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Financial secrecy, tax havens, and liquidity: evidence from non-US stocks

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Abstract

We investigate the relation between a country's level of financial secrecy and market liquidity for non-US stocks listed on the New York Stock Exchange (NYSE). Our results indicate that non-US stocks from countries with lower levels of financial secrecy have higher market liquidity, as well as a lower probability of information-based trading. Deeper analysis into components of financial secrecy, including a jurisdiction's activity as a tax haven, lends insight into significant drivers of these effects. Our findings suggest that reducing financial secrecy can enhance market liquidity, ultimately benefiting investors and contributing to the overall stability and efficiency of financial markets.

Keywords: market liquidity, bid-ask spreads, information-based trading, financial secrecy, tax havens

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1. INTRODUCTION

The benefits to globalisation of investment opportunities, particularly with equity, have been widely documented, both for the investor and for the companies that avail themselves of capital (Mittoo, 1992; Doidge, Karolyi & Stulz, 2004). For the investor, foreign investment provides the opportunity for portfolio diversification, achieving returns from multiple vehicles that are not perfectly correlated with each other. For the company, equity issuance enables access to a larger base of shareholders and a lower cost of capital. Standard market measures, such as valuation and liquidity, are improved by the increased visibility. But just how much are these measures improved?

At the same time that liquidity can be enhanced, these same stocks suffer from competing effects that plague investments into foreign companies (French & Poterba, 1991; Coval & Moskowitz, 1999; Coval & Moskowitz, 2001). The famed quote from legendary investor Peter Lynch to 'buy what you know' seems to weigh heavily for investors when it comes to foreign investment. This article seeks to examine information asymmetry effects directly by looking at one oft-overlooked source of investor trepidation: regulation.

The interplay between these two regimes – an investing landscape with diminishing global barriers and common capital interests, on the one hand, and a regulatory landscape with widely varying sets of governmental processes and philosophies across borders, on the other, set up a delicate balance between factors that can either encourage, or discourage, foreign investment. Our intersection is found by exploring the range of opportunities created by non-US stocks on the New York Stock Exchange (NYSE), coupled with the levels of financial secrecy that exist in the home countries of the companies representing those non-US stocks. We find that financial secrecy is significantly related to liquidity and information asymmetry across multiple measures, both in cross-section by country and within countries as levels of secrecy change over time. In a deeper analysis, we explore tax characteristics underlying financial secrecy and look specifically at a country's status as a tax haven for multinational corporations. We find that liquidity is lower, and information asymmetry is higher, in countries marked by higher haven indexes and scores. In so doing, we provide a different perspective from the conventional argument that listing requirements on a major stock exchange ensure adequate information availability for investors. Instead, characteristics of home countries, particularly pertaining to tax regulation, persist in their effects at least as far as the NYSE.

Our results suggest implications for investors and policy-makers, and much of this derives from the fact that the importance of liquidity is difficult to overstate. Investors demand liquidity as an offset to risk, needing assurance that positions can be sold when forecasts or personal/business situations change. Moreover, companies plagued by a lack of liquidity suffer damage to their own credibility, manifested in the form of discounted shares and a diminished ability to obtain capital, when investors require a higher return on their investment (Amihud & Mendelson, 1986).

The rest of this article is organised as follows: section 2 provides a literature review and hypotheses. Data and methodology are outlined in section 3, and section 4 presents the results. Section 5 provides conclusions, implications, and suggestions for future research.

2. LITERATURE REVIEW AND HYPOTHESES

2.1 Global investment and reduced barriers

As previously noted in the Introduction, the advantages for companies in listing across borders are numerous (Stulz, 1999; Doidge et al., 2004). Looking at the US markets alone, this can be observed in the increased number of listings of non-US stocks on US exchanges, as long charted by the Bank of New York Mellon. For example, in December 2000, there were approximately 330 non-US stocks listed on the NYSE. As of 2020, the number of non-US stocks listed on the NYSE had risen by nearly two-thirds, to 542. Some of this has simply been due to the globalisation of capital markets, which has made it easier for companies to access international investors. Another factor has been the growing interest in emerging markets, particularly in Asia and Latin America, where many companies are seeking to tap into the liquidity and expertise of US investors.

For domestic US investors, non-US stocks are becoming an increasingly popular way to gain exposure to international markets, particularly in regions where direct investment may be more difficult or risky. Non-US stocks in the form of American Depository Receipts (ADRs) offer investors a convenient and liquid way to invest in foreign companies, without having to navigate local market regulations or currency risk. Overall, the trend of listing non-US stocks is likely to continue in the coming years, as more companies seek to tap into global capital markets and more investors look for opportunities to diversify their portfolios internationally.

