MA terms are statistically significant and the

residuals are determined to be white noise. Table 23 shows the maximum likelihood estimation for the ARIMA (2,1,2) model.

**Table 23**

*Maximum Likelihood Estimation for Differenced Quarterly Embezzlement Incidents*

Maximum Likelihood Estimation					
Parameter	Estimate	Standard Error	T Value	Approx Pr >  t	Lag
MA1,1	1.31715	0.09264	14.22	<.0001	1
MA1,2	-0.92167	0.10152	-9.08	<.0001	2
AR1,1	0.83928	0.13562	6.19	<.0001	1
AR1,2	-0.60752	0.13017	-4.67	<.0001	2

The highest order autoregressive term is AR1,2. The AR1,2 term is significant with a t value of -4.67 and a p-value of less than .05. This means there is a relationship between the observations at lag 2 and the magnitude of the relationship is 0.60752 (Tabachnick & Fidell, 2013). The highest order moving average term is MA1,2 is significant with a t value of -9.08 and a p-value of less than .05. This means there is a relationship between the current value and the random shocks at lag 2 (Tabachnick & Fidell, 2013). The magnitude of the relationship is 0.92167. The prediction model for quarterly embezzlement incidents is in Figure 15.

**Figure 15**

*ARIMA (2,1,2) Model for variable EMBEZQ*

Model for variable EMBEZQ	
Period(s) of Differencing	1

*No mean term in this model.*

Autoregressive Factors	
<b>Factor 1:</b>	$1 - 0.83928 B^{**}(1) + 0.60752 B^{**}(2)$

Moving Average Factors	
<b>Factor 1:</b>	$1 - 1.31715 B^{**}(1) + 0.92167 B^{**}(2)$

The researcher checked the residuals of the model for autocorrelation. A more complex model is required if the residuals are not white noise (SAS, 2016). Table 24 shows the check for the white noise residuals for ARIMA (2,1,2) model. The test statistic p is greater than .05 through lag 24, so we accept the no-autocorrelation hypothesis at a high level of significance. This means the residuals are white noise and the model is suitable.



**Table 24**

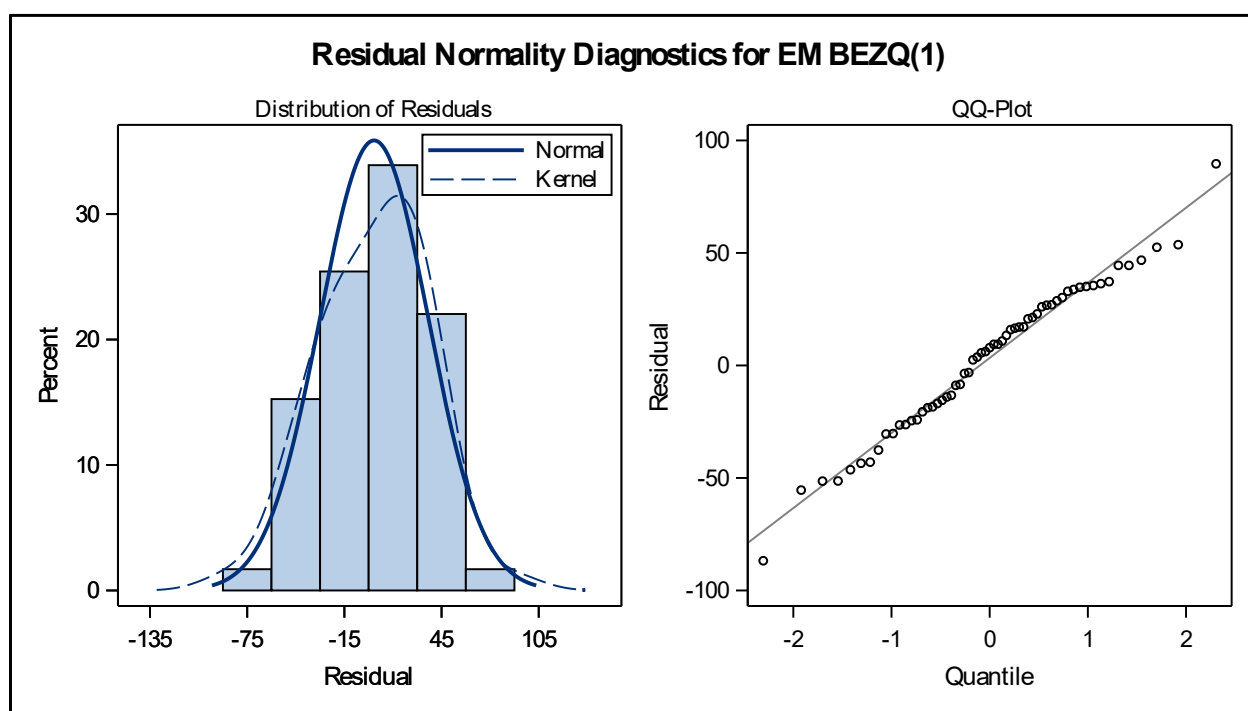
*Check for White Noise of Residuals for ARIMA (2,1,2) Model*

Autocorrelation Check of Residuals									
To	Pr >								
Lag	Chi-Square	DF	ChiSq	Autocorrelations					
6	2.54	2	0.2807	-0.017	0.020	-0.115	-0.018	0.117	-0.103
12	10.27	8	0.2466	-0.055	0.095	0.180	-0.174	0.119	-0.130
18	16.20	14	0.3014	0.193	-0.055	-0.018	0.072	-0.054	-0.153
24	27.70	20	0.1168	-0.046	-0.012	-0.083	0.028	-0.230	0.226

The residuals were plotted to check for normality. The residual correlation diagnostics confirm the residuals are white noise. The residual normality plots show the residuals depart from normality. The Q-Q plot shows the residuals follow normal distribution reasonably well, with slight departures at the tails. Figure 16 includes the residual normality diagnostics.

