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## **CORPORATE BOND LIQUIDITY VALUE IN STRESS SCENARIOS: IMPLICATIONS FOR THE BASEL ACCORDS**

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### **ABSTRACT**

Recent studies contend that flights to safety episodes are not only flights to quality but also flights to liquidity. In non-crisis periods, banks would rather trade off liquidity for higher yield in their bond portfolio. Therefore, banks have opportunistically engaged in regulatory arbitrage to garner higher returns. We contend that capital arbitrage exploits the misalignment created by strictly equating credit quality with liquidity. As bank regulations are intended to ensure that banks have enough capital to withstand such periods, the Basel Committee on Banking Supervision (BCBS) created the Liquidity Coverage Ratio (LCR) standards in Basel III. These standards provide methods for identifying High-Quality Liquid Assets (HQLA). This paper proposes and studies a measure for liquidity,  $E$ , that is based on an entropy equation. We find that  $E$  quantifies bond liquidity and is more useful than credit rating in predicting which corporate bonds will better maintain liquidity through periods of economic stress. The inputs for the equation are readily available, with the advent of TRACE bond trading data, and a liquidity value can be calculated with relative ease. We offer evidence that  $E$  is a useful continuous variable in determining which corporate bond assets regulators should favor in the calculation of High Quality Liquid Assets (HQLA). The findings of this study have implications for regulators and the Basel III standard setters.

Keywords: Liquidity, Bank Regulation, Corporate Bonds, Basel Accords, Capital Markets

### **INTRODUCTION**

Banks perform a vital function in our economy and banking regulation aims to provide stability to the financial sector. It aims to protect customers, workers and taxpayers from moral hazards that are inherent in certain bank management decisions which, given the interconnectedness of the banking industry with the national and global economies, could have enormous consequences leading to systemic failure. Beyond the costs of bailouts to taxpayers, Reinhart and Rogoff (2013) find that banking crises also weaken fiscal positions, as government revenues invariably contract. Three years after a crisis central government debt has been shown to increase by about 86% (Reinhart and Rogoff, 2013). This paper

will examine the history of banking regulations toward the goal of understanding the origins, goals, development and complexities of banking regulation. Then we show evidence of how a liquidity measure that we adapted from an entropy equation could be used to improve the classification of liquid assets in the calculation of the Liquidity Coverage Ratio (LCR) used in the Basel Accords.

Any improvement in the effective regulation of the banking sector should be of value to regulators, bank management and all stakeholders in the economy. The purpose of this paper is to contribute by providing evidence that liquidity can be measured independent of credit quality, i.e. default risk, and might therefore be used more appropriately in the risk-weighting of High-Quality Liquid Assets (HQLA) in the calculation of regulatory bank capital requirements, pursuant to Basel III.

Historically, banking regulations have been reactive, with crisis periods being followed by tighter policies, then successive waves of deregulation. Consider, for example, what is taking place in the wake of the 2007-2009 subprime financial crisis. First, there was the crisis. Then, there was the enactment of the Dodd–Frank Wall Street Reform and Consumer Protection Act (Pub.L. 111–203, H.R. 4173, commonly referred to as Dodd–Frank), signed into United States federal law on July 21, 2010. More recently, the waves of repeal/deregulation seem to be beginning with the United States House of Representatives vote on May 22, 2018 to repeal some of its provisions.

The problem is that the tighter regulations that typically follow crisis periods have done little to mitigate the impact or shock to the market of subsequent crisis periods. In fact, in some instances, the new regulations have amplified the shocks experienced in the following crisis period (Allen et al., 2012). We propose an entropy-based liquidity measure that will allow banks and regulators to identify which corporate bonds will be most liquid in periods of economic stress. This should aid regulators in setting parameters that will allow banks to reap the higher yields available in the corporate bond market over those offered in the treasury market, while preserving enough safety margin of liquidity.

This paper is structured as follows: Section 1 is a brief history of bank regulations and the development of the regulatory framework that lays the background for this study. Section 2 reviews the literature on and concepts behind the Basel Accords. Section 3 is hypothesis development.

explains the rationale for using an entropy equation to quantify bond liquidity and hypothesis development. Section 4 explains the data sample set, the hypothesis testing model, the methodology empirical results. Section 5 concludes with a summary, policy suggestions and recommendations for future research.

## THE HISTORY OF BANKING REGULATION

By way of a brief review of the history of banking regulations, we begin by referring to the 1930s and 1940s where several solvency ratios were tried by state and federal regulators, such as “capital to deposits” and “capital to assets” but all failed to be recognized as effective solvency measures (Balthazar, 2006). In 1954, the Statement of Principles of the American Bankers Association (ABA) provisioned that the use of regulatory ratios for prudential regulation was explicitly rejected (**Error! Reference source not found.**). Regulators at that time preferred to subjectively analyze bank risk on a case-by-case basis; such would be the case until the 1970s.

In 1969, the US dollar was the dominant currency in the world and was used for most international payments. Competition from European banks toward US banks remain limited because European banking regulations were so strict. However, in 1973, to help European banks become more competitive, the European Commission issued a new Directive that was the first true step in banking deregulation. From that moment, “national treatment” principles came into effect. The idea was that all banks operating in the same country would be subject to the same rules (even if their headquarters were in a different European country), which was to effectively “level the playing field.” Banking regulation has always been a delicate balance between the competing forces of allowing banks to be competitive and profitable versus the need to protect the national and international economies from systemic failures resulting from banking crises.

In 1973, the world economy was very bad. Inflation worldwide was at 9.7%, while growth was averaging 2.4%. Multiple oil crises pushed the price of oil from \$2 per barrel in 1970 to \$40 per barrel in 1980. Volatile foreign exchange and interest rates attracted several non-bank financial institutions that began to compete directly against banks. At the same time, there were important developments in the capital markets that brought about alternative sources of funding, leading to further disintermediation. This was unwelcome news for the level of banking assets – as companies were no longer dependent only on bank loans to finance themselves. To make matters worse, banks’ most lucrative source of financing, deposits, came under pressure as depositors could invest more profitably, and more easily, in money market funds rather than in savings accounts. Margins went down so, as banks faced decreasing asset yields (due to increased competition for investment opportunities) and increasing funding costs (due to the shrinking base of retail deposits), banks began to search for more lucrative assets. Real estate lending and loans to developing countries became popular investments of choice.

**The Necessity of Deregulation and Evidence of its Costs:** What had traditionally been a protected and stable industry, with (in many countries) a legal maximum

interest rate on deposits, ensuring lucrative margins, was now under fire. Through the combination of a weak economy, a volatile economic environment, and increased competition, banks were under pressure. The only possible answer was deregulation. Supervisory authorities all over the world at the end of the 1970s began to liberalize their banking sector to allow financial institutions to reorganize to face the new threat (Balthazar, 2006).

Some of the consequences from these changes are exemplified in instances like the failure of Continental Illinois Bank in 1984. In 1980, Continental was the 7<sup>th</sup> largest bank in the United States, with \$40 billion in assets, but it set an ambitious goal to become the country's number one commercial lender. In pursuit of that goal, the bank had targeted the energy sector, because of its considerable expertise in making profitable loans related to the oil business. Toward that same end, the bank also invested a substantial portion of its assets in loans to developing countries. But, a decline in oil prices in the early 1980s affected both the oil sector and the economies of developing countries. Continental Illinois Bank had but few deposits because Illinois was a "unit banking state" that greatly limited branches to be within a close proximity of the main office. As result, Continental Bank was forced to rely on less stable sources of funding like certificates of deposit on the international market. When Continental Bank announced that it had \$2.3 billion in nonperforming loans, analysts began to downgrade the bank and there was a run on the bank, as federal law did not protect the deposits of international investors. The bank lost \$10 billion in CD deposits in two months. Continental Illinois Bank became the largest bank failure in US history. The systemic threat came from the fact that 2,299 other banks had deposits at Continental Bank. Of that number, nearly 200 other banks would have failed if Continental Illinois Bank had been declared insolvent (Ennis and Price, 2011). Federal regulators injected \$2 billion, and top management was released. The government installed a new management to manage liquidity problems. The takeover of the bank was relatively successful in that the bill to taxpayers amounted to only \$1.1 billion. This case illustrates the delicate balancing act that must be performed between the competing interests of bank profitability performance, the efficient allocation of capital, and risks to the banking system.

The Basel Accords are three sets of banking regulations (Basel I, II and III) set by the Basel Committee on Bank Supervision (BCBS), which provides recommendations on banking regulations regarding capital risk, market risk and operational risk. The purpose of the accords is to ensure that financial institutions have enough capital on hand to meet obligations and absorb unexpected losses.

The Basel Accords are often criticized for failing to integrate the latest risk management techniques. Bikker and Hu (2012) describes the risk-weighting scheme of Basel I as inadequate to the point of arbitrariness (Bikker and Hu, 2012).

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Further, Hong et al. (2014) finds that the measures in the subsequent Basel Accords are very poor at helping banks maintain liquidity in crisis periods and the LCR ranks low in predicting bank failure as compared to the traditional measure of the government securities ratio (Hong et al., 2014). We posit that the underperformance of the LCR is due to its reliance on credit quality to determine HQLA rather than actual liquidity.

### **Capital Arbitrage**

Capital arbitrage consists of investing in the riskier assets within a risk-weight band. An example often cited in the literature is capital arbitrage using corporate bonds; a bank buys more speculative bond that and sells a higher-grade bond that requires the same regulatory capital. In other words, the bank engages in the arbitrage by shifting, within a given credit rating, from a more liquid asset to a less liquid asset with a higher return. This weakness in the Basel Accords that allows banks to adopt a higher risk profile than regulators intend. Again, this stems from using creditworthiness instead of a liquidity metric in standard setting. Recent literature cites the need for a liquidity risk component in the standard to increase its effectiveness (Dermine, 2015, Vazquez and Federico, 2015, Imbierowicz and Rauch, 2014, Hong et al., 2014).

This paper contributes to the goal of standard setters by quantifying liquidity such that it is directly measurable and can be used to prevent capital arbitrage. A bank would no longer be able to switch to a less liquid security and maintain the same level of regulatory capital.

### **The Liquidity Coverage Ratio (LCR)**

The objective of the Liquidity Coverage Ratio (LCR) is to ensure that banks have an adequate reserve of assets from which to raise cash to cover immediate (within 30 days) cash outflows in those times of severe economic stress. The LCR builds on traditional liquidity “coverage ratio” methodologies used internally by banks to assess exposure to contingent liquidity events. The total net cash outflows for the scenario are to be calculated for 30 calendar days into the future. The LCR has two components:

- (a) Value of the stock of HQLA in stressed conditions; and
- (b) Total net cash outflows. (BIS, 2013)

$$\frac{\text{Stock of HQLA}}{\text{Total net cash outflows over the next 30 days}} \geq 100\% \quad (1)$$

### **High-Quality Liquid Assets (HQLA)**

To qualify as “HQLA”, assets should be liquid in markets during a time of stress. Additionally, the Bank for International Settlements specifies that, “...an asset’s liquidity increases if market participants are more likely to agree on its valuation.” (BIS, 2013) Additionally, there should be historical evidence of market breadth and market depth and diverse number of market participants. These are precisely what the entropy measure,  $E$ , quantifies.

The Bank for International settlements goes on to suggest that these are characteristics of high credit quality. While we believe that credit quality and liquidity are usually associated, we contend that liquidity and be separately measured. Therefore, in this study we would like to demonstrate that high credit quality is not the sole determinant of liquidity. We contend that liquidity can be measured directly and is therefore a better determinant of enduring liquidation value than credit quality, i.e. default risk. The liquidity measure tested in this paper meets the proffered qualifications for HQLA described in BIS, 2013, “The pricing formula of a high-quality liquid asset must be easy to calculate and not depend on strong assumptions. The inputs into the pricing formula must also be publicly available. The Trade Reporting and Compliance Engine, TRACE, is the, Financial Industry Regulatory Authority, FINRA-developed vehicle that facilitates the mandatory reporting of bond market transactions, that began in 2002. The calculation for the entropy measure for liquidity is based upon TRACE data, now readily available.

In a critique of the new liquidity rules Basel III, Allen et al. (2012) find that the proposed definition of assets eligible to be treated as liquid under the proposed liquidity regulations is dangerously over-concentrated on government debt and that the definition of acceptable liquid assets should be broadened to give banks more scope to hold liquidity in the other forms.

### **HYPOTHESIS DEVELOPMENT**

The risk quantification and measurement tools are well developed. However, the academic literature has not developed similar quantification and measurement tools for liquidity. This paper contributes to the literature by proposing and testing a quantification management tool for liquidity. Value at risk (VaR) is a measure of the risk of loss for investments. It estimates how much a set of investments might lose in a set period. Credit VaR (Value at Risk) models are common, where liquidity VaR models are not. We contend that, in stress scenarios, the latter may be of greater import to bank solvency.

Prior literature has oft used bid-ask spread as a benchmark for liquidity, but, the sources of this information, market makers, are seeing changes that can introduce

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bias. Bid-ask spread quotes vary greatly amongst market makers, as inventory levels become an increasing influence for these firms, all of whom have risk management frameworks that set limits on holdings of different assets. When institutions approach those limits, they tend to adjust their quoted prices to realign their inventory (Fender and Lewrick, 2015).

The focus of our study is on bank liquidity risk and we contend that it is better to use a liquidity measure in the determination of HQLA, because it allows banks to access the higher yields of corporate bonds and collateralized debt obligations while gauging for liquidity risk. We employ a new model for liquidity based on an entropy equation that is based on the actions of investors. We think that this makes our liquidity measure more powerful than bid-ask spread. Bid-ask spread is a consensus estimate of quoted markets not actual transactions. The Bank for International Settlements has notably expressed a preference for metrics based on transactions over those based on estimates (Fender and Lewrick, 2015).

### **The Entropy Liquidity Measure, E**

A modified version of the entropy measure adapted from the physical sciences has been in use in business literature for many years. A famous example is the Hirsch-Herfindahl Index. Its background includes contributions from such notables as Claude Shannon and Edward H. Simpson. The Simpson index was introduced in 1949 by Edward H. Simpson to measure the degree of concentration when individuals are classified into types (Simpson, 1949). The same index was rediscovered by Orris C. Herfindahl in 1950, as per his unpublished doctoral dissertation, "Concentration in the U.S. Steel Industry" at Columbia University (Rhoades, 1993). The square root of the index had already been introduced in 1945 by the economist Albert O. Hirschman (Hirschman, 1945). As a result, the same measure is usually known as the Simpson index in ecology, and as the Herfindahl index or the Herfindahl-Hirschman index (HHI) in business literature.

The Shannon index has been a popular diversity index in the ecological literature, where it is also known as Shannon's diversity index, the Shannon-Wiener index, the Shannon-Weaver index and Shannon entropy. The measure was originally proposed by Claude Shannon to quantify the entropy (uncertainty or information content) in strings of text (Shannon, 1949).

The formula for the entropy measure that we use for E is as follows:

$$E = \sum_{i=1}^n P_i \ln \frac{1}{P_i} \quad (2)$$

where  $P_i$  is the share of the  $i$ th bond transaction's proportion on the total monthly trade volume for that specified bond issue, and  $n$  is the number of trades for the month. The entropy measure weights each  $P_i$  by the logarithm of  $1/P_i$ .

### **Indicators of the Entropy Liquidity Measure, $E$ , value in Standard Setting**

Liquidity standards for bank survival in stressful economic periods should be based on a metric that determines how well an investment instrument performs in such a period. In other words, the measure should identify which corporate bonds or other fixed-income investment will maintain the most value and thereby be salable when times are bad, and market-wide liquidity is low. Accordingly, hypothesis H1 states:

H1: The Entropy Measurement Index,  $E$ , can be used to predict ex post value at risk (VaR) separately from default risk in times of economic stress.

Further, previous and existing standards set for bank liquidity had been circumvented because banks have engaged in regulatory capital arbitrage. Accordingly, hypothesis H2 states:

H2: The liquidity measure  $E$  can be used to prevent or mitigate regulatory capital arbitrage.

Lastly, if liquidity measure  $E$  does in fact measure liquidity, it should be demonstrable that liquidity is priced in the market separately and distinctly from default risk. In other words, the liquidity component of a corporate bond must be identifiable and measurable to gain acceptance as a valid quantification of liquidity. Accordingly, the hypothesis H3 states:

H3: The Entropy Measurement Index,  $E$ , adds statistically significant model precision in the determination of corporate bond value.

## **METHODOLOGY AND EMPIRICAL RESULTS**

We used a measure for liquidity based on an entropy equation,  $E$ , and use it to show that high liquidity is a significant predictor of value retention through multiple crisis periods including the 2008-2009 financial crisis. For robustness, we also carry out OLS regressions and find a significant and positive relationship between the entropy variable and corporate bond value while controlling for time to maturity, credit quality and the risk-free rate, demonstrating that the entropy measure is a valid predictor of a bond's relative liquidity in a stress scenario.

### **Sample and Data Collection**

The Data for this study originates with those corporate bonds that had been issued between January 2002 and January 2011 as reported in the Thomson Reuters SDC Platinum database. We removed all transaction records for those corporate issues:

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- that were convertible
- that had floating interest rates
- that had initial maturities shorter than five years
- that were finance companies, insurance companies, or any type of bank or thrift
- that did not have TRACE identifiers, and
- that did not have at least 90% of the original issue amount still outstanding.

This left a sample of 2,306 corporate bond issues from 625 issuers. At the beginning of the 99-month study time period there were 546 corporate bond issues in the study. There are 123,017 of these “bond-months” in the study, after removing 69 bond-months determined to be outliers. The outliers were identified using Studentized residual, Hat-Value, and Cook’s Distance examinations.

### **Measurement of Market Performance of Portfolio Liquidity**

We divide the sample of industrial corporate bond issues that remained outstanding from March 2004 to March 2011 into quintiles based on E values and compare the relative performances of the top quintile to the bottom quintile in flight episodes and in “fair weather” periods. Tests were done to show that the differences between quintiles are statistically, significantly different from zero. We calculate portfolio returns using Equation 3 below:

$$Return_t = \frac{P_t + C - P_{t-1}}{P_{t-1}} \quad (3)$$

In Equation 3,  $Return_t$  is the bond return for the one-year holding period ending at time  $t$ ,  $P_t$  is the bond price at time  $t$ ,  $P_{t-1}$  is the bond price one year before time  $t$ , and  $C$  is the coupon rate of the bond.

Equation 4 is used to calculate the portfolio spread return is as follows:

$$\begin{aligned} Spread\ Strategy\ Return_t \\ = Low\ Entropy\ Return_t - High\ Entropy\ Return_t \end{aligned} \quad (4)$$

To test the relative value of high entropy portfolios versus those of low entropy portfolios through a series of economic additions, we use the yield to maturity histories of the bonds in the entire, initial sample, over eight one-year periods (reset at the same time each calendar year). The top 20% in entropy values became the High Entropy Portfolio and the bottom 20% in entropy values became my Low Entropy Portfolio. The portfolios are equally weighted.

**Empirical Results – Portfolio Liquidity****Table 1 – Reports High Liquidity versus Low Liquidity Portfolio Performance**

Table 1 reports returns for the portfolio strategies in each of 8 one-year periods. Note that, “Long Portfolio Returns” are simply the returns for the single-year “buy and hold” strategy. The “Spread Strategy Returns” reflect the returns from taking a long position in the low liquidity (having lower values computed using Equation 3) portfolio and a short position in the high liquidity (having higher values computed using Equation 3) portfolio. In other words, in this strategy, the long position is taken in low liquidity bonds, and a short position in high liquidity bonds because it is expected that in a “normal”, “fair weather” market the low liquidity portfolio will outperform the high liquidity portfolio because investors would demand a higher return as compensation for the risk of the liquidity. Conversely, in times of economic stress, the expectation is that the bond portfolio that has the higher liquidity is more valuable, outperforming less liquid securities

Holding Period 12 months ending	Long Portfolio Returns		Spread Strategy Returns			
	Low Entropy Portfolio	High Entropy Portfolio	Long Position = Low Entropy Short Position = High Entropy Portfolio			
Mar-04	0.10799	0.10468	0.00332	33	basis point GAIN	
Mar-05	0.11605	0.07287	0.04319	432	basis point GAIN	
Mar-06	GM/Ford Crisis	0.01899	0.04313	-0.02413	241	basis point LOSS
Mar-07		0.10882	0.08694	0.02188	219	basis point GAIN
Mar-08	Subprime Crisis	0.00620	0.04500	-0.03880	388	basis point LOSS
Mar-09	Subprime Crisis	-0.04674	0.00299	-0.04973	497	basis point LOSS
Mar-10		0.23896	0.15301	0.08595	859	basis point GAIN
Mar-11		0.08810	0.08011	0.00799	80	basis point GAIN

The spread strategy confirms that the high liquidity portfolios as identified by liquidity entropy measure do maintain greater liquidity in periods of economic stress as evidenced by the negative returns in the three periods ending in March 2006, 2008, and 2009. The losses from holding the low liquidity portfolios were 241, 388, and 497 basis points, respectively. This is consistent with the theory that

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holding illiquid assets in stressful economic periods is value destroying. The entropy liquidity measure successfully identified the bonds with the greatest value at risk (VaR) in the three stress scenarios during the study period, counter to the positive spread returns for the normal periods, thus supporting hypothesis H1.

### **Measurement of Market Value of Liquidity via Entropy Value, E**

To investigate hypotheses H2 and H3, the general form of my regression model for testing is shown in Equation 5:

$$\begin{aligned} ytm_{i,j} = & \beta_0 + \beta_1(1/age_{i,j}) + \beta_2riskfr_{i,j} + \\ & \beta_3amt.out.m_{i,j} + \beta_4rating_{i,j} + \\ & \beta_5E_{i,j} + \beta_6dum.onrun_{i,j} + \epsilon_{i,j} \end{aligned} \quad (5)$$

The yield to maturity variable,  $ytm_{i,j}$ , is being introduced at this point to study pricing effects and will be the dependent variable in the forthcoming regression models. Yield to maturity is the anticipated annual rate of return for a bond if it is held until the maturity date. The subscripts “i” and “j” referred to the company and month, respectively, for all variables. Yield to maturity and inverse relationship bond price, as the yield to maturity increases the price of the bond decreases, and vice versa. Fixed income instruments decline in value as market interest rates rise. The forthcoming regressions seek to model factors affecting bond value using yield to maturity as the dependent variable.

The variable *age* represents one of the factors affecting bond value and liquidity. It is how long the bond has been trading in the secondary market, i.e. the age of the bond. The *age* variable equates to the number of months since the bond was issued. To improve model-fit, a nonlinear transformation was performed on the *age* variable. We expect the age of a bond issue to be positively correlated with yield to maturity as older issues experience a decaying liquidity consistent with the on-the-run effect. (Anderson and Long, 2017)

The variable for the risk-free rate is *riskfr*. The risk-free rate is taken from the market rates of Treasury bonds, however, since the Treasury index in the WRDS database do not cover the full time period of the study, we used the AAA corporate bond interest rate index as quoted in the Federal Reserve, H15 report.

We expect the risk-free rate be positively correlated yield to maturity, as it is the base rate upon which all risk premia are added.

The variable for the issue’s outstanding face value, in millions of dollars, is *amt.out*. we expect that the size of the issue outstanding will be somewhat

negatively correlated with yield to maturity, as we expect larger issues would enjoy greater liquidity giving them greater desirability in the market, hence, *ceteris paribus*, a lower yield to maturity.

The variable for credit rating is *rating*. It is an ordinal variable for Moody's ratings, configured such that higher values coincide with higher ratings, from the lowest, in the range, set to one (Ca set to 1) to the highest set to twenty (Aaa set to 20). See table 2 below.

**Table 2 – Index to Numeric Moody's Credit Rating**

This Table has the first column showing the Moody's rating. The second column is the number of issues in the sample that have that Moody's rating. The third column is number assigned to that rating in the dataset.

Moody's	Count	Numeric
Aaa	20	20
Aa1	2	19
Aa2	30	18
Aa3	109	17
A1	137	16
A2	428	15
A3	329	14
Baa1	284	13
Baa2	440	12
Baa3	310	11
Ba1	91	10
Ba2	33	9
Ba3	9	8
B1	26	7
B2	29	6
B3	28	5
Caa1	9	4
Caa2	4	3

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Caa3	4	2
Ca	2	1

The variable for the liquidity entropy measure is  $E$ . It is my variable of interest, as we posit that it quantifies liquidity. We expect  $E$  to be negatively correlated with yield to maturity, as greater values of  $E$  indicate higher liquidity, therefore, greater value evidenced by a lower yield to maturity.

The variable *dum.onrun* is a dichotomous, or dummy, variable that is said to one if it is the most recent issue of a multi-issue issuer, otherwise zero. We expect *dum.onrun* to be negatively correlated with yield to maturity, because new issues have not experienced natural decline in liquidity that happens over time, consistent with the on-the-run effect. (Anderson and Long, 2017)

Table 3 (next page) presents the regressions of the yield to maturity on the factors that impact bond value and liquidity.

In Model 1, the regression is upon just the control variables (*1/age*, *riskfr*, *amt.out*, and *dum.onrun*) and, it explains 17.35% of the variation in corporate bond's yield to maturity, as per the coefficient of determination Adjusted R-square. All four of these variables are statistically significant in this model.

In Model 2, the regression includes the independent variable for credit rating, *rating*, which is statistically significant and more than doubles model accuracy to an Adjusted R-square of 38.11%.

In Model 3, we substitute the variable for credit rating with the variable for the liquidity entropy measure,  $E$ , which is also displays statistical significance. However, model accuracy decreases to 22.84%, clearly demonstrating that the liquidity component of a bond value has a lesser impact on bond valuation than does default risk. This was to be expected. The motivation of this study is to investigate whether liquidity risk can be separately measured from default risk.

In support of  $E$  being a measure of liquidity, please note that the other indicator of a degree of liquidity, *dum.onrun*, has the impact of its coefficient reduced from -3.571 to -3.095, when the variable  $E$  was included in the model.

In Model 4, the regression includes both the variable *rating* and the variable  $E$ . Both variables are statistically significant, and have similar coefficients at -.2940 and -.2833, respectively. Additionally, the full model explains 43.50% of the

**Table 3 – Regression Models**

INDEPENDENT VARIABLES	DEPENDENT VARIABLE = <i>Yield to Maturity</i>			
	MODELS			
	(1)	(2)	(3)	(4)
<i>INTERCEPT</i>	-.3987*** (0.0000)	-.4703** (0.0533)	-3.2630*** (0.0000)	.2396 (0.3060)
<i>1/AGE</i>	-1.4880*** (0.0000)	-1.0820*** (0.0000)	-1.1180*** (0.0000)	-.7554*** (0.0000)
<i>RISKFR</i>	1.8910*** (0.0000)	1.9210*** (0.0000)	1.8180*** (0.0000)	1.8490*** (0.0000)
<i>AMT.OUT</i>	-.0001** (.0011)	.0000 (.6238)	.0002*** (0.0000)	.0003*** (0.0000)
<i>RATING</i>		-.2947*** (0.0000)		-.2940*** (0.0000)
<i>E</i>			-.2858*** (0.0000)	-.2833*** (0.0000)
<i>DUM.ONRUN</i>	-.3298*** (0.0000)	-.3571*** (0.0000)	-.3095*** (0.0000)	-.3369*** (0.0000)
Observations	7,657	7,656	7,656	7,655
R-squared	0.1740	0.3815	0.2289	0.4354
Adjusted R-squared	0.1735	0.3811	0.2284	0.4350
Residual Std. Error	1.547	1.339	1.495	1.279
F-Statistic	402.6***	943.1***	435.9***	982.8***

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variation in corporate bond's yield to maturity, as per the coefficient of determination Adjusted R-square. The empirical results support hypotheses H2 (The liquidity measure E can be used to prevent or mitigate regulatory capital arbitrage) and H3 (The Liquidity Entropy Measure, *E*, adds statistically significant model precision in the determination of corporate bond value.). It is of particular import that when comparing Models 2 and 4 that we find that adding the entropy liquidity measure, *E*, to the corporate bond valuation model.

R-square goes from 38.11% to 43.50%. This demonstrates that liquidity is a significant component of value that is separately measurable and should be useful in assessing Value-at-Risk, VaR.

R-square goes from 38.11% to 43.50%. This demonstrates that liquidity is a significant component of value that is separately measurable and should be useful in assessing Value-at-Risk, VaR.

## **CONCLUSIONS AND RECOMMENDATION FOR FUTURE RESEARCH**

This paper makes four contributions. First, this paper offers a method to measure liquidity using readily available transaction data rather than estimates which can be influenced by dealer self-interest arising from dealer inventories. Second, this paper contributes to the goal of standard setters by quantifying liquidity such that it is directly measurable and can be used to prevent capital arbitrage. Third, this paper enables bank management to utilize a liquidity measure in the determination of the necessary level of economic capital for the bank's risk profile. Fourth, it provides academic researchers a way to compare liquidity between different asset types such as bonds versus collateralized debt obligations (CDO), and further differentiate within assets types, such as between various bond ratings or CDO tranches.

Avenues for further research would include testing the entropy measure of liquidity against other liquidity proxies for validity and robustness. Further, researchers can endeavor to prescribe a risk-weighting schema based on liquidity instead of default risk. Simply put, if the entropy measure for liquidity is a more accurate and earlier predictor of value retention in periods of economic stress then it should be preferred over credit rating in the determination of HQLA.

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**APPENDIX – VARIABLE DESCRIPTIONS AND SUMMARY STATISTICS****Variable Descriptions**

<i>YTM</i>	The average yield to maturity or internal rate of return earned by investors who bought the bond in the given month.
<i>AGE</i>	The number of months since the bond was issued.
<i>RISKFR</i>	WRDS - The Interest Rate (reported in the Federal Reserve, H15 report) reported for the month as the AAA bond yield, risk-free rate.
<i>AMT.OUT</i>	The amount of the issue outstanding, in millions.
<i>RATING</i>	The ordinal variable for the Moody's rating, configured such that higher values coincide with higher ratings, range lowest (Ca set to 1) to highest (Aaa set to 20)
<i>E</i>	The Entropy Measure. This measure increases with liquidity, i.e. the higher the value of E, the greater the liquidity of the asset.
<i>DUM.ONRUN</i>	The dichotomous (dummy) variable that takes the value of one, "1", for all issues that are the most recent for an issuer, provided that said issuer has more than one issue in the market/sample during that calendar month. Otherwise, the value for this variable is zero, "0".

**Summary Statistics**

Variable	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	Std.
	<i>YTM</i>	1.127	4.994	5.901	5.751	6.604	12.18
<i>AGE</i>	1	23	52	61.13	87	228	45.81706
<i>RISKFR</i>	4.49	5.127	5.331	5.317	5.54	6.281	0.353128
<i>AMT.OUT</i>	5	250	350	433.3	500	2500	320.6851
<i>RATING</i>	3	11	13	12.72	15	20	2.639269
<i>E</i>	0	0	1.924	1.854	2.987	6.303	1.469306
<i>DUM.ONRUN</i>	0	0	0.5	0.5	1	1	0.500033

## INVESTMENT METHODS BEFORE THE GREAT STOCK MARKET CRASH

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### **ABSTRACT**

This study examines investment methods the year before the stock market crash of 1929. It explores this issue by looking at books on investing published in 1928. It finds that investors were reasonably sophisticated and little criticism can be made of their methods. They understood the attributes of prudent investing and employed currently popular financial ratios in their analyses. While part of the problem was lack of company information and comparability, there were other structural issues in the stock market as well as in the relatively new economy of the 1920s that led to the downfall.

Key Words: investment analysis, stock market crash of 1929, financial reporting, corporate securities

### **INTRODUCTION**

A number of questions come to mind about investors in corporate securities in 1928, one short year before the debacle of the stock market crash of 1929. Was it simply the case that they did not know any better? Or, were they so intent on increasing their wealth that greedy speculators did not know when to get out of the market? Did they understand the importance of diversification across different types of securities? Did they have reasonable methods of analysis to help select securities? Were they knowledgeable investors but lacked the necessary company and economic information to make rational investment decisions?

The purpose of this study is to try to find out what went wrong for investors in the late 1920s that resulted in a cataclysmic collapse of the stock market. The method is to examine books on investing from 1928. As such, this is an extension of prior research that examined books on investing from the late 19<sup>th</sup> century through 1927 (see, for example, Thompson, 2017). WorldCat (2005) was searched to identify books using the key words “investing,” “security analysis,” and “financial statement analysis.” In addition, in an attempt not to miss any important books, also included were books cited by Graham and Dodd (1934) in their well-known *Security Analysis*. Selected books had to be available online or through interlibrary loan. In this study, the two books reviewed are *Investing for a Business Man* by Barron’s (1928) and *Badger on Investment Principles and Practices* by Ralph E. Badger (1928). As the current bull market stretches into its tenth year, understanding what happened in 1929 could be invaluable.

The next section examines *Investing for a Business Man* while the subsequent section reports on *Badger on Investment Principles and Practices*. The final section places investment practices of 1928 into perspective.

### ***INVESTING FOR A BUSINESS MAN (1928)***

This book (Barron's, 1928) resulted from a contest conducted by Barron's to answer the question: "How would you invest \$100,000 for a successful middle-aged business man whose earnings are ample for his present needs?" The book contains twelve investment plans along with five criticisms of the best three plans. In judging the 760 submitted essays, emphasis was placed upon "soundness of argument and style of writing," "broad principles underlying the investment plan," and readability (p. vi).

In "America's Best Investment Buys," Barron's summarized the results of their contest. In all, 508 submissions to the contest were considered "worthy" (p. 127). Notably, Barron's observed that "The popularity of common stocks is striking evidence of the change in investment policy that has taken place in the last few years" (pp. 127-128). Ninety-three percent of the submissions suggested investing in common stocks and almost 14% would invest the entire \$100,000 in common stocks. Of the top 45 common shares listed in the business man's contest, 43 traded on the New York Stock Exchange while "each stock has a broad and active market" (p. 130). Each of the 45 common shares were dividend-payers and represented domestic fundamental businesses (except for International Telephone) that had been in existence for at least 10 years. Only 20 submissions recommended preferred stocks.

Medium grade and convertibles were more popular than highest-grade bonds, apparently since the participants felt "they could secure for their business man a higher yield without undue loss of security, by broad diversification" (p. 131). The most popular bonds traded on the New York Stock Exchange or Curb and all but one was "seasoned" (p. 132).

Bank and insurance stocks were included by 29% of the participants, with banks being more popular than insurance companies. Interestingly, many of the participants suggested buying the stock of a local bank with whom the business man had a relationship as well as loaning money on real estate. Only a few suggested buying real estate. Several of the common stocks selected were typically considered as those bought for the long-run.

More generally, many of the participants viewed the business man's problem as "safety of principal and income" while others focused on appreciation "so in the course of years the business man could live...independently" (p. 133). The former suggested high-grade bonds, diversification, and savings banks with a few including some stocks to protect purchasing power. The latter group favored common stocks though sometimes limited their suggestions by their view of the high price of stock. Some concluded that "a reaction of major proportions was a virtual certainty in the not-distant future" (p. 134). So, some focused on stocks, some on stocks and long-term bonds and liquid investments, and some on stocks and short-term investments to be used for later purchase of stocks.

The average allocation of funds over the 508 submissions was common stocks 50.9%, bonds 41.6%, and preferred stocks 7.5%. The number of security issues purchased ranged from 4 to 91 with an average of 27. Income from the investments ranged from \$2,900 to \$6,925, averaging \$4,982. The 97 plans judged the best by Barron's invested in 31 securities with 57.4% in common stocks, 37.9% in bonds, and 4.7% in preferred stocks. By industry for the common stocks, the percentages were railroads 13.2%, industrials 27.6%, public utilities 10.6%, and bank and insurance stocks 6.0%. For types of bonds, the percentages were short-term notes 8.7%, foreign 5.2%, government 1.2%, convertible 2.0%, and other long-term bonds 20.8%.

What did the best essays suggest? Hazel Freeman won the first prize of \$1,000. She first emphasized investment safety noting that "Energy and experimentation do not exist apart from a risk of loss" (p. 1). Moreover, "Maximum safety must be sought somewhere between the two extremes of traditional conservatism...and reckless speculation" (p. 2). Freeman added that safety was obtained through diversification and "good investment risks" (p. 2).

She suggested that a successful business man invest in common stocks, noting that "If reasonable diversification, investigation and supervision be employed in the use of common stocks, the final results will justify the policy" (pp. 3-4). Freeman, like the other prize-winners, referenced Edgar L. Smith (1924) and Kenneth S. Van Strum (1925), among others, as support for investing in common stocks. She counseled that the investor in common stocks must "not be disturbed by seeing wide variations in the market value of individual holdings" (p. 4). However, she also suggested investing a portion of the available capital in bonds, "thus providing ready funds to take advantage of an opportunity that otherwise would not be open to him" (p. 4). She did not recommend preferred stock "because its range of appreciation is strictly limited" (p. 4).

Freeman considered the stock market at the time and business conditions and suggested that the business man invest 70% of his capital in common stocks and 30% in short-term bonds that could be readily sold with little risk of loss. Among her comments: "If money continues easy, as it bids fair to do for some time, stocks might advance substantially beyond present levels" (pp. 5-6). She added: "If we have a recession, on the other hand, it is unlikely to be drastic" (p. 6). Sanguinely, she wrote "Ultimate improvement in business and stock values will accompany the undoubted future growth and development of this country" and "The time to invest money is when you have the money to invest" (p. 7).

She would divide her stock fund into three groups, A, B, and C with A including less risky stocks while C "contains some newer industries which offer some possibility for greater profit (and greater loss)" (p. 8). Freeman suggested that a business man "diversifies more widely and reduces the total investment per group as the hazard increases" (p. 8). Thus, she allocated 30% to A with 10 stocks (listed), 25% to B with 13 stocks, and 15% to C with 15 stocks. She advised that stocks must be managed for changing economic conditions and that "The investor must sell as well as buy" (p. 8). Spock-like of Star Trek fame forty years later, her parting sentiment for a business man was "May he live long and prosper!" (p. 9).