There are several benefits to listing non-US stocks on US exchanges (Doidge, Karolyi & Stulz, 2009; Fernandes & Ferreira, 2008; La Porta et al., 1998; Lang, Lins & Miller, 2003; Reese & Weisbach, 2002). First, companies listed on non-US exchanges may seek to tap into US capital markets to raise funds and increase their visibility in the US. Listing non-US stocks on a US exchange provides US investors with easier access to the company's shares and allows the company to tap into the world's largest pool of investment capital. Second, it provides US investors with a convenient way to diversify their portfolios. Third, listing non-US stocks on US exchanges can increase the credibility of foreign companies. Finally, the transparency and governance requirements of a US exchange can lead to lower uncertainties and information asymmetries, with commensurate lower trading costs, for cross-listed foreign stocks.

2.2 Financial secrecy and threats to investment

La Porta and co-authors (2008) have noted that the regulatory environment can influence investment levels through their effect on information asymmetries, both real and perceived. Tax policy, in particular, can have implications for trading costs, as delineated in Listokin (2011). Within the last decade alone, the influence of taxation on markets has been the subject of significant attention among researchers. For example, Chen and co-authors (2018) found that income-shifting to jurisdictions with lower tax rates increased information asymmetry. Gaertner, Hoopes and Williams (2020) and Kalcheva and co-authors (2020) observed market valuation effects in response to new tax policies resulting from the Tax Cuts and Jobs Act (TCJA), and Wagner, Zeckhauser and Ziegler (2018) observed that even an expectation of changes to tax policy leads to valuation changes; importantly, these studies all showed variations relative to myriad taxation regimes internationally. At a philosophical level, related concerns have called for renewed discussion on the differences between tax avoidance and tax evasion, and regulation's influence on either activity (Christians, 2017).

In recent years, financial secrecy has become a widely discussed topic due to its potential role in facilitating illicit activities such as tax evasion and money laundering. Non-US stocks from countries with high levels of financial secrecy may be especially vulnerable to these risks. Increased concern for financial secrecy has prompted the Tax Justice Network (TJN) to formulate databases and analyses of different country environments in order to catalogue possible threats. Their work, while relatively new, is already being incorporated into the current body of academic literature (Killian et al., 2022; Walton, 2022). It is from this database, and out of this concern, that we conduct our exploration into the impact of financial secrecy on market dynamics.

2.3 Hypotheses development

On the one hand, one might expect negligible effects of financial secrecy on market liquidity. The NYSE itself sets up rigorous requirements for listing, demanding levels of transparency and conformity to accounting standards that could reduce information asymmetries. Janský, Palanská and Palanský (2022) find that only highly secret destinations are used for illicit purposes, which could reduce variation in market effects across the broad spectrum of our investment universe. Moreover, Hakelberg (2016) noted that an automatic information exchange instituted by the US Foreign Account Tax Compliance Act and the Common Reporting Standard initiated by the Organisation for Economic Co-operation and Development (OECD) (OECD, 2014, 2017) took significant steps to reducing financial secrecy, and an earlier effort attempted the same through the Savings Tax Directive of the EU in 2009. All of these efforts could minimise any effects within our sample period.

Conversely, ADRs present a very specific challenge to foreign investment. While they make it easier, in some respects, to invest in non-US stocks, they represent initial public offerings (IPOs) at the time of initial listing that have been essentially private until then. Consequently, an extensive set of historical analysis can be missing. In addition, even if measures to reduce financial secrecy are effective, Janský and co-authors (2022) assert that investors merely adjust by exploring tax havens in other destinations.

Specifically, financial secrecy can create information asymmetry and, in turn, reduced liquidity. Wherever information is difficult to obtain, sophisticated investors will have resources to uncover better information than those who are less resourceful or informed. Uninformed investors then need to protect against losses (Johnson & So, 2018; Amiram, Owens and Rozenbaum, 2016). In essence, when there is risk and uncertainty, market makers will obtain compensation through wider bid-ask spreads, as has been evidenced in multiple studies (Foerster & Karolyi, 1998; Odders-White & Ready, 2006; Ding & Hou, 2015; Hameed, Kang & Viswanathan, 2010). Liquidity, in turn, has been observed to mediate the impact of information asymmetry on markets (Kelly & Ljungqvist, 2012).