**Figure 16**

*Residual Normality Diagnostics for EMBEQ(1)*



The ARIMA (2,1,2) model was determined to be a sufficient model to predict embezzlement incidents based on the past values of the dependent variable. The model was further developed to determine if the economic indicator variable improves the predictability of embezzlement incidents. The additional variable changes the model to ARIMAX, autoregressive integrated moving average with explanatory variables. The causality test performed determined what economic indicator variables would be included in the ARIMAX model. The explanatory variable must not receive feedback from the dependent variable (Andrews et al., 2013). The Granger causality test evaluated the causality between the dependent variable and explanatory variable. Based on the Granger causality test performed, the explanatory variable home price index may help predict quarterly embezzlement incidents. The reverse causality test confirmed that the dependent variable does not receive feedback from the explanatory variable, the home price index. The Granger causality test determined the other explanatory variable, wages and salaries disbursement, would not improve the model and was excluded. The researcher added the home price index explanatory variable to the ARIMA model to determine if it improved the model.

The researcher explored different ARIMAX models to determine if the additional explanatory variable improved the model. First, the explanatory variable was added to the ARIMA (2,1,2) model. This resulted in an improvement in the AIC statistic, but the MA terms were not significant. The ACF plot indicated a MA term should be included in the model. Other models were tested. Five models were tested and the AIC statistic and terms are in Table 25.

**Table 25***ARIMAX Model Statistics and Highest Order Term Significance*

ARIMAX Model	AIC	AR		MA		HPI(1)	
		t value	Approx.	t value	Approx.	t value	Approx.
			Pr> t		Pr> t		Pr> t
(0,1,1) no constant	591.1368			4.13	<.0001*	2.15	0.0315*
(0,1,2) no constant	592.8036			0.52	0.6036	2.05	0.0399*
(1,1,1) no constant	592.9205	.34	0.7358	2.21	0.0271*	2.06	0.0393*
(1,1,2) no constant	593.4437	9.64	<.0001*	-4.91	<.0001*	2.22	0.0263*
(2,1,2) no constant	588.6136	-4.93	<.0001*	-0.05	.9566	2.20	0.0277*

\*Significant at 95% confidence interval.

The significance of the model terms varied. The ARIMAX (0,1,1), ARIMAX (1,1,1) resulted in significant MA terms and explanatory variable terms. ARIMAX (1,1,2) resulted in all terms AR, MA, and HPI (1) being significant. The AIC statistics for these three models are higher than the AIC statistic for the ARIMA (2,1,2) model selected. This indicates that quarterly embezzlement incidents are better predicted based on the past data of the embezzlement incidents alone than with the inclusion of the explanatory variable home price index. The increase in model complexity does not add explanatory value to the model. The ARIMA (2,1,2) model of the dependent variable alone is sufficient.

**Summary.** The researcher completed a detailed time-series analysis to address research questions three and four and the related hypotheses. The development of the time-series analysis model involved data collection, data preparations, and a series of statistical analyses. The detail was provided for each step. Statistical analysis determined if the economic explanatory variables of wages and salary disbursement and home price index improved the prediction of embezzlement incidents in the model. The Granger causality test specifically determined if the

explanatory variables would improve the prediction of quarterly embezzlement. The statistical test determined that both explanatory variables do not improve the prediction of embezzlement incidents at the 95% confidence level. The results of the Granger causality tests are shown in Table 20 and Table 21. The Granger causality related to the home price index was just outside of the 95% confidence interval, so the researcher investigated further to see if the inclusion of the home price index improved the time-series model. After completing the additional statistical analysis, it was concluded that the home price index data did not improve the ARIMA model. An autoregressive integrated moving average (ARIMA) model was developed for the prediction of quarterly embezzlement incidents.

### ***Relationship of the Findings***

The relationship of the research findings is covered in detail here. The results of the quantitative analysis concerning the relationship of economic indicators' impact on embezzlement incidents showed the economic indicators did not have a statistically significant impact on embezzlement incidents. First, the relationship of the findings to the research questions is discussed. Next, the discussion of the findings in relation to the theoretical framework of the study is included. Then, the findings in relation to the literature review are discussed. Lastly, the relationship of the findings to the problem being studied is included.

**Relationship of the Findings to the Research Questions.** The research questions and related hypotheses were developed to determine if the economic indicators in New England could influence the prediction of the incidents of embezzlement in New England. The primary research question is: is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions? This study included four research questions to investigate the primary research question. Each of the research questions

included a specific economic indicator in New England and the economic indicator's relationship to embezzlement incidents.