J. R. Shuman won second prize in Barron's contest. He recommended keeping 10% of the fund in liquid securities to take advantage of new opportunities as they arise. He would buy common stocks to maintain purchasing power as well as allowing for increased future income. On the other hand, Shuman conservatively recommended some bonds yielding 5 to 5.5 % be purchased in the event of a business depression. While he suggested investing 60% of the fund in common stocks, because of the high prices of the time, he would limit common stocks to 30% and invest the remaining 30% of his overall funds in bonds nearing maturity which could be used to buy more common stock as they mature and common stock prices fall. The remaining 30% of the \$100,000 should be invested in bonds. He added that when the business man retires, the 10% in liquid funds should also be invested in long-term bonds. Ultimately, Shuman advised 60% in common stocks and 40% in bonds eventually for the business man. Like Freeman, he did not recommend preferred stocks and he also avoided high-yield bonds as they "would require considerable attention in case of a prolonged depression" (p. 18).

Shuman's liquid investments consisted of U. S. Treasury certificates and corporate notes and bonds nearing maturity. As for common stocks, he favored investment stocks of large industrials "with the greatest possibilities for the long pull" (p. 19). He avoided for the time being high-priced investment stocks as well as low-priced speculative stocks, which might be added later when market prices fall. For bonds, he advised a diversified selection from different industries, regions of the country, and a variety of maturity dates, avoiding those bonds near their call prices. More specifically, he suggested railroad and public utility bonds that exhibit "a greater degree of stability of earning power" (p. 20). Shuman emphasized that his suggested proportions were rough guidelines.

Shuman's three basic principles were "liquidity, elasticity of income, and stability" (p. 21), but the proportions depended upon the investor and the economy. With notable prescience, Shuman was cautious as "The period through which we are now passing embodies certain characteristics that have never appeared before in the economic history of our country," and thus "place only a portion of our common-stock fund in stocks now, with the idea that more favorable purchasing opportunities will be presented later" (p. 21). Rather than investing in all bonds or all stocks for an investor, Shuman concluded: "By following a middle course, we assure him stability of dollar income through his bonds, elasticity and probability of future growth through his stocks and availability in case of need or opportunity through his liquid funds" (p. 21).

The third place prize went to Charles E. Brundage who penned his entry in the form of a letter to a business man seeking investment advice. He generally advised "utilize your capital effectively in the building up and enhancement of principal values as rapidly as may be consistent with safety" (p. 25). Further "facilities for growth of principal are best obtained by the ownership of sound common stocks carefully selected and adequately diversified" (p. 25). This was despite the current high prices in the market.

Brundage further expounded on the prevailing economic conditions. He explained that “Profits are being derived from quick turnover of capital invested in inventories and through declining costs made possible by large-scale production and more enlightened management” (p. 26). Moreover, declining commodity prices and “a hand-to-mouth buying policy, should tend to limit the intensity or duration of any business depression” (p. 26). He added: “To summarize the situation briefly, mass production, mass purchasing power and a higher scale of mass of social intelligence are the bases of our economic well-being” (p. 26). Brundage noted satisfaction with real wages, railroads, banking, credit, and the political situation as he expected President Coolidge to spur Congress for a tax cut.

On the other hand, Brundage did urge caution due to “overbuilding in certain sections, intense competition in several lines of business, uncertainty about future gold movements and overproduction in several major industries...such...as the petroleum industry” (p. 27). Unless there was a crop failure or negative political developments, Brundage did not “see the possibility of a general business depression or financial crisis without first passing through a period of inflation of commodity prices or serious over-expansion of general prosperity” (p. 27).

While Brundage believed that common stocks were the best investment in the long-run, he advised limiting investment in common stocks to “75% of your total capital in high-grade, carefully selected common stocks” (p. 28). The remaining 25% should “be utilized as a cash fund to be invested in high-grade, short-term, liquid obligations” (p. 28). This fund would protect in the case of falling stock prices as well as provide resources to additional common stock at low prices. In selecting common stocks, he advised “choosing sound and healthy industries...which are most strongly entrenched financially and strategically” (p. 29). He further suggested buying the stock of industries that “are producing goods and services having a large potential social demand” (p. 29) such as utilities, electric-equipment, chemical, aluminum, and chain-store businesses. He would also include railroads as he thought that they were undervalued.

Brundage preferred those companies that retained most of their earnings rather than distributing large cash dividends. Such companies exhibit “high degree of security and with their growth in principal, which reflect their increasing worth as equities and underlying values are constantly being built up and strengthened” (p. 30). He also suggested investing a small amount in industries with more risk whose “long-term prospects must be judged primarily by projection of the imagination into the future” (p. 30) such as radio, aviation, and rayon industries.

Overall, Brundage characterized the investment plan for a business man: “this combination of equities and fixed-income-bearing securities, together with the comparative dollar stability of your business income, will serve to protect the purchasing power of your wealth against the fluctuating dollar” (p. 31). His final bit of advice was to be patient: “Results cannot be accomplished quickly, and to safeguard your wealth it will be necessary to observe carefully changes in economic conditions as well as in individual industries and companies” (p. 31).

Nine other honorable mention essays were included in the volume. The recommended proportion of common stocks in a portfolio were 75%, 100%, 80%,

100%, 60%, 50%, 43%, 50%, and 95%. The authors' rationales echoed those of the three prize-winners and touched on a variety of now familiar themes: safety of principal, appreciation, fair returns, marketability, risk and diversification by industry, location, and maturities, buying well-seasoned dividend payers, commodity prices and the potential loss of purchasing power by buying bonds, compounding effect of reinvestment of earnings by corporations along with their growth and leverage, definite income versus speculation, long-term returns of stocks versus bonds, knowledgeable assessment of securities versus getting advice, call and conversion prices for bonds, high prices of stocks and the timing of purchases versus when funds were available, economic and political conditions, and retirement. These are the same issues confronting a current investor.

Thus, the contestants in *Barron's* "Investing for a Business Man" seemed knowledgeable even while taking different approaches. Their differing advice is not unlike one would get from currently watching the commentators on *CNBC*. Obviously, they were thoughtful advisors. On the other hand, likely due to space limitations, they offered only brief guidance on the method of selecting specific securities. This was not the case with the Ralph Badger's book, discussed in the next section.

### ***BADGER ON INVESTMENT PRINCIPLES AND PRACTICES (1928)***

This book (Badger, 1928) is a far-reaching and thorough description on the state of investment analysis just one year before the 1929 stock market crash. Ralph Eastman Badger, the author, was Professor of Economics at Brown University and intended the book as a textbook for a year's study of corporation finance and investments. He taught with this book at Brown University. Badger had experience as a consultant in tax cases involving industrial securities, as a statistician for investment bankers, and as an advisor on investments for estates (Preface, 1928). Bankers, brokers, lawyers and the "so-called middle class" desired to make investments "that will bring him the maximum return consistent with a minimum risk" (p. v). Badger admitted that his effort was introductory in that "It is possible to cover only in a rather broad way the more important aspects" (p. vi).

In nearly 900 hundred pages he examined the demand and supply of capital, returns, investment plans, types of securities, financial analysis, investment mathematics, practical aspects of investing, taxation, and business cycles. This review of his work focuses on Badger's suggestions for the financial analysis of corporate securities. Especially notable are the number of financial ratios Badger employed in evaluating securities. As will be seen, he employed a level of sophistication beyond that demonstrated by other authors up through his publication date of 1928. Not surprisingly, his text went through six editions, with the last being published in 1969.

Badger began his treatment of corporate securities with an introductory chapter entitled "Financial and Investing-General," Chapter XII in his book. Here,

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Badger takes the perspective on an investor who intends to invest his funds in the securities of a corporation for an extended period of time. This “makes it imperative for them to inquire not only as to the present financial status of the borrowing corporation, but as to its past record and future prospects as well” (p. 262). Beyond the legal features of a security, “investors are also interested in those factors bearing on the financial stability of the issuing corporation, its position in the industry, its prospects for growth, the particular risks inherent in the industry, the previous record of the management in control, and the financial record and existing condition of the company” (p. 262).

Badger emphasized the importance of capital structure through explaining trading on equity, or what is now called leverage. Common stockholders benefited by issuing bonds “so long as the earnings on borrowed capital exceed the rate of interest paid thereon” (p. 271). He next related trading on equity to business risk that he defined “as the extent to which the gross earnings, operating ratios, and net earnings of a corporation fluctuate from year to year” (p. 271). He also introduced the idea of an operating ratio that he explained is the ratio of operating expenses to gross earnings (sales). Companies with variable sales or operating ratios (including a high proportion of fixed operating expenses) have high business risk. For these companies, trading on equity was more dangerous. He concluded that “bonds may make up a large proportion of total capitalization in those industries and enterprises with low business risk, but must be used more sparingly in industries and enterprises with high risk” (p. 273).

Most public utilities had low business risk given their nature in dealing with necessities (e.g., electricity and water) that were not subject to style changes or competition and whose rates were regulated by public service commissions. With stable gross earnings and operating ratios, their common stockholders could take advantage of trading on equity with funded debt (bonds) exceeding the capital invested by stockholders. Railroads regulated by the Interstate Commerce Commission also had low business risk, though Badger noted that these businesses were more dependent on economic conditions. In 1924, they had a ratio of 62.6% of funded debt to total capitalization.

However, most industrials faced considerable business risk. Sources included competition from other sellers or prices. Further instability resulted from new products or style changes. Moreover, general changes in the economy affected the demand for luxuries and a fall in the price level could result in losses on existing inventories. On the other hand, Badger pointed out that there were industrials that had low business risk. Some of these had a monopoly due to patent rights (Eastman Kodak Company) or source of supply (Texas Gulf Sulphur Company) while others made low priced necessities (Gillette Safety Razor) or sold low priced goods (Woolworth Co. and S. S. Kresge Co.). In any event, industrials usually issued less debt than public utilities or railroads with ratios of debt to stockholders equity of 1 to 6 or even 1 to 10 based on studies at the time cited by

Badger. Badger cautioned “that the capital structure of the corporation be in keeping with the inherent risks present” (p. 281).

In the next chapter Badger began his analysis of industrials. Noting the diverse businesses included under the heading of “industrials,” Badger’s plan of evaluation involved understanding a specific industry before analyzing a particular company. Industry-wide factors considered included raw materials (source and price), labor issues (unionized or not and the possibility of strikes), marketing issues (necessities sold through many retailers or luxuries with only a few distributors), possibility of growth, competitors in an industry (many or few), and tariffs and their related politics.

After understanding an industry, Badger considered the rank of a company in that industry and its financial position as reflected in balance sheets and income statements. In explaining balance sheets, Badger lamented “there is an utter lack of standardization in industrial accounting that makes the analyst’s task at times very difficult” (p. 290). He cited examples involving depreciation (which may or may not be recorded) and other “offset reserves” that sometimes appeared on the liability side of the balance sheet. Similarly, he found problems with “special reserves” that may or may not be part of “true proprietorship” (i.e., what is now called an appropriation of retained earnings). Moreover, intangibles such as “good will” may be of little value and he recommended deducting them against surplus “to facilitate the statistical comparisons” (p. 292). Badger also wondered about deferred and prepaid items that might represent prepayments of insurance or start-up costs or losses. He suggested treating these amounts as current assets “where they are not large and where ‘accruals’ are included under current liabilities” (p. 292).

Badger also complained about the lack of standardization in the income account (i.e., income statement) including treatments of Federal taxes and depreciation as well as omitting gross sales altogether. Consequently, an analyst “is frequently required to use his ingenuity in interpreting various items” (p. 294). Moreover, when making comparisons “it is often necessary to rearrange the various corporate accounts in some standard form before any uniform results are possible” (p. 294). Figure 1 shows his preferred format.

Figure 1

Income Account

(Badger, 1928, p. 293)

Gross Sales.....	\$1,000,000
Operating Expenses.....	<u>800,000</u>
Operating Income.....	\$200,000
Income from Other Sources.....	<u>20,000</u>

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Total Income.....	\$220,000
Fixed Charges.....	30,000
U.S. Taxes.....	<u>20,000</u>
Net Earnings.....	\$170,000
Dividends on Stock.....	<u>100,000</u>
Profit and Loss.....	\$70,000

Badger began his analysis of the financial statements of a corporation with total investment (by security holders), which he defined as the sum of bonds outstanding, preferred stocks, common stocks, surplus, and other proprietorship reserves. He then calculated the percentage of funded debt (bonds), preferred stock (including subsidiary stock of minority interests), and common stock and surplus (including proprietorship reserves). He advised that the ratio of funded debt to proprietorship equity (including preferred stock) for industrials should be “1 to 3 or 1 to 4” (p. 305). He added that common shareholders were sometimes interested in the ratio of bonds and preferred stock to total investment, which he sometimes referred to as total capitalization to total assets (Badger netted any current liabilities against current assets in his thinking). He advised, however, for an even better way “in determining the actual security behind bond issues” (p. 306) was to substitute the market value of the common stock for its book value in calculating the total investment. Moreover, the par value of the preferred stock also could be compared to the market value of the common stock to assess its security.

Badger next explained how to analyze the number of times charges were earned on bonds and preferred stock. He emphasized that it is preferable to calculate the ratio of income available to satisfy interest (or dividend) charges divided by the interest charges rather than using the so-called “factor of safety” which is the amount of earnings left after deducting interest charges divided by the interest charge. Moreover, for junior bond claims or preferred dividend assessments, all senior claims should be included in the calculation, otherwise the results could be misleading. In any case, and subject to different risks, he recommended that interest should be earned at least three times for industrial bonds and that preferred dividends (including prior interest claims of bonds) should be earned at least two times. Moreover, these ratios should be maintained over a number of years.

The investor should pay attention to earnings per common share and not just focus on dividends per share. Badger advised that “Earnings over and above current dividends should not only be regarded as true earnings, but should also be considered as a safety factor in protecting the current dividend rate on the common stock” (pp. 311-312). To measure how effective a corporation utilized its reinvested earnings, Badger calculated the ratio of total income (earnings before charges) to average total investment for the year. He offered that industrials

typically earned less than 8 percent and that “An Industrial corporation which consistently earns in excess of 10 per cent may be considered above rather than below average” (p. 312). Being subject to competition, industrials might find it hard to maintain a high level of profitability. In contrast, the profitability for public utilities ranged 7 to 8 per cent while railroads were restricted to a return of  $5\frac{3}{4}$  per cent by the Interstate Commerce Commission.

Badger emphasized the benefit to stockholders whose corporation reinvested earnings rather than paying them out in the form of cash dividends. Using S. S. Kresge Co. as an example, whose earnings on total investment ranged from 15.0 to 28.0 per cent, he compared the increase in value of Kresge’s common stock between 1920 and 1924 to the amount of cash dividends forgone that were reinvested in the business. He calculated that a Kresge common shareholder gained \$386.62 in market value per share over the cash dividends that would have been received. He concluded that “The price of the stock of a company reflects at any time not only the actual earnings of the corporation, but also the value of the right it carries to have a certain number of dollars reinvested each year in an enterprise that has a demonstrated a given earning power” (p. 314). He added that high earnings on investment “may account in a measure for the apparently high prices at which some stocks sell in respect to earnings” (p. 314). Such corporations “will frequently prove to be a very profitable commitment for the investor” (p. 314).

Badger pursued additional ratios and other financial analysis techniques in the subsequent chapter on industrials. First, he revisited the operating ratio or the percentage of operation expenses (including depreciation) of operation revenues. An industrial with a lower ratio reflected more efficiency and a greater ability to survive a downturn in sales. He commented that (p. 315) “Such concerns have the least to fear during periods of depression, and, if competition becomes severe in the industry, they are most likely to survive, in that they can suffer the lowest price cuts before showing deficits” (p. 315). Most industrials had operating ratios from 80 to 90% with most being closer to 90%. Badger cautioned that an operating ratio over 93% “assumes an unfavorable aspect” while a ratio less than 80% reflected a “better than average efficiency” (p. 316).

He next addressed plant turnover defined as the ratio of sales to the average of the book value of fixed assets for the year. He added that a plant turnover of 1 was “reasonably good...although a turnover of two or three times a year is not uncommon” (p. 317). He also related plant turnover with the operating ratio noting that a plant turnover of 2 with an operating ratio of 80% yielded a profit of 40 cents per dollar of book investment ( $\$2.00$  in sales less  $\$2.00 \times .80$  equals  $\$.40$ ).

For liquidity measures, Badger started with the ratio of current assets to current liabilities adding that bankers liked a 2 to 1 ratio. He also mentioned the ratio of cash to current liabilities and cash plus marketable securities to current liabilities. He advised that “concerns with adequate working capital can take advantage of all cash discounts, can expand current operations when necessary

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without bank borrowings, and are always in a position to increase inventories of raw materials when prices are advantageous” (p. 318). He added that “In cases where the amount of cash on hand is sufficient to meet all current liabilities it is true that a 2:1 ideal ratio loses some of its significance” (p. 318).

Badger wanted to compute inventory turnover as the ratio of the cost of sales divided by the average inventory, but lamented that “It is often impossible for the analyst to get cost of sales, so the gross revenues or sales figures must usually be substituted” (p. 318). He noted that most manufacturers had ratios of 3 to 5. Badger explained related inventory turnover to the current ratio: “A corporation whose quick assets consist largely of slow moving inventories must maintain a much higher ratio of current assets to current liabilities than one whose current assets are composed of cash, receivables, and quick moving inventory” (p. 318).

Another important ratio for Badger was net quick (working capital) to total investment that reflected liquidity as well as “the corporation’s ability to expand operations without additional borrowing, or to maintain current dividends without further interruption during periods of depression” (p. 319). He remarked that 20% was “satisfactory,” but it might acceptably range from 10 to 50%.

Badger also thought that book value of the common stock was helpful “even though this gives no clue as to the market value of the stock” (p. 320). However, investors often thought that “stocks protected by substantial book assets are more secure than stocks which sell largely on the basis of earnings, and which are not protected by substantial tangible assets” (p. 320). On the other hand, Badger cautioned that a high return on book assets might attract competitors so the analyst should ascertain whether the high return is a result of the tangible assets that other companies could obtain or intangible assets such as “patent monopolies” or “an established name and personnel” (p. 322) with little book value that other companies could not obtain.

Most importantly, Badger addressed the relationship of earnings per share and dividends per share to the market price of a share of common stock. He maintained that (p. 323) “the market value of common stocks is a function of *earnings available*, and the risk factors involved in the industry and in the concern itself. By comparing the multiples at which the stocks of various companies sell in relation to earnings, it is possible to determine which appear to be cheap and which appear to be high priced” (p. 323). Here he is describing the price-earnings ratio commonly used today. As for the influence of cash dividends on stock prices, Badger cited a study that showed “that the yield on common stocks followed, in a general way, the yield on bonds” (p. 324). That is, as dividend and interest yields increased, prices of the securities were low and vice versa. However, Badger noted that this was less true for growing corporations reinvesting earnings in operations or by corporations unable to earn current dividends.

Badger analyzed the results for four automobile companies (General Motors, Nash, Packard, and Studebaker) using his financial ratios for 1923 to 1925. Interestingly, though he concluded that Nash did the best by his analysis while the other three companies did about the same, Badger added that “it is doubtful whether this factor should far outweigh the stability afforded General Motors by reason of its predominant position in the market” (p. 339). Moreover, since General Motors had the highest ratio of earnings per share to market price (lowest price-earnings ratio), Badger, advised that it “would appear to have been the most logical purchase on or about January 1926” (p. 340). Notably, he cautioned that “the purpose of this study is not so much to enable one to predict current fluctuations in the market as to enable the investor to select securities that may safely be held over a period of time, with the expectation of receiving a satisfactory current return and future appreciation” (p. 339). Apparently, this reflected his philosophy on investing.

Next, Badger began with an overview of public utilities noting their common features including the fact that they were regulated. Such regulation was helpful to investors in that rates were generally set so that public utilities could earn from 7 to 8 percent on “fair value.” Electric and light power companies serves as an example of Badger’s analysis of public utilities. As with industrials, Badger reviewed several key financial ratios for electric operating companies such as operating ratio (60 to 75 percent for electric steam generating companies), times interest earned (at least twice), assets to bond debt (at least two), and price-earnings ratio (12 to 18). Badger also thought that it important to consider capital of an electric utility per customer and per capita of the community to gage potential growth. Other considerations listed involved the possibility of merger, the area served, and current and future development. In turn, Badger also suggested similar analyses for electric holding companies as well as companies in the gas industry, street railways, water companies, and telephone and telegraph companies.

In his introductory chapter on railroads, Badger briefly traced the history of the development of railroads and the ever increasing regulation of them. Interesting, he recounted the numerous sources of railroad information available from the Interstate Commerce Commission (ICC), *The Commercial and Financial Chronicle*, the voluntary American Railway Association, and the Bureau of Railway Economics. Badger also emphasized the availability of individual railroad annual reports and appreciated their standardized form due to ICC requirements, commenting, “Unlike the financial reports of industrial and public utility companies, the reports of railroad companies are pleasingly uniform. Every item is similarly handled and the final form in which the income account and balance sheet of one road are set up is the same as that used by all other roads” (p. 468).

After describing in detail the income account as mandated by the ICC (shown in Figure 2), Badger recommended several financial ratios used for analysis of a railroad. He noted the importance of net railway operating income

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used by ICC to measure the return on investment. Gross income was compared to fixed charges to determine number of times charges were earned. He thought that the proportion of bonds to the total of bonds, preferred stock, common stock, and surplus should be no more than 50%, though, as noted, the average was 60% for all railroads. He calculated capitalization per mile, adjusting for leased lines. Again, he noted that interest should be earned at least two times while emphasizing the relative priorities of different bond issues. He used a similar ratio for preferred stock.

Figure 2

Standard Form of Income Account for Railroads

(Badger, 1928, pp. 489-490)

Section I.-Operating Revenues

Freight revenues

Passenger revenues

Other transportation revenue (including mail, express,  
etc.)

Nontransportation revenue

Total operating revenue

Section II.-Operating Expenses

Maintenance of way and structures

Maintenance of equipment

Traffic expenses

Transportation expenses

General and Miscellaneous expenses

Transportation for investment credit

Less total operating expenses

Section III.-Net Operating Revenues

Less railway tax accruals

Uncollectible railway revenues

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Section IV.-Operating Income

Add

Rent from locomotives  
Hire of freight cars (credit)  
Rent from passenger train cars  
Rent from joint facilities  
Other income

Section V.-Total Operating Income

Deduct

Hire of freight cars (debit)  
Rent for locomotives  
Rent for passenger cars  
Rent for joint facilities  
Rent for other equipment

Section VI.-Net Railway Operating Income

Add nonoperating income

Dividends received  
Income from funded securities  
Income from unfunded securities and accounts  
*Rents received*  
Miscellaneous income

Section VII.-Gross Income

Deduct

Interest on funded debt  
Interest on unfunded debt  
Rents for leased roads

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Miscellaneous rents

Miscellaneous charges

Section VIII.-Net Income

Deduct

Dividends paid

Special appropriations

Profit or loss for the year

With respect to common stock, sounding quite modern, Badger stated that “Railroad common stocks will sell at prices which reflect current per share earnings, current dividend rates, and future prospects” (p. 512). More specifically, he added that railroad common stock “will sell at about 10 times current per share earnings and to yield, currently, between 5 and 5.5 per cent” (p. 512). With more than 200 railroads with gross revenues over \$1,000,000 and having many differences, Badger cautiously warned “Mastering the field can be expected only after years of constant study and attention to detail” (p. 514). Hardly the view of a speculator.

The above is sufficient to illustrate Badger’s thoughtfulness and thoroughness with respect to investment. Leaving no stone unturned, Badger also had chapters on banks and insurance companies, investment trusts (some similar to mutual funds), investments secured by real estate, several chapters on governmental securities (federal, state, and municipal), and foreign investments. He also covered investment mathematics, the process of investing, taxation, and the business cycle.

Of particular relevance here were the sources of investment information identified by Badger. These included publications such as the *Wall Street Journal*, *Commercial and Financial Chronicle*, *Bond Buyer*, *Barron’s*, *Dun’s Review*, *Bradstreet’s Review*, and *Forbes Magazine*. He also mentioned several industry publications as well as investment services that issued publications including the Standard Statistics Company, Moody’s, Poor’s, and Fitch. Obviously, there was no shortage of investment periodicals. Badger named a number of indexes that measured business conditions: *Harvard Index of Volume of Manufacture*, *Survey of Current Business Indexes of Business Activity*, *Standard Statistics Company Index of Industrial Production*, *Bureau of Labor Statistics Index of Employment*, and *Federal Reserve Board New Index of Industrial Production*.

Badger remarked on business cycles as well: depression, recovery, prosperity, financial strain, and industrial crisis. He presented charts showing the

relationship between stock prices, business conditions, and money rates and credit conditions. Interesting, he relegated speculative activity to a “minor cycle” in stock prices, which he described. In a bull market “Speculative activity runs high, and many accounts become overextended. Likewise, the prices of some stocks are bid up beyond the point of real value” (p. 856). Then “Some bit of unfavorable news or other insignificant event causes prices to shade off” (p. 856). Some speculators with large profitable positions sell and others sell short. “At this point a severe reaction usually occurs in the market leaders, followed by declines throughout the entire list” (p. 856). Stop loss orders contribute to the decline and speculators “on slender margins find these margins wiped out and...are compelled to allow their brokers to sell” (pp. 856-857). He continued, “In this way, a minor reaction may continue for several weeks until the so-called weak accounts have been weeded out and the technical position of the market corrected, after which prices continue their advance” (p. 857).

In his final chapter, Badger considered attempts to forecast the business cycle and stock prices. Badger insightfully cautioned that forecasting methods should be used in conjunction with knowledge of general economic conditions since “No two economic situations are ever the same in all respects, with the result that economic forecasts based on what has happened in the past in an apparently similar situation may prove erroneous, for new and unconsidered factors are often present in the later situation” (p. 872).

### **A PERSPECTIVE OF INVESTORS IN 1928**

So, what were investors thinking in 1928? Judging by the books examined in this study, they seemed quite reasonable and knowledgeable. They understood diversification and the attendant issues of safety, fair returns, marketability, appreciation, and managing risk. Barron’s contest showed that they favored common stocks that benefited from reinvested earnings and that maintained purchasing power as compared to bonds. However, the recommended portfolios tended to be only slightly favored toward common stocks with a fair proportion in bonds and liquid assets. The contestants acknowledged many of the factors that went into a careful assessment of corporate securities including management, capital structure, earnings, dividends, stability, products, competition, and industry outlook.

Badger (1928) provided even further advice than Barron’s contestants in selecting securities. For example, he specified safe ratios for debt and times interest and dividends earned and considered other ratios such as operating and plant turnover. He understood price-earnings ratios and their use in judging the cost of a stock. Badger believed that stocks could be safely selected that offered a reasonable current return with the chance of future price appreciation. He extended his analysis to industrials, utilities, and railroads. Badger cited many sources of business and economic information. He also cautioned against using correlations to predict the future as the economy was constantly changing.

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Little fault can be found with the investment approaches outlined in these books. So, what was the problem? Several of the authors acknowledged the high price of securities at the time and the possibility of a recession. But they did not believe it would be severe and it would also offer an opportunity to buy more common stocks as prices fell. The authors were generally optimistic about the continued prosperity of the economy. Brundage, the third place winner in Barron's contest (1928), attributed this to improvements in production, purchasing power, and what he termed "social intelligence." From 1921 to 1929, GNP per capita increased 42% while personal income climbed 38%. For many, with the exception of some groups like farmers and rural bankers, times were good (Gordon, 2004).

On the other hand, Badger (1928) did comment several times about the lack of corporate information as well as the lack of comparability in financial statements. This limited his suggested analysis methods. Perhaps, part of the issue with the crash was that investors were too much in the dark and did not realize what they were buying. Berle and Means in their 1932 classic, *The Modern Corporation and Private Property*, concluded that corporations withheld financial information and abused accounting methods (Chatfield, 1996a). The accounting profession and the New York Stock Exchange had little power to curb such corporate behavior (Chatov, 1996). President Roosevelt aimed to rectify the situation in the creation of the Securities Act of 1933: "There is however an obligation upon us to insist that every issue to be sold in interstate commerce shall be accompanied by full publicity and information" (quoted in Geisst (2004, p. 228)). But this begs the question of whether market participants could or would have done the needed analysis of greater information (Previts and Merino, 1998). Hence, in addition to providing more information in an understandable fashion, the U.S. government also needed to educate investors that analyzing financial reports was worthwhile (Chatfield, 1996b).

The 1920s were a time of structural change in the type of organizations that dominated the economy. Large oligopolistic corporations run by professional managers became the major players due to technological change such as internal combustion engines and electrical power generation. Also growing in importance were financial intermediaries such as investment trusts, banks, and brokerage houses. Common stocks became the means for investors to participate in the remarkable changes occurring in the economy. However, investors could do little to influence the largely unknown activities of corporations that were controlled by their managers. Highly cyclical industries with little outside monitoring combined with 10 percent margin buying were the recipe for a disaster waiting to happen (Baskin and Miranti, 1997).

Yet the problems in the 1929 stock market went beyond a lack of information for investors. Specialists and floor traders on the New York Stock Exchange could manipulate prices through such devices as pools, including providing them with inside information on buy and sell orders, and short-selling (Gordon, 1999; Malkeil, 2007). Banks could borrow money at 5 percent from the

Federal Reserve, loan it to brokerage firms at 12 percent, who loaned it to their customers at 20 percent, fueling speculation (Gordon, 1999). Galbraith (1997) thought that the speculative bubble was a product of the prosperity of the 1920s, availability of money from savings and call loans, trust in corporate leaders, and the general feeling “that ordinary people were meant to be rich” (Galbraith, 1997, p. 169). Moreover, “A mania for speculation swept the country, thousands of small investors putting their savings in common stocks” (Garraty, 1995, p. 729).

Once the bubble burst on Black Thursday, October 24, 1929, it became too hard to stop. Thus, while Badger (1928) thought speculation was only a “minor” cycle in stock prices, it did not turn out that way. Stocks bought on thin margins of as little as 10 percent were sold off as speculators could not meet margin calls and short-selling became rampant. As prices plummeted, bankers would not underwrite new corporate security issues and the federal government did little to counter the downward spiral. The bottom for the Dow Jones Industrial average would not be reached until June 8, 1932, wiping out almost all of its gains since its inception in 1896 (Gordon, 1999). It hit 41.22, down 90% from its 1929 high, and less than one point higher from its initial amount in 1896 (Gordon, 2004). For most participants in the stock market, the hope of something for nothing turned into a reality of nothing for something.

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## **CASH HOLDING, INCOME SHIFTING AND TAX**

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### **ABSTRACT**

This paper examines the effect of different tax rates (domestic and foreign) on cash holdings between multinational firms and non-multinational firms. Our major findings are: 1) multinational firms' cash holdings level (cash-to-asset ratio) is affected by both the domestic tax rates and the foreign tax rates. The higher the domestic tax rates and/or foreign tax rates, the lower the cash held by the multinational firms. 2) Domestic tax rates negatively affect non-multinational firms' cash holdings level. The higher the domestic tax rates, the lower the holding of cash (cash-to-asset ratio); 3) Compared to non-multinational firms, multinational firms' cash holding is less affected by domestic tax rates; 4) Multinational firms tend to shift income from US to foreign countries when domestic tax rates are higher than foreign tax rates. 5) Among multinational firms, those with higher proportion of income in foreign countries tend to have higher levels of cash holdings when domestic tax rates are higher than the foreign tax rates. Our findings are also consistent with the precautionary motive of cash holding for the non-multinational firms. i.e. those smaller, and hence more likely to be financially constrained firms, are more likely to hold more cash.

Keywords: Cash holding, Income Shifting, Tax-based motivation, Multinational and non-multinational firms

### **I. INTRODUCTION**

Studies show that the average cash holdings of U.S. firms dramatically increased over recent years. According to Bates et al. (2009), the average corporate cash ratio increased by 12.7% from 1980 to 2006. What's more, US multinational firms hold significantly more cash than the domestic firms. By examining a sample of domestic and multinational firms during the 1998-2008 period, Faulkender et al. (2017) documented that the aggregate cash level from domestic firms increased between 50-60% while the aggregate cash held overseas increased by 410% during the same period. Following Opler et al. (1999), different theories have been utilized to explain firms' cash holdings behavior: trade-off theory, agency cost theory, pecking order theory, precautionary motives and repatriation taxes.

The tax-based explanation for cash holding began in more recent literature. Foley et al. (2006) show that the growing cash that multinational companies keep

overseas can be attributable to the high tax cost associated with repatriating foreign income. Research by Simone, et al. (2017) seems to confirm this tax-based explanation. They showed that multinational firms are willing to shift income back to the US in anticipation of a reduction of repatriation taxes. The paper by Faulkender et al. (2017) finds that domestic cash (cash held in US) and foreign cash holding are driven by different motives: variations in domestic cash holdings can be explained by precautionary motives while the increasing foreign cash holdings (cash held overseas) is explained by the lower tax rates in foreign countries.

Although the tax-based explanation on cash holding literature examined the differences in domestic cash and foreign cash, most of the papers examined the cash holdings of multinational firms. No prior research has directly examined whether cash holdings of multinational firms and non-multinational (domestic) firms are affected differently by tax rates. We first examine the cash holding difference between domestic and multinational firms and then we test the tax-based explanation by examining the effect of domestic tax rates on multinational and non-multinational firms' cash holdings, the effect of foreign tax rates and average tax rates on multinational firms' cash holdings. Finally, we investigate the income shifting behavior of the multinational firms and the effect on multinational firms' cash holdings.

## **II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

### **2.1 Theoretical Basis for Corporate Cash Holding**

Weidemann (2015) provided a comprehensive review of cash holding research. He summarized three major theories that explained the corporate cash holdings: the trade-off theory (Whalen 1966), pecking-order theory and agency theory (Jensen 1976, Jensen and Merckling 1986). These theories predict that companies hold higher level of cash when growth opportunities, profitability, or liquidity constraints increase, and the level of cash decreases when firms size, leverage, liquidity substitutes, investment activities, or dividends increase.

### **2.2 Empirical Evidence for Corporate Cash Holding**

Empirical evidence for corporate cash holdings dates back to as early as 1940s and suggests a relationship between corporate cash holdings with certain firm characteristics. Chudson (1945) finds that cash/assets ratio tend to vary by industry and is associated with firms' profitability. Vogel and Maddala (1967) find that cash/assets ratio varies with firm size, larger firms tend to have lower cash/assets ratio.

Opler et al. (1999) find support for the trade-off theory as well as the pecking-order theory. By examining the publicly traded US firms from 1971-1994, they find that firms that have the greatest access to the capital markets, such as large firms and those with high credit ratings, tend to hold lower ratios of cash to total non-cash assets. Firms that do well tend to accumulate more cash than

predicted by the static tradeoff model where managers maximize shareholder wealth.

Precautionary savings motive predicts that firms will hold more cash if they anticipate there are unexpected future projects, and if they realize that they may not be able to fund the projects through external financing. (Weidemann 2015). Empirical evidence seems to support this motivation. For example, firms with more limited access to the capital markets (those smaller firms) and firms without excess cash flows (e.g. firms that do not pay dividends) tend to hold more cash (Opler et al. 1999; Bates et al. 2009). Similarly, Harford et al. (2014) showed that firms with more financing risks tend to hold more cash. Faulkender (2017) also find evidence in support of the precautionary savings motive. They find that firms that are associated with more financial flexibility, i.e. having easier access to capital, will find less benefit holding cash.

### **2.3 Tax-based Explanation for Cash Holding of Multinational Firms**

Several studies documented the growing cash held abroad by the multinational firms and examined the underlying motives of multinational firms holding cash overseas. This stream of literature generally relates corporate cash holdings to tax costs.

The US corporate income tax structure suggests that Multi-national firms have an incentive to retain earnings abroad: Income earned inside the US is taxed immediately and available for investment while income earned in foreign countries is taxed immediately in that foreign country and no additional tax will be due to the US till the earnings are repatriated and when the US tax rates exceed the foreign tax rates. Therefore, when the domestic (US) tax rate is high and when attractive investment opportunities in the US are lacking, companies hold the earnings abroad as cash. (Faulkender et al. 2017)

Foley et al. (2006) used data drawn from the detailed results of the Bureau of Economic Analysis (BEA) annual survey of U.S. Direct Investment Abroad to test if repatriation taxes motivate companies to retain cash in foreign affiliates and reduce domestic cash holdings. They find that repatriation tax burdens induce firms to hold more cash abroad. Faulkender and Smith (2016) showed that total cash is negatively associated with average tax rates (the average of the domestic US tax rate and the foreign tax rates). The lower the average tax rates, the higher the firms' cash holdings. Faulkender et al. (2017) examined if the determinants of cash holdings are different for domestic and multinational firms. Using a sample period from 1998 to 2008 and the firm-level data on multinational firms from the Bureau of Economic Analysis, they showed that apart from precautionary savings motives, it is the low tax rates in the foreign countries that played an important role in explaining the level and growth of corporation's cash held abroad.

Our paper focuses on the differences in cash holdings between multinational firms and domestic firms based on a tax-based motive. Multinational

firms may differ from domestic firms in several aspects. Multinational firms may be larger, more profitable and more likely to pay dividends, more likely to have access to bond markets, have less volatile cash flows, lower market-to-book ratio and also less likely to be financially-constrained firms (Faulkender et al. 2017). These differences may result in differences in motivation for holding cash.