Because non-US stocks represent a particularly vulnerable set of investments, and as investors can move their capital to alternative destinations as regulations in one country change, we expect that concerns from financial secrecy would be strong enough to impact investor sentiment, as seen through market measures of liquidity and information asymmetry. We operationalise these predictions through multiple measures of each, but broadly express the predictions in two overarching hypotheses:

H_1: *Non-US stocks from countries of higher financial secrecy will possess lower levels of market liquidity.*

H_2: *Non-US stocks from countries of higher financial secrecy will possess higher levels of information asymmetry.*

3. DATA AND METHODOLOGY

We obtained Financial Secrecy Score (FSS) data from the TJN. Due to the limited availability of financial secrecy data, we use data from 2011, 2013, 2015 and 2018, and fill in missing years with prior data. This score ranks jurisdictions based on their level of complicity in facilitating financial secrecy, which can enable tax abuse and money laundering via, for example, weaknesses in tax regulation and a lack of legal entity transparency. By using these scores, we aim to assess the potential impact of financial secrecy on the liquidity of non-US stocks.

The FSS can range from 0 (no secrecy) to 100 (unlimited secrecy), and it is calculated by the TJN using 20 indicators across four categories. These four categories are Ownership Registration, Legal Entity Transparency, Integrity of Tax and Financial Regulation, and International Standards and Cooperation. Ownership Registration consists of five indicators, which are bank secrecy, trust and foundations register, recorded company ownership, other wealth ownership, and limited partnership transparency. The overarching concept within this category is to capture the degree to which individual wealth is opaque to outside inquiry.

Legal Entity Transparency also consists of five indicators, which are public company ownership, public company accounts, country-by-country reporting, corporate tax disclosure, and legal entity identifier.

Integrity of Tax and Financial Regulation consists of six indicators, which are tax administration capacity, consistent personal income tax, avoids promoting tax evasion, tax court secrecy, harmful structures, and public statistics.

International Standards and Cooperation consists of four indicators, which are anti-money laundering, automatic information exchange, exchange of information on request, and international legal cooperation.

The TJN determines an index value by combining FSS and Global Scale Weight (GSW), which is the degree to which multinational financial activity occurs in a country. The precise formula used in this combination is to multiply the cube of FSS by the cubed root of GSW, dividing the result by 100. The computations related to financial secrecy are discussed in more detail in Janský and co-authors (2022).

Because of the prominence of tax-related measures in the TJN's assessment of financial secrecy, we probe further by looking at the TJN's determinations of Haven Score and the Corporate Tax Haven Index (CTHI). The Haven Score uses a set of 20 indicators in five categories to evaluate jurisdictions on their level of financial transparency and their provision of offshore financial services. It indicates the allowance for tax abuse within the jurisdiction's laws and ranges from 0 (no ability for corporate tax abuse) to 100 (unrestrained allowance).

The Haven Score is an average of the five category variables: LACIT (Legal and Accounting Complexity Index); Loopholes and Gaps; Transparency; Anti-Avoidance; and Double Tax Treaty Aggressiveness. LACIT measures the complexity of a country's legal and accounting systems. Higher levels of complexity can create loopholes and opportunities for tax avoidance and evasion. Loopholes and Gaps refers to specific gaps

or weaknesses in a country's tax laws or enforcement mechanisms that can be exploited for tax avoidance or evasion. Transparency measures a country's level of openness in terms of its tax and financial systems. Higher levels of transparency can help prevent tax evasion and illicit financial flows. Anti-Avoidance measures a country's commitment to combating tax avoidance through the use of legal and regulatory measures. Double Tax Treaty Aggressiveness refers to agreements between two countries to prevent double taxation of income earned by individuals or companies operating in both countries. These treaties can help promote investment and trade between countries while also preventing tax evasion.

The CTHI then combines the Haven Score with GSW. The precise formula used in this combination is to multiply the cube of the Haven Score by the cubed root of GSW, dividing the result by 100. A higher CTHI therefore indicates a higher risk of multinational corporate tax abuse occurring in a jurisdiction.

We identify non-US stocks listed on the NYSE by obtaining information from the NYSE's non-US companies database, resulting in a sample of 3,462 non-US stocks from 41 different countries. The number of non-US stocks and countries varies each year, and we use data from 2011 to 2019.

To gather data on liquidity variables for non-US stocks, we use the Trade and Quote database (TAQ) provided by the NYSE, which contains extensive historical data on stock prices, trading volume, bid-ask spreads, and other important liquidity measures. We apply standard data filters commonly used in microstructure literature to remove errors and outliers. These filters include: (1) deleting quotes if either the bid or ask price is negative; (2) deleting quotes if either the bid or ask size is negative; (3) deleting quotes if the bid-ask spread is greater than USD 4 or negative; (4) deleting trades and quotes if they are out of time sequence or involve an error; (5) deleting before-the-open and after-the-close trades and quotes; (6) deleting trades if the price or volume is negative, and (7) deleting trades and quotes if they changed by more than 10% compared to the last transaction price and quote. These filters help to ensure that the data is cleaned of errors and outliers and is suitable for analysis.