The first research question studied the relationship between payroll employment and embezzlement incidents in New England. The related null hypothesis proposes there is no statistically significant relationship between embezzlement incidents and payroll employment levels. The researcher analyzed the null hypothesis using payroll employment levels and embezzlement data over 15 years in time-series analysis. The causality between payroll employment and embezzlement incidents was investigated using the Granger causality tests. The Granger causality test results are shown in Table 12. The resulting F statistic and related p-values are not significant at the 95% confidence level. This indicates that payroll employment data does not help predict monthly embezzlement incidents. Based on the results of the statistical analysis the researcher fails to reject the null hypothesis for the first research question. The evidence is not sufficient to reject the claim there is no statistically significant relationship between payroll employment and embezzlement incidents.

The second research question examined the relationship between unemployment rates and embezzlement incidents in New England. The related null hypothesis proposes there is no statistically significant relationship between embezzlement incidents and unemployment rates. The researcher analyzed the null hypothesis using unemployment rates and embezzlement data over 15 years in time-series analysis. The causality between the unemployment rate and embezzlement incidents was investigated using the Granger causality tests. The Granger causality test results are shown in Table 13. The resulting F statistic and related p-values are not significant at the 95% confidence level. This indicates that unemployment rate data does not help predict monthly embezzlement incidents. Based on the results of the statistical analysis the

researcher fails to reject the null hypothesis for the second research question. The evidence is not sufficient to reject the claim there is no statistically significant relationship between the unemployment rate and embezzlement incidents.

The third research question investigated the relationship between wages and salary disbursement and embezzlement incidents in New England. The related null hypothesis proposes there is no statistically significant relationship between embezzlement incidents and wages and salary disbursement levels. The researcher analyzed the null hypothesis using wages and salary disbursement levels and embezzlement data over 15 years in time-series analysis. The causality between wages and salary disbursement levels and embezzlement incidents was investigated using the Granger causality tests. The Granger causality test results are shown in Table 20. The resulting F statistic and related p-values are not significant at the 95% confidence level. This indicates that wages and salary disbursement data do not help predict quarterly embezzlement incidents. Based on the results of the statistical analysis the researcher fails to reject the null hypothesis for the third research question. The evidence is not sufficient to reject the claim that there is no statistically significant relationship between wages and salary disbursement levels and embezzlement incidents.

The fourth research question studied the relationship between housing prices and embezzlement incidents in New England. The related null hypothesis proposes there is no statistically significant relationship between embezzlement incidents and housing price levels. The home price index was used as a measure for housing price levels. The researcher analyzed the null hypothesis using the home price index and embezzlement data over 15 years in time-series analysis. The causality between the home price index and embezzlement incidents was investigated using the Granger causality tests. The Granger causality test results are shown in

Table 21. The resulting F statistic and related p-values are not significant at the 95% confidence level. This indicates that home price index data does not help predict monthly embezzlement incidents. Based on the results of the statistical analysis the researcher fails to reject the null hypothesis for the fourth research question. The evidence is not sufficient to reject the claim that there is no statistically significant relationship between the home price index and embezzlement incidents.

**Relationship of the Findings to the Theoretical Framework.** This study investigated the relationship between cases of embezzlement and economic indicators in New England. Three theories were selected for this study, white-collar crime theory, fraud triangle theory, and agency theory. The white-collar crime theory developed by Sutherland in 1940 included crime committed by the upper socioeconomic class. One classification of white-collar crime includes embezzlement (Sutherland, 1941). This study sought to understand the impact economic indicators have on embezzlement in New England better. The findings relate to the white-collar crime theory due to the focus on the white-collar crime of embezzlement. The relations of the findings to both the fraud triangle theory and the agency theory are discussed below.

The fraud triangle theory developed by Cressey in 1953 theorized why individuals participate in the white-collar crime activity of embezzlement. In the development of the fraud triangle, Cressey identified pressure as one of the three key elements present when embezzlement occurs (Cressey, 1971). The pressure present can come from internal decisions or external factors such as economic conditions (Cressey, 1971). The analysis completed as part of this study sought to determine if there was a statistically significant relationship between embezzlement and economic indicators in New England. The impact of external factors such as economic conditions in New England could improve the prediction of embezzlement incidents in

New England. The research questions focused on the relationship of four economic indicators with embezzlement. The four economic indicators were payroll employment, unemployment rate, wages and salary disbursement, and the home price index.

Each research question addressed a separate economic indicator's relationship with embezzlement. The statistical analysis was completed to address the research questions. Granger causality tests were completed for each of the four economic indicators, the independent explanatory variables, to determine if the economic indicator Granger causes embezzlement incidents. The Granger causality indicates if the independent explanatory variable improves the prediction of the dependent variable. The F statistic for all four economic indicators, payroll employment, unemployment rate, wages and salary disbursement, and the home price index, were not significant at the 95% confidence level. The result supports there is insufficient evidence to support the claim that the economic indicators selected, payroll employment, unemployment rate, wages and salary disbursement, and the home price index, have a statistically significant relationship with embezzlement. The prediction of embezzlement incidents is not improved by the inclusion of the economic indicator explanatory variables. These findings disconfirm Cressey's fraud triangle theory of pressure of economic conditions and suggest that economic conditions do not Granger cause embezzlement incidents.