We first test the hypothesis that multinational firms hold significantly different amount of cash and have significantly different cash to asset ratio from the domestic firms in US. This may be due to several reasons. First, compared to domestic firms, multinational firms are larger in firm size. Large firms would be least likely to face financing problems in a poor economy and they are also more likely to face economies of scale in cash holdings (Opler et al. 1999). Hence, we would expect that cash holding is negatively associated with firm size. Our first hypothesis is as follows:

*Hypothesis 1: Multi-national firms hold significantly less cash (i.e. less cash to asset ratio) compared with domestic firms.*

Second, compared with domestic firms which have only one tax rate, multinational firms have two (or more) different tax rates: domestic tax rate applied to the income earned domestically (in US) and foreign tax rates applied to income earned in the company's foreign affiliates. Hence, we would expect that while non-multinational firms cash holdings level is affected by domestic (US) tax rates, multinational firms, however, are affected by both domestic tax rates and foreign tax rates and hence, average tax rates, rather than domestic tax rate alone. Additionally, based on US tax law, income earned abroad is not taxed till repatriated to the US. For multinational firms, when foreign tax rates are low, multinational companies have incentives to hold cash in foreign jurisdiction, i.e. cash holdings in foreign subsidiaries will become high, which will increase the percentage of the cash holdings in foreign jurisdiction relative to the firms' domestic cash holdings. If the foreign tax rates' affecting firms total cash level reduces the effect of the domestic tax rates, then we may infer that multinational firms' cash levels will be less affected by domestic tax rates compared to domestic firms. In other words, if domestic tax rates affect cash holdings level of both the domestic firms and multinational firms, the negative relationship between domestic tax rates and cash holdings level is less pronounced for multinational firms. Hence, we have the following hypotheses:

*Hypothesis 2a: Cash holdings of non-multinational firms are affected by Domestic tax rates. The higher the domestic tax rates, the lower the cash holdings.*

*Hypothesis 2b: Multinational firms' cash holdings are affected by domestic tax rates, foreign tax rates, average tax rates. The higher these rates, the lower the firms' cash holdings.*

*Hypothesis 2c: Compared with domestic firms, cash holdings of multinational firms are less affected by domestic tax rates.*

#### **2.4. Cash holding and Income Shifting of Multinational Firms**

Although prior literature suggests that multinational firms have incentives to hold cash abroad, it is difficult to obtain firm-level data regarding domestic cash and cash held abroad for multinational firms. However, prior research did provide some evidence of the tax-motivated income-shifting. Under normal business operations, companies' net profits (earnings) are strongly and positively related to cash flows and theoretically accumulated earnings and cash flows tend to converge over a relatively longer period (prior empirical tests have provided extensive evidence regarding the convergence). Therefore, a test of income-shifting may serve as a supporting evidence of the growing cash holdings of the multinational firms. i.e. If multinational companies have incentives to shift profits from countries of high tax rates to countries of low tax rates to save tax costs, this might explain why multinational firms hold so much cash abroad.

Literature on income shifting concerning shifting direction can be generally classified into the following types: 1) papers document income shifting of the multinational companies among affiliates (e.g. Grubbert and Mutti 1991; Hines and Rice 1994), between US parent companies and foreign affiliates (e.g. Harris 1993, Klassen et al. 1993), and income shifting of the public and private companies in a European setting (e.g. Beuselinck 2015).

In particular, Grubert and Mutti (1991), using cross-country aggregate data, provide evidence that U.S. multinational affiliates report more after-tax profit (as a percentage of sales or shareholders' equity) in low-tax than in high-tax jurisdictions. Similarly, Hines and Rice (1990) analyze country-level aggregate data in 1982 on U.S. nonbank majority-owned foreign affiliates and find a negative relation between various measures of pretax profitability and host-country average tax rates.

Both Grubert and Mutti (1991) and Hines and Rice (1990) focus on income shifting between foreign affiliates, income shifting between US and other countries is addressed in David Harris (1993). Instead of using tax rates, Harris et al. (1993) uses dummy variables indicating either the high-tax rate or low-tax rate location of foreign subsidiaries and regress the US tax liability against the indicator dummies and find that U.S. tax liabilities are lower for U.S. multinationals with subsidiaries in low-tax-rate countries than for those with subsidiaries in high-tax-rate countries, suggesting that the subsidiaries having lower foreign tax rates tend to shift income out of the United States, while those facing high foreign tax rates tend to shift income into the United States.

More recently, Huizinga and Laeven (2008), for instance, show for a sample of European manufacturing MNCs that profit shifting depends on a weighted average of international tax rate differences between all countries where the multinational is active. Using a similar research design, Markle (2012) finds confirmation for these family-level tax results on a global sample and that, on

average, MNCs subject to territorial tax regimes shift income more than those subject to worldwide regimes.

Unlike the previous literature we reviewed here, our paper is not attempting to measure the estimates of income shifting, nor is it attempting to examine the effect of different tax regimes on income shifting, but rather it focuses on a more general objective of finding evidence of the tax-motivated income shifting.

When domestic tax rates are high compared to foreign tax rates, multinational firms have incentives to have more profits generated in foreign countries rather than in US. The higher the difference in tax rates, the greater the difference in profits (earnings) we would expect exists between the US and the foreign countries. Hence, we have the following hypothesis:

*Hypothesis 3a: For multinational firms, the greater the difference between the domestic tax rates and foreign tax rates, the greater the difference between the Foreign pretax income and domestic pretax income.*

If the domestic and foreign tax rate difference triggers or is associated with the multinational firms' shifting income between domestic and foreign countries, and if earnings can be a proxy for cash holdings, then we can further hypothesize that for multinational firms, as the difference in domestic and foreign tax rates are higher, those with higher proportion of income in foreign countries are likely to have higher cash holdings retained overseas and hence are likely to accumulate higher overall cash holdings. Hence, our next hypothesis is stated as follows:

*Hypothesis 3b: For multinational firms, the higher the proportion of income in foreign countries, the higher the cash holdings as the difference between the domestic tax rates and foreign tax rates is higher.*

### III. DATA AND RESEARCH METHODS

Our firms were taken from Compstat for the period between 1987 to 2017. We have a total of 17,428 firm-year observations: about 96% of our sample (16,738 observations) is multinational firms, and the remaining small portion – about 4% (690) is domestic firms. In other words, multinational firms represent a dominant portion of our sample. Following previous research, we remove the financial firms and utility firms. We also delete the firms with negative tax rates (both foreign and domestic) and remove the outliers using winsorizing (winsorizing is performed at the 1<sup>st</sup> and 99<sup>th</sup> percentile).

To test the first Hypothesis: Multi-national firms hold significantly less cash (cash-to-asset ratio) compared with domestic firms. We use the following model (Domestic firms):

$$\text{Cash holdings} = \alpha + \beta_1 * \text{Firm\_Dummy} + \text{control variables} + \varepsilon \quad (1)$$

Where:

Cash Holdings: Cash to total assets ratio, see below for more details.

Firm\_Dummy: an indicator variable with “1” being multinational firms and “0” otherwise (Same in the subsequent regressions having this dummy variable).

(Other control variables are described below).

If multi-national firms hold significantly less cash (cash-to-asset ratio) compared with domestic firms, we would expect that  $\beta_1 < 0$ .

To test hypothesis 2a: Cash holdings of non-multinational firms are affected by Domestic tax rates. The higher the domestic tax rates, the lower the cash holdings. We use the following model:

$$\text{Cash holdings} = \alpha + \beta_1 * \text{Domestic tax rate} + \text{control variables} + \varepsilon \quad (2)$$

Where:

Cash holdings is the cash to total assets ratio of domestic (non-multinational) firms.

If higher domestic tax rates are associated with lower cash holdings, then we expect  $\beta_1 < 0$ .

Hypothesis 2b states that multinational firms’ cash holdings are affected by domestic tax rates, foreign tax rates, average tax rates. The higher these rates, the lower the firms’ cash holdings. To test this hypothesis, we use the following model:

$$\text{Cash holdings} = a + \beta_1 * \text{Domestic tax rate} + \beta_2 * \text{Foreign tax rate} + \beta_3 * \text{Avg. tax rate} + \dots + \dots \text{Control variable} + \varepsilon \quad (3)$$

Where:

Cash holdings is the cash to assets ratio of the multinational firms;

Average tax rate: Following Faulkender and Smith (2016), we use a weighted average of the domestic tax rates and foreign tax rates, weighted by firms’ pretax income (domestic and foreign).

Hypothesis 2b predicts that  $\beta_1, \beta_2, \beta_3$  all  $< 0$ .

Hypothesis 2c states that compared with domestic firms, cash holdings of multinational firms are less affected by domestic tax rates (i.e. the negative relationship between domestic tax rates and cash holdings level is less pronounced for multinational firms). The model we use to test this hypothesis is:

$$\text{Cash holdings} = \alpha + \beta_1 * \text{Domestic tax rates} + \beta_2 * \text{Foreign tax rates} + \beta_3 * \text{Avg. tax rates} + \beta_4 * \text{Firm\_Dummy} + \beta_5 * \text{Firm\_Dummy} * \text{Domestic tax rate} + \text{control variable} + \varepsilon \quad (4)$$

Where:

Cash holdings: the cash to assets ratio from multinational and domestic firms respectively.

Hypothesis 2c predicts that  $\beta_1, \beta_2, \beta_3$  all  $< 0$ , but  $\beta_5 > 0$

To test Hypothesis 3a: For multinational firms, the greater the difference between the domestic tax rates and foreign tax rates, the greater the difference

between the foreign pretax income and domestic pretax income. We use the following model:

$$(Diff\_Income) = a + \beta_1 * Diff\_TaxRates + control\ variables + \varepsilon \quad (5)$$

Where:

$Diff\_Income = (Foreign\ Pretax\ Income - Domestic\ Pretax\ Income)/total\ assets;$

$Diff\_Tax\ Rates = Domestic\ Tax\ Rates - Foreign\ Tax\ Rates$

The hypothesis predicts that  $\beta_1 > 0$ .

To test hypothesis 3b: For multinational firms, the higher the proportion of income in foreign countries, the higher the cash holdings as the difference between the domestic tax rates and foreign tax rates is higher. We use the following model:

$$Cash\ holdings = a + \beta_1 * Diff\_Tax\ rates + \beta_2 * Pretax\ Income\ Foreign * Diff\_Tax\ rates + control\ variables + \varepsilon \quad (6)$$

Where:

$Diff\_Tax\ Rates = Domestic\ Tax\ Rates - Foreign\ Tax\ Rates$

Foreign Pretax Income is the multinational firms' pretax income in foreign countries divided by total assets.

The hypothesis predicts that  $\beta_2 > 0$ .

Apart from the variables we are interested in, we take some control variables from the paper by Opler et al. (1999), Megginson et al. (2014). These variables are: Firm's profitability, dividend payout, leverage, firm size, liquidity, growth. These variables, together with the dependent and variables of interest, are explained in more detail as follows:

Cash holdings: We follow Opler et al. (1999) and use the natural logarithm of the ratio of cash to net assets (defined as total assets less cash),  $\ln(Cash/Net\ Assets)$  as measure of cash holdings. Cash includes cash and short-term investment.

Our variables of interest are: Income Taxes—domestic and Foreign. Income Taxes—domestic is the current amount of income taxes payable to the US government. Income taxes-foreign represents the current amount of income taxes payable to foreign governments.

Control variables include the variables related to firm characteristics (Firm size, dividend dummy variable, capital expenditure and market-to-book ratio), growth opportunities and firm risks:

Firm size and dividend dummy variable: Both Opler et al. (1999) and Foley (2006) show that firms that have the greatest access to capital, i.e. larger firms and firms that pay dividend hold less cash. Firm size is measured as the natural logarithm of total assets; Dividend Dummy is an indicator variable that

equals one if the firm pays a dividend in a given year and zero otherwise. Capital expenditures is the ratio of capital expenditures to total assets, and it is a proxy for investment.

**Growth Opportunities:** Firms with more growth opportunities usually tend to hold more cash because firms are more likely to take the investment opportunities when they have cash in hand (Opler et al. 1999). We use Research & Development expenses to proxy for growth opportunities and deflate the variable by total assets.

**Firm Risks:** the first measure of firm risks we use is volatility of cash inflows, we use a measure similar to Opler et al. (1999) and calculate the Standard Deviation of cash balance at the firm level over the sample period. The second measure of firm risk is leverage. Leverage is measured as the ratio of total debt to total equity. Leverage can be positively or negatively associated with cash holdings. On the one hand, firms with higher debt may have a greater demand to hold cash, hence they tend to accumulate more cash compared with firms with less debt. On the other hand, firms with more debt may have higher debt service costs and hence cannot retain as much cash as firms with less debt; moreover, firms with high leverage may have priority to pay off debt using cash rather than holding it (Foley 2006).

We also include pretax income that are supposed to be closely related to firms' cash holdings. Pretax income can come from operations in foreign countries as well as from inside US. Therefore, we have Foreign Pretax Income, which is income earned before tax from foreign sources and Domestic Pretax income, which is income earned before tax from domestic operations.

#### **IV. EMPIRICAL RESULTS**

We first provide some information regarding cash holdings (cash to assets ratio) for firms for the year 1987 to 2017. Figure 1 and 2 describe the cash to assets ratio for multinational firms and domestic firms respectively over the years 1987-2017. We can see that for multinational firms, cash holding as a percentage of the assets has experienced a dramatic increase since 2000. For domestic firms, cash holding is particularly low in year 1998 (following the 1997 Asia financial crisis), which seems to suggest that domestic firms were particularly impacted and constrained during the financial crisis and had much less cash holdings during the period.

Figure 1: cash holdings (cash to assets ratio) for Mutinationals from 1987-2017

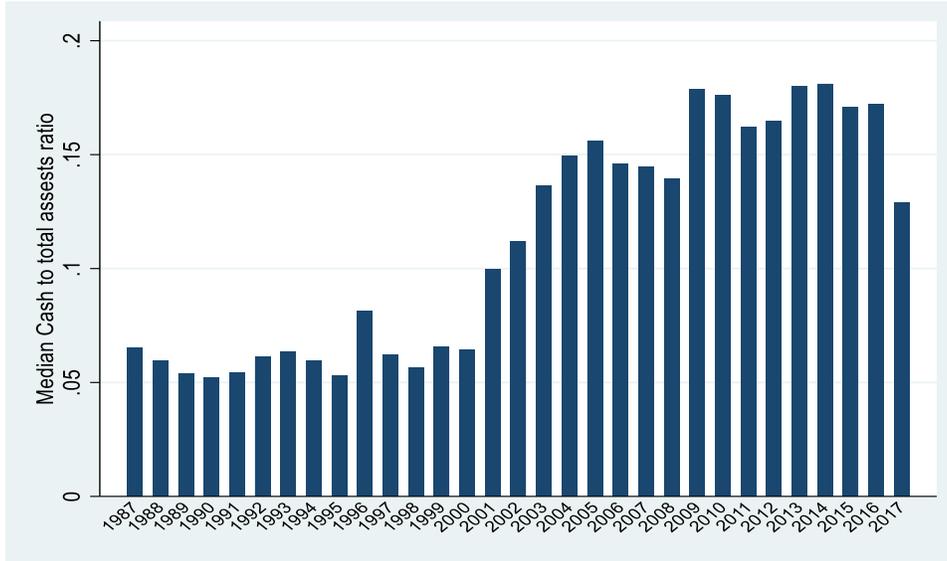


Figure 2: cash holdings (cash to assets ratio) for Non-Mutinationals from 1987-2017

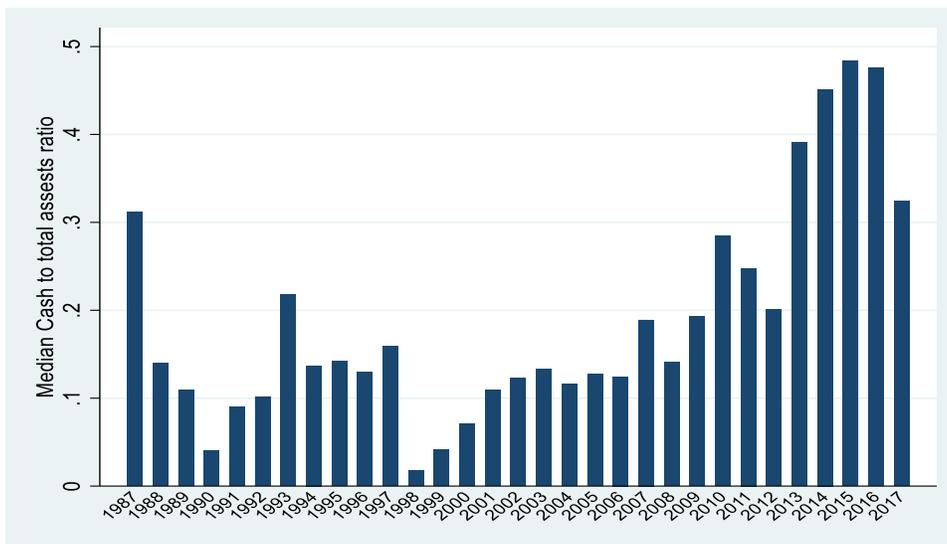


Table 1 provides descriptive statistics for the variables we use in this paper. Panel A is for multinational firms and Panel B for domestic firms. The two panels seem to suggest that on average, multinational firms are larger, hold relatively less cash, higher (domestic) income tax rates, higher market-to-book ratio, higher debt-to-equity ratio than domestic firms and they are also more likely to pay dividends. However, multinational firms have relatively lower Research & Development expenses and Capital Expenditure.

Table 1: Descriptive Statistics

Panel A: Multinational firms				Panel B: Non-multinational firms		
Variable	N	mean	sd	N	mean	sd
Ln (Cash/Total Assets)	16727	-2.198	1.279	669	-1.983	1.691
Foreign Pretax Income	16738	343.645	2050.844	690	0	0
Domestic Pretax Income	16738	298.197	1620.191	690	64.668	462.204
Income Taxes_Foreign	16738	93.280	708.318	690	0	0
Income Taxes_Domestic	16738	108.403	660.176	690	25.306	161.141
Foreign Tax Rate	16738	0.217	5.430	0	.	.
Domestic Tax Rate	16682	0.172	5.472	672	0.092	0.860
Ln (Assets-Total)	16738	6.795	2.205	673	4.238	2.391
Market-to-Book	16736	2.88	60.763	689	1.872	134.086
R &D expense/total assets	16738	0.076	0.239	673	0.164	0.482
Debt-to-Equity	16737	0.921	10.242	688	0.332	4.188
Dividend dummy	16738	0.4781	0.500	690	0.255	0.436
CAPEX/Total Assets	16738	0.043	0.042	673	0.044	0.055

We also obtained the correlation matrix for all the variables used in this paper (not presented here due to space constraint) and we did not find serious correlation between the explanatory variables. The correlation matrix suggests cash holding is negatively related to most of the variables and some of the relations are consistent with our expectations, for example: Cash holdings level is negatively associated with domestic income tax rates.

Table 2: Cash Holdings (Cash-to-Assets Ratio of Multi-national vs. Domestic firms—A Comparison

	Coef.	P-value
Firm_Dummy (= 1 if multinational)	-0.8983***	(0.000)
Domestic Tax Rate	-0.4218***	(0.000)
Foreign Tax Rate	-0.4829***	(0.000)
Foreign Pretax Income/Total Assets	2.006***	(0.000)
Domestic Pretax Income / Total Assets	0.458***	(0.000)
Ln (Assets Total)	-0.129***	(0.000)
R&D Exp / Total Assets	3.7315***	(0.000)
Market to Book Ratio	0.0403***	(0.000)
Debt to Equity Ratio (Leverage)	-0.334***	(0.000)
CAPEX / Total Assets	-5.797***	(0.000)
Standard Deviation (cash)	0.0002***	(0.000)
Dividend_Dummy	-0.4153***	(0.000)

Number of observations	9514
Adj. R-square	0.848

Model used:  $Cash\ holdings = a + b * Firm-Dummy + control\ variables + e$

Table 2 provides the test results of the difference in Cash holdings (Cash-to-Assets ratio) between multi-national vs. domestic firms using OLS regression. The negative coefficient for the firm dummy variable shows that multinational firms have a lower cash-to-asset ratio compared with domestic firms.

The table also shows that the aggregate cash holding is significantly negatively associated with both the domestic and foreign income tax rates. Cash holding is also significantly negatively related to firm size (Ln(Assets total: -0.129), debt-to-equity ratio (-0.334), dividend dummy (-0.415) and capital expenditure (-5.727). These results are consistent with the findings from earlier research that the less financially constrained firms (i.e. larger firms, firms with higher debt and that firms that have earnings to pay dividend, etc.) tend to hold less cash.

Cash holding is significantly positively related to Research & Development (3.732), which suggests that firms (e.g. technology firms) requiring large financial resources to conduct research and development tend to hold more cash. Market-to-book ratio (0.403) is also positively related to cash holdings, which is consistent with the perception that market seem to attach a higher value to those firms with higher levels of cash holdings.

Table 3: The Effect of Tax Rates (Domestic and Foreign) on Multinational and Non-multinational Firms

	(1) Model 1 Coef./P- value	(2) Model 2 Coef./P- value	(3) Model 3 Coef./P- value
Domestic Tax Rate	-2.1489*** (0.000)	-0.6459*** (0.000)	-4.4615*** (0.000)
Foreign Tax Rate		-0.7510*** (0.000)	
Avg. Tax Rate		0.0000** (0.036)	
Foreign Pretax Income/ Total Assets		2.0613*** (0.000)	
Domestic Pretax Income / Total Assets	0.6749*** (0.005)	0.5438*** (0.000)	0.4702*** (0.000)
ln(Assets Total)	-0.2843***	-0.2140***	-0.0949***

	(0.000)	(0.000)	(0.000)
R&D Exp / Total Assets	1.4869**	2.9800***	4.2753***
	(0.018)	(0.000)	(0.000)
Market to Book Ratio	0.1025***	0.0326***	0.0415***
	(0.000)	(0.000)	(0.000)
Debt to Equity Ratio (Leverage)	-0.3647***	-0.3629***	-0.3236***
	(0.000)	(0.000)	(0.000)
CAPEX / Total Assets	-6.6330***	-7.5116***	-5.7148***
	(0.000)	(0.000)	(0.000)
Op Net Cash Inflow / Net Income	0.0437**	0.0055	0.0053
	(0.016)	(0.231)	(0.145)
Working Capital minus Cash	-0.0002***	-0.0001***	
	(0.005)	(0.000)	
Standard Deviation (cash)	0.0006	0.0002***	0.0002***
	(0.200)	(0.000)	(0.000)
Dividend_Dummy	-0.1932	-0.3708***	-0.4248***
	(0.200)	(0.000)	(0.000)
Firm_Dummy (= 1 if multinational)			-1.2778***
			(0.000)
Interaction between Firm_Dummy and Domestic Tax Rate			4.2254***
			(0.000)
Number of observations	318	9514	11,841
Adj. R-square	0.8064	0.8412	0.8427

Model 1: For non-multinational firms:

$$\text{Cash holdings} = \alpha + \beta_1 * \text{Domestic Tax Rate} + \text{control variables} + \varepsilon$$

Model 2: For multi-national firms:

$$\text{Cash holdings} = a + \beta_1 * \text{Domestic Tax Rate} + \beta_2 * \text{Foreign Tax Rate} + \beta_3 * (\text{Avg. Tax rate}) + \dots + \text{Control variable} + \varepsilon$$

Model 3: Multinational and domestic firms combined:

$$\text{Cash holdings} = \alpha + \beta_1 * \text{Domestic Tax Rates} + \beta_2 * \text{Foreign Tax Rates} + \beta_3 * \text{Avg. tax rates} + \beta_4 * \text{Firm\_Dummy} + \beta_5 * \text{Firm\_Dummy} * \text{Domestic Tax Rate} + \text{control variable} + \varepsilon$$

Note: 1) Here, we provide the OLS regression results. We also conduct the test using panel data random effect model (after the Hausman test). Panel data random effect model produces similar result. 2) Since non-multinational firms do not have some foreign data, we have missing coefficients for those foreign variables for non-multinational firms.

Table 3 provides result for the test of the differences in the effect of the domestic tax rate on the multi-national and domestic firms' cash holdings. The first column of the table provides the test result for model 1 (non-multinational firms). The significant negative coefficient (-2.1489, 0.0000) supports the hypothesis 2a that the cash holding of the domestic firms is negatively associated with the domestic tax rate.

The second column in table 3 provides test for Model 2, which shows that cash holding of the multinational firms is negatively affected by both the domestic tax rates and the foreign tax rates and the average tax rates (although average tax rates does not have economic significance)—i.e. the higher the tax rates (both foreign and domestic), the lower the amount of cash held by multinational firms, supporting Hypothesis 2b. Moreover, the coefficient for foreign tax rate is more negative than that for domestic tax rate, suggesting that foreign tax rate seem to affect multinational firms' cash holding more than the domestic tax rates (However, no test has been conducted to test the significance of the difference).

In the third column (model 3), the significant positive interaction term (Firm\_Dummy variable interacted with the Domestic tax rate, 4.2254, 0.0000) suggests that although both multinational firms and domestic firms' cash holdings are affected by domestic tax rates, multinational firms' cash holdings are less affected by domestic tax rates compared to non-multinational firms, supporting hypothesis 2c.

Table 4: Test of Income Shifting and Effect on Cash Holdings  
for Multinational Firms

	(1) Dependent Variable: Diff_Income (Coef./P-value)	(2) Dependent Variable: Cash holdings (Coef./P-value)
Diff_Tax Rates	0.010** (0.013)	-0.1435** (0.012)
ln(Assets Total)	0.010*** (0.000)	-0.2599*** (0.000)
R&D Exp / Total Assets	0.778*** (0.000)	2.6719*** (0.000)
Market to Book Ratio	-0.005*** (0.000)	0.0346*** (0.000)
Debt to Equity Ratio	0.016*** (0.000)	-0.3723*** (0.000)
CAPEX / Total Assets	-0.627*** (0.000)	-8.2418*** (0.000)
Op Net Cash Inflow / Net Income	-0.002*** (0.000)	0.0007 (0.884)
Dividend Dummy	0.0000 (0.153)	-0.4094*** (0.000)
standard deviation (cash)	-0.000*** (0.000)	0.0003*** (0.000)
Foreign Pretax Income/Total Assets		1.2700*** (0.0000)

## Domestic Pretax Income/Total Assets

(Foreign Pretax Income/Total Assets)* Diff_Tax Rates		0.3570*** (0.0000) 7.5966*** (0.0000)
Number of observations	9730	9676
R-sq: within	0.127	0.0482
R-sq: between	0.236	0.3780
R-sq: overall	0.155	0.3064

Model (1)  $Diff\_Income = a + \beta_1 * Diff\_TaxRates + Control\ Variables + \varepsilon$  ;

Model (2):  $Cash\ holdings = a + \beta_1 * Diff\_Tax\ Rates + \beta_2 *$

$Foreign\ Pretax\ Income * Diff\_Tax\ Rates + control\ variables + \varepsilon$  ;

$Diff\_Income = (Foreign\ Pretax\ Income - Domestic\ Pretax\ Income)/total\ assets$

$Diff\_Tax\ Rates = Domestic\ Tax\ Rates - Foreign\ Tax\ Rates.$

Note: We used both the Pooled OLS regression and Panel Data models to run the above regression. The structure of our data and the Hypothesis we are trying to test (Hypothesis 3) suggest that a Panel Data Model might provide more efficient estimates. Hausman Test result suggests a Random Effect model is better. The above table presents the test results using Panel Data random effect model. Coefficient for Tax rate difference between Domestic and Foreign in Pooled OLS regression is insignificant.

Table 4 provides the result of the test of income shifting for multinational firms. From the first column of the table, we can see that the coefficient of the difference in tax rate is significantly positive (0.010, 0.013), suggesting that for multinational firms, the higher the domestic tax rate than the foreign tax rate, the higher the difference between the foreign pretax income and the domestic pretax income, suggesting that multinational firms shift income to lower tax rate jurisdictions.

The second column in table 4 shows that the interaction term has a significantly positive coefficient (7.5966, 0.0000), supporting the hypothesis that among the multinational firms, those with higher proportion of net income in the foreign countries tend to have higher levels of cash holdings when the difference between the domestic tax rates and foreign tax rates are higher.

## V. CONCLUSION

This paper examines the effect of tax rates (both domestic and foreign) on the cash holding of the domestic and multinational firms. We also examined the possibility of the multinational firms shifting income to lower-tax rate countries. We find that both cash holding and income shifting provide consistent results in terms of tax-based explanation. More specifically, we find that non-multinational firms' cash holding is negatively affected by domestic tax rates; both domestic and foreign tax rates negatively affect multinational firms' cash holdings. Results also

suggest that compared to domestic firms, multinational firms' cash holdings are less affected by domestic tax rates.

We also find evidence of income shifting of the multinational firms due to tax rates differences (between domestic and foreign). The larger the difference between domestic tax rate and foreign tax rate, the more likely that firms with higher proportion of income in foreign countries tend to hold cash overseas and have higher total cash holdings.

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## **THE SUPREME COURT RULES FROM ON HIGH AND DEFINES AN ERISA CHURCH PLAN**

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### **ABSTRACT**

In *Advocate Health Care Network v. Stapleton*, 137 S. Ct. 1652, 198 L. Ed. 2d 96 (2017) the Supreme Court unanimously ruled that for purposes of the Employee Retirement Income Security Act of 1974 (ERISA), a pension plan maintained by a church-affiliated organization is a church plan, even if the plan is not established by a church.

Pursuant to ERISA § 1003(b)(2), a church plan is exempt from ERISA. ERISA § 1002(33)(A) defines a church plan as a plan established and maintained for its employees by a tax-exempt church. ERISA § 1002(33)(C)(i) generally provides that a plan established and maintained for its employees by a church includes a plan maintained by a church-affiliated organization. The Court reasoned that the plain meaning of ERISA § 1002(33)(A) and (C)(i) taken together is that the church establishment requirement for church plans is removed for plans maintained by church-affiliated organizations.

The Supreme Court reversed the decisions of the Third, Seventh, and Ninth Circuit Courts, which all held that ERISA's plain text requires that a pension plan maintained by a church-affiliated organization must be established by a church to be an ERISA church plan. The circuit courts ruled that subparagraph (C)(i) only expanded the definition of a church plan to include one established by a church but maintained by a church-affiliated organization.

**KEY WORDS:** ERISA, Church Plans, Principal Purpose Organization

### **INTRODUCTION**

In recent years, the U.S. court system has entertained a wave of litigation with regard to the Free Exercise and Establishment Clauses of the U.S. Constitution. While many of the cases deal with the necessity for government to be neutral toward religion, others deal with statutes compelling entities to provide services that violate their religious beliefs. See, *Burwell v. Hobby Lobby Stores, Inc.*, 134 S. Ct. 2751 (2014) and *Trinity Lutheran Church of Columbia, Inc. v. Comer*, 137 S. Ct. 2012 (2017).

In *Advocate Health Care Network, et al., v. Maria Stapleton, et al.; Saint Peter's Healthcare System, et al., v. Laurence Kaplan; and Dignity Health, et al., v. Starla Rollins*, 137 S. Ct. 1652, 198 L. Ed. 2d 96 (2017) (*Advocate*), the Supreme Court issued a decision entailing the interpretation of the Employee Retirement Income Security Act of 1974, 88 Stat. 829 *et seq.*, as amended, 29 U.S.C. § 1001 *et seq.* (ERISA), regarding the pension plans of church-affiliated hospitals and healthcare networks. *Advocate* has implications for religious freedom and a profound

impact on the functioning and viability of the pension plans and operations of a multitude of church-affiliated organizations. For example, it impacts religious universities, schools, daycare centers, retirement homes, mental health facilities, youth programs, housing for the homeless, care for the disabled, soup kitchens, missions, and many others.

In 1974, Congress enacted ERISA to regulate private industry pension plans. It aims “to insure that employees will not be left empty-handed once employers have guaranteed them certain benefits,” as stated in *Lockheed Corp. v. Spink*, 517 U.S. 882, 887 (1996).

ERISA § 1001(a) states Congress’s intent that standards should be provided “assuring the equitable character of [employee benefit plans] and their financial soundness.” Among the costly and complex safeguards enacted in ERISA are minimum funding requirements, minimum vesting requirements, ensuring plan benefits through premiums paid to the Pension Benefit Guarantee Corporation (PBGC), and requiring reporting, disclosures and fiduciary responsibilities. See, *New York State Conference of Blue Cross & Blue Shield Plans v. Travelers Ins. Co.*, 514 U. S. 645, 651 (1995).

Church plans have been exempted from ERISA since its inception. As stated in the Report of Senate Finance Committee, No. 93-383 (August 21, 1973), church plans were exempted as the government’s examination of a church’s books and records might be seen as “an unjustified invasion of the confidential relationship that is believed to be appropriate with regard to churches and their religious activities.”

ERISA § 1002(33)(A) (paragraph (A)) defines a “church plan” as a “plan established and maintained ... for its employees ... by a [tax-exempt] church or by a convention or association of churches.” The phrase “church or a convention or association of churches” will herein be referred to as “church” or “churches,” which includes all religious faiths.

As originally enacted, ERISA § 1002(33)(C) allowed a church plan to cover employees of the church and the employees of agencies of the church, but the provision regarding employees of agencies of the church was to sunset in 1982. In 1980, as part of the Multi-employer Pension Plan Amendments Act (MPPAA), Pub. L. No. 96-364, § 407 (1980), Congress expanded the church agency provision in ERISA § 1002(33)(C) and made it permanent. As amended, ERISA § 1002(33)(C)(i) (subparagraph (C)(i)) states, “A plan *established and maintained for its employees ... by a church ... includes a plan maintained by an organization, ... the principal purpose or function of which is the administration or funding of a plan or program for the provision of retirement benefits ... for the employees of a church ..., if such organization is controlled by or associated with a church ...*.” (Emphasis added.) Accordingly, ERISA § 1002(33)(A) continues to define “church plan” as “a plan established and maintained ... by a church.” However, subparagraph (C)(i) now provides that paragraph (A) “includes a plan maintained by a principal-purpose organization controlled by or associated with a church.” The primary purpose of a principal-purpose organization is to fund or manage a benefit plan for the employees of churches or church affiliates. Herein this “church-associated entity” will be referred

to interchangeably as a “principal-purpose organization,” “church-affiliated organization,” or “church agency.”

Section 414(e) of the Internal Revenue Code of 1986, as amended (I.R.C.), contains a parallel provision defining “church plan” similarly to the definition in ERISA. Congress made identical changes to the parallel tax provision in I.R.C. § 414(e)(3)(A) as those in subparagraph (C)(i).

In 1980 as part of the MPPAA, Congress added ERISA § 1002(33)(C)(ii), providing that “employee of a church” includes “an employee of a church agency.” It added the parallel tax provision in I.R.C. § 414(e)(3)(B). Also, in ERISA § 1002(33)(C)(iii), Congress provided that a “church ... shall be deemed the employer of any individual included as an employee under Clause ii” and added the parallel tax provision in I.R.C. § 414(e)(3)(C). Accordingly, when ERISA § 1002(33)(C)(i) refers to employees of a church, it includes employees of church agencies. The amendments are retroactive to ERISA’s enactment in 1974.

In *Advocate*, the Supreme Court addressed the issue of whether a plan maintained by a principal-purpose organization must have been established by a church to qualify as a church plan exempt from ERISA. It held that ERISA does not impose a church establishment requirement on a plan maintained by a principal-purpose organization. Accordingly, a plan both established and maintained by a principal-purpose organization is a church plan under ERISA.

In *Kaplan v. St. Peter’s Healthcare System*, 810 F. 3d 175 (CA-3, 2015), *rev’d*, 198 L. Ed. 2d 96 (2016), (*Kaplan*) the Third Circuit affirmed the decision of the district court in *Kaplan v. St. Peter’s Healthcare System*, 2014 U.S. Dist. LEXIS 44963 (2014) (unreported decision) (*Kaplan I*) and held that ERISA’s “plain text” requires that church plans may only be established by churches.

In *Stapleton v. Advocate Healthcare Network*, 817 F. 3d 517 (CA-7, 2016), *rev’d*, 198 L. Ed. 2d 96 (2016) (*Stapleton*), the Seventh Circuit affirmed the district court’s decision in *Stapleton v. Advocate Healthcare Network*, 76 F. Supp. 3d 796 (N.D. Ill., 2014) (*Stapleton I*), and held that a church plan maintained by a principal-purpose organization must be established by a church.

In *Rollins v. Dignity Health*, 830 F. 3d 900 (CA-9, 2016), *rev’d*, 198 L. Ed. 2d 96 (2016) (*Rollins*), the Ninth Circuit affirmed the decision of the district court in *Rollins v. Dignity Health*, 59 F. Supp. 3d 965 (N.D. Cal., 2014) (*Rollins I*) and held that ERISA church plans must be established by a church. *See also, Rollins v. Dignity Health*, 19 F. Supp. 3d 909 (N.D. Cal., 2013).

While the Courts of Appeals for the Third, Seventh, and Ninth Circuits all ruled that a church must establish a plan maintained by a principal-purpose organization for the plan to be an ERISA church plan and utilized the same reasoning, the Supreme Court granted certiorari and consolidated all three cases due to the importance of the issue.

Before discussing *Advocate*, an analysis of the relevant law is necessary.

## **OVERVIEW OF THE RELEVANT SECTIONS OF ERISA**

Church plans have always been exempt from ERISA. ERISA § 1003(b)(2) provides that “The provisions of this subchapter shall not apply to any employee

benefit plan if . . . such plan is a church plan (as defined in section 1002(33) of this title)[.]”

ERISA’s definition of church plan was developed in two distinct phases: its original iteration in 1974 and the amended iteration in 1980. ERISA § 1002(33) originally defined a church plan as follows, in relevant part:

(A) The term "church plan" means

(i) a plan established and maintained for its employees by a church or by a convention or association of churches which is exempt from tax . . . or

(ii) a plan described in subparagraph (C).