The last theory considered as part of this study was the agency theory. Jensen and Meckling developed the agency theory in 1976. The agency theory proposed that in a principal-agent relationship both parties prefer to maximize their own utility (Jensen & Meckling, 1976). The agency theory suggests occupational fraud, such as embezzlement occurs due to parties seeking to maximize utility and not due to the fraud triangle element of pressure. This study investigated the one potential element of pressure, economic conditions. The study developed



four research questions relate to different measures of economic conditions in the region. Each question investigated the relationship between embezzlement and an economic condition explanatory variable: payroll employment, unemployment rate, wages and salary disbursement, and the home price index. The statistical analysis results found that the economic indicators selected do not help predict embezzlement incidents within a 95% confidence level. The study found that embezzlement incidents are better predicted based on previous embezzlement incident data and the exclusion of economic indicator data. These findings confirm that the utility maximizing behavior such as embezzlement is not Granger caused by pressure from external economic conditions.

**Relationship of the Findings to the Literature.** The researcher completed a detailed literature review to support this study and determined a study had not been conducted to investigate the relationship of fraud or embezzlement within a region of a larger nation. The researcher completed this study to address the gap in the related literature. This study focused on the economic conditions and embezzlement incidents in New England. The primary research question was, “is there a relationship between embezzlement incidents and economic indicators in New England?” The study was broken out into four research questions to incorporate different economic indicators as measures of economic conditions. The findings of this study relate to previous studies related the fraud and the economy in different ways.

The first research question examined the relationship between payroll employment and embezzlement incidents in New England. The statistical analysis was performed to determine if there was causality between the dependent variable, monthly embezzlement incidents, and the explanatory variable, payroll employment. The ARIMAX model requires that both directions of causality are performed to determine if the explanatory variable should remain in the model

(Andrews et al., 2013). The analysis findings for reverse causality results indicated that embezzlement incidents Granger cause payroll employment at the 95% confidence interval. The results are presented in Table 12. Although this confirmed the need for removal of the payroll employment explanatory variable from the model, it indicates embezzlement incidents are a leading indicator. A leading indicator is a variable that indicates an onset of part of a business cycle (Yaffee & McGee, 2000). This is similar to the findings of Povel et al. (2007), and Detotto and Otranto (2012). Povel et al. (2007) found that embezzlement incidents peak at the end of economic expansion. Detotto and Otranto (2012) found embezzlement was a leading economic indicator in their study of crime in Italy. The findings for the research question are consistent with other researchers as embezzlement was indicated as a leading indicator of the economy in multiple studies.

The second research question examined the relationship between unemployment rates and embezzlement incidents in New England. Statistical analysis was completed to determine if the unemployment rate would improve the prediction of monthly embezzlement incidents. The Granger causality test determined that unemployment rates do not Granger cause embezzlement incidents. The reverse causality was also tested to determine if embezzlement incidents Granger cause the home price index. Both direction Granger tests indicated that neither variable is useful in predicting the other at the 95% confidence level. The test results are presented in Table 13. This finding is consistent with Geppert (2016), who found the state of the business cycles did not influence embezzlement incident prediction. This finding is inconsistent with Vousinas' study (2019), which noted fraud incidents increased following the financial crisis and economic recession. This finding is also not consistent with Detotto and Otrando (2012) who found

embezzlement to be a leading economic indicator. The relationship of the findings to the literature for research question two was consistent for research questions three and four.

The third research question investigated the relationship between wages and salary disbursement and embezzlement incidents in New England. Statistical analysis was completed to determine if wages and salary disbursements would improve the prediction of quarterly embezzlement incidents. The Granger causality test determined that wage and salary disbursements do not Granger cause embezzlement incidents with a 95% confidence level. The reverse causality was also tested to determine if embezzlement incidents Granger cause wage and salary disbursements. The test results are presented in Table 20. The results indicate that embezzlement incidents prediction is not improved by the inclusion of wages and salary disbursement. This finding is consistent with Geppert's (2016) findings that business cycles did not improve the prediction of embezzlement. The reverse causality indicated that the wages and salary disbursement level is not predicted by the incidents of embezzlement. This finding is inconsistent with Svare (2009), DeMarco (2009), and Vousinas (2019) who indicated that there was an increase in fraud or financial crimes when the economy is declining. However, the studies conducted by Svare, DeMarco, and Vousinas were not tied to a specific act of fraud or financial crime. This study only focused on the act of embezzlement.

The fourth research question studied the relationship between housing prices and embezzlement incidents in New England. Statistical analysis was completed to determine if the home price index variable would improve the prediction of quarterly embezzlement incidents. The Granger causality test determined that unemployment rates do not Granger cause embezzlement incidents. The reverse causality was also tested to determine if embezzlement incidents Granger cause the home price index. Both direction Granger tests indicated that neither

variable is useful in predicting the other at the 95% confidence level. The test results are presented in Table 21. This finding is consistent with Geppert's (2016) findings that business cycles did not improve the prediction of embezzlement. Svare (2009), DeMarco (2009), and Vousinas (2019) found that financial crimes and fraud increase when there is a recession. Housing prices tend to decrease in a recession, so based on Svare, DeMarco, and Vousinas an inverse relationship with the home price index and embezzlement was expected. However, the statistical analysis did not result in a statistically significant relationship between the home price index and embezzlement.