. . . .

(C) . . . [A] plan in existence on January 1, 1974, shall be treated as a "church plan" if it is established and maintained by a church or convention or association of churches for its employees and employees of one or more agencies of such church (or convention or association) . . . , and if such church (or convention or association) and each such agency is exempt from tax . . . The first sentence of this subparagraph shall not apply to any plan maintained for employees of an agency with respect to which the plan was not maintained on January 1, 1974. The first sentence to this subparagraph shall not apply with respect to any plan for any plan year beginning after December 31, 1982.

A church plan as originally defined required that a plan be both established and maintained by a church for its employees and the employees of a church agency. Since prior to the enactment of ERISA many churches allowed the employees of church agencies to participate in the churches’ pension plans, paragraph (C) allowed plans covering employees of a church agency to qualify as church plans, but only until December 31, 1982. Plans including church agency employees after that date would either have to comply with ERISA or divide into separate plans, which would have imposed significant costs for the plans and other limitations. Accordingly, Congress amended the statute in 1980 by adding subparagraph (C)(i), eliminating the sunset provision and permanently allowing employees of church agencies to participate in plans established and maintained for its employees by a church.

The original statute required that a church plan be maintained (i.e. administered) by a church; thus, plans maintained by a church-affiliated organization, such as a pension board, were excluded from the definition of church plans. Recognizing that many churches had established plans that were maintained by church pension boards, Congress amended the language in the original statute in 1980, adding subparagraph (C)(i), providing that a plan maintained by a church-affiliated organization is included in a plan established and maintained by a church.

ERISA § 1002(33), as amended by the MPPAA in 1980 reads as follows, in pertinent part:

(A) The term "church plan" means a plan established and maintained . . . for its employees (or their beneficiaries) by a church or by a convention or association of churches which is exempt from tax under section 501 of Title 26.

. . .

(C) For purposes of this paragraph —

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(i) A plan established and maintained for its employees (or their beneficiaries) by a church or by a convention or association of churches includes a plan maintained by an organization, whether a civil law corporation or otherwise, the principal purpose or function of which is the administration or funding of a plan or program for the provision of retirement benefits or welfare benefits, or both, for the employees of a church or a convention or association of churches, if such organization is controlled by or associated with a church or a convention or association of churches.

(ii) The term employee of a church or a convention or association of churches includes—

(I) a duly ordained, commissioned, or licensed minister of a church in the exercise of his ministry, regardless of the source of his compensation;

(II) an employee of an organization, ... which is exempt from tax ... and which is controlled by or associated with a church or a convention or association of churches ... .

Subparagraph (C)(i) starts by incorporating the language from paragraph (A), stating “A plan established and maintained for its employees (or their beneficiaries) by a church or by a convention or association of churches.” It then adds that it “includes a plan maintained by an organization.” Then, the language starting with the word “whether” merely describes a particular kind of church-associated entity whose main job is to fund or manage a benefit plan.

After the 1980 amendment, subparagraph (C)(i) unambiguously defines a church plan to include a plan established by a church but maintained by a church-affiliated organization. It also clearly allows plans established by churches to allow participation by both church and church agency employees on a permanent basis. However, it does not clearly state whether a church plan may be established and maintained by a church-affiliated organization.

In IRS General Council Memorandum 37266, 1977 WL 46200 (September 22, 1977) (GCM 37266), the Internal Revenue Service (IRS) interpreted the original definition of a church plan in ERISA § 1002(33)(A) as excluding a pension plan established by two orders of Catholic sisters for employees of their hospitals. Even though both orders were established by the Roman Catholic Church, the IRS reasoned that under a then-proposed regulation (now Reg. § 1.414(e)-1(e)), a religious order is not a church unless it is an “integral part of the church” and is engaged in “carrying out the religious functions of the church,” which entails engagement in the “ministration of sacerdotal functions and conduct of religious worship.” The IRS announced that the orders’ efforts to care for the sick and needy are “not ‘church functions’ ... since they are not religious.” A multitude of religious groups from many denominations objected to the IRS’s intrusion into the affairs of churches and church agencies due to its action.

After Congress amended ERISA § 1002(33)(C) in 1980, the IRS issued IRS General Council Memorandum 39007, 1983 WL 197946 (November 2, 1982) in 1982, concluding that the plan that was the subject of GCM 37266 issued in 1977 was now a church plan, even though it was not established by a church. The IRS reasoned that because of the MPPAA, a plan is a church plan if it is maintained by a qualifying

church-affiliated organization and covers the employees of a church-affiliated organization, regardless of whether a church established the plan. The IRS stated that “church plan status no longer hinges on whether an order is a church.” Since the amendment in 1980, the IRS, Department of Labor (DOL), and PBGC, the three federal agencies responsible for administering ERISA, consistently have held that plans maintained by church-affiliated organizations are church plans exempt from ERISA, regardless of whether a church separately established the plan.

### **ANALYSIS OF *ADVOCATE***

In *Advocate*, the Supreme Court resolved the issue of whether Congress, in 1980, intended to either: 1) eliminate the church establishment requirement for plans maintained by church-affiliated organizations; or, 2) merely expand who may maintain a plan, so that a church-established plan may be maintained by a church-affiliated organization. It ruled that Congress eliminated the church establishment requirement for plans maintained by church-affiliated organizations.

### **Facts and Lower Courts**

St. Peter’s Healthcare System (SPHS), Advocate Healthcare Network (AHN), and Dignity Health (DH), are three church-affiliated nonprofits that run hospitals and other healthcare facilities (collectively hospitals). Each offers their employees defined-benefit pension plans, established their plans and managed them by internal employee-benefits committees, are affiliated with a church, and were separately subject to a putative class-action suit alleging that their plan was not an ERISA church plan.

In *Kaplan I*, the district court concluded that the plan was not an ERISA-exempt church plan because it was not established by a church. The district court stated, “The key to this interpretation is to recognize that subsection A is the gatekeeper to the church plan exemption: although the church plan definition, as defined in subsection A, is expanded by subsection C to include plans *maintained* by a tax-exempt organization, it nevertheless requires that the plan be *established* by a church or a convention or association of churches. In other words, if a church does not establish the plan, the inquiry ends there. If, on the other hand, a church establishes the plan, the remaining sections of the church plan definition are triggered.” *Kaplan I*, 2014 U.S. Dist. LEXIS 44963, at \*14 (emphases in original).

In *Kaplan*, the Third Circuit affirmed *Kaplan I*, opining that subparagraph (C)(i)’s use of the word “includes” only expanded the church-maintenance requirement. Thus, a plan established by a church and maintained by a principal-purpose organization is an ERISA church plan. However, a plan not established by a church but maintained by a principal-purpose organization is not an ERISA church plan.

In *Stapleton I*, the district court held that AHN’s plan is not an ERISA church plan, as the statutory definition requires a church plan to be established by a church.

In *Stapleton*, the Seventh Circuit affirmed *Stapleton I*, stating that “the plain language of 33C merely adds an alternative meaning to one of subsection (33)(A)’s

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two elements – ‘maintained’ element – but does not change the fact that a plan must still be established by a church.” *Stapleton*, 817 F. 3d, at 523.

In *Rollins I*, the district court granted the motion for partial summary judgment, holding that the DH plan is not an ERISA church plan, as it was not established by a church.

In *Rollins*, the Ninth Circuit affirmed *Rollins I*, stating “that the more natural reading of Subparagraph C(i) that the phrase preceded by the word ‘includes’ serves only to broaden the definition of organizations that may maintain a church plan. The phrase does not eliminate the requirement that a church plan must be established by a church.” *Rollins*, 830 F. 3d, at 906.

### **Supreme Court**

The Supreme Court weighed the argument of the employees that subparagraph (C)(i) only expanded the requirement that a pension plan be maintained by a church to include maintenance by a principal-purpose organization against the argument of the hospitals that it eliminated the church establishment requirement and brought all pension plans maintained by a principal-purpose organization within the church-plan definition, regardless of who established it. It stated, “We conclude that the hospitals have the better of the argument.”

The Court interpreted ERISA §§ 1002(33)(A) and (C)(i). Regarding subparagraph (C)(i), it stated, “That is a mouthful, for lawyers and non-lawyers alike.” It recognized that subparagraph (C)(i) is a new definitional phrase piggy-backing on the one already existing in paragraph (A). Noting that subparagraph (C)(i) provides that the original church plan definition in paragraph (A) will now “include” another, namely a plan maintained by a principal-purpose organization, the Court focused on the word “include” and ruled that it means that the church establishment requirement no longer exists for plans maintained by a principal-purpose organization. The Court stated, “That use of the word ‘include’ is not literal—any more than when Congress says something like ‘a State “includes” Puerto Rico and the District of Columbia.’ See, e.g., 29 U. S. C. §1002(10).”<sup>4</sup> Rather, it tells readers that a *different* type of plan should receive the same treatment (*i.e.*, an exemption) as the type described in the old definition. And those newly favored plans, once again, are simply those ‘maintained by a principal-purpose organization’—irrespective of their origins. In effect, Congress provided that the new phrase can stand in for the old one as follows: ‘The term “church plan” means *a plan established and maintained by a church* [a plan maintained by a principal-purpose organization].’ The church-establishment condition thus drops out of the picture.” In footnote 4, the Court provided, “Or any more than when Congress, in the same 1980 amendment to ERISA, provided that an ‘employee of a church’ was to ‘include[ ]’ an employee of a church-affiliated organization. §1002(33)(C)(ii)...” *Advocate*, 198 L. Ed. 2d, at 103-104.

Applying the so-called “surplusage canon,” which presumes that each word Congress uses in a statute is there for a reason, the Court reasoned that if Congress intended to alter only the maintenance requirement in paragraph (A), it could have left out the words “established and” from the first part of the sentence in subparagraph (C)(i) so that it would have provided that “a plan maintained by a church includes a

plan maintained by” a principal-purpose organization. Then, the statute would have left the church establishment requirement intact but allowed plans established by a church to be maintained by a principal- purpose organization. The Court stated, “But Congress did not adopt that ready alternative. Instead, it added language whose most natural reading is to enable a plan ‘maintained’ by a principal-purpose organization to substitute for a plan both ‘established’ and ‘maintained’ by a church. That drafting decision indicates that Congress did not in fact want what the employees claim.” *Advocate*, 198 L. Ed. 2d, at 104.

The Court rejected a hypothetical set forth by the employees. The employees imagined a statute that provides free insurance to a “person who is disabled and a veteran,” and an amendment then states that “a person who is disabled and a veteran includes a person who served in the National Guard,” then posited the question whether a person who served in the National Guard but is not disabled qualified to collect free insurance? The employees contended the answer is no, as everyone would understand the “includes” provision in the amendment expands or clarifies only the meaning of “veteran.” Thus, the disability requirement is unchanged. The employees applied the logic in the hypothetical to subparagraph (C)(i), arguing that it only modified the “maintained” language in the statute and left the “established” requirement unchanged.

The Court provided its own hypothetical. It stated, “But one good example does not a general rule make. Consider a variant of the employees’ hypothetical: A statute offers free insurance to a ‘person who enlisted and served in the active Armed Forces,’ with a later amendment providing that ‘a person who enlisted and served in the active Armed Forces includes a person who served in the National Guard.’ Would a person who served in the National Guard be ineligible for benefits unless she had also enlisted in the active Armed Forces—say, the regular Army or Navy? Of course not.” *Advocate*, 198 L. Ed. 2d, at 105.

The Court opined that, in its hypothetical, as opposed to the employees’, the statute’s literal and most natural meaning cohered, as service in the National Guard, the amendment’s single eligibility for insurance requirement, is enough to qualify the person for the free insurance.

The Court reasoned that its holding is in accord with both the hospitals’ and employees’ contentions concerning the origins of subparagraph (C)(i). The hospitals contended that it was Congress’s intent to eliminate any distinctions between churches and church-affiliated organizations in ERISA in response to the uproar generated by the IRS’s decision in GCM 37266. The employees maintained that the main goal of subparagraph (C)(i) was to include local pension boards within the church plan exemption, thus ensuring equal treatment to congregational and hierarchical churches.

A concurring opinion expressed concern that plans neither established nor maintained by a church could deny scores of employees ERISA’s protections, even though those organizations operate similar to secular businesses, earning billions of dollars and competing in the secular market with companies subject to ERISA.

## CONCLUSION

In *Advocate*, the Supreme Court unanimously ruled that paragraph (A) and subparagraph (C)(i), taken together, provide that an ERISA church plan includes a plan maintained by a principal-purpose organization, even if it is not established by a church; hence, religious-affiliated hospitals may establish and maintain ERISA church plans for their employees. The Supreme Court reversed the decisions of the Third Circuit in *Kaplan*, the Seventh Circuit in *Stapleton*, and the Ninth Circuit in *Rollins*, which ruled that ERISA requires a church to establish the plan, as subparagraph (C)(i) merely expanded the meaning of “maintain” in paragraph (A) so that a church-established plan may be maintained by a church agency.

In 2013 a wave of litigation, including the three cases addressed in *Advocate*, challenged the views of the IRS, DOL, and PBGC that exempted plans like the hospitals from the relevant statute’s mandates. While the “church establishment” issue was resolved in *Advocate*, there are other issues remaining to be resolved, including interpreting the provisions governing which organizations are principal-purpose organizations. In *Advocate*, the Supreme Court did not address the issue of whether the hospitals have the needed association with a church to be a church plan, or, even if they do, whether their internal benefits committees count as principal-purpose organizations.

The viability of the hospitals in *Advocate* as well as other church affiliates throughout the nation with defined benefits plans treated as ERISA-exempt church plans was at stake. Approximately a million people in the U.S. are employed by hospital networks exempted from ERISA’s requirements. The hospitals in *Advocate*, which employ around 100,000 people, may have been liable for ERISA-related minimum funding requirements, penalties, and other costs totaling over \$60 billion. If plans maintained by principal-purpose organizations not established by a church had been excluded from ERISA church plans by the Supreme Court, church-affiliated organizations throughout the country may have been forced to discontinue their defined benefit plans, incur astronomical costs if they maintained them, severely reduce their workforce and/or operations, or even be bankrupted.

*Advocate* has a positive impact on religious liberty. In a sense, it keeps the government out of religion, as now for purposes of determining if a church plan was established by a church it will not have to determine if the establishing entity is or is not a church, or what is or is not the church’s mission, and whether the services provided by a principal-purpose organization are part of the church’s mission.

While the decision allows plans maintained by principal-purpose organizations not established by a church to avoid paying premiums to the PBGC, the plans will not have the insurance provided by the PBGC. Thus, participants in the plan will be at greater risk of not receiving the benefits of the plan. Since some church affiliates offering ERISA-exempt church plans voluntarily comply with ERISA, participants’ exposure is somewhat mitigated.

The Supreme Court’s decision in *Advocate* has implications beyond ERISA. For example, the definition of “church plan” in ERISA § 1002(33) is incorporated in the definition of “church plan” in I.R.C. § 414(e); thus when determining tax-exempt status for church plans and other related tax matters, the Supreme Court’s

interpretation of “church plans” is determinative. In addition, the definition of “church plan” in ERISA and the I.R.C. is incorporated into a dozen other provisions in the U.S. Code (e.g., exempting church plans from securities regulations).

One might view *Advocate* as the Supreme Court using an ERISA eraser to erase an erroneous ERISA argument. As the Supreme Court noted, “This is a mouthful, for lawyers and non-lawyers alike.”

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## **CPA PRACTITIONERS' FEEDBACK ON AUDITING CURRICULUM**

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### **ABSTRACT**

The Sarbanes-Oxley Act in 2002 increased the prominence and responsibilities of the audit profession. The accounting profession has responded by taking steps to enhance the relevance of auditing curriculum. The purpose of this research is to assess contemporary auditing curriculum by surveying an important stakeholder in auditing education—practicing CPAs. The survey ascertains the CPAs' assessment of both the importance of 63 auditing curriculum topics and the effectiveness of the auditing curriculum in developing these topics in preparing students for entry level work and career advancement. Unlike prior research that focused only on importance, this study, by using effectiveness as well, permits the translation of results into action.

Key Words: auditing, curriculum, Sarbanes-Oxley, survey

### **INTRODUCTION**

Based on the recommendation of the U.S. Treasury Advisory Committee on the Auditing Profession (U.S. Dept. of Treasury, 2008), the American Accounting Association (AAA) and the Institute of Certified Public Accountants (AICPA) created the Pathways Commission on Accounting Higher Education to study the future structure of higher education for the accounting profession. Its charge was developing recommendations for educational pathways to engage and retain the strongest possible community of stakeholders in the profession. These stakeholders include students, academics, practitioners, and all other knowledgeable leaders in the practice and study of accounting. Among the Commission's seven recommendations, Recommendation 4 includes developing curriculum models, engaging learning resources, and mechanisms for easily sharing them as well as enhancing faculty development opportunities in support of a robust curriculum. Specific objectives to accomplish their recommendations include engaging the accounting community to define the body of knowledge that serves as the foundation for accounting curricula of the future and implementing curricular models that serve future needs (AAA, 2012).

Subsequently, the Institute of Management Accountants (IMA) and the Management Accounting Section (MAS) of the AAA formed a joint Task Force to extend the work of the Pathways Commission [Lawson et al, 2014]. The Task

Force developed a proposed Framework that offered definitions of the competencies required by all accounting students for long-term career requirements and an understanding of how to develop the competencies within the accounting curriculum. The Sarbanes-Oxley Act of 2002 (SOX) influences much of the discussion as it requires practicing CPAs to have extensive knowledge of internal controls to effectively complete an audit and comply with regulatory requirements. The Task Force, however, recognizes that knowledge of internal controls is a competency all accounting graduates need, even graduates that do not enter public accounting but instead join other organizations. Interviewing corporate directors Cohen et al (2013) found that the legislation influenced both audit committees and internal auditors. For the former, the perception is that the Act led to a more structured formal approach to accounting policy decision making by audit committees and external auditors. With respect to the latter, they found that SOX led to a substantial improvement in the scope, responsibility, and status of internal auditors.

University faculty and students entering the workforce are also affected stakeholders. The Pathways Commission (AAA, 2012), in evaluating accounting knowledge competency, identified knowledge topics for accounting in the Financial Accounting and Reporting area and Auditing and Attest Services area that are directly affected by the Sarbanes-Oxley Act of 2002. The purpose of this research is to assess both the importance and effectiveness of contemporary auditing curricula by surveying an important stakeholder in auditing education—practicing CPAs. The survey first identifies the stakeholders' assessment of the relative importance of sixty-three auditing topics within the auditing curriculum in preparing students for entry level work and career advancement. The survey then asks these stakeholders to rate the effectiveness of current auditing curriculum in developing these competences based on their experience with recent accounting graduates. The results of this study should be helpful to auditing educators in evaluating their curricula and designing appropriate curriculum changes to improve its effectiveness in preparing accounting graduates for entry into the accounting profession and for undertaking the duties and assignments of an auditor.

## **METHODOLOGY**

Past research confirms the content of the first auditing course is strongly connected to textbook content. Engle & Elam (1985) established a direct relationship between undergraduate auditing classroom emphasis and auditing textbook emphasis. A study by the American Accounting Association's (AAA) Auditing Section to assess the status of auditing courses in the undergraduate accounting curriculum found the content of the first auditing course to be textbook dependent (Frakes, 1987). More recently, the AAA's Auditing Section (2003) conducted a survey in which course syllabi from 285 auditing and assurance courses were analyzed on a number of dimensions including identifying auditing topics. Like Frakes, the AAA

study (2003), Bisoux (2005), and Reed et al (2007), also found that textbooks are the most common learning activity in introductory auditing courses. Given the key role of auditing texts to auditing curricula, the 63 auditing topics employed in this survey were gleaned from the topical coverage in several popular auditing texts that span the offerings in the introductory undergraduate auditing textbook market. Table 1 lists the 63 individual auditing topics employed in the survey.

The practicing certified public accountants selected for survey were developed from a mailing list that included all U.S. public accounting firms/offices that had at least 50 professionals (2,065 firms/offices). Every fifth name was surveyed resulting in 413 CPAs being surveyed. The survey was addressed to practitioners that had responsibility for evaluating new hires as they would be highly cognizant of the duties and responsibilities of new auditors. Those surveyed included senior-staff auditors, managers, and partners. Usable responses were received from 91 CPA firms, representing a 22% response rate. The 91 responding firms consisted of 39 international firms (42.9%), 32 regional firms (35.2%), 17 local firms (18.7%), and 3 (3.3%) with no response. The respondents were primarily partners (68.1%), followed by managers (25.3%). The remaining 6.6% were distributed across supervisor, human-resources director, or non-response.

<b>TABLE 1</b>	
<b>AUDITING TOPICS</b>	
<b>ID</b>	<b>Individual Auditing Topic</b>
<b>1</b>	Nature of the audit profession and how it differs from that of other practicing accountants
<b>2</b>	Generally Accepted Auditing Standards
<b>3</b>	Statements on Auditing Standards — their origin and use in audit practice
<b>4</b>	Quality Control Standards — their origin and use in audit practice
<b>5</b>	Auditor's decision process for issuance of an audit report
<b>6</b>	Detailed analysis of the unqualified audit report
<b>7</b>	Conditions requiring departure from the standard unqualified audit report
<b>8</b>	Materiality
<b>9</b>	Detailed analysis of the qualified audit opinion
<b>10</b>	Detailed analysis of an adverse audit opinion
<b>11</b>	Detailed analysis of a disclaimer of an audit opinion
<b>12</b>	Other audit engagements or limited assurance engagements
<b>13</b>	Attestation engagements
<b>14</b>	Auditor association with prospective financial statements
<b>15</b>	Reporting on internal control structure related to financial statements
<b>16</b>	Compilation services and reports
<b>17</b>	Review services and reports
<b>18</b>	Review of interim financial information
<b>19</b>	Business ethics and ethical dilemmas

**TABLE 1**  
**AUDITING TOPICS**

ID	Individual Auditing Topic
20	Code of Professional Conduct, including concepts as independence, objectivity, confidentiality, etc.
21	Enforcement of Code of Professional Conduct
22	Definition of audit risk, business failure and audit failure
23	Legal concepts, terminology, and auditor liability to clients and third parties under common law
24	Legal concepts, terminology, and auditor liability to clients and third parties under federal securities law
25	Nature of persuasive audit evidence
26	Types of audit evidence
27	Purpose and timing of analytical procedures
28	Management's and auditor's responsibilities concerning financial statements
29	Planning the audit
30	Working papers and documentation
31	Assessing business risk
32	Materiality and risk in preliminary phase of the audit
33	Internal control reportable differences
34	Overview and understanding of internal control structure
35	Assessing control risks and testing of key controls
36	Audit objectives and tests related to accounting transactions
37	Design and use of audit program procedures related to tests of balances
38	Business functions – cycles (revenue, acquisition, inventory, etc.) and related records, transactions, and documents
39	Tests of internal controls and substantive tests of transactions for business functions
40	Evaluation and effects of results of tests of internal controls and substantive test of controls
41	Tests of details of account balances
42	Evaluation and effects of details of account balance tests
43	Statistical and nonstatistical sampling concepts
44	Attribute sampling and applications
45	Sampling for tests of details of balances — e.g. monetary unit sampling and variable sampling procedures
46	Analysis of statistical results and implication on audit procedures
47	Internal EDP controls
48	Use of computers in the audit of client records and financial statements
49	Contingent liabilities
50	Subsequent events review
51	Discovery of facts subsequent to issuance of audit report

<b>TABLE 1 AUDITING TOPICS</b>	
<b>ID</b>	<b>Individual Auditing Topic</b>
<b>52</b>	Evaluation of results and communication of facts to audit committee and management
<b>53</b>	Internal auditing and various tasks performed by internal auditors
<b>54</b>	Governmental auditing and generally accepted government accounting principles
<b>55</b>	SOX section 404 combined report on financial statements and internal control over financial reporting
<b>56</b>	SOX – auditor independence
<b>57</b>	Public Companies Accounting Oversight Board, including concepts such as ethics, independence, etc.
<b>58</b>	SOX – Audit Committee responsibilities
<b>59</b>	SOX – Requirements for auditor reporting on internal control
<b>60</b>	Fraud – SAS 99 – Consideration of fraud in a financial statement audit
<b>61</b>	Fraud and analytical procedures
<b>62</b>	Recognize specific fraud areas and develop procedures to detect fraud
<b>63</b>	Corporate governance oversight to reduce fraud risks

The questionnaire asks the CPA respondent to provide his/her perceptions of both the importance of auditing curriculum topics and the effectiveness of the auditing curriculum in preparing students for entry level work and career advancement using a separate six-point Likert scale for each which are listed below. Note that the scales for importance and effectiveness are not equivalent. Since the auditing topics were textbook determined, an assumption of being necessary for professional success is assumed. Hence, the importance scale focuses on relative importance with only one scale value indicating that the auditing topic was not important. The effectiveness scale, on the other hand, is more balanced. Accordingly, comparisons of results between the two ratings focus on comparing the relative rankings and not the rating means.

<b>Importance Scale</b>	<b>Point Value</b>	<b>Effectiveness Scale</b>
Extremely Important	6	Very Effective
Very Important	5	Effective
Important	4	Slightly Effective
Moderately Important	3	Slightly Ineffective
Slightly Important	2	Ineffective
Not Important	1	Very Ineffective

## RESULTS

Table 2 displays the mean ratings responses for both importance and effectiveness for all the topics where the auditing topics are arranged based on their mean importance ratings ranking. Grand means for both importance and effectiveness are calculated as reference points representing the average importance and effectiveness levels for all the auditing topics. The overall grand means for importance and effectiveness are 4.53 and 4.26, respectively. Scanning the rankings on the mean importance ratings clearly shows that practicing CPAs assign high importance ratings to almost all the auditing topics as none of the topics have a mean importance rating below 3.00. Further breakdown reveals that 33 topics have mean values between 5.50 and 4.50 and, thus, are assigned an importance level of *Very Important*, 27 topics have mean values between 4.50 and 3.50 and so are ascribed an importance level of *Important*, and only 3 topics have mean values between 3.50 and 3.00 and, thus, are accorded an importance level of *Moderately Important*. Given that the practicing CPAs have an explicit commitment to auditing, the high responses on importance are not surprising. However, since this research does not permit an absolute assessment of importance or effectiveness but rather a subjective assessment of each dimension, this research focuses appropriately on the relative responses. Accordingly, 32 topics have mean importance ratings above or equal to the grand mean (4.53) on importance and 31 topics are lower than the grand mean.

ID	Auditing Topics	Importance		Effectiveness	
		Rank	Mean	Rank	Mean
30	Working papers and documentation	1	5.37	43	4.17
25	Nature of persuasive audit evidence	2	5.30	14	4.59
26	Types of audit evidence	2	5.30	4	4.99
20	Code of Professional Conduct, including concepts such as independence, objectivity, confidentiality, etc.	4	5.29	6	4.87
19	Business ethics and ethical dilemmas	5	5.23	51	3.89
8	Materiality	6	5.20	26	4.41
27	Purpose and timing of analytical procedures	6	5.20	23	4.44
2	Generally Accepted Auditing Standards	8	5.12	1	5.20
34	Overview and understanding of internal control structure	8	5.12	12	4.61
22	Definition of audit risk, business failure and audit failure	10	5.09	7	4.82
28	Management's and auditor's responsibilities concerning financial statements	10	5.09	2	5.00
41	Tests of details of account balances	10	5.09	8	4.73
36	Audit objectives and tests related to accounting transactions	13	5.08	10	4.63
60	Fraud - SAS 99 - Consideration of fraud in a financial statement audit	14	5.07	22	4.46
37	Design and use of audit program procedures related to tests of balances	15	5.04	29	4.39

**TABLE 2**  
**AUDITING TOPICS MEANS AND RANKS BY**  
**IMPORTANCE AND EFFECTIVENESS**

ID	Auditing Topics	Importance		Effectiveness	
		Rank	Mean	Rank	Mean
38	Business functions- cycles (revenue, acquisition, inventory, etc.) and related records, transactions, and documents	15	5.04	16	4.58
29	Planning the audit	17	4.96	9	4.69
61	Fraud and analytical procedures	17	4.96	49	3.93
42	Evaluation and effects of details of account balance tests	19	4.95	25	4.42
62	Recognize specific fraud areas and develop procedures to detect fraud	19	4.95	55	3.65
32	Materiality and risk in preliminary phase of the audit	21	4.93	33	4.37
39	Tests of internal controls and substantive tests of transactions for business functions	21	4.93	17	4.54
35	Assessing control risks and testing of key controls	23	4.92	31	4.38
33	Internal control reportable differences	24	4.87	46	4.07
40	Evaluation and effects of results of tests of internal controls and substantive test of controls	24	4.87	38	4.30
31	Assessing business risk	26	4.79	43	4.17
48	Use of computers in the audit of client records and financial statements	27	4.74	62	3.13
3	Statements on Auditing Standards - their origin and use in audit practice.	28	4.63	31	4.38
43	Statistical and nonstatistical sampling concepts	29	4.60	35	4.34
15	Reporting on internal control structure related to financial statements	30	4.56	37	4.31
57	Public Companies Accounting Oversight Board, including concepts such as ethics, independence, etc.	31	4.54	26	4.41
5	Auditor's decision process for issuance of an audit report	32	4.53	26	4.41
56	SOX - auditor independence	33	4.52	17	4.54
21	Enforcement of Code of Professional Conduct	34	4.44	51	3.89
49	Contingent liabilities	34	4.44	23	4.44
4	Quality Control Standards - their origin and use in audit practice.	36	4.43	53	3.87
44	Attribute sampling and applications	36	4.43	21	4.48
55	SOX section 404 combined report on financial statements and internal control over financial reporting	38	4.40	39	4.27
63	Corporate governance oversight to reduce fraud risks	39	4.39	57	3.56
50	Subsequent events review	40	4.38	14	4.59
7	Conditions requiring departure from the standard unqualified audit report	41	4.37	2	5.00
46	Analysis of statistical results and implication on audit procedures	41	4.37	45	4.10
45	Sampling for tests of details of balances - eg. monetary unit sampling and variable sampling procedures	43	4.34	41	4.24
1	Nature of the audit profession and how it differs from that of other practicing accountants	44	4.33	19	4.49
59	SOX - Requirements for auditor reporting on internal control	44	4.33	35	4.34
52	Evaluation of results and communication of facts to audit committee and management	46	4.30	42	4.23
51	Discovery of facts subsequent to issuance of audit report	47	4.28	29	4.39
23	Legal concepts, terminology, and auditor liability to clients and third parties under common law	48	4.25	39	4.27
47	Internal EDP controls	49	4.14	58	3.51

**TABLE 2**  
**AUDITING TOPICS MEANS AND RANKS BY**  
**IMPORTANCE AND EFFECTIVENESS**

ID	Auditing Topics	Importance		Effectiveness	
		Rank	Mean	Rank	Mean
24	Legal concepts, terminology, and auditor liability to clients and third parties under federal securities law	50	4.13	33	4.37
58	SOX - Audit Committee responsibilities	51	4.12	48	4.00
6	Detailed analysis of the unqualified audit report	52	4.07	5	4.89
17	Review services and reports	53	3.92	55	3.65
18	Review of interim financial information	54	3.86	59	3.49
13	Attestation engagements	55	3.80	47	4.03
9	Detailed analysis of the qualified audit opinion	56	3.76	10	4.63
12	Other audit engagements or limited assurance engagements	57	3.67	50	3.92
53	Internal auditing and various tasks performed by internal auditors	58	3.66	61	3.34
11	Detailed analysis of a disclaimer of an audit opinion	59	3.58	19	4.49
16	Compilation services and reports	60	3.57	54	3.70
10	Detailed analysis of an adverse audit opinion	61	3.48	12	4.61
54	Governmental auditing and generally accepted government accounting principles	62	3.36	63	2.48
14	Auditor association with prospective financial statements	63	3.20	60	3.37

On the effectiveness dimension, the practicing CPAs assigned 18 topics to an effectiveness level of *Effective* as their mean effectiveness ratings are between 5.50 and 4.50, 40 topics to an effectiveness level of *Slightly Effective* with mean effectiveness ratings between 4.50 and 3.50, 4 topics to an effectiveness level of *Slightly Ineffective* as their means are between 3.50 and 2.50, and 1 topic below 2.50 with an effectiveness level of ineffective. Once more, the focus is directed toward the relative effectiveness with 40 auditing topics having mean effectiveness ratings above the grand mean (4.26) on effectiveness and 23 topics below the grand mean.

While importance can stand on its own merits, the real value of effectiveness is with respect to achieving a goal. Consequently, the useful interpretation of the effectiveness ratings rests on determining how effectively the auditing curriculum develops the more important auditing topics. Ideally, for a curriculum to be efficient, it should be more effective in developing the higher rated topics on importance. That is, an ideal situation would be one where the Spearman rank correlation coefficient between the two rankings on importance and effectiveness is close to + 1.0. For the two rankings in Table 2, the Spearman rank correlation coefficient is positive ( $r_s = + 0.430$ ) and significant at the 0.000 level. Thus, current auditing curriculum efficiency appears less than ideal, and significant differences between the importance and effectiveness rankings signal both topical areas in which the curriculum is underperforming and topical areas where the curriculum is, in a sense, over-performing and could be replaced by topics perceived as more important.

### **Importance-Effectiveness Diagram**

Creating an importance-effectiveness analysis diagram (Martilla & James, 1977), yields a better perspective of the results shown in Table 2 and allows for an analysis of the relative performance of the auditing curriculum with respect to each of the 63 auditing topics. Figure 1 provides such an analysis diagram with the individual auditing topics, each identified by the ID number assigned in Table 1, plotted on a two-dimensional grid with importance being the y-axis and effectiveness being the x-axis. The origin or reference point within the grid is determined by the grand means on importance and effectiveness. The positioning of the auditing topics is determined by subtracting the grand means on importance and effectiveness from their respective mean values for each of the topics. Thus, each topic's position is made relative to the overall average ratings on importance or effectiveness.

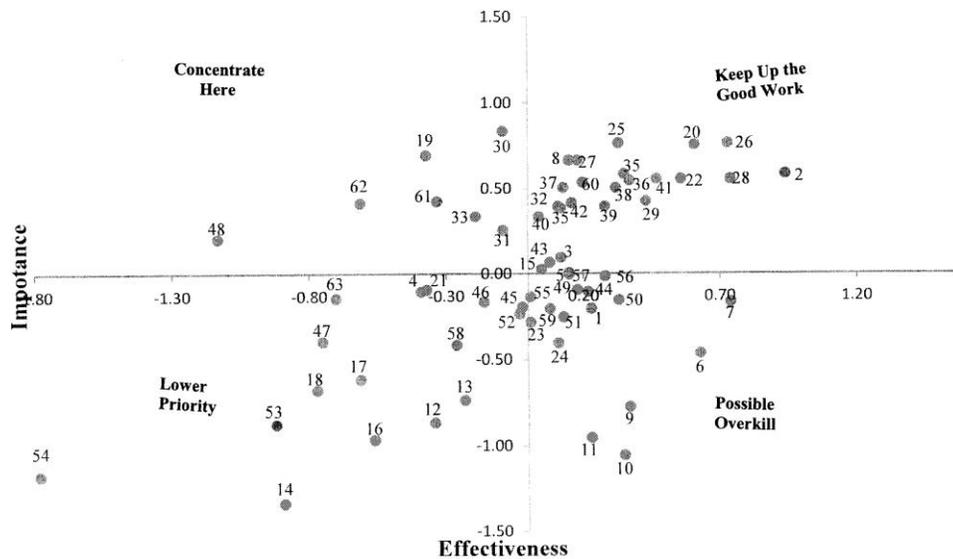
To facilitate interpretation and to provide guidance for curriculum development, the four quadrants are labeled. Quadrant I (upper right) – labeled “Keep up the Good Work” – contains topics that respondents considered relatively more important (i.e. above the average) and the curriculum's effectiveness in developing these topics as above average. Quadrant II (upper left) – labeled “Concentrate Here” – contains topics that are relatively more important, but respondents considered the effectiveness of the curriculum in developing these topics as below average. Quadrant III (lower left) is labeled “Lower Priority” since the topics in this quadrant are considered to have lower relative importance and the effectiveness of the curriculum in developing these topics is below average. Quadrant IV (lower right) is labeled “Possible Overkill.” The topics that fall into this quadrant are considered to have lower relative importance and the effectiveness of the curriculum in developing these topics is above average. Obviously, the positioning of the vertical and horizontal axes on the grid is a matter of judgment and a shift will change the quadrant into which a particular topic is positioned. However, using the grand means initially provides a relative basis for positioning the auditing topics.

Figure 1 shows that the practicing CPAs feel the curriculum is doing a very good job with respect to the 25 topics that plot in the first quadrant of the importance-effectiveness grid where both importance and effectiveness are above average. However, the CPAs believe more effort is required in developing the 7 topics that fall in Quadrant II where importance is above average but effectiveness is below average. Thus, to improve course performance, auditing faculty need to concentrate on the following topics plotting in Quadrant II: *Use of computers in the audit of client records and financial statements* [ID=48], *Working papers and documentation* [ID=30], *Business ethics and ethical dilemmas* [ID= 19], *Recognize specific fraud areas and develop procedures to detect fraud* [ID=62], *Fraud and analytical procedures* [ID=61], *Internal control reportable differences* [ID=33], and *Assessing business risk* [ID=31]. The latter five of these topics have become more important given the business failures of the recent past and the Sarbanes-Oxley 2002 legislation. Faculty may need to consider alternative approaches to

increase student learning and understanding of these topics. Alternative approaches that faculty might consider include additional outside reading, case studies or outside speakers whose expertise focus on these areas. Auditing curriculum should present these topics in more effective ways.