**Relationship of the Findings to the Study Problem.** The specific problem addressed by this study was the negative impact of embezzlement on businesses in New England that results in losses for organizations. This study sought to better understand the phenomenon of embezzlement through investigating the impact economic indicators have on incidents of embezzlement. The ACFE estimates 5% of revenues are lost to occupational fraud each year and embezzlement occurs in 86% of occupational fraud cases (ACFE, 2020). Additional knowledge of embezzlement may help organizations protect against losses.

The primary research question focused on the relationship between the number of discovered and reported acts of embezzlement in New England and the economic conditions in the region. The researcher used four economic indicators: payroll employment, unemployment rate, wages and salary disbursement, and the home price index, as measures of economic conditions in the region. Four research questions were developed each focusing on one of the selected economic indicators. Based on statistical analysis, this study found that the economic indicators selected do not improve the prediction of embezzlement incidents. The results of the study improve knowledge on economic indicators' influence on embezzlement incidents.

DeMarco (2009) noted management expects increases in fraud, including embezzlement, during economic declines. Additional knowledge related to the negative impact of embezzlement helps management plan for fraud prevention and detection. The results indicate that the consideration of the economic indicators, payroll employment, unemployment rate, wage and salary disbursements, and home price index, should not influence management's approach to prevention and detection of fraud.

### ***Summary of the Findings***

This correlational study sought to address the gaps in the literature related to the economic conditions of a small macroeconomic region and cases of embezzlement. The study focused on the New England region of the United States. The primary research question addressed in this study was, "is there a relationship between the number of discovered and reported acts of embezzlement in New England businesses and economic conditions?" The economic conditions of the New England region were measured by four separate economic indicators. The four economic indicators were payroll employment, unemployment rate, wages and salary disbursement, and the home price index. The primary research question was broken into four specific research questions to focus on the four economic indicators selected. Time-series analysis was determined appropriate for this study due to the collection of dependent and explanatory variable data at equal time intervals for more than 50 time periods (Tabachnick & Fidell, 2013). The researcher completed a time-series analysis to address the research questions. The researcher worked to develop two autoregressive integrated moving average with explanatory variables (ARIMAX) models.

**Research Question 1.** The first research question examined the relationship between payroll employment and embezzlement incidents in New England. The researcher identified

payroll employment as the explanatory independent variable and monthly embezzlement incidents as the dependent variable. The null hypothesis related to research question one was, “there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by payroll employment levels.” The researcher failed to reject the null hypothesis for research question one. Payroll employment does not help predict monthly embezzlement incidents. The explanatory variable payroll employment was removed from the time-series model for monthly embezzlement incidents.

**Research Question 2.** The second research question investigated the relationship between the unemployment rate and embezzlement incidents in New England. The researcher identified unemployment rate as the explanatory independent variable and monthly embezzlement incidents as the dependent variable. The null hypothesis of research question two was, “there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by unemployment levels.” The researcher failed to reject the null hypothesis for research question two. The unemployment rate does not help predict monthly embezzlement incidents. The explanatory variable unemployment was removed from the time-series model.

**Research Question 3.** The third research question studied the relationship between wages and salary disbursements and embezzlement incidents in New England. The researcher identified wages and salary disbursement as the explanatory independent variable and quarterly embezzlement incidents as the dependent variable. The null hypothesis of research question three was, “there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region

determined by wages and salary disbursement levels.” The researcher failed to reject the null hypothesis for research question three. Wage and salary disbursement does not help predict monthly embezzlement incidents. The explanatory variable wage and salary disbursement was removed from the time-series model for monthly embezzlement incidents.

**Research Question 4.** The fourth research question examined the relationship between the home price index and embezzlement incidents in New England. The researcher identified the home price index as the explanatory independent variable and quarterly embezzlement incidents as the dependent variable. The null hypothesis of research question number four was, “there is no significant statistical relationship between the numbers of discovered and reported acts of embezzlement in New England and the economic conditions of the region determined by housing prices.” The researcher failed to reject the null hypothesis for research question four. The home price index does not help predict quarterly embezzlement incidents. The explanatory variable home price index was removed from the time-series model for quarterly embezzlement incidents.

The results of the quantitative analysis concerning the influence of economic indicators on embezzlement incidents showed the economic indicators did not have a statistically significant impact on embezzlement incidents. The Granger causality tests statistically determined if the explanatory variables would improve the prediction of the dependent variable (Granger, 1969). The F statistic of the Granger causality tests indicated the economic indicators selected did not improve the prediction of embezzlement incidents within a 95% confidence level. The researcher removed the explanatory variables from the ARIMAX models. The removal of the explanatory variables resulted in two pure ARIMA models. The ARIMA models were developed and presented for the prediction of monthly and quarterly embezzlement

incidents. The findings of this study specifically relate to the New England region of the United States.

### **Application to Professional Practice**

The purpose of this study was to expand the body of knowledge by exploring the relationship between economic conditions and embezzlement incidents. Different fields of accounting could be impacted by occupational fraud. Losses resulting from occupational fraud negatively affect organizations (ACFE, 2020). A greater understanding of the phenomenon of embezzlement may help organizational leaders improve their practices and strategies to protect the organization from occupational fraud.