Since each quadrant of Figure 1 encompasses a large area, the location of an auditing topic's plot within the quadrant is very important. Unfortunately a "perfect tradeoff metric" that can be used to optimize course performance has yet to be developed. Auditing faculty must use their own judgment and experience

Figure 1  
IMPORTANCE-EFFECTIVENESS ANALYSIS OF AUDITING TOPICS



when making decisions to improve the performance of an auditing course. In general, as the importance of an auditing topic increases, the effectiveness of its development should increase. But, clearly some topics are more easily developed than others. Note that some topics appearing in Quadrant I may be higher in importance than others that are more effectively developed. For example, *Types of audit evidence* [ID=26], *Code of Professional Conduct, including concepts such as independence, objectivity, confidentiality, etc.* [ID=20], *Generally Accepted Auditing Standards* [ID=2], *Management's and auditor's responsibilities concerning financial statements* [ID=28], *Definition of audit risk, business failure and audit failure* [ID=22], *Test of details of account balances* [ID=41], and *Planning the audit* [ID=29] are more effectively developed than other topics in Quadrant I that have equal or higher ratings on importance. Thus, viable course tradeoffs may occur between auditing topics within the same quadrant as well as between auditing topics plotting in different quadrants. For example, it may be

possible to spend less classroom time on the auditing topics just listed given the rather effective development of these topics by the curriculum, and spend more time on those with higher importance ratings that are being less effectively developed. Likewise, it is clear from Figure 1 that the four topics plotting farther to the left in Quadrant II [IDs = 19, 61, 62, and 48] need more attention than the three topics plotting farther to the right [IDs = 30, 33, and 31], which also plot within Quadrant II. Additionally, topics ID61 and ID62 deal directly with fraud, and today's students will be expected to have a much better understanding of these topics and their importance to the audit process in light of the Sarbanes-Oxley Act. The third quadrant represents auditing topics that are perceived to be below average in importance and, therefore, it is quite acceptable to have these topics receive a below average rating in the curriculum's effectiveness in developing these topics. That is, practicing CPAs perceive that, on a relative basis, lower priority should be assigned to these sixteen topics. Again, plot location would indicate that *Corporate governance oversight to reduce fraud risks* [ID=63] would have a much higher priority than *Government auditing and generally accepted government accounting principles* [ID=54].

Twelve auditing topics plot in the fourth quadrant. They represent topics that are below average in importance but are developed with above average effectiveness. As such, they represent topics that could be used in acceptable tradeoffs. That is, the resources and time allocated to developing the topics that are lower in importance but are already effectively developed can be shifted to those topics plotting in Quadrant II, considered very important but not being effectively developed. Here again, the plotting within the quadrant is important. Thus, appropriate action to improve the performance of an auditing course would be for faculty to decrease, for example, their efforts in developing the following five topics: *Conditions requiring departure from the standard unqualified report* [ID=7], *Detailed analysis of the unqualified report* [ID=6], *Detailed analysis of a qualified audit report* [ID=9], *Detailed analysis of an adverse audit opinion* [ID=10], and *Detailed analysis of a disclaimer of an audit opinion* [ID=11]. Thus, these topics would rightly move westward in Figure 1 toward the third quadrant as they have a lower priority. However, other topics in Quadrant 4 such as *Contingent liabilities* [ID=49], *SOX section 404 combined report on financial statements and internal control over financial reporting* [ID=55], and *SOX – Requirements for auditor reporting on internal control* [ID=59], already plot close to the origin and represent average performance and average effectiveness. Thus, their tradeoff potential is less appealing.

## DISCUSSION

The practicing CPAs' overall assessment of the effectiveness of the auditing curriculum in developing auditing topics is that the curriculum is performing quite well. Forty-one of the 63 topics appropriately plot in Quadrants I and III. However, ample room for improvement still exists, particularly with regard to the seven

topics plotting in Quadrant II. An important outcome of importance-effectiveness analysis is assessing the potential tradeoffs that exist within a curriculum that could improve its performance. For example, one could spend less time on topics that plot in the fourth quadrant and reallocate that effort to the topics plotting in the second quadrant. In addition, potential tradeoffs can exist within each of the quadrants. Thus, this research represents an improvement over past studies through its ability to translate research results into guides for action to improve auditing curriculum performance.

The subjective nature of importance-effective analysis needs to be emphasized for several reasons. First, the practicing CPAs' responses are subjective and have only relative values, not absolute values. Second, no simple metric exists to assess the potential tradeoffs. While in an ideal case, high importance topics would have high levels of effectiveness and vice-versa, the intuitive appeal of having individual topics plot on a line with a positive slope must be tempered with judgment and a sound understanding of the nature of the auditing course. Unquestionably two topics rated equally on importance can require substantially different amounts of time and effort for the curriculum to effectively prepare students for the auditing profession. Thus, the potential benefits of de-emphasizing one topic to allocate the freed resources to another topic will clearly depend not only on the two topics selected for the tradeoff but also on the experience and skill of the instructor vis-a-vis each of these topics. Hence, different instructors may perceive potential tradeoffs differently.

Another contribution of this paper is providing vital communication between two important stakeholders in auditing education: auditing educators and a national sample of practicing CPAs. The task of auditing educators is facilitated as they understand the perceptions of practicing CPAs on both the relative importance of a broad array of auditing topics in preparing accounting graduates and the effectiveness they perceive of auditing curriculum in developing each of these topics.

Finally, the survey results clearly indicate apparent weaknesses within current auditing curriculum with respect to their effectiveness in developing the necessary knowledge and skills in recognizing, evaluating and dealing with fraud and ethics. A logical course of action for auditing faculty to undertake in this circumstance is to supplement their auditing course with added materials on fraud and ethics. Peterson (2003) provides an excellent source of additional material including academic and trade books, case materials, journal articles, and videos all relating to fraud examination, detection, and control. Several casebooks have been written dealing with ethics. For example, Mintz and Morris (2008) have several short and extensive cases dealing with audit ethics. With the wealth of material found in textbooks and constraints of time, educators might look to extracurricular activities as a way to enhance learning experiences in the classroom. Many schools have active student organizations, like the Student Chapter of the IMA and Beta Alpha

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Psi. These organizations can sponsor speakers that discuss topics of fraud and ethics.

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## **BIBLICAL TAXES: HOW WOULD ADAM SMITH RATE THEM?**

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### **ABSTRACT**

An old saying, still heard today, is that nothing is certain except for death and taxes. Taxes have been imposed upon and collected from citizens around the globe for thousands of years. This paper examines the various taxes described in the Old and New Testaments of the Bible. Many taxpayers feel that our current tax policy is both harsh and excessive, but it does not compare to the plethora of Temple and Roman taxes imposed on citizens living during this period. Historians cite more than ten types of taxes described in the books of the Old Testament. Beginning with the Temple Tax which was described in Exodus, the second book of the Old Testament, this paper discusses the various types of taxes described in the Bible. In addition to Biblical taxes, a second layer of assessments were collected by the Roman government. This dual system of taxation created an overall tax structure that was extremely burdensome to inhabitants of this period. The authors begin this paper with an examination of Adam Smith's four maxims of taxation. Smith argues that a fair and equitable tax will exhibit these four characteristics. Biblical taxes are reviewed in light of Smith's requirements for a good and fair tax. The New King James Version of the Bible was used by the authors in researching this paper.

Key Words: Taxes, Biblical Taxes, Historical Tax Systems, Ancient Taxes

### **INTRODUCTION**

Taxes, in some form, have existed since the development of the earliest civilizations. Early rulers realized that funds had to be extracted from its citizens in order to support the operation of the government and provide basic services to the inhabitants of the area. Over the centuries, governments have utilized a number of types of taxes including income taxes, sales taxes, excise taxes, property taxes, and various forms of census taxes. This paper will attempt to review the various taxes utilized over the last 3,500 years beginning with those mentioned early in the Old Testament of the Bible. Taxpayers living at the time of Christ suffered from excessive taxes that were imposed by the Romans. These taxes often left the citizens with scarcely enough money to pay for the basic necessities of food and shelter.

This paper begins with a brief review of Adam Smith's maxims or cannons of taxation. Smith's four characteristics of a fair and equitable tax have influenced

many countries tax systems for more than two hundred years. The characteristics of the many Biblical taxes reviewed in this paper will be compared to Smith's qualities of a good tax. Surprisingly, many of the Biblical taxes did have qualities of what Smith would consider to be a good tax.

#### **ADAM SMITH'S MAXIMS OF TAXATION**

Adam Smith published his famous publication "An Inquiry into the Nature and Causes of the Wealth of Nations" on March 9, 1776 (Smith, 1776). This publication included a total of five books that discussed a wide range of subjects. Book V was titled "Of the Revenue of the Sovereign or Commonwealth." Chapter II of Book V is titled "Of the Sources of the General or Public Revenue of the Society." Part II of Chapter II (Book V) is titled "Of Taxes" and contains Smith's famous maxims or canons of taxation. Prior to his discussion of various taxes such as taxes on land, he lists the characteristics of a good tax.

His first maxim introduces the concept of "equity" in taxes. He states in Part II of Chapter II in paragraph v.2.25 that "the subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities." This introduces a tax concept that is still important today and that is the "ability to pay." Currently, this basic principle is the foundation for many countries tax systems including the United States. The ability to pay principle provides support for the use of progressive tax rate schedules which are common around the world. It supports the logical fact that taxpayers with higher incomes have the ability to pay more in taxes than those taxpayers with more meager incomes. Smith also used the phrase "the equality or inequality of taxation" for this characteristic of a good tax (v.2.25).

Smith's second maxim of taxation is certainty. In Part II, Chapter II, paragraph v.2.26, he states "The tax which each individual is bound to pay ought to be certain, and not arbitrary. The time of payment, the manner of payment, the quantity to be paid, ought to be clear and plain to the contributor, and to every other person." Smith felt that certainty was a mandatory quality for any good tax. He believed that "uncertainty of taxation encourages insolence and favors the corruption of an order of men who are naturally unpopular." Here Smith is speaking of tax collectors who, even in Biblical times, were typically corrupt and collected excess taxes that enhanced the collector's income.

Adam Smith felt that certainty was a more important characteristic of a good tax than equality or equity. Also, in v.2.26, he writes "The certainty of what each individual ought to pay is, in taxation, a matter of so great importance that a very considerable degree of inequality, it appears, I believe, from the experience of all nations, is not near so great an evil as a very small degree of uncertainty." Smith felt that above all other characteristics or attributes a good tax must have a very high degree of certainty, so that taxpayers knew how much, when, and in what form the tax had to be paid.

In next paragraph of Smith's work, Part II, Chapter II, v.2.27, he discusses his third characteristic of a good tax which is convenience. He felt that "Every tax ought to be levied at the time, or in the manner, in which it is most likely to be convenient for the contributor to pay it." He uses the example of taxes on land or houses. Smith argues that taxes on the rental income should be paid when the rents are collected, since the party collecting the rent money has the ability to pay the related tax at that time. In other words, it is convenient to pay the tax when the funds are available and, in Smith's words, he has the "wherewithal to pay." The wherewithal to pay concept continues to influence our current Internal Revenue Code. For example, like-kind exchange gains are often deferred until the period that the taxpayer has the ability or wherewithal to pay the tax.

Another example that Smith uses involving convenience is the collection of sales or excise taxes on "consumable goods." He argues that these taxes should be paid "little by little" as the taxpayer "has occasion to buy the goods" (v.2.27). Like the typical sales taxes collected today, the tax is collected at the time that the goods are purchased which is logically the most convenient time for the taxpayers to pay the tax. Smith argues that the taxpayer is at liberty to buy or not buy the consumer goods, as he or she pleases, so "it must be his own fault if he suffers any considerable inconvenience from such taxes." In effect, Smith believes that collection of sales and excise taxes at the time of sale is most convenient and the taxpayers must realize the total cost of the goods includes the related sales tax.

Smith's fourth characteristic of a good tax is economy. In essence, he believes that the tax collection process should remove minimal tax revenues, so that the taxes collected are available to provide taxpayer services and support the operations of the government. He writes in Part II, Chapter II, v.2.28, "Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state." Smith believed that the tax assessment and collection process should be as "lean" as possible requiring minimal funds to complete these tasks.

Smith continues his economy discussion with this thought "A tax may either take out or keep out of the pockets of the people a great deal more than it brings into the public treasury, in the following four ways" (v.2.28). His first way that money could be lost was the hiring of a large number of collection officers "whose salaries may eat up the greater part of the produce of the tax." This is certainly also true today with various charities hiring so many fundraisers that a relatively small proportion of the contributions is actually used for charitable purposes but, instead, funds administrative overhead.

Smith's remaining three reasons that tax funds may not reach the public treasury are various. First, he argues, that the tax may be large enough to "obstruct the industry of the people, and discourage them from applying to certain branches of business." In other words, the after tax income of certain occupations is not enough

to encourage taxpayers to seek employment. Smith also felt that if people thought that taxes were excessive, they often would devise methods to evade the tax. He argues that, when caught, many lives were ruined, and that person would never again be able to find gainful employment. Finally, he argues that some people will chose not to work due to tax collector “frequent visits and the odious examination of the tax-gatherers.”

Smith’s work had long been considered in the tax systems of many countries. In particular, the U.S. Internal Revenue Code has been built upon the qualities of equality or equity, certainty, convenience and economy. Later authors on this subject, such as the Irish economist Charles Francis Bastable, have added other characteristics of a good tax including elasticity, productivity, simplicity, diversity, and expediency (Bastable, 1892). These additional qualities of a good tax are not discussed here. The remainder of this paper reviews the numerous Biblical taxes and compares them to Smith’s four maxims of taxation. It is surprising that taxes instituted thousands of years ago bear at least some of Smith’s four qualities of a good tax.

#### **TAXES IN THE OLD TESTAMENT OF THE BIBLE**

The Old Testament of the Bible contains a multitude of taxes that were paid by the Hebrew people. The tax system of this period contains various types of taxes that are somewhat similar to those that exist today. For example, the Bible mentions four types of direct taxes or involuntary payments. These include income taxes, property taxes, special assessment taxes, and poll or capitation taxes. In addition, the Bible identifies indirect taxes such as sales taxes and customs duties (Jose and Moore, 1998). Although the Bible does not use the same tax terminology of today, an analysis of the calculation and payment of the tax provides sufficient information to categorize each tax.

As previous historians have indicated, in ancient Israel, taxation in a government context was the same as tithing in a religious one. Therefore, it is virtually impossible to separate governmental and religious taxation. For example, Hartman wrote “In a strictly theocratic state there is no real distinction between the treasury of the sanctuary and the treasury of the government” (Hartman, 1963). Examples of each type of direct tax (income, property, special assessment, and poll) and indirect tax (sales taxes and custom duties) are discussed in the remainder of this paper.

An introductory note of those individual who were exempt from all taxes is appropriate here. Specifically, the Old Testament book of Ezra 7:24 states that “it shall not be lawful to impose tax, tribute, or custom on any of the priests, Levites, singers, gatekeepers, or servants of the house of God.” In effect, no one associated with the Temple had to pay any form of tax, tribute, or customs duty. Anyone associated with the Temple received a total exemption from all forms of tax. According to Wikipedia, “the Tribe of Levi were assigned various religious duties

for the Israelites and had political responsibilities as well” (Wikipedia, 2018). Also, according to Wikipedia, the Levites selected to be priests were called “Kohanim” who performed “the work of holiness in the Temple.” All of the Levites, not selected to be Priests, were given other Temple related positions such as singing or playing music, serving as guards, and other associated duties. All of the other Israelite tribes were required to give a tithe to support the Levites in their performance of necessary temporal duties.

### **POLL TAXES**

A poll taxes are a flat sum levied on a per capita basis (Jose & Moore, 1998). They are not related to voting as we would typically use the term “poll” today. In the second book of the Old Testament, Exodus, a poll tax was introduced. The word Exodus is derived from the Greek, Exodos, which means to depart or exit (Book of Exodus, biblestudytools.com). The book tells the traditional story of the deliverance of the Israelites from slavery in Egypt. Several verses in Exodus imply the traditional belief that Moses was the author along with the books of Genesis, Leviticus, Numbers, and Deuteronomy which together are known as the Pentateuch (Exodus 17:14, 24:4, and 34:27).

Exodus chapter 30 introduces the temple tax which was a form of poll tax. A poll tax is a fixed sum tax that is assessed on a per capita basis. The poll tax, historically, has applied to a specific period of time such as one year similar to taxes paid today on a yearly basis such as property taxes on a residence. Exodus 30:11 states that the Lord told Moses to count the children of Israel and extract what was termed the temple tax from all males age twenty and older (Exodus 30:11-16). Verses 13-15 state “The half shekel shall be an offering to the Lord. Everyone included among those who are numbered, from twenty years old and above, shall give an offering to the Lord. The rich shall not give more and the poor shall not give less than half a shekel.” This was a specific annual fixed tax per adult male that was not related to the person’s ability to pay or net worth. The collection of this tax supported the Levites who cared for the tabernacle (Nelson Study Bible, p.154).

The half shekel or 10 gerahs was an ancient Hebrew measures of weight and currency. A gerah was a bean, most likely from the carob tree. This was the smallest unit of Hebrew weight and smallest unit of money equalling one twentieth of a shekel (Easton, M.G., 1897). A shekel was the common standard of weight and value for the Hebrews. According to Easton’s Illustrated Bible Dictionary, it was estimated at 220 English grains or slightly over half and ounce avoirdupois. Historically, the tax was paid with a silver coin.

According to Easton’s Dictionary, shekels were, over time, minted in gold, silver, brass, and iron. Originally, the shekel was a silver coin and therefor much more valuable than brass or copper coins of the period. Easton’s Dictionary also states that the value of six gold shekels was equal to 50 silver shekels. A final bit of information from the Illustrated Bible Dictionary is that, in addition to minting one

shekel coins, the Hebrews produced a sanctuary half-shekel coin specifically for the payment of the temple tax by all adult men. To estimate the value of a shekel at the time is extremely difficult. According to an online currency exchange site, the approximate value of a modern shekel is approximately twenty-eight cents in U.S. currency ([xe.com/currency-converter/](http://xe.com/currency-converter/)).

According to the Nelson Study Bible, Exodus 30, verse 11 states “every man shall give a ransom for himself to the Lord” (Nelson Study Bible, 1997). The tax was due on the “Day of Atonement” which was specified in Leviticus 16. The Day of Atonement was observed on the tenth day of the seventh month (Tishri) with fasting and no work in order for the people to atone for their sins of the past year. The word ransom related to the words for atonement and propitiation. The idea is to pay a price for one’s life. The Israelites had to acknowledge that their lives were from God and governed by Him by giving Him an offering of money (Nelson Study Bible, 1997). This ransom offering or tax was taken very seriously by the Israelites for hundreds of years.

The importance of the “Temple Tax” is evident throughout the entire Bible. For example, 2 Chronicles 24:9 states “They sent word throughout Jerusalem and Judah for everyone to bring to the Lord the tax which Moses, God’s servant, had first collected in the wilderness.” This follows the decision by Joash, king of Judah (and the sole surviving son of Ahaziah after the massacre of the royal family by his grandmother, Athaliah) to restore the temple of the Lord. King Joash ordered that a chest should be made and placed at the gate of the temple of the Lord where the people could pay their temple tax.

The revenue raising program was a tremendous success as 2 Chronicles 24:10-11 say “All the officials and all the people brought their contributions gladly, dropping them into the chest until it was full. Whenever the chest was brought in by the Levites to the king’s officials and they saw that there was a large amount of money, the royal secretary and the officer of the chief priest would come and empty the chest and carry it back to its place. They did this regularly and collected a great amount of money.” It is interesting to note that the citizens “gladly” paid their temple taxes. Evidently the taxpayers felt that it was a fair and equitable tax and they happily supported the renovation of the temple. Despite benefits gained from modern taxation, few people today seem “glad” to pay them.

The tax program was so successful that 2 Chronicles verse 13 states that masons, carpenters, and workers in iron and bronze were hired to restore the Lord’s temple and they rebuilt the temple of God according to its original design and reinforced it. Verse 14 reveals the fact that when the temple repairs were completed there remained enough additional tax money that they “made articles for the Lord’s temple; articles for the service and for the burnt offerings, and also dishes and other objects of gold and silver.” It appears that the tax revenue projects of this period were exceptionally successful.

Another situation where the poll tax was described in the Bible can be found in the New Testament book of Matthew. Chapter 17 describes the situation when Jesus and Peter had just arrived at Capernaum when those who received the temple tax came to Peter and said, “Does your teacher not pay the temple tax?” (vs. 24). Jesus, not wanting to offend the local authorities, told Peter to “cast in a hook and take the fish that comes up first and when you have opened its mouth, you will find a piece of money; take that and give it to them for Me and you” (vs.27). This miracle stressed the importance of paying the poll tax that had existed since the time of Moses. According to the Nelson Study Bible, the tax amounted to two days wages for a common laborer. It is interesting to note that tax collectors, historically, were held in very low esteem by the average citizen. Tax collectors were often quite dishonest collecting more taxes than required and stealing the additional funds. Jesus, for example, was criticised for eating and preaching to “prostitutes and tax collectors.” These two groups were at the bottom of the social hierarchy.

How would Adam Smith evaluate this poll tax? Considering the qualities of equity, certainty, convenience, and economy, this tax is somewhat lacking. Smith would argue that a tax has equity or is equitable if it is “in proportion to the taxpayer’s respective abilities.” This poll tax is a fixed amount for both the rich and the poor. As mentioned above, Exodus 30:15 states that the rich do not pay more than one half shekel and the poor do not pay less. The authors believe that Smith would view this as inequitable since it is not proportional to the person’s ability to pay. The wealthy could easily afford to pay far more while many poor laborers would struggle. While it may seem equitable since every individual pays the same as everyone else, the tax would take a far greater percentage of income from the poor.

As far as certainty is concerned, this is a good tax as the annual amount and time of payment (Day of Atonement) is clearly specified. Convenience is absent here as the payment does not coincide with any form of income received (such as in the case of withholding tax at the time when wages are paid). In other words, the taxpayers would likely not have, as Smith says, the wherewithal of ability to pay the tax. Finally, this tax appears to have economy as the Israelites came to the temple to make their tax payments, so a minimal number of “tax collectors” were required to accomplish this task. The second type of tax found in the Bible is the income tax.

### **INCOME TAXES**

Income taxes, historically, have been collected on both wages and farm production of animals and crops. In the 47<sup>th</sup> chapter of Genesis, Joseph created one of the first income taxes in the land of Egypt. Verse 24 states “And it shall come to pass in the harvest that you shall give one-fifth to Pharaoh. Four-fifths shall be your own, as seed for the field and for your food, for those of your households and as food for your little ones.” Verse 26 continues “And Joseph made it a law over the land of Egypt to this day, that Pharaoh should have one-fifth, except for the land of the

priests only that did not become Pharaoh's." This 20% income tax was significant to the large percentage of people who earned their living through farming.

Since the taxation terminology of today was not contained in the Bible, the concept is the same as income taxes extracted from citizens today. Instead of a modern income tax collected from wages or salaries, the income tax in Genesis was extracted from the "fruit or production of the land." This practice is similar to the Confederate government collecting income taxes from southern farmers, during the Civil War, in the form of livestock and crops that were raised. Historically, this has been a typical practice in situations where taxpayers lacked resources in the form of coins and currency.

It is interesting to note that after the Hebrews exited Egypt the tax rate decreased to one tenth or 10%. Leviticus 27:32 states "And concerning the tithe of the herd or flock, of whatever passes under the rod, the tenth one shall be hold to the Lord." According to the Nelson Study Bible, "sheep and goats were counted as they passed 'under the rod,' which the shepherds placed across the fenced pasture gate. Each year, the newborn animals were counted this way. Every tenth animal was part of the tithe that belonged to God."

Another form of income taxation during this period was the use of forced labor. According to Oden, "one of the ways in which national projects were financed in biblical Israel was through the utilization of forced labor. The Biblical word for "forced labor" was "mas", which is now the modern Hebrew word for "tax" (Oden, 1984). Many authors argue that forced labor was one of the first and basic forms of tax. Mas, or forced labor, was utilized over hundreds of years in ancient Israel. Authors, such as Oden, suggest that this type of tax began during the reign of David although it appears, in the book of 1 Kings, that Solomon and his successor utilized it to a much greater extent. "Mas" was a temporary induction into the labor force for a limited amount of time.

1 Kings 5:13 says "Then King Solomon raised up a labor force out of all Israel; and the labor force was thirty thousand men." Later in 1 Kings 5:15 a larger forced labor force was mentioned. Verses 15-16 state "Solomon had seventy thousand who carried burdens, and eighty thousand that quarried stone in the mountains, besides the three thousand three hundred from the chiefs of Solomon's deputies, who supervised the people who labored in the work." This shows that Solomon used forced labor extensively. Part of the need for so many workers may have been due to the fact that Solomon was quite a "ladies man." 1 Kings 11:3 tells us that Solomon "had seven hundred wives and princesses, and three hundred concubines." His need for household servants was in addition to all the workers he forced into service to quarry and carry stone for building projects such as the Temple in Jerusalem and royal residences.

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As far as Adam Smith's view of these income taxes, the quality of equity or equality is somewhat satisfied. The 20% income tax on fruits of the land (livestock and crops) was in accordance with the ability to pay concept. In other words, farmers producing a greater quantity of sheep or bushels of wheat paid more in tax compared to a smaller farmer producing much less. From the viewpoint of the forced labor, this was an equitable tax considering that all healthy adult males had an equal likelihood of being inducted into forced labor service. Certainty is also a characteristic of this tax. The farmers knew that 20% of their animals or crops produced were required to be paid to satisfy this tax. The 20% tax, in the form of "kind," was due and payable when the animals or crops matured. Likewise, the forced labor group knew that they were paying their "labor tax" with their daily personal services provided.

Convenience appears to have been a quality of this tax as far as the 20% tax on livestock and crops are concerned. When harvest time arrived, the farmer had the wherewithal or ability to pay this tax with the animals or crops raised that were ready for market. The forced labor type of income tax could be argued to be a convenient tax since it was paid on a daily basis as the work was completed. The forced labor tax is unique since the tax is basically 100% as the work is extracted for little or no compensation. Smith's fourth quality of a good tax is economy. For the 20% tax on animals and crops, some "collectors and/or assessors" would have been required to collect the tax. This opens the door to unethical behavior on the part of the collectors who historically have collected more than the required tax in order to supplement their income. Considering the forced labor tax, it was certainly quite economical with all healthy males being inducted into service. The only modern parallel for a "forced labor tax" would be the requirement in some nations that all citizens serve in the country's armed services for some period of time. The third type of tax in Biblical times was property taxes which will be discussed in the following section.

### **PROPERTY TAXES**

Taxes on personal property and real estate are very common in today's federal and state tax systems. Many states assess personal property taxes on taxpayer's autos, RV's, and boats. This tax is typically based on the fair market value of the property at the end of the year. Therefore, as the auto gets older, the amount of the personal property tax is less. Real estate taxes on land and buildings is also typically based on the assessed or fair market value at year end. These taxes normally will increase over the years, unlike personal property taxes, with the increase in the worth of real estate.

Property taxes are discussed in 11 Kings. In chapter 23, verse 35, King Jehoiakim of Judah collects property taxes, in gold and silver, based upon the assessed value of the property to meet the demands of Pharaoh Necho. Verse 35 says "So Jehoiakim gave the silver and gold to Pharaoh; he taxed the land to give money according to the command of Pharaoh; he exacted the silver and gold from the

people of the land, from everyone according to his assessment, to give to Pharaoh Necho.” According to Jose & Moore, “The tax object was the land, although the owners of the land were paying the tax.”

This tax is unlike the income taxes discussed earlier. The income taxes were based on the production of manual labor, livestock, or farm crops. In this case, the property taxes were based upon the fair market value of the property. Therefore, those property owners with more valuable real estate paid more in property tax than those owning less valuable land.

Using Adam Smith’s four maxims of a good tax, the property tax possesses many of the desired qualities. For example, the tax appears to be equitable since wealthier landowners have a higher ability to pay a larger tax compared to the owners of property of less value. Second, the tax was assessed on an annual basis, so the landowners knew when the tax would be due and were able to set money aside for its payment. Third, the tax may or may not have been convenient for the landowner to pay. If the property owner budgeted and put money aside to pay the tax, then convenience would not be a problem. However, if rental income was not being collected in the month the property tax was due, then it would not have been convenient for the landowner to pay the tax due. Finally, whether the tax was economical or not depended upon the complexity of the collection system at the time. If numerous assessors and collectors were required to recover the taxes due, the tax would not have been judged to be an economical one. The authors found no evidence of the cost involved in the collection of any of the Biblical taxes. The last portion of this paper discusses some of the special assessment taxes that are described in the Bible.

### **SPECIAL ASSESSMENT TAXES**

The Bible mentions a number of taxes that were instituted in wartime situations when money was raised to pay “tribute” to an enemy to avoid fighting and encourage the foes to leave the lands of Israel. For example, in 2 Kings, 15:19-20, the Israeli King Menahem collected a special tax used to pay tribute to Assyrian king Tiglath-Pileser III (also known as Pul) in order to avoid a major battle. Verses 19-20 read “Pul king of Assyria came against the land; and Menahem gave Pul a thousand talents of silver, that his hand might be with him to strengthen the kingdom under his control. And Menahem exacted the money from Israel, from all the very wealthy; from each man, fifty shekels of silver, to give to the king of Assyria. So the king of Assyria turned back, and did not stay in the land.” This tax is similar to some of the taxes in our current Internal Revenue Code that apply only to the very wealthy such as luxury taxes that apply to the purchase of very expensive automobiles or payroll of professional sports teams when it exceeds a predetermined guideline level set by the league.

Another special tax assessment is mentioned in the 24<sup>th</sup> chapter of 11 Chronicles. This tax was earmarked for the rebuilding of the temple in Jerusalem built by King

Solomon. This portion of scripture was mentioned earlier under the poll tax discussion. In addition to being a continuation of the annual poll tax, 11 Chronicles makes it clear that it was an emergency special assessment tax to give much needed repairs to the Temple in Jerusalem. To be specific, verses 4-5 of chapter 24 state “Now it happened after this that Joash set his heart on repairing the house of the Lord. Then he gathered the priests and the Levites, and said to them, Go out to the cities of Judah, and gather from all Israel money to repair the house of your God from year to year, and see that you do it quickly.” Evidently, collection of this tax was quite urgent suggesting that the temple was in disrepair and needed immediate renovation. This tax resembles taxes raised in modern times for much needed infrastructure improvements such as roads and bridges.

Considering Adam Smith’s four maxims of taxation and the special assessment tax to raise tribute money to avoid armed conflict, this tax of 50 shekels of silver was extracted from only the very wealthy. Considering this fact, it was not equitable as the middle and lower class citizens were not taxed according to their ability to pay. This tax fell completely on the upper class very wealthy people. It did contain some certainty as the tax was stated to be 50 shekels of silver, but what constituted the “very wealthy” was not specified and was a subjective judgement by the tax collectors. This tax lacked convenience as it was assessed and collected in haste in order to avoid an armed conflict. Finally, depending on the number of assessors and tax collectors needed to identify the “very wealthy,” this tax may or may not have been an economical tax. The next portion of this paper discusses the various indirect taxes that existed during Biblical times.

### **INDIRECT TAXES**

There were a number of what could be termed “indirect” taxes identified in the Bible. For example, in the book of Deuteronomy, “gleaning rights” were described in Chapter 24. “Gleaning is the act of collecting leftover crops from farmers’ fields after they have been commercially harvested or on fields where it is not economically profitable to harvest” (Wikipedia, 2018). As described in Deuteronomy, gleaning was a legally enforced entitlement for the poor during this period. The practice removed a small portion of the farmer’s income to provide assistance to the poor. Gleaning was an indirect tax upon the farmers to provide food necessary for the poor who lacked funds to buy daily food supplies.

In Deuteronomy 24:19-22, gleaning was described as follows “When you reap your harvest in your field, and forget a sheaf in the field, you shall not go back and get it; it shall be for the stranger, the fatherless, and the widow, that the Lord your God may bless you in all the work of your hands. When you beat your olive trees, you shall not go over the boughs again; it shall be for the stranger, the fatherless, and the widow. When you gather grapes of your vineyard, you shall not glean it afterward; it shall be for the stranger, the fatherless, and the widow. And you shall remember that you were a slave in the land of Egypt; therefore, I command you to do this thing.”

This represented a very clear proclamation from God that his people should provide for the less fortunate. In particular, those with limited income namely the traveling stranger, children who were fatherless, and women who were widowed. This part of society was often forced to beg for money in order to purchase the basic necessities of daily life. Although gleaning was not a direct tax on the farmers, it was, effectively, an indirect tax that reduced the farmer's total income from his crops.

Deuteronomy, Chapter 26, describes another indirect tax that is referred to as "offerings of first-fruits." This is described in verse 1 as follows, "And it shall be, when you come into the land which the Lord your God is giving you as an inheritance, and you possess it and dwell in it, that you shall take some of the first of all the produce of the ground, which you shall bring from your land that the Lord your God is giving you, and put it in a basket and go to the place where the Lord your God chooses to make His name abide." The Israelites were required to "offer to God the fruit that ripened first, even though there was the possibility that the rest of the crop would not ripen or be harvested because of some unforeseen circumstance" (Nelson Study Bible, 1997). It appears this is a fairly nominal indirect tax because the farmers were instructed to put the first-fruits in a basket to be presented to God.

In addition to the first-fruits offering, which some authors estimate to be from 1% to 3% of a farmer's crops, there were two other taxes that were considered to be "Temple Taxes" (Shillington, 1997). Shillington argues that the Temple would tax the average person approximately 23% of his income (Shillington, 24-25). He further states that "the Temple is an institution in every nuance of the word. It was not only a venerable place of worship; it was an economy unto itself, second only to the Roman system. It employed thousands to keep its sacrificial system running and its precincts in repair. Its treasury held huge wealth and it served as a central bank for the rich and poor alike." Historically, temples and churches wielded far more political and economic power over the people than they do today.

Shillington further states that "the Temple was an institution of immense economic power, influence, and need." The operating expense must have been huge in order to, in effect, operate an institution similar to the Federal Reserve Banks of today. The tax regulations were contained in the Torah and according to many authors was as complex as the modern Internal Revenue Code. Shilling specifies the components of the 23% total Temple tax mentioned above. He says that "There were three major taxes: (1) the annual 'wave offering,' or first fruits set at from 1 to 3 percent of the produce; (2) the annual first 10 percent tithe, provided to support the priests and Levites; and (3) a second tithe, used for different purposes during the six year cycle between the sabbatical years" (Shillington, 24-25).

The sabbatical year was described in Exodus 23:10-11 which reads “Six years you shall sow your land and gather in the produce, but the seventh year you shall let it rest and lie fallow, that the poor of your people may eat; and what they leave, the beasts of the field may eat.” The sabbatical year system was similar to typical work week described in Exodus 23:12 “Six days you shall do your work, and on the seventh day you shall rest, that your ox and your donkey may rest.” The second tithe, mentioned above, provided funds to use during the sabbatical year when nothing was produced or grown.

There are a number of other indirect taxes identified by various historians that are not discussed here due to length considerations. According to Jose and Moore, indirect taxes such as customs duties or sales taxes were common in Biblical times. They state that, “An excise tax on articles consumed was called ‘belo’ in Hebrew, and a road toll or customs tax was termed ‘halakh’. Paul mentions customs duties in the book of Romans. Romans 13:7 says “Render therefore to all their due; taxes to whom taxes are due, customs to who customs are due, fear to whom fear is due, and honor to whom honor is due.”

This paper did not discuss any of the Roman taxes that were also required of all the Israelites. During the time of Christ, citizens not only had to pay the various Temple taxes required but also the taxes extracted by the Roman Empire. One brief comment on the extent of Roman taxation is appropriate to conclude this paper. According to Heinrich Graetz, “The Syrian Governor, Quirinius, was instructed to take a census of the population, and to estimate the property of the country for the purpose of the new method of taxation. A tax was levied upon every individual, inclusive of women and slaves; however female children under age twelve and male children under age fourteen years of age and very old people were to be exempt” (Graetz, 1893). This occurred shortly after Judea became a province of Rome.

Graetz states that this “new method of taxation” by the Romans included both an income tax and a property tax. He writes “Furthermore, an income tax was levied, and those who kept cattle were called upon to give part of their herds. The taxes on the land were to be paid out of the produce of the harvest.” This harsh, extensive tax system raised the anger of everyone. Graetz continues “This method of levying imposts aroused the indignation of all classes alike. Every one resented such interference in private as well as political affairs, and felt as if the land and property, and the very person of each individual were in the hands of the emperor, and made use of according to his pleasure.” Obviously, this system of “dual taxation” caused a great deal of anger and frustration for all the people of that period.

#### **CONCLUSIONS AND SUMMARY**

This paper reviewed the numerous taxes described in the Bible. The characteristics of these taxes were compared with Adam Smith’s four maxims of a good tax.

During Biblical times people paid a combination of direct and indirect taxes. Although not covered in this paper, they were also forced to pay a number of Roman imposed taxes. This dual tax system, no doubt, caused extreme hardship on the people living during this period. Many of the taxes described in the Bible are similar to the forms of taxes collected today including income, property, special assessment, excise, and sales taxes. The concepts of Adam Smith's maxims of taxation continue to be relevant today when any specific type of tax is analyzed. In summary, the basic types of Biblical taxes reviewed in this paper continue to be employed today in order to raise required funds for essential governmental operations.