### ***Improving General Business Practice***

The findings of this study may provide organizational leaders and accounting professionals information to improve their approach to risk assessment and fraud prevention and detection. The quantitative analysis results indicated that there was no statistically significant relationship between the economic indicators selected and embezzlement incidents in the region. The changes in economic conditions do not help predict embezzlement incidents. Understanding the relationship between embezzlement and economic indicators can influence the consideration business leaders give to economic conditions when evaluating fraud risk. The perception of management and internal auditors is that fraud risk increases during a down economy (DeMarco, 2009; Svare, 2009). The study results do not support the perception that there is a relationship between the economy and cases of embezzlement. The study findings are relevant to improving general business practices because they help organizational leaders and accounting professionals in their approach of assessing, implementing, and monitoring internal controls to prevent misappropriation of assets.



The findings of this study may improve the approach taken by organizational leaders and accounting personnel to assessing and monitoring fraud risk. The primary role responsible for the prevention and detection of fraud is management (Sarbanes-Oxley Act 2002). The accounting function or internal audit function assesses risk with the help of management. In the evaluation of fraud risk, consideration must be given to the various types of fraud, the presence of incentives and pressures, opportunities available to commit fraud, and personnel attitudes (COSO, 2013). The study findings specifically relate to the presence of pressure from economic conditions. The study results support recognition by organizational leaders and accountants that the risk of embezzlement does not change with the economic conditions. The evaluation of risk can impact the organizational leaders' decisions regarding internal controls used to help the organization achieve its objectives (The IIA, 20116). Organizational leaders may improve their general business practices by adjusting internal controls and company policies to consider the need for continued consideration of fraud risk related to embezzlement, irrespective of economic conditions.

The findings of this study may improve the general business practice of an external auditor's evaluation of risk in a financial statement audit. The financial statement auditor must consider two types of misstatements due to fraud, intentional misstatement of the financial statements and misstatement due to asset misappropriation (PCAOB, 2020, 2401.06). The auditing standards utilize the fraud triangle when assessing fraud risk (PCAOB, 2020, 2401.07). The fraud triangle considers opportunity, pressure, and rationalization in evaluating the risk of fraud (Cressey, 1971). This study relates to an element of pressure considered in the conditions of the overall economy. Economic conditions are included in the auditing standards as a consideration of pressure (PCAOB, 2020, 2401.07). The results of this study indicate that the

pressure from economic conditions does not influence the misappropriation of assets. This finding may improve the general business practice of the external auditor's evaluation of pressure in a financial statement audit, specifically when evaluating the risk of misappropriation of assets.

### ***Potential Application Strategies***

The results of this study may help improve the prevention and detection of fraud. The application to improving general business practice relates to the evaluation of fraud risk related to embezzlement. Misappropriation of assets occurs in 86% of occupational fraud causes (ACFE, 2020). The results of this study found that economic conditions do not influence embezzlement incidents. The findings influence the professional practice of those responsible for assessing, evaluating, and monitoring fraud risk. The application to professional practice may contribute to organizational leaders and accounting professionals assessing fraud risk differently and adjusting their approach to protecting organizational assets. Organizational leaders and accounting professionals should always be vigilant of the risk associated with embezzlement, regardless of the economic conditions. Managers and accounting practitioners may apply strategies based on the findings to help protect organizations from embezzlement, such as the implementation of continuous monitoring of controls, required continuing education for management and accountants, and using the autoregressive integrated moving average (ARIMA) model to predict embezzlement.

**Continuous Monitoring.** Continuous monitoring of internal controls is a strategy organizations can utilize to protect against losses from embezzlement. The activity of monitoring controls includes assessing changes in the internal and external environment of the organization and the impact these changes have on the risk assessment (COSO, 2013). Performance of a fraud

risk assessment is important to understanding where organizations are vulnerable to fraud. PwC's 2020 Global Economic Crime and Fraud Survey respondents noted that only about 30% perform minimal testing of internal control effectiveness and 12% do not test internal control effectiveness (PwC, 2020). Internal control deficiencies increase the opportunity for a fraudster to commit occupational fraud (Zakaria et al., 2016). The strategy of continuous monitoring of controls helps determine if the controls are effective in preventing fraud occurrences. The control monitoring process is a strategy that should take place regularly and not be impacted by the overall economic conditions.

**Continuing Education.** Requiring education on fraud risk, fraud prevention, and fraud detection for organizational leaders and accounting professionals is a strategy businesses could use to help these individuals stay mindful of fraud risks and developments occurring in the field. Currently, education related to fraud and internal controls is not a requirement for organizational leaders or certain accounting professionals. Education for organizational leaders and accountants on the prevention and detection of fraud may help them better assess, monitor, and evaluate fraud risk. Continuing education of individuals responsible for the prevention and detection of fraud, and for evaluation of fraud risk, is a strategy that may help them to be attentive to fraud risk regardless of the economic conditions.

**ARIMA Model.** The implementation of the ARIMA model developed in this study is a strategy organizational leaders could use in their evaluation of risk. The ARIMA model could be used to forecast future incidents of embezzlement based on past cases of embezzlement. Organizational leaders could use this information to evaluate trends in embezzlement and adjust the risk level accordingly. The use of an ARIMA model to predict embezzlement incidents is a strategy businesses could use in risk assessment.

### ***Summary of Application to Professional Practice***

The findings of this research study are relevant to improving the general business practice related to the prevention and detection of fraud. The findings of this study support changes to the consideration of the economic conditions in the evaluation of pressure contributing to fraud risk related to embezzlement. The evaluation of fraud risk influences both the internal controls in place to protect and detect fraud and the procedures selected by auditors. Individuals involved in assessing, evaluating, monitoring fraud risk should always be alert of the risks associated with embezzlement regardless of the economic conditions. Strategies that could be used to address the findings of this study include continuous monitoring, continuing education, and implementation of the ARIMA model. The evaluation of risk may impact procedures implemented by professionals to protect organizations from financial losses from fraud. Additional knowledge about embezzlement and fraud can influence the general business practices and application of strategies used by organizations to protect their resources.

### **Recommendations for Further Study**

This study investigated the correlation between select economic indicators and embezzlement incidents in New England. This study was the first to focus on investigating the relationship between the economy and embezzlement in a smaller macroeconomic region within a country. Four economic indicators selected measured economic conditions: payroll employment, unemployment rate, wages and salary disbursement, and home price index. The study found no statistically significant correlation between the economic indicators selected and embezzlement. There are recommendations for further study of accounting regarding occupational fraud and embezzlement.

The results of this study pertain to the economic indicators selected and the New England area of the United States. First, this study could be replicated in other regions in the United States. The economic conditions of states and regions vary due to the impact of different local, national, and global factors. These studies may provide information about how economic indicators impact embezzlement differently throughout the United States. Another study could be completed using different economic indicators. Gross Domestic Product is an economic indicator that could be used in another study. Gross Domestic Product is a widely used measure of economic progress (FRBB, n.d.c.). The economic indicators selected and the region selected could affect the results of the study.

Another area of further study could include numerous qualitative studies related to embezzlement and the economy. DeMarco (2009) conducted a survey of management sentiment on fraud expectations during an economic downturn. The recent downturn in the economy starting in March 2020 (NBER, 2020) warrants performing an updated study to investigate management's perceived risk level related to embezzlement and financial crimes and the relation to the state of the economy. A survey could focus on different regions of the United States and management sentiment. Another area of further research would be an embezzlement case study to investigate if economic conditions played a role in the offender's motivation. Additional research on financial crimes, including embezzlement, may help management allocate resources and efforts to prevent and detect occupational fraud.

## **Reflections**

The process of completing this research study proved to be both challenging and enriching. The research study focused on the business function of accounting. One of the roles accountants have in an organization is to work towards proper stewardship of financial resources.

The study leads to both personal and professional growth for the researcher. The topic of study also relates to the Grand Narrative of the biblical worldview. The researcher's reflections include both personal and professional growth and the biblical perspective.

### ***Personal and Professional Growth***

The researcher achieved significant personal growth over the course of the past few years. This study's completion proved to be much more challenging than any task or course the researcher had previously completed. Perseverance and dedication have been a key part of moving forward towards reaching the goal. The researcher developed both research and writing skills through each stage of the doctoral process. Each course throughout the program has built upon the researcher's business knowledge and skills developed in prior courses. The researcher approached the research study prepared to complete the research and writing required. The researcher was not prepared to complete the quantitative analysis selected as the methodology. The statistical analysis was much more challenging than anticipated and required a substantial amount of additional research and learning. After completing the data analysis and presentation of findings, the researcher felt a great sense of accomplishment. This process required persistence, which helped the researcher grow both personally and professionally.

The completion of the research study provided the researcher with professional growth. The researcher has held various roles in the accounting field throughout employment. Each role has focused on a different aspect of the accounting field, including auditing, internal auditing, tax, and teaching. As an internal auditor, the researcher developed an interest in learning about occupational fraud. This interest has grown over the years and lead to the researcher earning a certification in the area. The development of this study further expanded the researcher's knowledge about fraud, embezzlement, and the related theories. The researchers expanded

knowledge in the area will support working in the field and in the classroom. Another area of professional development from this study is the improvement in data analysis skills. With the growth of technology in the field of accounting, data analysis skills have become a valuable skill in each field of accounting. Through the completion of this study, the researcher learned how to use statistical software to analyze data in new ways. The skills and knowledge gained through the completion of this study helped the researcher grow as an accountant and educator.

### ***Biblical Perspective***

Individuals act as stewards of God's resources to help His purpose for cultivating the earth and society. Accountants and managers are entrusted to properly steward the financial resources of organizations. Proper allocation of financial resources supports the organization's ability to further develop and support society. Organizations and financial individuals are entrusted by God to properly steward and manage resources (Grudem, 2016). The research study focused on the violation of trust and the misuse of financial resources through embezzlement. This violation negatively impacts organizations and individuals involved. Accountants, with other fields, have worked to protect organizations and individuals from the misappropriation of financial resources. The discussion below relates the field of accounting and the act of embezzlement to the Grand Narrative.

**Creation.** God created the world and filled it with life and resources. "God saw everything that he had made, and behold, it was very good" (*English Standard Bible*, 2001, Genesis 1:31). God created humans to cultivate and care for the world He created. "The LORD God took the man and put him in the Garden of Eden to work it and keep it" (*English Standard Bible*, 2001, Genesis 2:15). The cultivation of earth's raw materials helps individuals and society grow and flourish as God intended (Keller & Alsdorf, 2014). God has entrusted individuals to

steward the resources He created and manage those resources properly (Grudem, 2016).