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## **RESEARCH IN TAX EDUCATION: 2010-2017**

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### ***ABSTRACT***

This paper aims to offer suggestions for future research that may encourage an increased emphasis on the teaching of taxation. All articles published in primary accounting education journals from the years 2010-2017 were reviewed and broken into categories of tax policy, instructional aids, individual taxation, taxation of business entities, estate and gift tax as well as international taxation. Advancement of tax education research will provide resources for accounting faculty to more effectively manage curriculum, and deliver the tools that will close expectation gaps that exist between the profession, academic community and Uniform CPA exam. This paper provides value as it allows the reader who may be unfamiliar with research in tax education to become familiar with the primary areas of focus in the major journals that specialize in accounting education. This paper is a call for increased research in all areas of tax education based on the gaps in literature in addition to the fact that a significant volume of this historical literature may be outdated to the Tax Reform Act of 2017.

**Key Words:** Curriculum and Instruction, Faculty, Literature Review, Taxation, Students, Accounting Education

### **INTRODUCTION**

This paper is a review of accounting education literature on taxation education in the United States consisting of 40 articles selected from five primary accounting education journals; (1) *Issues in Accounting Education*; (2) *Journal of Accounting Education*; (3) *Accounting Education: An International Journal*; (4) *Advances in Accounting Education* and (5) *The Accounting Educators' Journal*. This literature review organizes the literature into categories of (1) Tax Policy; (2) Instructional Aids; (3) Individual Taxation; (4) Taxation of Business entities; (5) International Taxation and (6) Estate and Gift Taxation. Within each section, literature is reviewed from all selected journals as published between the years 2010-2017.

Yu and Churyk (2013) show that there are perception gaps between employers and academic programs as to what makes a successful accounting graduate. Rebele & St Pierre (2015) argue that there is stagnation in accounting education research that focuses on a limited number of topics and has not adapted

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to what is needed in the profession, and on expectations of graduates. Additionally, Sangster, Fogarty, Stoner & Marriott (2015) report that overall citation levels of publications in accounting education levels are low compared to other disciplines. Low citation rates will act as a disincentive for faculty to publish and conduct research suitable for accounting education journal publication. This paper serves two purposes: (1) to educate academics and professionals who do not routinely publish and review accounting education research on the common elements of research covered within accounting education journals with a specific emphasis on education in taxation; and (2) to stimulate thought by the reader, who may have a scholarly interest in taxation on new issues that can bridge the tax profession, current research in taxation and accounting education research. Bringing together taxation education and other areas of taxation research will stimulate new areas of taxation education research that can better bridge the expectation gaps shown in Yu and Churyk (2013), stagnation in accounting research (Reble and St. Pierre, 2015), and produce output in accounting education journals, as well as other general accounting journals that will be of greater reader interest and more actively cited (Sangster et.al. 2015).

On review of all articles published in the aforementioned articles between the years 2010 and 2017, the proportion of accounting education articles with a focus on taxation is small compared to other areas such as financial accounting or auditing, despite the demand for tax professionals within the profession and representation on the Certified Public Accountant (CPA) exam.

In total, the five journals profiled within this paper had near 600 articles published over the seven-year period reviewed, of which 40, or roughly 6.67% of total were related to tax education. Certain areas of taxation, such as state and local taxation and education of students on professional expectations of a tax professional are non-existent over the period reviewed. Cases with an emphasis on tax research exist on a small scale, despite previous calls from the profession for increased research, communication and critical thinking skills previously reported by LaFrancois (1992).

## **METHODOLOGY**

This paper is the result of a comprehensive literature review, composed of all articles related to taxation education from the primary education journals with an exclusive focus on accounting education during the years 2010-2017. Based on analysis of the articles included within the literature, implications are discussed from the research, as well as suggestions where future research should be explored. Appendix A summarizes the major areas of focus by journal pertaining to tax education. A vast majority of the articles reviewed were cases or teaching notes.

Near none of the articles were empirical studies of traditional research into any education issues.

### **Tax Policy**

Cloyd and Weaver (2012) introduce the Tax Attitudes Survey Project (TASP), which provides a hands-on introduction to empirical research for undergraduates in which they can gain understanding of factors, such as taxpayer attitudes and perceptions, which produce framework for the politics of current tax-policy debates commonly highlighted within the media.

Daugherty, Dickins, & Fennema (2012) examine the use of offshore locations for large accounting firms. Offshore arrangements are advantageous because of a skilled labor pool at a substantially lower cost than that of the United States. Challenges include cultural differences and communication between staff that do not have face-to-face relationships.

Camp & Schnader (2010) focus on the use of tax education to enhance critical thinking skills. The authors provide suggestions for developing debates for use in the accounting classroom and two examples of debates that the authors have utilized. The first debate requires students to argue for or against the extension of tax provisions, which are currently deliberated by Congress, and the second requires students to examine the provisions of Sarbanes-Oxley and propose independent amendments to the bill.

### **Instructional Aids**

Adkins, Henderson and Key (2012) provide a teaching note to share with tax instructors. The notes contain several graphical organizers developed by the authors for use in teaching topics typically covered in undergraduate and graduate tax courses. These notes were developed as a result of studies, which illustrate improvements in student learning through improved text comprehension and memory when these tools are utilized. These notes were also motivated by studies which conclude that students typically use reduced reliance on textbook information as an alternative to instructor provided communications in their learning and study processes.

Brucker and Hetherington (2011) examine the composition of graduate programs that offer a Masters in Taxation program. This paper was produced as a result of an absence of current literature regarding curriculum, enrollment, and delivery of graduate tax programs in the United States. This paper is the first study to compile information on MST program trends. The authors found consistency in program design and enrollment, but significant disparity in style and use of online program delivery. The data from this survey was utilized to create a website to provide a resource for MST program administrators to share curriculum

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information, course syllabi, teaching innovations, experiences with on-line courses, and other information relevant due to the lack of available literature.

Volunteer Income Tax Assistance (VITA) programs are a key component of tax education within many academic programs. Not only can integration of VITA into a curriculum assist to deliver important skills that cannot be easily delivered within the classroom, but it can effectively serve as examples of engagement, innovation and impact for the AACSB. Blanthorne and Westin (2015) conduct a comprehensive literature review of past research into VITA Programs in accounting education, which effectively demonstrates their effectiveness within a program, yet shows it may be underutilized. Christensen and Woodland (2015) further examination into VITA programs and show that VITA is an effective learning strategy to deliver experiential methods of learning, shown in research to be needed and highly valuable experiences to college students.

Many of the cases prepared over the time period reviewed are designed to allow students to practice communication skills, a known area of improvement expected by firms of students. Noga and Rupert (2017) provide advice on how to reduce apprehension of students in tax classes. The authors describe a combination of pedagogical methods we employed in tax classes at two universities to reduce written communication apprehension among students. More specifically, we draw ideas from communications research, which suggest that increased writing opportunities, progressively increasing the weighting of the assignments, using models and examples for study and comparison, and trying to make feedback more effective may help to reduce written communication apprehension. The authors show that their technique does reduce apprehension of students to complete writing assessments.

Hageman & Fisher (2013) investigate the perceptions and attitudes of both students and tax professionals on the use of the Internal Revenue Code and Regulations in an introductory tax course. The authors conduct a survey at the beginning and end of the semester to 106 students enrolled in an introductory tax course, and a separate survey that is completed by 120 tax professionals. Students enrolled in an introductory tax course that integrates the use of the Code and Regulations feel significantly more proficient with the surveyed information after completion of the semester. The data also shows that students who have been exposed to the Internal Revenue Code and Regulations in this course have a fairly high degree of proficiency in accessing and interpreting material. The ability to read and interpret the Code and Regulations has been regarded by tax professionals as highly valuable as a new hire out of a program and somewhat valuable for the Uniform CPA exam. The study supports teaching pedagogy that a taxation course designed around use of the Internal Revenue Code is beneficial.

### **Individual Taxation**

Gross, Hemker, Hoelscher and Reed (2017) examine the challenges of tax law enforcement on Bitcoin currency. Bitcoin currency has significantly increased in value and applicability, but has little primary source guidance on treatment. The case uses Bitcoin to advise a student on how to advise a client when there is not primary source data available.

Burke, Burke and Gates (2017) examine tax consulting for a client relative to the *Windsor* case. The case allows the student to determine if the client should amend prior year tax returns because of the ruling on same sex marriage by the Supreme Court, *United States v. Windsor*. In order to develop a recommendation for the clients, the student must consider various tax strategies and apply them to the provided fact pattern. Exposure to issues such as the marriage penalty, phase outs and filing status are examined. It is important to note that the Tax Cuts and Jobs Act of 2017 may impact the validity of this case, and should be considered prior to classroom implementation.

Quirin and O'Bryan (2015) allow students to examine how a tax return can provide useful information for use in a litigation case. Though the case is based around an individual tax return, it is designed for use within a forensic accounting class. The student can based on a problem-based learning approach wherein students are put in the role of the forensic accountant and must request additional information from the instructor. Students must first review a personal income tax return to develop a list of financial documents that would serve as a discovery request when assisting a family law attorney and his divorcing client. Using the information obtained from their requests, students must then prepare an income exhibit and an asset/liability exhibit that will support the client's need for a division of the marital estate, spousal maintenance, and child support.

Single and Rosner (2017) present a case challenging the student to address issues concerning a couple who have doubts as to the accuracy of the tax return prepared for them by a national tax firm. The case describes the dilemma faced by a young couple who were trying to file an accurate 1040. The taxpayers experienced some major life events during the year and decided to have their return prepared by a national chain of walk-in tax return preparation services. They were disappointed in the result and didn't have a lot of faith in the person who worked on their return. The taxpayers are faced with the issues that may be challenged by the IRS, as well as what would be necessary in order to file an accurate return.

Morrow and Stinson (2015) further provide a case where the student assumes the role of tax preparer for an individual return and is asked to utilize documentation within a real life setting. This is an example of experience where the student can generate questions based on the initial information provided, meet

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face-to-face with the client, and roll forward a set of electronic work papers before submitting a complete current year engagement file for senior review. This case adds work papers and client interaction to the traditional tax compliance case to reinforce both the technical and communication skills valued in professional practice.

Schwartz, Spires and Young (2015) provide a teaching note to demonstrate the fundamental tax advantages of retirement savings plans through analysis of a simplified tax setting. The authors show positive attributes of existing retirement plans, tax-deferred contributions, tax-deferred earnings, never-taxed earnings, and income smoothing through the use of progressive tax rates. The authors analyze the choice between the two most popular forms of retirement savings, traditional and Roth accounts in a manner that the introductory tax student can apply.

Geisler (2013) provides a “phase out table” to be used as a tool for tax education. The table profiles the phase-outs of limitations on deductions, credits, exclusions from income, and allowed contributions for individual U.S. federal income taxpayers in 2013. For each phase out provided, the table includes explanation how the phase out works, the adjusted gross income (AGI) range for the phase out, and the related formula to compute impact. The table provides a comprehensive summary, as well as instructor notes that can be used for class discussion to make the topic more manageable for a student to understand.

Hossein and Opatosky (2010) provide a case study that analyzes the sale of publication in national magazines the first photographs of celebrity babies. There have been instances where some celebrities have chosen to donate the proceeds from such sales to charity. This case study allows the student to role-play a tax advisor to analyze and discuss the tax implications of their potential donations to determine the most favorable tax treatment for them. This case allows the student to become exposed to tax research, and how research can demonstrate applicability of tax deductions.

### **Taxation of Business Entities**

Drnevich and Sternburg (2016) present a case to present an approach to understanding tax liability and organizational form in the areas of partnership and corporation formation within a dynamic tax environment. Students examine various forms of business entity and develop an explanation how different business entities can have a profound impact on tax liability. The case will allow students to develop a better understanding of the impact taxes have on business decisions, while creating a robust educational environment for the students.

Best and Schafer (2017) allow the student to explore use of electronic work papers on a corporate tax engagement. This case is designed to address

commonly lacking skills in Excel, communication, as well as documentation. Consistent with the model tax curriculum, students prepare a tax return and follow the process of preparation. The second part of the case allows students to make modifications to the case based on senior manager feedback.

Larson, Lewis and Spilker (2017) provide a case that guides students through the process of reconciling book and tax income. Students gain experience in calculation of the tax provision, as well as all forms and related schedules. The case is an opportunity to work at high levels of Bloom's Taxonomy and apply concepts to see the difference between book and tax accounting.

Inger, Long, Loraas & Stanley (2013) present a case to demonstrate the process of tax issues faced in a tradition that is common, and where tax issues are often not a consideration. Customers at a famous restaurant following their meal, have the option to participate in a tradition where the customer can personalize a dollar bill and staple it to a surface in the restaurant. For the case, the student is required to address the legal, financial, taxation, and audit related considerations that management must address. Each section of the case is a separate module so that instructors can assign the modules that suit the specific course, or it can be used across several courses as a comprehensive case.

Gore (2013) developed a case study that examines the consequences of holding appreciated assets within a C Corporation. In this case, a business holding appreciated assets is worth a smaller valuation to its owner if it is held in a C corporation than the fair market value of the assets. The difference in worth is a result of the double tax imposed on C corporations. Shareholders will often in an attempt to avoid this issue structure the sale of the business as a sale of stock in the corporation. It is common practice in these instances for the buyer to demand a discount in the price of the business if the deal is structured as a purchase of stock as opposed to a direct purchase of the assets. The reason for this discount is that the buyer passes on the future tax savings from the step-up in basis in the appreciated assets of the target corporation in a stock acquisition. Students are required to determine the present value of the future forgone tax savings to the buyer and utilize this information along with the tax consequences to the seller to negotiate a compromise final purchase/sale agreement between the parties.

Goldman, Makridis and Wu (2016) also examine the tax issues of an asset acquisition. This case study draws attention to a critical issue in asset acquisitions under the U.S. federal tax system - the purchase price allocation process specified in IRC Section 1060. The student is presented with a realistic situation involving the sale of a technology company's analytics division. To solve the case, the student must leverage an understanding of depreciation, amortization, and purchase price allocation rules to assess the competing incentives of the buyer and seller and

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present the allocations preferred by each party. Additionally, the student will perform analyses to determine whether a business case exists for the buyer to assume certain loss-generating contracts from the seller.

Apple, Gradisher & Calderon (2012) developed a project that can be utilized in an entity tax class. The student is presented a single set of data from which to prepare tax returns based on three separate assumptions about the entity for tax planning: The assumption is that the entity is (1) a partnership, (2) a C corporation, or (3) an S corporation. The student must communicate with the instructor in order to obtain necessary information to complete the tax engagement in the same manner that a junior accountant would communicate with a manager/supervisor. The tax returns are initially prepared manually to reinforce material learned in class. Following the manual preparation of the tax return, students are required to complete the same returns using professional tax software to provide exposure as requested by firms of accounting program graduates.

Kern (2012) provides a series of mini cases exploring the tax planning, tax research, tax policy and financial statement implications of a company's utilization of the alternative fuel mixture tax credit. The cases are designed in a flexible manner so instructors can integrate cases at the undergraduate or graduate level.

Sonnier, Henning, Everett and Raabe (2012) present a case study based on recent events in financial and tax accounting, which has exposed a major issue of financial accounting for tax expenses. The case examines ASC 740/FAS 109 and ASC 740-10/FIN 48 issues on the financial accounting side to the Schedule M-3 and Schedule UTP reporting requirements on the tax side. The case integrates financial accounting and tax courses through a review of computational, disclosure and reporting requirements from a financial accounting and tax perspective. The case allows students to both identify as well as implement the requirements for reporting.

Miller, Miller and Tollin (2016) also through a teaching note allow critical thinking under ASC 740. This teaching note is more general than Sonnier, Henning, Everett and Raabe (2012), but requires the student to critically think and synthesize concepts learned in their financial reporting and tax classes. The student will use and interpret accounting standards to prepare tax provisions, comparative financial statements and the appropriate footnote disclosures.

Convery and Outslay (2012) develop and present an ethics case dealing with an uncertain tax position. The case can be used to assess professional ethics as part of an assurance-of-learning (AOL) plan as well as a component of a course grade. In this case, students analyze ethical frameworks to present ethical dilemmas they might face in order to determine whether to support a client's suggested treatment and disclosure of an uncertain tax position. Students will also

examine AICPA guidance and U.S. Treasury standards on uncertain tax positions as well as the FASB and PCAOB standards on reporting and auditing uncertain tax positions from a financial statement perspective. From this case, students will learn how to assess situations that may be in conflict between the professional and client.

Fisher and Hagerman (2012) examine complex issues of partnerships and how a mechanical journal entry approach can be utilized to teach partnership taxation concepts and provide students the ability to visualize the concepts. The authors provide a comprehensive project, which illustrates the process for partnership reporting. Graduate tax students who completed this case agreed through feedback that the case meets its stated learning objectives, and reported journal entries are helpful for analyzing partnership tax transactions and make comprehension of partnership taxation easier.

Gujarhthi and Noga (2012) examine taxation and financial reporting issues for a national owner and operator of hair salons. The student is required to utilize source material to determine the amount and timing of federal income tax liability for the gift cards of other retailers that the salon chain has sold, gift cards for its own products and services, and the gift cards that have been issued during a special promotion. Students have the option to compare and contrast differences between tax and financial reporting rules for gift cards in the different situations presented.

Baird and Rolfes (2011) place the student in the role of a new staff accountant at a public accounting firm who is asked to research financial accounting and tax issues for a client. The client is a large, rapidly growing and a successful consulting firm that specializes in corporate restructuring and consulting. The student is required to research, analyze and report on all complex financial and tax reporting issues in the same manner expected as a professional accountant.

Serocki and Callaghan (2011) provide insights on the effective tax rate in order to better understand accounting for income taxes relating to SFAS No.109. The case provides guidance for an instructor to implement in the classroom, and a comprehensive analysis of the fundamentals of the effective tax rate elements.

Blazovich, Huston, & Huston (2014) is a case that allows the student to role-play a compensation committee team member for a publicly traded corporation. The student has the opportunity to create a compensation plan for the company's CEO using past data. To develop a comprehensive plan for the executive, the student as CEO must incorporate numerous issues and course topics, both tax and nontax, applying them to the particular fact pattern. To adjust for the complexity of the case, there are three separate versions that the instructor can utilize based on the course where utilized.

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Anderson, Jones, & Reed (2012) present a case on an insurance reinsurer that has engaged in deceptive financial reporting relative to a catastrophic loss. The case analyzes the doubtful financial reporting and auditing practices employed, including charitable contributions made with fraudulent funds. The case can serve as an instructional resource for teaching financial accounting, auditing, tax, ethics, and law. The case can improve students' research skills, as students must use the ASC as well as IASB website to answer the financial accounting questions, and a tax research database such as RIA Checkpoint to address tax questions.

Sonnier (2010) is a comprehensive case that introduces students to corporate taxation through the complete life cycle of the entity. Most textbooks in corporate taxation provide separate problems at the end of a chapter that address or deal with the specific topics covered in that chapter independently. This case demonstrates rules of corporate taxation through integration in a comprehensive illustration.

Lorras and Key (2010) require the student to take the role of a consultant who has been hired to calculate the provision of income taxes as well as use spreadsheets and a word processor to create a template for the footnote disclosure. This case also introduces the student to documentation of process and internal controls for the calculation. From the case, the student develops an increased understanding of accounting for income taxes, as well as the development of spreadsheet skills from both computational and control standpoints.

### **Estate and Gift Tax**

Huston and Huston (2013) is a role-play of the student to perform the work of a partner in a private wealth practice. The student presents a client with a comprehensive estate and gift tax plan. The student is required to incorporate course topics and apply them to a specific fact pattern. The student increases understanding of the interplay between estate and gift tax rules, and develops the ability to generate critical thinking skills in the context of estate and gift tax planning.

### **International Taxation**

Cripe, Harmon and West (2015) integrate cost accounting principles to the impact on financial and tax disclosures. The case focuses on four inter-company transactions and provides an analysis of how transfer pricing impacts reporting. Not only does the case provide an analysis of international taxation issues, but the student can link the technical issues to cost and financial reporting principles. The authors have effectively used the case with M.Acc., M.B.A., and E.M.B.A. students to demonstrate the implications of management's transfer pricing

decisions, the impact of judgment in critical thinking, and how problem solving represents leadership.

Rossing, Cools and Rohde (2017) also examine transfer pricing, with a focus on its role in responsibility accounting and measurement of management performance. The case allows students to make decisions blending regulations that influence decisions as well as risk factors to consider.

Gujarathi and Comerford (2016) provide an international taxation case that examines the Vodafone acquisition of Hutchison Essar. The student has the opportunity to examine the litigation of tax treatment for indirect share transfers. As a result of the indirect transfers and resulting treatment, the Indian government \$5 billion and taxes and penalties. The case helps students (1) research tax literature in the U.S. and a foreign country and apply it to a real-world context, (2) understand a complex acquisition transaction and its tax ramifications, (3) determine whether a similar transaction would be taxable in the organization for Economic Co-operation and Development (OECD) countries, and (4) evaluate the pros and cons of taxing the transfer of shares between two foreign entities by tax authorities. Joseph (2016) also examines the case of Vodafone, which has received considerable attention in many regards. The author examines the transaction to highlight the complex role of the accountant and tax practitioners who need to distinguish legitimate tax planning from tax evasion, distinctions with moral, financial and reputational implications for multi-national enterprises and professionals involved. Overall, the case brings out several themes suitable for a global course in accounting. Joseph (2016) examines Vodafone over a more macro level compared to Gujarathi and Comerford (2016) who focus specifically on the litigation surrounding the share transfer.

Kyj and Romeo (2015) draw attention to the high corporate tax rate and the complexity of the U.S. tax code, which has been criticized to provide U.S. multinationals with the incentives and opportunities to shift income to foreign low-tax jurisdictions. The case focuses on the behaviors of Microsoft Corporation, and the treatment of their offshore earnings. The case demonstrates to the students the complex environment in which multinational corporations operate, and provides discussion on the merit of inversion transactions.

Hess and Alexander (2015) explore the ethical issues surrounding the corporate tax-planning and tax-avoidance strategies common to many international organizations. The case focuses on the ethics of international tax strategies commonly utilized to place income and assets in offshore tax havens. The case focuses on the real-world experiences of one of the world's largest beverage companies.

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Thomasson and Wilkinson (2012) provide the student opportunity to conduct a complete tax-planning exercise for a multinational corporation who has several tax planning considerations from a current restructuring. The student from the case will be required to understand basic international tax theory, to engage in the tax research process and to apply skills to typical business situations faced by multinational business entities.

Muehlmann & Burnaby (2011) demonstrate a methodology for teaching multi-jurisdictional taxation. The methodology incorporates the travels of a T-Shirt in the Global Economy. The author tells the history of a T-shirt, initially with the cotton grown for the shirt's manufacturing process through the shirt's sale in the open market. Students are required throughout the life of the shirt at the various phases to reflect on tax issues relating to international transactions throughout the process.

Engel (2017) examine the issue of offshore cash, specifically Apple and Microsoft, and their activities to manage large sums of cash that are trapped overseas as a result of international tax laws. It is important to note that these cases specifically must be looked at carefully relative to the 2017 Tax Cuts and Jobs Act, as it may significantly alter the strategy of each company and free up ability to move cash back to the United States.

Campbell and Helleoid (2016) examine the role social responsibility and how it impacts tax avoidance. The case looks at the UK division of Starbucks to illustrate how accounting choices, and specifically tax minimization practices, should consider a company's overall strategy and positioning within multiple stakeholder groups. Starbucks had been successful in growing its stores and presence in the United Kingdom (UK), and described the profitable growth to investors as something it wanted to build on in other international markets. However, in its 15 years of operations in the UK, the company had paid UK corporate income taxes only once. Using a combination of legal tax avoidance practices (e.g., transfer prices, royalty payments, interest expense), Starbucks UK had effectively shifted taxable income to other Starbucks subsidiaries where it would be taxed at lower rates. The case examines the negative public relations impact Starbucks faced with this strategy, as well as how students need to think about social implications to balance between being a good corporate citizen versus taking a strategy that may save tax liability at significant social cost.

## **IMPLICATIONS**

A significant implication that cannot be overlooked from the literature reviewed is the lack of research conducted in tax education. Upon the review of licensing requirements in many states, as well as the elements of the CPA exam, taxation is a major educational emphasis, and an area where a large and growing

population of accounting graduates embark on a career. Despite the importance of and growth in the area, there is not the requisite growth and emphasis on educational research in the area. This lack of research may be a contributor to the significant expectation gap between the profession and educators as referenced in Yu and Churyk (2013). Additionally, as there has been so little emphasis on taxation research in accounting education, an increased emphasis within the area may be a way in which the stagnation in accounting education research as shown by Sangster et.al. (2015) can be reduced with new innovative research to improve teaching in tax.

Education and the learning process of taxation are significantly different from financial accounting and management accounting. Regardless of these differences, there is little publication that provides best practices and research on methodologies specific to teaching introductory taxation, yet there is a significant volume of research with a focus on methodology specific to teaching the introductory accounting course, intermediate accounting and cost accounting. There are opportunities for research that examine the cause for this lack of focus. One suggestion for future research is the impact of adjunct faculty on tax education research. The proportion of adjunct and non-research instructional faculty has increased significantly at many business schools, specifically accounting programs due to the shortage and high cost of tenure-track accounting hires. Adjuncts and non-research faculty typically have little to no requirement to perform academic research. For some institutions, it may be more common to have a greater emphasis on adjunct faculty in the area of taxation due to the availability of professionals within communities with professional experience in tax. Do research based accounting programs utilize a higher percentage of adjunct faculty in taxation compared to other areas of accounting? If indeed the case, it would support a reduced publication emphasis in taxation education research and stagnate research in the area. The lack of publication in tax education makes one question the efficiency of preparation provided to tax students and quality of instruction provided by these adjunct faculty, who are not exposed to research and the exchange of ideas to improve teaching within the subject area that meets the needs of the profession.

Though typical undergraduate accounting programs have a curriculum focus specifically on individual taxation, as well as taxation of business entities, it is the responsibility of faculty to educate students on the career option of taxation, and Subject areas within tax. There is more to tax education than teaching principles of taxation, and there should be an emphasis on the balance between tax compliance requirements, tax research as well as understanding how tax policy influences regulation. Though tax research and compliance has been represented, there is been little emphasis to investigate tax policy, and its impact on regulation. As highlighted in Appendix A, the majority of articles published related to areas

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of business entities, with a very small percentage of overall publications dedicated to individual taxation. For innovation to occur within the introductory taxation class at the undergraduate level, more emphasis would be needed to develop materials that relate to individual taxation.

At the graduate level, whether it is an elective within a Masters of Accounting program, or required course within a Masters of Taxation program, there has been no research focus on other important areas of taxation such as state and local taxation or real estate taxation. Estate and gift taxation is also an area of emphasis at the graduate level, but received very little focus within education research. Due to the changes to the estate tax as a result of the 2017 tax legislation, it is unlikely that there will be an increase in output for the estate and gift tax.

Brucker and Hetherington (2011) support the lack of literature available in taxation curriculum and attempt to address the issue through a database where ideas can be exchanged, but this is not a substitute for research and tested methodologies as well as best practices to exchange ideas and innovate tax education.

Educators also cannot forget the current impact of the Tax Reform Act of 2017. The significant changes resulting from this act may have made many of the teaching notes and cases obsolete and no longer suitable for classroom use. Opportunities exist to revise and create new materials that represent the new tax act, and also allow students to analyze the impact of the act on the economy and all stakeholders.

## **CONCLUSION**

This paper provides a comprehensive literature review of all taxation education related articles published between the years 2010-2017 as included in (1) Issues in Accounting Education; (2) Journal of Accounting Education; (3) Accounting Education: An International Journal; (4) Advances in Accounting Education and (5) The Accounting Educators' Journal. Based on the publications within these sources during the time period examined, it is clear that taxation education research has not received the same attention as other areas of accounting practice. There are several reasons why this may be the case, with one primary reason being the abundance of adjunct faculty responsible for teaching of taxation, and their lack of research requirement. Faculty members learn and collaborate with each other through the exchange of ideas. The publication of research is what drives innovation and exploration of ideas. With the vastly limited volume of research in taxation education, innovation and the exchange of ideas becomes significantly more difficult compared to other areas of accounting education, and this is a factor that can further increase disconnects that are faced between the academic and professional environment. This paper serves as a call to action and

show of awareness that there is a significant need for increased research in taxation education, and academic departments need to encourage and offer incentive for qualified faculty to explore opportunities within the area.

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**Research in Tax Education: 2010-17**  
**Mitchell Franklin**

**Appendix A: Summary of Article Type Published by Journal**  
 Includes all articles published in the journals through November 2017

<b>Journal</b>	<b>Tax Policy</b>	<b>Instructional Aids</b>	<b>Individual Taxation</b>	<b>Taxation of Business Entities</b>	<b>Estate and Gift Tax</b>	<b>International Taxation</b>
Journal of Accounting Education	1	2	3	5	0	1
Accounting Education: An International Journal	0	0	0	0	0	0
Issues in Accounting Education	2	5	1	10	1	5
The Accounting Educators' Journal	0	1	0	1	0	0
Advances in Accounting Education	0	2	0	1	0	0
<b>Total</b>	<b>3</b>	<b>9</b>	<b>4</b>	<b>17</b>	<b>1</b>	<b>6</b>
<b>Percentage of Total</b>	<b>7.5%</b>	<b>22.5%</b>	<b>10%</b>	<b>42.5%</b>	<b>2.5%</b>	<b>15%</b>

## **R VS. PYTHON: EASE OF USE AND NUMERICAL ACCURACY**

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### ***ABSTRACT***

Business Schools are seeing a surge in students' interest in coding. Previously, coding skills were primarily the domain of PhD. students engaged in research. The direction of all business disciplines toward quantitative analysis, particularly those in Finance and Investments has created a demand for competent coding skills at every level of education. While many seasoned, business school professors and researchers are well versed in the open source statistical package R, many students and those new to programming are discovering Python. This paper seeks to evaluate the ease of use and numerical accuracy of each. Both are open source, free, and both have been available since the 1990s. In the recent past, Python has enjoyed an explosion in popularity, while the numbers in the R community are dwindling. What is causing this shift? In many ways, younger undergraduate students see Python as the easier pathway to coding, and they see coding skills as necessary to effectively market themselves to potential employers. Python emphasizes productivity and readability, and targets developers. R generally caters to data analysis, statistics and graphical models. The syntax of Python makes coding and debugging easier, but the statistical power of R can be harnessed with a few lines of code. We explore the different uses of these software packages. We determine the better choice depending on the nature of the task. We further compare the numerical accuracy of each using The Wilkinson Tests. The Wilkinson Statistics Quiz are entry-level tests of the accuracy of computer software developed and successfully implemented prior to the development of the Statistical Reference Datasets of the Institute of Standards and Technology, part of the U. S. Department of Commerce.

**Keywords:** R, Python, Coding, Data analysis, Statistics software

### **INTRODUCTION**

The world is becoming increasingly data driven. Data analysis skills are required on any well-rounded resume. The proliferation of big data, the online presence of almost all consumers, and almost universal computer literacy make the ability to interpret the steady stream of data we all generate a job requirement in the twenty first century. Additionally, current college graduates and the millennial

generation employment force have never known a world without computers and the tidal wave of technology we see today. Code literate graduates have become the norm in business schools, whereby in the past only computer science students learned the insides of any data analysis packages. Business school students were certainly given skills in EXCEL and maybe SAS or SPSS, if they were lucky, but these skills no longer make a graduate highly competitive in today's workplace. According to an article by Dan Kopf in the online magazine Quartz, *The-great-r-versus-python-for-data-science-debate*, (2017) it is estimated that there will be 2.72 million job openings in data analytics by 2020.

In addition to the preponderance of data and data analysis, open source tools are more available than ever before. Students and researchers do not have to rely on expensive, proprietary statistical and data analytics software. There are huge communities of contributors adding to the wealth of choices in open source software options. Freely available to all are sophisticated software programs dedicated to solving every conceivable iteration or nuance of data in the business world.

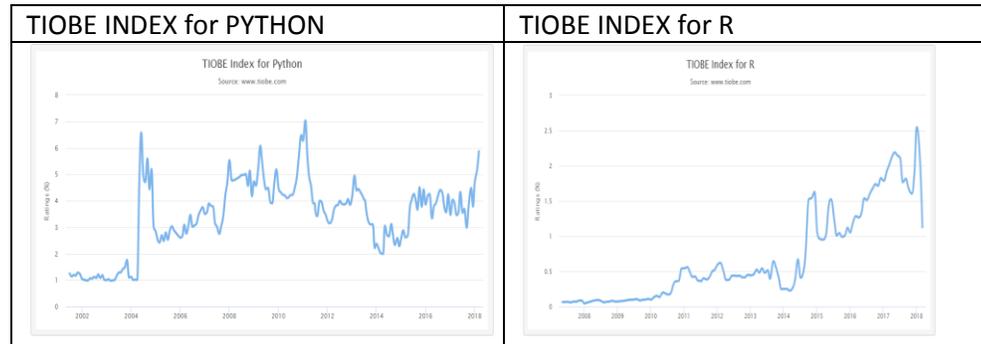
The two open source top choices available to newcomers in coding for data analytics are R and Python. Many students are drawn to Python, whether because it is allegedly simpler to learn, or is less mathematically frightening, or it is simply trendy. This paper seeks to explore the differences, point the new coder in the right direction, and test the numerical acumen of each.

### **Which language to use?**

Both languages are widespread, fully-grown and deeply tested, but R and Python are distinctly different. According to the University of Miami Center for Computational Science website, Python is based on C; it is primarily a software development language, a great scripting language that can tie together your workflow. R, on the other hand, is an implementation of S, it is a mathematical, statistical language most useful for statistical analysis.

The TIOBE Index, which maintains all sorts of metrics on software, has data on the popularity of R vs. Python. Popularity is measured as search engine queries. Year over year ending February 2018, R ranked at 2.086 percent, where percent is 100 percent of all programming languages. Year over year ending February 2018, Python ranked at 5.168 percent, where 100 percent is all programming languages. Table 1 shows the graphical representation of this popularity trend.

**Table 1**



Academics and research scientists have been the primary users of R, in other words, statisticians and data scientists will most often benefit from using R. Programmers or software developers have been the primary users of Python, typically then, this community will turn to Python when they are preparing a project that require data analysis.

The community of quantitative analysts, statisticians, and researchers that contribute package applications to R is huge. The ongoing support through mailing lists and forums is enormous. The support for Python is mostly developers contributing code and documentation. Python support is more in the nature of general purpose.

From a statistician’s perspective, R can achieve the same results a number of different ways. Once you are well versed in coding in R, complicated mathematical models can be initiated with a few lines of code. A great deal of complex code and tests are already written in R, the user need only to load the correct package and apply it to a data set. Python, on the other hand, invokes a syntax which could be described as phonetic. The code is written in what some call “nice” script, in other words, you write what you want the program to do. The online community Datacamp characterizes Python as useful and flexible for performing tasks that are repetitive and original.

One can easily see a natural divide between users of Python and users of R. As was previously mentioned, newcomers to data analytics seem to be choosing Python, perhaps because the “nice” syntax allows for a less steep learning curve, perhaps because the name sounds more fashionable. Whatever the reason, more and more students are learning to code, and bringing new talent to the burgeoning world of data analytics. The next section looks at the robustness of the two languages.

**Comparing the Numerical Accuracy of R vs. Python.**

Considering the upswing in popularity of Python, it is worth assessing its numerical accuracy and robustness. While it is fantastic that big data and revolutionary access to information across all aspects of the business world are garnering new recruits to data analytics, it is sensible to determine if those new recruits choosing Python are making the right choice. The test of accuracy

employed is the Wilkinson Statistics Quiz developed, implemented, and published by Wilkinson at SYSTAT in 1985. The Wilkinson Statistics Quiz is a forerunner to the Statistical Reference Datasets of the Institute of Standards and Technology, part of the U. S. Department of Commerce. (STRD NIST) The STRD NIST benchmarks are the industry standard source of data sets to test econometric packages across three areas; estimation, both linear and nonlinear; random number generation; and statistical distributions. For an initial assessment, the Wilkinson Tests should prove sufficient.

### **Where do computers go wrong?**

One of the difficulties as cited by B.D. McCullough in, *Assessing the Reliability of Statistical Software: Part 1*, (1998) is that computers recognize numbers in binary form and cannot represent an infinite number of digits. Entering the decimal number 0.1 in a computer is interpreted by the computer in single precision binary form as .00011001100110011001100110. Asking the computer to convert this back to decimal form results in .099999964, which is correct to 7 decimal places. Again, entering the number 100,000 into a computer is interpreted by the computer in single precision binary form as 11000011010100000.0. Asking the computer to convert this back to decimal form results in 100,000. This becomes problematic when the computer is tasked with adding these two numbers. Because the binary representation of the numbers is only carried to 7 decimal places, 100,000 plus 0.1 results in 100,000.09375 instead of 100,000.1. Asking the computer to add two simple numbers results in a number that is less accurate than the two numbers individually because the computer must convert both to binary form, do the calculation, then translate back to decimal form.

### **Rounding Error**

Analogous to Binary representation and Finite Precision is rounding error. The Institute of Electrical and Electronics Engineers (IEEE) sets the standards for computer arithmetic. Single precision machines have six or seven digits of accuracy; double precision has fifteen to sixteen digits of accuracy. The implication here is that 1,000,000 and 0.000001 can both be represented in single precision accurately but the sum of these two numbers cannot. The sum of these two numbers can be accurately represented only in double precision.

A wonderful example of rounding error is provided in Dahlquist and Bjorck, *Numerical Methods*, (1974). These two formulas are algebraically equivalent:  $\sum_{n=1}^{10000} n^{-2}$  and  $\sum_{n=1}^{10000} (10001 - n)^{-2}$  however numerically these do not result in the same answer, the first adds the numbers in ascending order, while the second adds the numbers in descending order. By the time the first formula gets to the smaller numbers, they are all lost to rounding error. The result is 650 times different from the result of the second formula. This is an enormous error lurking behind the scenes inside the hardware of our computers.

## Truncation

Software also contributes to a lack in numerical accuracy. An iterative algorithm can yield an incorrect result because although the algorithm may be infinite, the computer must process a finite number of algorithms. To illustrate the truncation issue, consider this example from McCullough, *Assessing the Reliability of Statistical Software: Part 1* (1998). Here we calculate the *sine* of  $x$ :  $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$  It is obvious the computer cannot do this for infinity, and clearly there will be a difference between an assumed infinite precision, and any finite number of terms the computer will attempt to tackle. The difference is truncation error.

Additionally, the algorithm itself can be suspect. This idea is explored in Ling's *Comparison of several algorithms for computing sample means and variances* (1974). Ling shows there are at least five ways to calculate sample variance. Notably, the methodology presented in elementary textbooks, although pedagogically suitable, is numerically unstable. Nonetheless, this very algorithm is present in many software applications.

### The Data

Wilkinson's Statistical Quiz employs a dataset designed to uncover exactly these types of inconsistencies in computer software packages. The dataset is named NASTY, and is a very simple collection of data with commonly used combinations of numbers, labels, missing data, rounded numbers, and zeros. The numbers vary in magnitude from tiny numbers to numbers reflecting the size of United States National Debt. These tests include six types of calculations, real numbers, missing data, and regression.

**Table 2**

The NASTY Dataset

LABEL\$	X	ZERO	MISS	BIG	LITTLE	HUGE	TINY	ROUND
ONE	1	0	.	99999991	0.99999991	1.0E12	1.0E-12	0.5
TWO	2	0	.	99999992	0.99999992	2.0E12	2.0E-12	1.5
THREE	3	0	.	99999993	0.99999993	3.0E12	3.0E-12	2.5
FOUR	4	0	.	99999994	0.99999994	4.0E12	4.0E-12	3.5
FIVE	5	0	.	99999995	0.99999995	5.0E12	5.0E-12	4.5
SIX	6	0	.	99999996	0.99999996	6.0E12	6.0E-12	5.5
SEVEN	7	0	.	99999997	0.99999997	7.0E12	7.0E-12	6.5
EIGHT	8	0	.	99999998	0.99999998	8.0E12	8.0E-12	7.5
NINE	9	0	.	99999999	0.99999999	9.0E12	9.0E-12	8.5

### The Tests.

The first tests involve rounding numbers. It is possible for some software to round numbers inconsistently, the implication is the software must do the rounding and print one digit, not a rounding procedure done by the user where more than one digit is truncated. Correctly rounded numbers will return the

numbers 1-9 for the ROUND column in NASTY. In fact, both R and Python perform this feat flawlessly.

In another test remember  $\sqrt{2}\sqrt{2} = 2$ , and  $\exp[\ln(2)] = 2$ . So given the following:

$$\begin{aligned}
 Y1 &= \text{INT}(2.6*7-0.2) && \rightarrow \text{INT}(18.0) && \rightarrow 18 \\
 Y2 &= 2 - \text{INT}\left(\text{EXP}\left(\text{LOG}\left(\text{SQRT}(2)*\text{SQRT}(2)\right)\right)\right) && \rightarrow 2 - \text{INT}(2.0) && \rightarrow 0 \\
 Y3 &= \text{INT}\left(3 - \text{EXP}\left(\text{LOG}\left(\left(\text{SQRT}(2)*\text{SQRT}(2)\right)\right)\right)\right) && \rightarrow \text{INT}(3.0-2.0) && \rightarrow 0
 \end{aligned}$$

Software that answers Y2 with 0 will return  $\exp[\ln(2)] = 2$ , and this program will answer Y3 with 1. However, software which answers Y3 with 0 may sometimes return  $\exp[\ln(2)] = 2$  and sometimes return  $\exp[\ln(2)] \neq 2$ . Both R and Python return Y2=0 and Y3=0. According to Wilkinson, the implication of this is that both R and Python will round inconsistently.

Table 3 displays the results of this rounding test for R and Python.

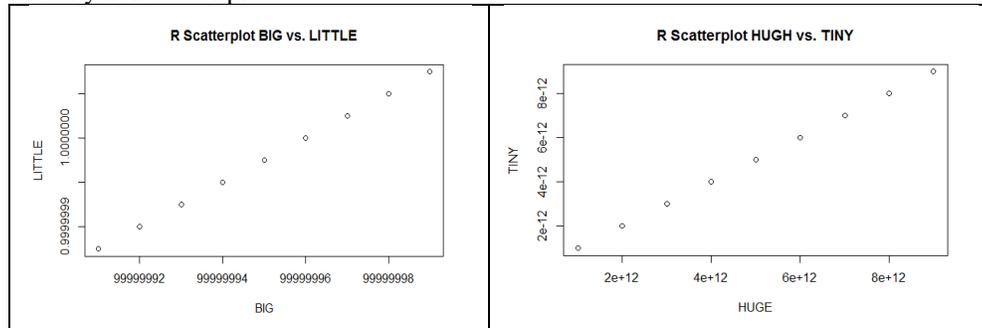
**Table 3**

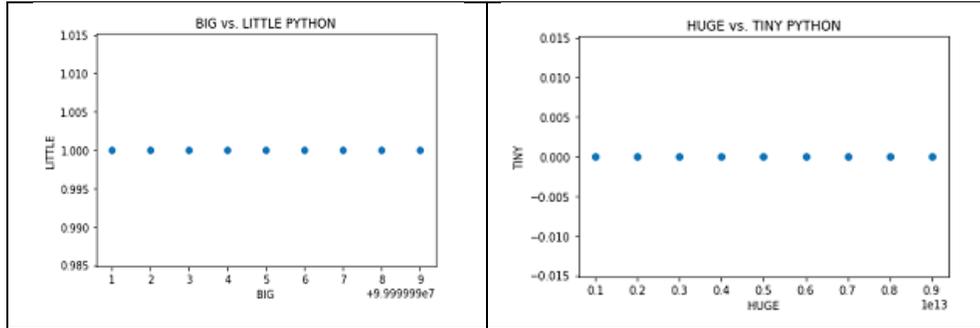
	R	Python
Y1, Y2, Y3	18, 0, 0	18, 0, 0

The next test on Real Numbers involves scatterplots of very large or very small numbers. Plotting the numbers in the columns for HUGE against TINY and BIG against LITTLE depends on the precision employed by the graphing component of the software. While the computational components in the software may be in double precision, the graphing component may be in single precision. As a result, the graph is a misrepresentation of the data. The results of these two tests obviously must result in a 45-degree line, unless the software loses accuracy. Table 4 shows the results of the graphing tests.

**Table 4**

R vs. Python scatter plots





Python loses accuracy when faced with graphing unless the parameters for precision are adjusted by the user. It is possible to change the precision in Python by specifying a higher-precision accumulator. New users to coding often don't know the levels of precision and can generate inaccurate results as was discussed in the previous section.

**Basic Statistics**

Calculate basic descriptive statistics for each variable. The results are in Table 5. The NUMPY Python Package was used to do the analysis. One issue surfaced, when calculating Standard Deviation, NUMPY defaults to a biased degrees of freedom estimate. In order to attain an unbiased standard deviation, Delta Degrees of Freedom must be manually adjusted in the code to reflect  $n - 1$  degrees of freedom, as outlined in the NUMPY documentation. In itself, this is not problematic; however the user must be aware of the idiosyncrasies in coding Python for data analytics.

**Table 5**  
Basic Statistics

	X	ZERO	MISS	BIG	LITTLE	HUGE	TINY	ROUND
R mean	5	0	NA*	1e+08	0.9999999	5e+12	5e-12	4.5
Python mean	5	0	0	99999995.0	0.9999995	5000000000000.0	5.000000000000005e-12	4.5
R std. dev.	2.738613	0	0	2.738613	2.738613e-08	2.738613e+12	2.738613e-12	2.738613
Python std. dev.	2.5819	0	NA	2.581988	2.581988e-08	2581988897471.61	2.581988897471611e-12	2.581988

**Correlation Matrix**

Compute a correlation Matrix for all the variables. Correlation is defined as the covariance of two variables divided by the product of the standard deviation of the variables.

$$\rho_{xy} = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$$

The interesting result about this is that R returned a correlation of unity for the correlation of ZERO with ZERO, when in fact intuitively we would say zero with zero is perfectly correlated, but strictly, by definition, the software should say it is undefined for division by zero. This in fact is the result generated by Python. The results are in Table 6. R will not compute the correlation of any of the data if the variable MISS is included in the data set. Not surprisingly, Python also will not accept missing data but returns the error “Syntax error: invalid syntax.” According to McCullough’s interpretation of the Wilkinson tests, the implication of this is that the software does not handle missing data, but simply deletes them. *Wilkinson’s tests and econometric software* (2004).

**Table 6**

Correlations in R

	X	ZERO	BIG	LITTLE	HUGE	TINY	ROUND
X	1	N/A	1	1	1	1	1
ZERO	N/A	1	N/A	N/A	N/A	N/A	N/A
BIG	1	N/A	1	1	1	1	1
LITTLE	1	N/A	1	1	1	1	1
HUGE	1	N/A	1	1	1	1	1
TINY	1	N/A	1	1	1	1	1
ROUND	1	N/A	1	1	1	1	1

Correlations in Python

	X	ZERO	BIG	LITTLE	HUGE	TINY	ROUND
X	1	nan	1	1	1	1	1
ZERO	nan	nan	nan	nan	nan	nan	nan
BIG	1	nan	1	1	1	1	1
LITTLE	1	nan	1	1	1	1	1
HUGE	1	nan	1	1	1	1	1
TINY	1	nan	1	1	1	1	1
ROUND	1	nan	1	1	1	1	1

## Regression

Various regressions are run. With variable X, compute  $X1 = X, X2 = X^2, X3 = X^3, \dots, X9 = X^9$ . Regress  $X1$  on a constant and  $X2$  thru  $X9$ . The coefficients should be: (Intercept)  $3.535e-01$ ,  $X2 = 1.142e+00$ ,  $X3 = -7.049e-01$ ,  $X4 = 2.624e-01$ ,  $X5 = -6.163e-02$ ,  $X6 = 9.205e-03$ ,  $X7 = -8.475e-04$ ,  $X8 = 4.384e-05$ ,  $X9 = -9.741e-07$ . R returns exactly these values and  $R^2$  of unity. Additionally, the sum of squared residuals is zero. Python also returns exactly these values. Python has a number of methods available for running regressions. These results were obtained using the Pandas in conjunction with Python module Statsmodels as outlined by Seabold, Skipper, and Perktold in *Statsmodels: Econometric and Statistical Modeling with Python* (2010).

The regression of X on a constant, BIG, and LITTLE; the software should report that this is a singular regression and R in fact does inform the user the regression is singular. The language R uses is; coefficient 2 is not defined because of singularities. The statsmodels module in Python displays an error, however it is slightly vague because Python reports that LITTLE is undefined. It does not report singularities. The regression of ZERO on a constant and X; the program should report a Correlation and Sum of Squares of zero, and R correctly does return zero's for all values of coefficients and standard errors. Python will not perform the regression, citing ZERO as undefined.

## **Conclusion**

Wilkinson's Statistics Quiz is implemented using R and Python. The results clearly show the strength of R as a statistical, data analytic product. R is a vector-oriented language, which makes it ideal for data analytic work. Python does indeed have the robust analytical resources to do this kind of work also. Python lends itself more to a developer platform; a language used for scripting and automating processes, and is a wonderful choice for the discerning developer. Python is easy to use, has a softer learning curve, and appeals to newcomers in data analytics. Precision in Python, especially in float mode, is dictated by the input. Higher precision in Python is available, but must be called upon by the user. In other words, the user must code specific requests to get desired results. The integrated developer environment (IDE) chosen by the Python user additionally imposes constraints of the particular IDE; currently there are numerous IDE's from which to choose. The myriad of choices can be as difficult as learning to code.

The results of this comparison demonstrate that R and Python are mature, developed platforms with a robustness suited to high caliber computation and data analytics. Both languages have extensive open-source modules and packages capable of doing the most intensive data analytics. Python users need to be particularly sensitive and knowledgeable about the statistical processes the user is trying to invoke. Those seriously interested in big data and research involving data analytics would be better served starting on Python, learning coding in a user-friendly environment and then learning R as coding skills are more developed, and the user seeks to more exclusively focus on statistical and analytical analysis.

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## **ACCOUNTING STUDENT PERCEPTIONS OF TABLET TECHNOLOGY FOR ACADEMIC SUCCESS**

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### **ABSTRACT**

Technology has become an integral part of instruction and engagement on many university campuses. Online and hybrid courses, as well as other distance learning options, employ the use of technology as a means of instruction, examination, and communication. In addition, tablets and other devices are often used by students in lecture courses on campus to access the internet and online platforms specifically designed for instruction. Because this impacts the delivery of college courses, it is important to understand the students' perceptions of technology use in the academic environment. This research surveys accounting students regarding their use of technology in the classroom, as well as their perceptions of its importance and effectiveness in achieving academic success.

Key Words: distance learning, iPad, accounting, tablet technology

### **INTRODUCTION**

The use of technology in the academic environment is not a new concept. Higher education institutions often utilize online Learning Management Systems (LMS) such as BlackBoard and Canvas. In addition, technology in the classroom has expanded to the use of wireless mobile devices, such as tablets, by both instructors and students. Because mobile "smart" technology has permeated almost every aspect of life, it is no surprise that it has also become prevalent as a resource in the academic environment. Since its release in 2010, the Apple iPad has become exceedingly predominant in classrooms, including both K-12 schools and college campuses. Programs that facilitate 1:1 student iPad use seek to enhance learning and engagement (Diemer, Fernandez, & Streepey, 2012).

The use of tablet technology in higher education is a fairly recent development. "Distance learning" such as online degree programs and "blended learning," the use of smart technology integrated with traditional teaching methods, are becoming exceedingly common in the university environment. This research adds to the existing literature by presenting students' perceptions of tablet technology in the undergraduate academic environment. The study relates specifically to students' responses pertaining to the following areas: personal technology use, importance of technology in academic success, the learning experience through the use of technology, expertise in operating devices and software applications, and

how tablet technology (especially the iPad) is used in various aspects of courses. The study relates specifically to an introductory Principles of Accounting course.

## **REVIEW OF RELATED LITERATURE**

There is an increasing trend toward student use of mobile technology, both in the classroom and otherwise, to study and complete assignments. Such mobile devices include laptops, smartphones, tablets, and hybrid or “2 in 1” computers. E-learning is no longer exclusively used for distance learning, but is also integrated into lecture courses through “blended” learning. A study by Kenney and Newcombe (2011) found that the blended learning approach improved student learning and increased student involvement. The present study relates specifically to a blended learning experience, using mobile technology in a face-to-face lecture course. While this is a shift in the learning process, it also presents new opportunities for students in both lecture and online courses (Chen, Seilhamer, & Bennett, 2015).

In a previous study of students’ learning processes using tablet technology, it was found that students use mobile devices during lecture courses to access online textbooks, utilize discipline-specific online software, and use the internet to search topics relevant to the lecture (Chen et al, 2015). Pearson Higher Education, in partnership with Harris Poll, conducted a study to collect data on college student ownership and utilization of mobile devices. According to the study, roughly 90% of students use a smartphone or laptop regularly, and 51% use a laptop on a regular basis. It was noted that tablet usage has increased significantly since the study was conducted in 2015. However, 73% of students use a laptop for daily school work, while only 24% reportedly use a tablet. In addition, 54% of students perceive they learn best on a laptop, 16% on a tablet, and 11% on a smartphone (Pearson, 2015).

College students place importance on mobile devices for academic success. Specifically regarding tablets, a majority of students feel that tablets help them to better study and perform academically (Pearson, 2015). According to a study by the Educause Center for Analysis and Research (2016), almost all students responded that mobile devices are extremely important to academic success. In addition, the survey revealed that laptops are still considered to be most important, due to power and flexibility. In fact, the study shows that students value laptops more than smartphones or tablets for academic success. The study also concludes that students perceive mobile devices to be extremely important when they use them for at least half their classes (Brooks, 2016).

A qualitative case, directed specifically toward student iPad use, investigated student use of personal iPads in the college environment (Alyahya & Gall, 2015). Students described the iPad as a multi-functional device suited for personal and academic use. It was observed that students had personalized their iPad with mobile apps to fit their own unique learning and course needs. Educational benefits of importance to students were the ability to organize schoolwork, conduct research, and communicate more efficiently and effectively. Creative uses

included using the audio and video features of the iPad to record lectures, take photos of instructor notes during class, incorporate screen captures into notes, and for presentations. Additional benefits included the ability to access lecture notes and internet-based content during class. (Hahn & Bussell, 2012; Rossing, Miller, Cecil, & Stamper, 2012). iPads without keyboards had limited use for intensive writing assignments. Other negative aspects of using tablets were revealed in an early study of college students who experienced anxiety with learning new technologies and frustration with learning how to incorporate it into collaborative group assignments (Kaganer, Giordano, Brion, & Tortoriello, 2013). Conversely, iPads can lead to increased sharing and collaboration with peers in the right setting (Rossing et al., 2012).

Content delivered on mobile devices can enhance the learning experience by providing a learning environment that is more like the real world. Mobile devices can enhance learning by providing access to more interactive and visual educational content (Rossing et al., 2012). Textbook publishers are offering interactive digital textbooks with text, video, and 3D objects. Students described using eTextbooks on an iPad as convenient and easy to use. They liked the note taking features and search options (Sloan, 2013; Shim, Dekleva, Gui, & Mittleman, 2011). Another feature of blended learning is the use of a Learning Management System (LMS). A popular LMS is Blackboard, which allows instructors and students to interact electronically. Among many learning management features, Blackboard allows instructors to upload course documents, facilitates peer and instructor discussion, provides student grades, and allows assessments and assignments to be administered online. In a 2015 study, university students were surveyed on digital teaching and learning. Nearly one-half of the students indicated that learning management systems were most important in managing and organizing the logistics of studying (Henderson, Selwyn, & Aston, 2015).

Mobile devices provide more opportunities for collaboration during class and interaction outside of class (Murphy, 2011). The large screen and portability of tablets supports student collaboration if learning activities are appropriately designed (Fabian & MacLean, 2014; Rossing et al., 2012). More opportunities are available for communication through virtual interaction with instructors and online course support (Charron & Raschke, 2014). Mobile apps also increase the effectiveness of tablets as tools for communication and collaboration as they allow course content, such as notes, to be shared through email and social media (NMC, 2013).

Mobile devices were not originally developed for educational environments yet their daily use for communication and productivity leads educators to attempt to adapt and integrate them into the learning environment (Traxler, 2010). Studies agree that the proper use of mobile devices can have a positive influence on overall academic success through increased engagement and satisfaction, yet there is no perception of increased performance in learning (Van Oostveen, Muirhead, and

Goodman, 2011; Otieno, 2015; Rossing, et al., 2012; Nguyen, Barton, & Nguyen, 2015).

The 21st century college student has had access at a young age to mobile technologies (Wakefield & Smith, 2012). Students are comfortable using mobile devices in their daily personal lives and have become accustomed to continuous access to the virtual world. This daily dependence on mobile technologies has affected the teaching environment as colleges seek to meet the learning needs of these digital natives by using these resources for instructional purposes. Despite this comfort with using mobile devices, most students desire technological training and support for academic purposes. The majority of students do not view themselves as technology savvy despite using some type of computer device on a regular basis (Kinash, Brand & Mathew, 2012). In addition, most students viewed faculty as providing inadequate instruction in how to use the educational technology for academic purposes. Overall, students were interested in learning to use digital tools in the classroom, yet expected guidance in using the tools for learning. Students are comfortable using digital technology for entertainment, but may need faculty support to realize the potential for education (Gong, 2012). Students view their instructors as the experts when using technology in the classroom and faculty must be ready and willing to meet this role if students are to remain confident in using the technology for academic success (Mang & Wardley, 2012). Mobile technologies, including iPads, have the potential for a positive impact on academic success due to their ease of use and new opportunities. The challenge is to manage the negative impact such as distraction and frustration with faculty instruction and support (Otieno, 2015).

Tablets and other mobile devices are used on campuses in a variety of different subjects and courses. Because the following study relates to students using mobile devices in an introductory accounting course, it is important to consider the conclusions of previous studies that are specific to accounting students. In a study related to engagement through technology in an accounting course, results showed that online instruction was associated with increased engagement among students (Mo, 2011). Mo also stated that students who took advantage of online and mobile learning were more likely to perform better in the course. Similarly, in a study of students in an accounting course that employed computer-assisted learning, it was found that such instruction improved final exam scores (Bawaneh, 2011). When compared to traditional lecture courses, a study concluded that blended learning improved accounting knowledge retention and resulted in a higher level of understanding (Halabi, Essop, Joosub, Padia, Vawda, & Yasseen, 2010). . According to the AICPA Core Competency Framework, educators should equip students to use technology tools effectively to develop personal, functional, and business competencies. Students need to be confident and prepared to adapt technology to the business environment (AICPA, 2017). The Accounting Education Change Commissions agrees that teaching techniques and tools should reflect the changing environment and innovative use of technology is essential to

prepare students to be lifelong learners (AECC, 1990). The available literature concludes that accounting students, as well as students in other courses and programs, benefit in degree programs and subsequent careers through the use of technological instruction.

## METHODOLOGY

For the purpose obtaining information regarding the students' perceptions of technology use, a survey was completed by 36 university students enrolled in the second semester of a principles of accounting course. The survey instrument collected demographic information, which includes gender, age, class, employment status, housing status, as well as students' opinions of technology use, divided into four categories: importance of devices, importance of resources/tools, importance of iPad, and iPad ease of use. These perceptions were measured using questions with a five-point Likert scale with rankings from 1 (strongly disagree) to 5 (strongly agree). Differences in opinions will be explored using a series of Analysis of Variance (ANOVA) tests.

**TABLE 1 – DESCRIPTIVE STATISTICS**

Variable	Frequency	Percent
<u>Gender</u>		
Male	15	41.7
Female	21	<u>58.3</u>
Total		100.0
<u>Age</u>		
Under 20	8	22.2
20-24	26	72.2
25 and up	2	<u>5.6</u>
Total		100.0
<u>Class</u>		
Freshman	3	8.3
Sophomore	21	58.3
Junior	10	27.8
Senior	2	<u>5.6</u>
Total		100.0
<u>Employment</u>		
Full Time	3	8.3
Part Time	20	55.6
Not Currently Employed	13	<u>36.1</u>
Total		100.0
<u>Housing Status</u>		
On Campus	9	25.0
Off Campus	27	<u>75.0</u>
Total		100.0

## RESULTS AND DISCUSSION

Descriptive statistics of the study are provided in Table 1. The majority of the respondents of the survey were female (58.3%). Nearly one-fourth were aged 20-24, and were either sophomores (58.3%) or juniors (27.8%). Over one-half of the respondents work part-time, and 75% live off campus.

Statistics for the mean responses of the Likert scale survey are listed in Table 2. Mean responses and relevant descriptors are included to illustrate perceptions for each of the survey items. Questions for which the mean response was less than 3.000 were assigned the descriptor “unimportant,” while questions with a mean response greater than 3.000 were assigned the descriptor “important.” Questions with a mean response equal to 3.000 were assigned the descriptor “neutral.”

**TABLE 2 – STATISTICS FOR LIKERT SCALE QUESTIONS ON STUDENTS’ PERCEPTIONS OF DEVICES, RESOURCES, AND IPADS**

<b>Question</b>	<b>Mean</b>	<b>Descriptor</b>
<b><u>Importance of Devices</u></b>		
How important is each of the following devices to your academic success?		
a. Laptop	4.667	Important
b. Desktop (Personal)	2.833	Unimportant
c. Desktop (Lab/Library)	3.250	Important
d. iPad	3.000	Neutral
e. E-Reader	2.333	Unimportant
f. Smartphone	4.000	Important
<b><u>Importance of Resources/Tools</u></b>		
How important is each of the following resources/tools to your academic success?		
a. Blackboard	4.778	Important
b. Websites and other online resources	4.389	Important
c. iPad apps	3.472	Important
d. Classroom use of LCD projector or television	4.139	Important
e. Classroom use of Smartboard	3.943	Important
f. Classroom use of iPads	3.556	Important
g. Classroom use of laptops	4.194	Important
h. Classroom use of smartphones	4.000	Important
<b><u>Importance of iPad</u></b>		
How important is an iPad for each of the following?		
a. Completing homework	3.361	Important
b. Completing writing assignments	3.139	Important

c. Communicating with instructors	3.583	Important
d. Organizing school work	3.556	Important
e. Conducting research	3.750	Important
f. Staying motivated and engaged in my class work	3.333	Important
g. Accessing information	3.806	Important
<b>iPad Ease of Use</b>		
How easy is it to use an iPad for each of the following?		
a. Turning in assignments	4.139	Important
b. Completing writing assignments	3.472	Important
c. Creating content (presentations, slideshows)	3.778	Important
d. Installing my own apps	4.444	Important
e. Communicating with others	4.389	Important
f. Connecting wirelessly at school	4.306	Important

A series of one-way analysis of variance (ANOVA) tests was conducted to examine any differences in responses to the four Likert-scale questions used to analyze respondents' perceptions toward tablet technology for academic success. The results of this study are grouped and presented for the four analyses of variances performed.

The first analysis of variance (ANOVA) model was created using the importance of devices to academic success. The results presented in Table 3 indicate the model was robust and significant ( $p < .01$ ) when tested at a significance level of .05. A post-hoc test (Tukey's HSD) was used to determine the nature of the differences. Eight of fifteen comparisons were significantly different at  $p < .05$ . A closer examination of the results reveals the student opinions of the importance of a smartphone and laptop are significantly different from those of an iPad, personal desktop, and E-reader, but the laptop and smartphone are not significantly different from each other. Student opinions of the importance of an iPad is significantly different from the laptop and smartphone, but is not significantly different from E-readers and desktops.

**TABLE 3 – SELECTED ANOVA RESULTS OF FOUR ANALYSES**

<b>ANOVA Model</b>	<b>F-Ratio</b>	<b>p-value</b>
Importance of Devices	16.87	$p < .01^*$
Importance of Resources/Tools	5.59	$p < .01^*$
Importance of iPad	1.24	0.286
iPad Ease of Use	6.91	$p < .01^*$

\*Significant when tested at a significance level of .05

The second analysis of variance model was created using the importance of resources and tools to academic success. The results presented in Table 3 indicate the model was robust and significant ( $p < .01$ ) when tested at a significance of .05.

Tukey's HSD test was used to determine the nature of the differences. Six of twenty-eight comparisons were significantly different at  $p < .05$ . A closer examination of the results reveals the student opinion of the importance of Blackboard as a resource/tool for academic success is significantly different from that of iPads, apps, smartboards, and smartphones but is not significantly different from laptops and online resources.

The third analysis of variance model was created using the importance of iPads to academic success. The results presented in Table 3 indicate there is no significant difference in the importance of an iPad for various academic tasks.

The fourth analysis of variance model was created using the iPad ease of use for academic tasks. The results presented in Table 3 indicate the model was robust and significant ( $p < .01$ ) when tested at a significance level of .05. Tukey's HSD test was used to determine the nature of the differences. Six of the fifteen comparisons were significantly different at  $p < .05$ . A closer examination of the results reveals the students opinions of the ease of use of an iPad for writing assignments differed significantly from the ease of use of an iPad for turning in assignments, installing apps, communicating with others, and connecting wirelessly at school.

### **LIMITATIONS OF THE STUDY**

This study was performed at a regional university in the southeastern United States. The size of the university and its geographic location could present a limitation to the study. Due to the size of the university, the study was limited to relatively small course sections at one university. Therefore, the findings and results may not extend to other settings.

In the present study, the survey was administered to students who were provided iPads at no cost for the semester. Results of the survey could differ for students in courses where students use their personal devices.

In addition, only students in an accounting course were surveyed. Due to course material, the results could differ based on the perceptions of students in other courses.

### **RECOMMENDATIONS FOR FUTURE RESEARCH**

Investigating the educational use of tablet technology and other mobile devices for academic success is a current topic of interest. Determining the best uses of mobile technology for enhancing student success would be of value to educators and students. The popularity of mobile devices such as smartphones, laptops, and iPads has been recognized in recent years. While educators seek to understand and adopt this new technology there has been no clear evidence of actual improvements in learning.

Future research might question whether mobile devices distract from academic success rather than enhance it. Mobile devices such as the iPad and smartphone are also limited in their usefulness for writing assignments. However, they do appear useful for communication purposes and when using apps. Future research might explore curriculum based use of mobile apps for specific disciplines. Mobile apps for gathering information, collaboration, and presentation could also lead to improved efficiency and communication among faculty and students.

Additionally, students recognized the university's learning management system as important to their academic success in this study. Future studies might investigate how faculty and students can fully utilize this resource to enhance the overall academic experience.

## **CONCLUSION**

In much of the related literature, results suggest that mobile devices improve the learning experience for university students. Such devices provide opportunities for collaboration (Murphy, 2011), interactive content (Rossing et al., 2012), and improved learning (Kenney & Newcombe, 2011). A study by Bawaneh (2011) found that blended learning improved final exam scores. The present study relates to student perceptions of mobile devices used in such blending learning, and indicates that students value mobile devices and online resources that are incorporated into course structure.

In this study, student opinions of the importance of laptops and smartphones were not significantly different from each other. Both devices appear to be useful to students, according to this study and related literature. In the Pearson Student Mobile Device Survey, 90% of students reportedly use a smartphone or laptop regularly (Pearson, 2015). However, the Pearson study also indicated that 54% of students perceive they learn best on a laptop, while only 11% learn best on a smartphone (2015).

The survey administered in the present study resulted in a significant difference between student use of iPads when compared to laptops or smartphones. The study suggests that students prefer laptops and smartphones over iPads. A previous study by the Educause Center for Analysis and Research (2016) indicated that students perceive laptops to be the most important mobile device, which is in agreement with this study's outcome. However, the ECAR study also revealed that students value laptops more than both smartphones and tablets, which is a different outcome than the results of the present study.

Students reportedly value Blackboard, the learning management system used at the university in this study. The study reveals that the student opinion of the importance of Blackboard as a resource for academic success is significantly different from that of iPad apps. Similarly, in a study by Henderson, Selwyn, &

Aston (2015), nearly one-half of the students indicated that learning management systems were most important in managing and organizing the logistics of studying.

Overall, student perception indicates that mobile devices and online resources are beneficial to the learning experience. They improve involvement (Kenney & Newcombe, 2011), engagement (Mo, 2011), and academic success (ECAR, 2016). Specifically in accounting courses, to which this study is applicable, blended learning results in improved knowledge retention and a higher level of understanding (Halabi et al., 2010). This information should encourage instructors to further pursue and integrate mobile devices into instruction and coursework.

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## **IS TOO MUCH INSURANCE A BAD THING? A SURVEY OF COURTS' VARYING INTERPRETATIONS OF 'OTHER INSURANCE' CLAUSES**

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**ABSTRACT:** "Other insurance" clauses are provisions found in both property and liability insurance policies establishing how a loss is to be apportioned among insurers when more than one policy provides coverage for the same loss. These provisions vary: some policies provide no coverage when other insurance is in place, some purport to pay a pro rata share, and others claim to apply only in excess. Where two or more insurance companies provide concurrent coverage for the same risk at the same level, courts rely on other insurance clauses to determine whether, and to what extent, the insurance companies will share in covering the loss.

Keywords: insurance coverage, other insurance clause, priority of coverage

### **INTRODUCTION**

When an insured has more than one policy that provides coverage for a claim, courts generally examine the "other insurance" clause in the policies to determine the order, and the amount, in which two or more policies must respond. Frequently, these clauses contradict each other. When the "other insurance" clauses in the policies are not deemed mutually repugnant, courts generally apply the clauses as written. If the policies are silent as to how apportionment should proceed in the event of concurrent coverage under another policy, the majority approach is to require proration in the ratio which each individual policy's limits bear to the sum of all available coverage. *See, e.g., AMHS Ins. Co. v. Mutual Ins. Co. of Arizona*, 258 F.3d 1090, 1102 (9<sup>th</sup> Cir. 2001) (citing Ostranger & Newman, *Handbook on Insurance Coverage Disputes* §11.04 (9<sup>th</sup> Ed. 1998).

The minority approach, on the other hand, is to hold that all "other insurance" clauses, regardless of their nature, are mutually repugnant. The minority approach stems from the decision in *Lamb-Westin, Inc. v. Oregon Auto. Ins. Co.*, 219 Or. 110, 341 P.2d 110, *modified and rehearing denied*, 219 Or. 129, 346 P.2d 643 (1959). In *Lamb-Weston*, the court was confronted with two co-insuring primary policies, one which contained an excess clause and the other a pro-rata clause. The court found that "whether one policy uses one clause or another, when any come in conflict with the other insurance clause of another insurer, regardless of the nature of the clause, they are in fact repugnant and each should be rejected *in toto*." *Id.* at 119. Several courts have followed the minority rule. *See e.g., State Farm Mut. Auto Ins. Co. v. United States Fid. & Guar. Co.*,

490 F.2d 407 (4th Cir. 1974) (West Va. law); *Crown Center Redev. Corp. v. Oxidental Fire & Cas. Co.*, 716 S.W.2d 348, 361 (Mo. Ct. App. 1986); *Westhoff v. American Interins Exch.*, 250 N.W.2d 404 (Ia. 1977). Under the minority rule, the insurers are treated as co-insurers and the loss is prorated between them.

#### **TYPES OF OTHER INSURANCE CLAUSES**

There is no standard language used for “other insurance” clauses, but they are generally classified as either pro-rata, excess, or escape clauses. *See Dealers Mut. Fire Ins. Co. v. Farmers Ins. Exch.*, 444 S.W.2d 583, 586 (Tex. 1969).

##### **Pro-Rata:**

A pro-rata clause usually provides that if there is other applicable insurance, the insurer’s liability is limited to its pro-rata share of the loss (which typically is apportioned according to the amount the insurer’s policy limit bears to the aggregate limit of all other valid and collectible insurance). This is referred to as the “contract limits” method. *See, e.g., American Cas. Co. of Reading, Pa. v. PHICO Ins. Co.*, 549 Pa. 682, 702 A.2d 1050, 1053 (1997). However, some pro-rata other insurance clauses provide for contribution by equal shares. Under the “equal shares” arrangement, each insurer contributes the same amount, dollar-for-dollar, until the liability limit of one is exhausted. *Id.* The remaining insurer or insurers then pay the balance of the claim until the loss is paid or the policy limit is exhausted. A typical pro-rata clause provides:

If the insured has other insurance against liability or loss covered by this policy, the company shall not be liable for a greater proportion of such liability or loss than the applicable limit of liability bears to the total applicable limit of liability of all collectible insurance against such liability or loss.

The more common method for apportioning pro rata shares is “contract limits,” although several states apply the “equal shares” method. Many recent commercial liability policies include a “method of sharing” provision, which outlines the pro rata method the policy contemplates. An example of such a clause reads:

If all of the other insurance permits contribution by equal shares, we will follow this method also. Under this approach each insurer contributes equal amounts until it has paid its applicable limit of insurance or none of the loss remains, whichever comes first.

If any of the other insurance does not permit contribution by equal shares, we will contribute by limits. Under this method, each insurer’s share is based on the ratio of its applicable limit of insurance to the total applicable limits of insurance of all insurers.

*See, e.g., American Indem. Lloyds v. Travelers Prop. & Cas. Ins. Co.*, 335 F.3d 429 (5th Cir. 2003) (applying Texas law); *Employers Ins. of Wausau v. American Intern. Specialty Lines Ins. Co.*, 2005 WL 1220945 (N.D. Cal. 2005) (applying California law). Courts seem to be divided on the issue of whether to apply a “method of sharing” clause, if one policy contains such a clause but the other policy does not. *See, e.g., Allstate Ins. Co. v. TIG Ins. Co.*, 711 So.2d 84 (Fla. Dist. Ct. App. 1st Dist. 1998) (each of two policies contained “other insurance” clauses, one contained “method of sharing” clause but the other was silent; court disregarded “method of sharing” clause and applied state’s “contract limits” approach instead); *Universal Underwriters Ins. Co. v. CAN Ins. Co.*, 308 N.J. Super. 415, 706 A.2d 217 (App. Div. 1998) (court applied “contract limits” approach when one policy had “method of sharing” clause that provided for that approach and other policy was silent).

#### Excess

By contrast, an excess clause usually provides that an insurer’s liability is limited to the amount the loss exceeds the coverage provided by any other valid and collectible insurance. A typical excess clause provides:

This policy shall be excess over any other insurance whether prior or subsequent hereto, and by whomsoever effected, directly or indirectly covering loss or damage insured hereunder, and this Company shall be liable only for the excess of such loss or damage beyond the amount due from any other valid and collectible insurance, however, not exceeding the limits as set forth in the Declarations.

#### Escape

An escape clause attempts to avoid all liability for a loss covered by other valid and collectible insurance. A typical escape clause provides:

If any other Insured included in this insurance is covered by valid and collectible insurance against a claim also covered by this Policy, he shall not be entitled to protection under this Policy.

There are three generally recognized types of escape clauses: simple, super, and excess. An example of a simple escape clause is the one cited above. In contrast, a super escape clause may provide:

This insurance does not apply to any liability for such loss as is covered on a primary, contributory, excess, or any other basis by insurance in another insurance company.

The excess escape clause is more complicated; it typically provides that the insurer is liable for only the amount of loss that exceeds the limits of other available

insurance, but the insurer is not liable when the other available insurance equals or exceeds its own limits. An example excess escape clause reads:

If other valid insurance exists protecting the insured from liability for such bodily injury, this policy shall be null and void with respect to such specific hazard otherwise covered, whether the insured is specifically named in such other policy or not; provided, however, that if the applicable limit of liability of this policy exceeds the applicable limit of liability of such other valid insurance, then this policy shall apply as excess insurance against such hazard in an amount equal to the applicable limit of liability of this policy minus the applicable limit of liability of such other valid insurance.