Financial leaders support God's intentions by properly protecting and allocating the resources provided for businesses to grow. Every decision made in business leadership entails financial implications (Rodin, 2013). The growth of businesses supports the cultivation of the world created by God (Keller & Alsdorf, 2014). Proper stewardship of financial resources provides for innovation, payment to investors and employees, and further growth in operations.

**Fall.** Adam and Eve's decision to disobey God has implications for all areas of life and business. The human professions were harmed; many individuals are no longer serving God and their neighbor. The stewardship of resources has been impacted by distrust, love of money, and theft. The Ecclesiastes author stated, "He who loves money will not be satisfied with money, nor he who loves wealth with his income; this also is vanity" (*English Standard Bible*, 2001, Ecclesiastes 5:10). The researcher focused on one aspect of violation of trust with financial resources, embezzlement. Individuals who embezzle are entrusted to properly steward the resources in which they have been trusted. The embezzler violates that trust. The acts of embezzlement and fraud are violations of the Seventh Commandment, "Thou shall not steal." The Bible refers to greed and the love of money in multiple books. King Solomon noted in Proverbs, "Wealth gained hastily will dwindle, but whoever gathers little by little will increase it" (*English Standard Bible*, 2001, Proverbs 13:11). The idolization of wealth and money has negatively impacted the ability of humans to properly steward God's resources.

**Redemption.** After the fall, the work humans do should support reconciliation and redemption (Van Duzer, 2010). Matthew stated, "No one can serve two masters, for either he will hate the one and love the other, or he will be devoted to the one and despise the other. You cannot serve God and money" (*English Standard Bible*, 2001, Matthew 6:24). The love of



money or other idols has significantly influenced the profession of accounting. Timothy noted, “For the love of money is a root of all kinds of evil. It is through this craving that some have wandered away from the faith and pierced themselves with many pangs” (*English Standard Bible*, 2001, 1 Timothy 6:10). Fields of accounting have been developed to protect financial resources and work towards good stewards of resources. The fields of internal audit, fraud examination, auditing, and accounting ethics each work to protect the resources of organizations. The work towards protecting and stewarding God’s resources will support the further development of businesses and the cultivation of society.

**New Creation.** Working to make a difference in the broken world reflects the world to come. Proper accounting for financial resources supports all aspects of a business. Stewards of financial resources must continue to adapt to the changing environment and promote the necessity of integrity and growth. Timothy stated, “As for the rich in this present age, charge them not to be haughty, nor to set their hopes on the uncertainty of riches, but on God, who richly provides us with everything to enjoy” (*English Standard Bible*, 2001, Timothy 6:17). As a steward of God’s resources, we can lead by example by not idolizing money or practicing the ideals the profession promotes. Paul the Apostle noted, “You then who teach others, do you not teach yourself? While you preach against stealing, do you steal” (*English Standard Bible*, 2001, Romans 2:21)? Financial resource allocation should be restorative in nature with efforts to support employees, stakeholders, environmental initiatives, and helping the community (Van Duzer, 2010). Accountants have a key role in business to steward resources to support God’s intentions for people and businesses to cultivate the Earth in a positive manner.

### ***Summary of Reflections***

This section included the researcher’s reflection on personal and professional growth and

the biblical perspective. The process of completing this research study proved to be both thought-provoking and rewarding. The research study focused on expanding knowledge related to the phenomenon of embezzlement. The challenges faced during this research study helped the researcher grow both personally and professionally. The research study relates to the biblical worldview and each stage of the biblical Grand Narrative. The researcher can use the skills and knowledge developed during this process to grow as an accountant and as an educator.

### **Summary of Section 3**

Section 3 provided a discussion of the application of professional practice and implications for change. This section began with an overview of the study. A detailed discussion of the presentation of findings was included. An explanation of how the presentation of findings relates to the research questions, the theoretical framework, the literature, and the study problem was provided. The study's application to professional practice included a discussion on how the findings could improve general business practices and potential application strategies. Recommendations for further study were incorporated. The researcher provided a personal and professional reflection. Lastly, a detailed discussion was provided on the biblical perspective of the study.

### **Summary and Study Conclusions**

This quantitative study investigated the relationship between economic indicators and embezzlement incidents in New England. The researcher completed statistical analysis to determine if economic indicators could be used to help predict embezzlement incidents. Archival data from governmental agencies were used to complete the analysis. A time-series analysis was completed using data for years 2004 through 2018. The researcher worked to develop two autoregressive integrated moving average with explanatory variables models (ARIMAX) to

determine the impact of the economic indicators on embezzlement incidents. The Granger causality statistical tests determined the economic indicators do not help predict embezzlement incidents. The researcher then removed the explanatory variables and developed two ARIMA models for predicting embezzlement.

This research was completed to increase knowledge related to the phenomenon of embezzlement. Embezzlement or misappropriation of assets result in losses to organizations (ACFE, 2020). All organizations may be susceptible to embezzlement. Additional understanding of occupational fraud, including embezzlement, may help organizations better protect their assets from theft. This research suggests that the economic indicators selected do not influence embezzlement. Therefore, it is important for organizational leaders and accountants to always be attentive to the risk of embezzlement. Organizational leaders and accountants can utilize knowledge related to embezzlement to help assess risk, prevent, and detect fraud. Reducing losses from embezzlement may improve organizations' ability to achieve their objectives.

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