There are numerous variations to the three general types of other insurance clauses and many “other insurance” clauses cannot be categorized as pure pro-rata, excess or escape clauses. There is some disparity in the approach courts take to conflicting other insurance clauses, but many courts analyze the language of the policies in light of the circumstances of each contracting party in an attempt to determine the intention of each contract within the design of a consistent overall insurance scheme. *See Allstate Ins. Co. v. Employers Liab. Assur. Corp.*, 445 F.2d 1278, 1283 (5th Cir. 1971). Often, contracting parties will custom create an “other insurance” clause to suit their specific intent. Although this may meet the needs of the parties, the clause is more likely to conflict with the “other insurance” clauses in other policies, in which case a court might not enforce the custom clause as written. *See, e.g., McDonald v. Country Mut. Ins. Co.*, 133 Ill. App. 3d 89, 101 Ill. Dec. 53, 478 N.E.2d 571 (3d Dist. 1985).

When two policies provide coverage at the same level, *i.e.*, two primary policies or two excess policies, and both contain a similar other insurance clause, the clauses usually cancel each other out and the policies are treated as coinsurance. When confronted with similar other insurance clauses, each insurer is liable for its pro-rata share of the loss. In most cases, a pro-rata share is determined according to the amount the insurer’s policy limit bears to the aggregate limit of all other valid and collectible insurance. *See Atlantic Mut. Ins. Co. v. Truck Ins. Exch.*, 797 F.2d 1288 (5th Cir. 1986).

#### CONFLICTING “OTHER INSURANCE” CLAUSES (SAME COVERAGE LEVEL)

Most courts have no problem handling policies that contain similar other insurance clauses. The difficulty arises when two or more policies contain conflicting other insurance clauses. Most courts attempt to reconcile dissimilar other insurance clauses by giving effect to the intent of the policies through an examination of the language in the “other insurance” clauses. The minority approach is to disregard the other insurance clause and pro-rate the loss amongst the insurers that have available coverage.

### **Similar Clauses**

If two policies have the same or similar “other insurance” clauses, enforcement is not particularly difficult. If neither policy contains an “other insurance” clause, courts will simply pro-rate the loss. *E.g. Federal Ins. Co. v. Gulf Ins. Co.*, 162 S.W.3d 160 (Mo. App. 2005); *Aetna Cas. & Sur. Co. v. Continental Ins. Co.*, 110 N.C.App. 278, 428 S.E.2d 406 (1993); *Oregon Auto Ins. Co. v. U.S. Fidelity & Guar. Co.*, 195 F.2d 958 (9th Cir. 1952). If only one policy contains an “other insurance” clause, courts will generally give effect to the clause. *E.g. U.S. Fidelity & Guar. Co. v. Budget Rent-A-Car Systems, Inc.*, 842 P.2d 208 (Colo. 1992); *Fremont Indem. Co. v. New England Reinsurance Co.*, 168 Ariz. 476, 815 P.2d 403 (1991); *Carriers Ins. Co. v. American Policyholders’ Ins. Co.*, 404 A.2d 216 (Me. 1979). When both policies contain pro-rata “other insurance” clauses, most courts will distribute the loss by the “contract limits” method. *E.g. State Farm Fire & Cas. Co. v. Griffin*, 888 S.W.2d 150 (Tex.App.—Houston [1st Dist.] 1994, no writ); *Tarolli v. Cont. Cas. Co.*, 181 A.D.2d 1021, 581 N.Y.S.2d 510 (4th Dep’t 1992); *but see Western Cas. & Sur. Co. v. Universal Underwriters Ins. Co.*, 232 Kan. 606, 657 P.2d 576 (1983) (applying “equal shares” method when neither “other insurance” clause specified method of sharing).

When multiple policies potentially cover a loss, but each contains excess clauses or escape clauses, courts generally treat the clauses as mutually repugnant and pro-rate the loss. If the clauses were enforced as written, then the insured would have no coverage under either policy. *E.g. Allstate Ins. Co. v. Tokio Marine & Nichido Fire Ins. Co. Ltd.*, 464 F.Supp.2d 452 (E.D.Pa. 2006) (two excess clauses); *Twin City Fire Ins. Co. v. Fireman’s Fund Ins. Co.*, 386 F.Supp.2d 1272 (S.D.Fla. 2005), *aff’d* 200 Fed.App. 953 (11th Cir. 2006) (two excess clauses); *Commerce & Industry Ins. Co. v. Chubb Custom Ins. Co.*, 89 Cal.Rptr.2d 415 (Cal. App. 1999) (two escape clauses).

### **Pro-Rata v. Excess Clause**

The majority of courts that have compared an excess clause with a pro-rata clause have held that the excess clause prevails and the excess insurer is not liable for the loss until the policy containing the pro-rata clause has been exhausted. *See generally David P. Van Knapp, Annotation Resolution of Conflicts in Non-Automobile Policies, Between Excess or Pro-Rata Other Insurance Clauses*, 12 A.L.R. 4th 993 (1982); *Annotation, Apportionment of Liability Between Automobile Liability Insurers Where One of the Policies Has an Excess Clause and the Other a Proportionary or Pro-Rata Clause*, 76 A.L.R. 2d 502 (1961). The policy containing the excess clause is usually not considered “other valid collectible insurance” for the purpose of triggering the operation of the pro-rata clause in the other policy. In other words, when there is other valid and collectible insurance available to the insured, the policy containing the excess clause becomes secondary coverage only.

Texas courts appear to follow the majority rule. *See e.g. Allstate Ins. Co. v. Universal Und. Ins. Co.*, 439 S.W.2d 385 (Tex. Civ. App.—Houston [14th Dist.] 1969, no writ); *Canal Ins. Co. v. Gensco, Inc.*, 404 S.W.2d 908 (Tex. Civ. App.—San Antonio 1966, no writ). A Fifth Circuit decision creates some uncertainty as to whether a Texas court would follow the majority rule or pro-rate the loss. *See St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*, 888 F.Supp. 1372 (S.D. Tex. 1995), *aff'd*, 78 F.3d 202 (5th Cir. 1996) (court pro-rated loss between insurers when one had escape clause and other had pro-rata clause). However, it appears no Texas court has had the opportunity to revisit this precise issue.

### **Pro-Rata v. Escape Clause**

Similar to an excess clause, an escape clause has generally been found to trump a pro-rata clause. A policy that contains a pro-rata provision is liable prior to a policy that contains an escape clause. The rationale is the same as that applied to an excess clause; the policy containing the escape clause does not provide other valid and collectible insurance within the terms of the policy containing the pro-rata clause while the policy containing the pro-rata clause is other insurance that gives effect to the escape clause. *E.g. American Intern. Specialty Lines Ins. CO. v. Canal Indem. Co.*, 352 F.3d 254 (5th Cir. 2003) (predicting Louisiana law); *McFarland v. Chicago Express, Inc.*, 200 F.2d 5 (7th Cir. 1952).

It is unclear how a Texas court will rule on this issue. In a Fifth Circuit decision, the court pro-rated the loss between the insurers when one policy contained an escape clause and the other policy contained a pro-rata clause. *See St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*, 888 F.Supp. 1372 (S.D. Tex. 1995), *aff'd*, 78 F.3d 202 (5th Cir. 1996) (applying Texas law). In *St. Paul*, the court found that an escape clause conflicted with a pro-rata clause relying on the Texas Supreme Court's decision in *Hardware Dealers. Id.* at 210. We believe a Texas court will likely follow the majority and reject the Fifth Circuit's opinion.

### **Excess Clause v. Escape Clause**

Courts have had difficulty reconciling conflicts between escape and excess clauses. The majority of courts have held that the excess clause prevails over the escape clause, reasoning that the policy with the excess clause does not provide other valid collectible coverage within the meaning of the escape clause. *See Mosca v. Ford Motor Credit Co.*, 150 A.D.2d 656 (N.Y. 1989); *Protective Nat'l Ins. Co. v. Bell*, 361 S.2d 1058 (Ala. 1978). Other courts have held the opposite. *See e.g., State Farm Mut. Auto Ins. Co. v. Bursin*, 752 F.Supp. 877 (W.D. Ark. 1990); *Calder Race Course, Inc. v. Hialeah Race Course, Inc.*, 389 S.2d 215 (Fla. App. 1980). This has the effect of making the policy with the escape clause primary and the policy with the excess clause excess. Texas courts follow the minority, and pro-rate the loss between the policies when one policy contains an excess clause and the other an escape clause. *See Hardware Dealers Mut. Fire Ins. Co. v. Farmers Ins. Exch.*, 444 S.W.2d 583 (Tex. 1969); *see also St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*, 888 F.Supp. 1372 (S.D. Tex. 1995), *aff'd*, 78 F.3d 202

(5th Cir. 1996). Only a few other courts have found that the excess and escape clauses are mutually repugnant, and pro-rate the loss. *E.g. Yarbrough v. Fed. Land Bank of Jackson*, 731 So.2d 482 (La.App. 1999); *Planet Ins. Co. v. Ertz*, 920 S.W.2d 591 (Mo.Ct.App. W.D. 1996); *Brown v. Travelers Ins. Co.*, 610 A.2d 127 (R.I. 1992).

#### CONFLICTING CLAUSES (DIFFERENT COVERAGE LEVELS)

While most courts give effect to “other insurance” clauses in policies that provide coverage at the same level, courts are reluctant to give effect to “other insurance” clauses in policies that provide coverage at different levels. *See Olympic Ins. Co. v. Employers Surplus Lines Ins. Co.*, 126 Cal. App. 3d 593 (Cal. App. 1981). Most courts will require the primary policies to exhaust before the “true excess” policy must respond. Unlike primary policies containing excess “other insurance” clauses, the true excess contract, by its own terms, does not cover a loss until the underlying insurance is exhausted. Texas courts have followed the general rule and have not required an excess policy to pro-rate with a primary policy that contains an excess other insurance clause. *See Liberty Mut. Ins. Co. v. United States Fire Ins. Co.*, 590 S.W.2d 783 (Tex. Civ. App.—Houston [14th Dist.] 1979, writ ref’d n.r.e.); *Carrabba v. Employers Cas. Co.*, 742 S.W.2d 709 (Tex. App.—Houston [14th Dist.] 1987, no writ). In *Carrabba*, the court held that the excess other insurance clause in the umbrella policy was not mutually repugnant with the excess other insurance clause in the primary policy because the policies are not of the same character and do not supply coverage at the same level. *Id.* at 715. Texas courts require primary policies to exhaust before excess insurers become liable. *See St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*, 888 F.Supp. 1372 (S.D. Tex. 1995) *aff’d* 78 F.3d 202 (5th Cir. 1996).

Other insurance issues in many cases can be resolved by examining the other insurance clauses in the policies. However, when multiple policies are involved with conflicting other insurance clauses, the other insurance issue can become complicated and may require more than simply a review of the policies. As one court put it:

This is an area in which hair splitting and nit picking has been elevated to an art form. “Other insurance” clauses have been variously described as: “the catacombs of insurance policy English, a dimly lit underworld where many have lost their way,” a circular riddle, and “polic[ies] which cross one’s eyes and boggle one’s mind.”

*South Carolina Ins. Co. v. Fidelity & Guar. Ins. Underwriters, Inc.*, 327 S.C. 207, 489 S.E.2d 200 (1997) (citing *Ins. Co. of North America v. Home & Auto Ins. Co.*, 256 Ill.App. 3d 801, 195 Ill.Dec. 179, 628 N.E.2d 643 (1st Dist. 1993)).

**CASE STUDIES – THE RULES AS APPLIED BY TEXAS COURTS**

*Liberty Mutual Ins. Co. v. United States Fire Ins. Co.*, 590 S.W.2d 783 (Tex. Civ. App. —Houston [14th Dist.] 1979, writ ref'd n.r.e.).

This case sought a declaratory judgment to determine the liability of two insurance companies for a \$250,000.00 settlement against the insured arising out of an automobile accident. The driver maintained a policy with Liberty Mutual with policy limits of \$100,000.00 per person per accident. The owner of the vehicle was insured by American General and had available primary limits of \$100,000.00 and by a U.S. Fire umbrella policy with limits of \$1,000,000.00 in excess of the insured's retained limit. American General paid its policy limits of \$100,000.00; Liberty Mutual paid its policy limits of \$100,000.00; United States Fire paid the remaining \$50,000.00, and the parties agreed to seek a judicial determination of priority of coverage.

Liberty Mutual's policy provided primary coverage for bodily injuries and contained an excess clause. The U.S. Fire policy also had an excess clause. The Court of Appeals distinguished the case from *Hardware Dealers Mut. Fire Ins. Co. v. Farmers Ins. Exch.*, 444 S.W.2d 583, 586 (Tex. 1969), where the carriers were both primary insurers, and the Hardware policy contained an escape clause, which specifically made the "other insurance" clause applicable to excess insurance. Since this case involved an umbrella and a primary automobile policy, and neither policy contained an escape clause, the court declined to apply *Hardware Dealers*. Instead, the court held that, "where there is apparent conflict between clauses of applicable insurance policies, the courts should look to the overall pattern of insurance coverage to resolve disputes among carriers." *Id.* at 785, citing *Berkeley v. Fireman's Fund Ins. Co.*, 407 F.Supp. 960 (W.D. Wash. 1975). Thus, the court confirmed that Liberty Mutual's policy generally afforded primary coverage and U.S. Fire's remained excess in all events. Holding that the intent of all parties was for U.S. Fire's policy to remain an umbrella and Liberty Mutual's policy to underlie it, the Court ruled that Liberty Mutual was required to pay the full limits of its coverage prior to U.S. Fire's indemnity obligation being triggered. Thus, courts are not to lose sight of the insured's overall pattern of coverage when making priority determinations among carriers. (Cornell, 2011)

***Traders & General Ins. Co. v. Hicks Rubber Co.*, 140 Tex. 586, 169 S.W.2d 142 (1943)**

This case stems from a personal injury suit brought by Harper, a pedestrian on the sidewalk who was injured by Hicks' employee who was unloading a truckload of tires. Hicks carried two policies of public liability indemnity insurance, one with Employers, which provided coverage for the building premises and the adjacent sidewalks, and the other with Traders, which covered Hicks' trucks and automobiles while used in its business operations. The policies both contained pro rata clauses. The Employers' policy provided for \$10,000 of coverage to any one person; the Traders' policy provided \$20,000 of coverage to any one person.

Hicks was defended by both of these insurance companies. After the jury was selected and impaneled, Harper offered to settle for \$3,000 and court costs. Employers consented to the settlement. Traders refused the offer of settlement, and insisted on trying the case. Employers, believing that the two companies were liable in proportion to their maximum coverages, offered to pay to Harper one-third of the \$3,000, and also offered to pay one-third of all court costs then incurred. This offer was refused by Harper. Employers then declined to further assist in the defense of the Harper case in any way. The trial proceeded with only Traders defending, and a \$10,000 verdict was returned by the jury.

Traders paid two-thirds of the judgment. Employers paid \$1,025, which represented one-third of the amount it could have settled based upon the rejected settlement offer. Both insurance companies refused to pay any more than the sums just indicated. Hicks was compelled to pay the remaining \$2,717.91 in order to avoid having its property levied and sold at public auction to satisfy the judgment. Hicks then sued its carriers, who each filed cross-claims against each other. The court held that payment of the whole loss by any of the insurers does not discharge the liability of the other carriers. This is because the contracts, and the liability, are several and independent of each other. The court, in this case, holds that payment of the whole loss by one insurer will not discharge the liability of the other insurers. (Cornell, 2011).

*United States Fire & Ins. Co. v. Stricklin*, 556 S.W.2d 575 (Tex. Civ. App.—Dallas 1977, writ ref'd n.r.e.).

In this case, property damaged by fire was covered on the date of loss by two separate policies. Plaintiff elected to sue each insurance company for the loss in separate actions. Both insurance policies had pro-rata clauses.

During the trial involving U.S. Fire, the trial court improperly refused to admit evidence of the second fire insurance policy issued by Houston General Fire Insurance Co. and refused to give effect to the policies' "other insurance" clause. On appeal, the Dallas Court of Appeals reversed and remanded, holding that the trial court erred in refusing to give effect to the "other insurance" clause and in refusing to pro-rate the loss between the insurers. "The rule is that if two or more insurers contract to pay a portion of a loss, each is liable only to the extent that the amount insured by such insurer bears to the total loss and that none of the insurers has any right of contribution from the other insurers because the contracts are several, rather than joint." *Id.* at 578. Of course, an insured is not permitted to recover more than a pro rata amount from each insurer, *i.e.*, an insured cannot profit from a casualty loss. Further, the court held that, while consolidating the cases might have served judicial efficiency, consolidation was not required. Thus, even in separate suits against concurrent insurers, pro-rata apportionment will apply. (Cornell, 2011).

*Farmers Texas County Mutual Ins. Co. v. Jones*, 660 S.W.2d 879 (Tex. App.—Fort Worth 1983, no writ).

Plaintiff maintained a \$20,000 fire policy from EMMCO Insurance Company, which covered her mobile home, and a \$25,000.00 fire policy from Farmers Mutual, which covered both the home and its personal property contents. Both policies contained pro rata clauses. The mobile home, which was valued at between \$32,000.00 and \$38,000.00, was destroyed by fire.

EMMCO settled its liability for \$12,000.00. Farmers Mutual denied any liability under its policy, alleging the loss was caused by arson. Jones sued Farmers Mutual. The jury found that the value of the home was \$12,300 and the value of the contents was \$10,444. The Court held Farmers Mutual liable for the \$10,444.00 in contents and \$6,833.00 for the loss of home (representing a 25/45 pro-rata proportion of the \$12,300.00 jury-determined value). On appeal, Farmers Mutual alleged that requiring a \$6,833.00 payment, in light of EMMCO's previous \$12,000 payment, resulted in unjust enrichment to the insured, whose loss totaled only \$12,300. The court held that EMMCO was obligated under the terms of its policy to pay 20/45ths of the loss, and its decision to voluntarily pay \$12,000 bore no effect on the jury's finding. Similarly, Farmers Mutual was liable under the pro rata clause in its policy for 25/45ths of any loss. It chose to have a jury determine the existence and amount, if any, of its loss, and the jury's finding that the loss was \$12,300 obligated Farmers Mutual to pay Jones 25/45ths of that amount. Because EMMCO's payment was based on a separate valuation of the loss which is not binding on Farmers Mutual, the court ruled that there was no overpayment. Thus, the settlement of one insurer does not affect the liability at trial of other insurers. (Cornell, 2011).

***Utica National Ins. Co. of Texas v. Fidelity & Casualty Co. of New York*, 812 S.W.2d 656 (Tex. App.—Dallas 1991, writ denied).**

These cases arises out of a \$2.2 million settlement for injuries received by a passenger in an automobile accident. Two lines of insurance existed at the time of the accident, one covering the passenger (the "Utica line") and the other covering the driver (the "Fidelity line"). Primary insurance from both lines, \$1,350,000 total, was exhausted and applied toward settlement, leaving a balance of \$850,000 to be paid by the excess carriers. Utica paid the \$850,000 excess obligation and sought contribution from Fidelity.

The Utica line of insurance contained one policy providing \$10,000,000.00 in coverage. The Fidelity line included a Fidelity excess policy with limits of \$5,000,000.00, a second Fidelity excess policy in the amount of \$10,000,000.00, a Harbor excess policy in the amount of \$10,000,000.00, a Nutmeg policy in the amount of \$10,000,000.00 and a First State excess policy in the amount of \$15,000,000.00 for a total aggregate of Fidelity excess in the amount of \$50,000,000.00. All policies in both lines contained an excess clause.

Utica contended that the trial court's pro rata apportionment was in error because it did not include all of the excess insurance policies in effect at

the time of the accident, i.e., Utica argued that Fidelity line aggregating \$50,000,000.00 should be prorated against the Utica line of \$10,000,000.00. However, the court held that, because the excess umbrella policies in the Fidelity line all contained conditions precedent that they would not be called upon to respond to a loss until all underlying insurance had been exhausted, the inclusion of those policies/ limits in the aggregate calculation is improper. Since Fidelity's first excess layer of \$5,000,000.00 would not be exhausted by the settlement, and the other excess umbrella policies in that line of coverage would not be triggered by the loss, the other policies in the Fidelity line should not be considered in determining the pro-rata share. Therefore, only those layers of coverage which are likely to be reached are included in the aggregate calculation. (Cornell, 2011).

### **CONCLUSION**

The issue of the application of "other insurance" clauses is a regular source of conflict between carriers, and the courts are regularly asked to resolve in these disputes. Although the jurisprudence on the issue is complex, and sometimes conflicting, an analysis of the case law does review some useful guidelines for use in applying these contractual provisions. Generally speaking, when only one of two policies has an "other insurance" clause, it is given effect. When both policies contain "pro-rata" clauses, the insurers typically share in payment of the loss in proportion to the total amount of collectable insurance. And where both policies contain "excess" or both contain "escape" clauses, a pro-rata allocation generally utilized rather than applying with of the clauses included in the policy. Where the policies contain dissimilar provisions, the courts attempt to discern the intent of the parties and the overall package of insurance. Of course, as with all insurance policies, if the policy is found to be ambiguous, it is construed against the drafter (i.e., the insurer) and in favor of coverage.

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## **CORPORATE INVERSION AND ITS IMPACT ON CORPORATE TAX REVENUE**

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### ***ABSTRACT***

Inversion is a change in the position, order, or relationship of things so that they are the opposite of what they were before. In the business world, the definition of inversion, aka corporate inversion, is the relocation of the business headquarters to achieve tax savings. Politicians and government officials believe it is a morally illegal strategy while corporations see it as an adaptive strategy to help increase profits. The question is where does inversion fall on the scale of ethics? Companies attempt every option they find in the best interest of the company. It is the government's purpose to create beneficial situations to attract companies and retain their operations for taxes. It is best to view these situations from both sides before deciding which side to support. This paper investigates the advantage and disadvantage of corporate inversions and finds that the domestic government continues to lose tax revenue due to corporate inversions.

Key Words: Corporate Inversion, Multinational Regulations, Taxation, Mergers

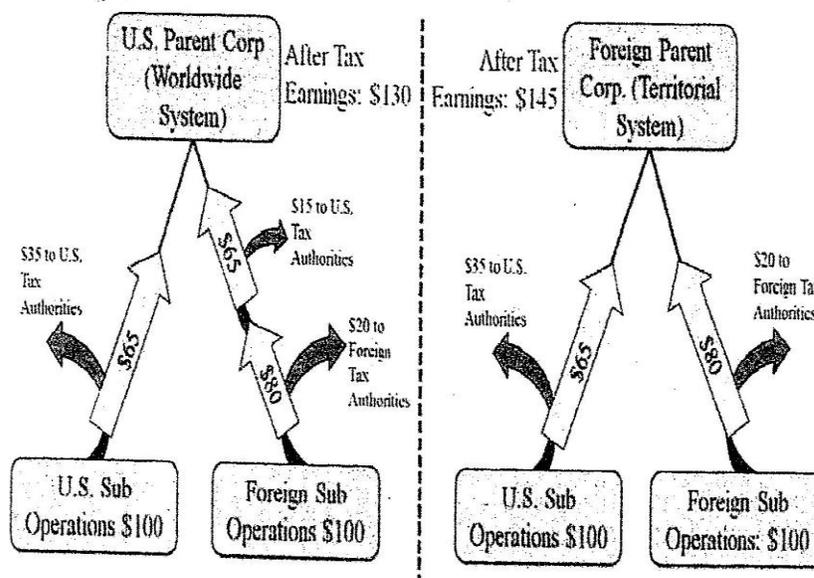
### **BACKGROUND**

U. S. corporate tax inversion, subsequently referred to as inversion, is a common practice in today's business world (Jeffers, 2014). In a typical inversion, a U.S. multinational corporation merges with a foreign company. The entity that ultimately emerges from this transaction is invariably incorporated abroad, yet typically remains listed in U.S. securities markets. When structured to satisfy tax requirements, corporate inversions permit the domestic multinational corporation eventually to replace their U.S. tax treatments with foreign tax treatments of their extraterritorial earnings at a far lower effective rate (Talley, 2015). This discussion adds to the literature by identifying and illustrating domestic tax ramification compared to foreign treatment.

This discussion explores the pros and cons to develop an understanding of the growing concern regarding inversions. Inversions have developed over the past quarter-century into a problem where the blame is placed on every entity involved. Some find this strategy illegal while others deem it necessary for a corporation to stay competitive. It is unclear which party is more at fault, without knowing the

facts. For example, a company finds a manufacturer with cheaper goods, or companies find countries with lower tax rates where they can establish a headquarters for their company. Would a consumer fault a company for choosing a company that sells products with a \$1.00-unit cost versus a company offering the same product at a cost of \$1.75? This would be a smart business decision by the company to lower their costs in order to lower the price of their own product or to create a wider profit margin thereby paying a smaller tax amount. Exhibit 1 displays the difference between paying US tax and foreign tax for operating revenues.

**Exhibit 1**  
**U.S. Tax System compared to Foreign Tax System Payments**



Source: Talley, 2015, p 1663.

What is the issue? Is it the company for finding a country to house their production with a lower tax rate or is it the government for not being proactive to equalize tax rates? Companies say inversions are a logical response to high corporate tax rates in the U.S. This is because an inversion allows companies to retain all the benefits of operating in the U.S. while being responsible for none of the tax obligations. Companies also claim the debate over corporate inversions will continue until regulators intervene to resolve the issue (Bybee, 2016). Even with the need of change, repeated attempts by Congress through legislative and executive actions to stem the flow of firms abroad have not stopped the expatriations of U.S. firms (Rao, 2015).

The first inversion in the U. S. was in 1982 when McDermott International, Inc. moved its domicile to Panama. Congress reacted to the move by passing §1248(j) to the tax code prohibiting inversions of the redomiciling form. (Rao,

2015). In 1994 Congress passed another tax code addition that made shareholders of U.S. target firms responsible for taxes on gains between the share purchase price at the time of inversions and the cost-basis when the shareholders owned more than 50 percent of the new corporation. Thanks to a large number of inversions in the late 1990s, congress again changed the tax code (Section §7874) to disallow inversions when a U. S. firm simply re-incorporated abroad without a substantial presence in its new domicile (Rao, 2015).

By enacting a tax code change to prevent inversions that were only an address change and no movement of operations only made mergers with a foreign firm more attractive to firms looking to invert for tax purposes. Merging with a substantive foreign firm resolved compliance with the tax code Section §7874 but made the loss of U.S. business activity including the loss of jobs and contribution to the U.S. tax base (Rao, 2015). According to Clausing (2014), U. S. corporations shifted more than \$111 billion internationally through inversions and other tax-saving strategies. She estimates that multinational firms moving profits away from the U.S. tax base will cost the U. S. government more than \$100 billion each year.

Dropping its U.S. domicile, saved Johnson Controls \$149 million thanks to a lower tax rate when it merged with Tyco International in 2014 and transferred its official corporate headquarters to Cork, Ireland where Tyco is already based. Although Johnson's new domicile is officially Ireland, the company retained its real operating headquarters in its current site just outside Milwaukee. The only change in operations was the designation of three office rooms in Cork (Bybee, 2016). Johnson's inversion proves that even with the tax code changes, U. S. firms continue to initiate inversions to escape tax obligations.

There are an abundant number of positive and negatives aspects of corporate inversions and the contrast between these two are quite interesting. Inversions allow for the retention of money by the inverted company which in turn allows the entity to reinvest the funds into different available assets. The reinvestments can range from fixed assets to intangible assets to the expansion of the workforce. These investments provide strength to the company enabling them to perform tasks they otherwise would not be able to perform such as corporate diversification into different economies (Desi & Dharmapala, 2009).

A particular issue is when the foreign subsidiary provides credit support for loans made to their parent company. When structuring credit support arrangements, both the borrower and lender should consider how to avoid unintentional costs. For example, under U.S. tax rules, certain tax support provided by foreign subsidiaries of a U.S. parent company borrower can cause the parent for tax purposes, to receive an annual dividend from the foreign subsidiary to the extent of the subsidiary's earnings typically to the amount of the loan. Such dividends can have significant adverse tax consequences for the parent entity being required to pay U.S. tax on the dividends without sufficient cash on hand to satisfy the tax liability. To avoid this situation, lenders and borrows often agree to the amount of credit support to be provided by the foreign subsidiary to avoid creating the dividend issue (Osler et al., 2017)

Inversions can cause unneeded tension on the economy for the country they are exiting. These problems range from loss of revenue to unemployment increases. Significant damage can be placed upon the economies by the loss of these entities. This burden can also be passed along to the individual taxpayer as they see the increasing tax obligation. However, Babkin et al. (2017) report foreign and tax-exempt investors, along with chief executive officers, disproportionately benefit from an entity's inversion. Although Babkin et al. (2017) show that an inversion reduces the wealth of many, they also report personal taxes are the recipients of a generous wealth transfer. Governments must be willing to find common ground with its citizens in order to satisfy the needs of both parties (Clausing, 2014).

Corporate inversions have become a common practice in today's world as companies continue to expand their visions and goals to accommodate the consumers. The company that can most accommodate their consumers will be able to retain their business and investments. Companies must be open to new methodology to remain competitive in the most difficult economies. Companies are increasing their efficiencies dramatically in order to remain "in the green." Thankfully, there is an abundance of decision makers that have found ways to operate in the most efficient manners (Bybee, 2016).

With the positive outlooks, come negatives. The negative effects must be viewed by the governing body in order to make the most informed decision regarding the resolving process. Governments must work effectively with large corporations to provide important tax incentives to keep corporations in the U.S. from electing to invert. Some situations may not warrant the existence of tax incentive programs to keep companies within their current domicile (Voget, 2011).

However, there are companies that transfer their domicile overseas to get back to their origins. For example, Anheuser-Busch transferred back to Belgium, its original home residence. Apparently, the U.S. government does not try to prevent these inversions from happening. Rather, it would like to stop the companies that are purposely doing so to avoid higher taxes (Rao, 2015). Governments must ascertain the corporation's intent and decide whether the intent violates tax regulations imposed by the U. S. (Bybee, 2016).

## **DISCUSSION**

Tax Inversion creates opportunities for some while creating issues for the others. A company's main objective is to increase profits and dividends for shareholders. Companies constantly evolve their corporate strategies to adapt and survive in the current marketplace. Transferring their home domicile to another country allows the corporation to retain a higher amount of their profits based on the lower tax rates of the foreign country. It is important to not confuse this with tax evasion. Tax evasion is the intent to withhold the payment of taxes from the government. For tax inversion, the company finds another country with a lower tax rate to relocate its domicile. Does this make it ethical? That depends on what side of the issue you stand, corporate strategy or the government tax revenue collection.

Many U.S. multinational corporations decide to reduce the adverse effects of the U.S. tax code on their profitability by reincorporating in places such as Bermuda, Barbados, the Cayman Islands or other jurisdictions with low or no corporate income tax. The reincorporation is legal under U.S. law as there is no requirement that a company sell or produce anything in its country of domicile (Kim, 2005). While inversion transactions can damage the U.S. economy by reducing tax receipts, the inverted corporations directly benefit from the tax savings. The corporate tax savings are a plus as they translate into higher wages and more jobs (Sheppard, 2003). Given this result, corporate inversions will continue to go unabated and the legislative and executive efforts may be inadequate to end altogether the practice of corporate inversions (Simpson, 2012; Chiu, 2015).

Theorists believe that the best way to avoid the loss of corporations engaging in tax inversions is to lower the corporate tax rate (Mann, 2004; Yang et al., 2017). That may be a simple and easy solution to a difficult problem but there are consequences. Where will the U.S. government find income to replace the loss of tax revenues from the exiting corporations? This burden will be passed on to the shareholders or individuals (Talley, 2015) as a lower corporate tax rate results in a higher individual tax rate. The U.S. government must maintain its constant revenue stream in order to satisfy budget demands.

With the lack of resources due to decreased tax revenues, the economy begins to weaken and budget deficits increase. This makes the economy more fragile. While it seems unfair to tax corporations more that stay in the U. S., the significant revenue loss from corporate inversions will force the U.S. into this position.

The taxation of foreign-earned income is something of strategic value to a company moving its operations overseas. Governments created ways to prevent double taxation on income earned in other countries and brought into their country, by awarding foreign tax credits (Jeffers, 2014). The tax credits reduce the tax burden when income is brought into another country to continue operations. For instance, if a company earns revenue of \$1,000 in a foreign country that holds a 15% tax rate, they would essentially owe that country \$150 of its income. If the corporation chooses to bring that earned income into the United States of America, it must pay an additional tax of 20% (The difference between the U.S. tax rate of 35% and the tax rate of the foreign country of 15%), or \$200, to the United States government. This practice is a government's way of trying to prevent the purpose of transferring operations overseas. If a company pays the same amount of tax, it detours companies from going overseas as they gain no benefit.

What happens when companies move their domicile abroad for strategic advantages rather than a tax advantage? An example of a strategic corporate move is the 2014, Burger King acquisition of Canada's Tim Horton's in an \$11 billion deal, which allowed Burger King to transfer its domicile into a lower-tax rate country. Burger King's focus was to remain competitive in a very lethal and strong market, which is fast food service (Turchiaro, 2015). To compete with other corporations like McDonalds and Starbucks, Burger King was willing to adjust the

overall scheme of their business plan to adapt to the changing market. By acquiring Tim Horton, Burger King diversified their market into another country while cornering a very important aspect of consumer usage. The following are data comparing the Burger King acquisition versus remaining in the U. S.

**Exhibit 2**  
**U. S. versus Canada using the Same Purchase Price**

	U.S.	Canada
<b>Purchase Price</b>	<b>\$11,000,000,000</b>	<b>\$11,000,000,000</b>
<b>Earnings Before Income Tax</b>	<b>\$340,000,000</b>	<b>\$340,000,000</b>
<b>Federal Tax Rate</b>	<b>35%</b>	<b>26.5%</b>
<b>Taxes Payable</b>	<b>\$119,000,000</b>	<b>\$90,100,000</b>
<b>Tax Difference</b>		<b>\$28,900,000</b>
<b>Percent Purchase Price</b>		<b>0.262%</b>

(Capurso, 2016)

Further analysis of these data provides justification beyond a tax advantages for Burger King’s acquisition. Yes, the acquisition the \$11 billion purchase lead to a \$28.9 million tax savings that is less than 1% of the total price paid. This was not a strategic purchase advantage because using the \$28.9 million tax savings results in 381 years buy back (\$11 billion/\$28.9 million). However, the acquisition provided Burger King an entry into a market that was otherwise closed that ultimately provided a lucrative fast food market deriving extensive profits (Capurso, 2016).

The government’s main objective when dealing with problems like these are to make sure and create tax opportunities and incentives that will keep companies in America. The failed performance by today’s government has allowed companies to transfer overseas, causing lower income for the United States Government. This lack of income has led to many government projects and operations being cancelled. The government is simply not producing the revenue needed to match the expenditures of these projects. Without stronger corporate reform, we will continue to see these corporations leave for “greener pastures.”

The Corporate Tax Rate in the United States stands at 38.90 percent. Corporate Tax Rate in the United States averaged 39.19 percent from 2000 until 2017, reaching an all-time high of 39.30 percent in 2001 and a record low of 38.90 percent in 2016 (DTTL, 2017). The U.S. has the highest tax rate for corporations at 38.9.1%, while the single average is a mere 25.0% (Piketty & Saez, 2007). That is equivalent to a manufacturer charging \$10 per product while other manufacturers are charging \$6 for the same product. Unless there is a significant advantage provided by the higher production cost that would distinguish it from the lower production cost, it would be seen as an uneducated decision to buy products produced at the higher costs. If a corporation has the choice between two countries with significantly different tax rates, it is prudent to place their headquarters in the country with the lower tax rate, providing it is legal.

Since the origins of tax inversion, the U.S. government has implemented strategies and laws that have been slowly handcuffing corporation inversion

practices. In 2014, the U.S. government implemented Treasury Notice 2014-52 which addressed two basic aspects of inversions. One set of changes limited the ability to access the accumulated deferred earnings of foreign subsidiaries of U.S. firms. The second regulatory action restricted certain techniques used in inversion transactions that allowed firms to qualify with less than 80% ownership (Marples & Gravelle, 2015)

By implementing these policies, the U.S. government forced companies to pay the corporate tax rate if they deposited the earned income in a U. S. financial account. These new regulations established a means to slow the rate of inversions. Congress continues to place restrictions on corporate earned income as well as not working to lower the tax rate paid by corporations (Babkin et al., 2017). Until Congress acts to lower the high corporate tax rate, corporation will continue to find means to circumvent restrictions so as to continue to move their tax domicile to a location to take advantage of paying a lower tax rate.

## **CONCLUSION**

Overall, corporate strategies have their place in the market but it is the government's responsibility to regulate the market to ensure companies are not taking advantage of the system. Companies wishing to move their domicile to foreign countries to minimize tax obligations must be willing to adhere to the payment of any and all tax penalties. Governments must find strategies that are beneficial to both parties when considering tax options. The temptation will be present for companies to implement tax inversions as long as the tax rate differences are significant. Governments and the Organization for Economic Co-Operation and Development (OECD) must work together to ensure that countries are not continuing to lose corporations to transfers abroad. A compromise is warranted for the corporate tax situations.

The U. S. has the highest statutory corporate rate in the developed world, but also raises far too little revenue relative to its tax planning, compliance, and administrative costs. While the regulatory actions recently announced by the Treasury Department may be effective in temporarily stalling the current wave of inversions, they will likely do no better than to serve as stopgap measures (Zahrt, 2015). The regulations that are currently on U. S. corporations are only temporary blocks in the floodgates of corporate inversion. These regulations cannot continue to hold back corporations from leaving the U. S. without inducing heavier reform on tax laws. Unless stronger provisions are made to the tax laws, the U. S. will continue to lose corporations to tax inversions and mergers which mean major reductions in U.S. tax revenue.

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