This section outlines the procedures for calculating various measures of liquidity and information-based trading. The quoted spreads of stock *i* at time *t* are calculated as the difference between the ask and bid prices:

$$Quoted\ Spread_{i,t} = (Ask_{i,t} - Bid_{i,t});$$

where $Ask_{i,t}$ is the ask price for stock *i* at time *t*, and $Bid_{i,t}$ is the bid price for stock *i* at time *t*.

To calculate the effective spread when trades occur within the bid and ask quotes, we use the following:

$$Effective\ Spread_{i,t} = 2D_{i,t}\ (P_{i,t} - M_{i,t});$$

where $P_{i,t}$ is the transaction price for stock *i* at time *t*, $M_{i,t}$ is the midpoint of the most recently posted bid and ask quotes for stock *i*, and $D_{i,t}$ is a binary variable equal to 1 for customer buy orders and negative 1 for customer sell orders. We estimate $D_{i,t}$ using the algorithm proposed by Ellis et al. (2000).

We calculate the quoted depth of stock *i* at time *t* as the sum of the ask and bid depths:

$$Quoted\ Share\ Depth_{i,t} = (Ask\ Depth_{i,t} + Bid\ Depth_{i,t});$$

where Ask $Depth_{i,t}$ is the ask depth for stock *i* at time *t*, and Bid $Depth_{i,t}$ is the bid depth for stock *i* at time *t*. Ask depth and bid depth indicate the number of limit orders to sell and buy, respectively, a security. As such, the quoted depth of a stock measures the degree to which a large number of trades would affect its market price.

We use the market quality index (MQI) proposed by Bollen and Whaley (2004) to measure the overall effect of the ratings on market liquidity. This measure captures the tradeoff between quoted spread and market depth and is a direct measure of liquidity. The MQI is defined as the ratio of the quoted depth to the quoted spread:

$$Market\ Quality\ Index_{i,t} = (0.5)Quoted\ Depth_{i,t} / Quoted\ Spread_{i,t}.$$

The price impact of trades measures the extent of information-based trading, and we calculate it using the following:

$$Price\ Impact_{i,t} = 100\ D_{i,t}(M_{i,t+5} - M_{i,t});$$

where $M_{i,t}$ and $M_{i,t+5}$ are the quote midpoints for stock *i* at time *t* and *t+5* minutes, respectively. The price impact of trades measures the extent to which a trade alters the share price. If a trade carries no new information on the value of the share, its price impact should be zero on average. If a trade is information motivated, the price will tend to rise if initiated by a buyer and fall if initiated by a seller. The mean value of the price impact during each interval is calculated by weighing each trade equally.

The realised spread for each trade measures the market maker's revenue net of losses to informed traders (manifested by the price impact of trades):

$$Realised\ Spread_{i,t} = 2D_{i,t}\ (P_{i,t} - M_{i,t+5});^{1}$$

where *i* is the stock, *t* is the time interval, $D_{i,t}$ is the trade direction (1 for buy and -1 for sell), $P_{i,t}$ is the transaction price, and $M_{i,t+5}$ is the mid-quote price (the average of the bid and ask prices) 5 minutes after the transaction. The trade-weighted average realised spread can be calculated for each 30-minute interval.

In addition to analysing the realised spread and price impact as metrics for measuring information-based trading, we also incorporate the probability of informed trading (PIN) introduced by Easley and co-authors (1996). PIN is a metric that quantifies the likelihood of a trade in a financial market being informed, where informed trades are those executed by traders who possess non-public information about the value of an asset that is not yet reflected in its market price. The PIN is calculated based on the order flow characteristics of the market and the proportion of informed traders. The model assumes that the order flow in a market is a mixture of informed and uninformed trades, with the proportion of informed trades denoted by the symbol 'θ'. The PIN is defined as:

$$PIN = (\theta/1-\theta) * (E(qi)/\sigma(qi))^2$$

[1] Note that the realised spread is equal to the difference between the effective spread and the price impact of trades, all expressed in dollars: $2D_{i,t}\ (P_{i,t} - M_{i,t+5}) = 2D_{i,t}\ (P_{i,t} - M_{i,t}) - 2D_{i,t}(M_{i,t+5} - M_{i,t})$.

where θ is the proportion of informed trades, E(qi) is the expected value of the order flow of informed trades, and σ(qi) is the standard deviation of the order flow of informed trades.

4. RESULTS

4.1 Primary analysis

Table 1 (Appendix), Panel A presents FSS data from the TJN for the countries in our dataset (Janský et al., 2022). The scores can theoretically range from 0 to 100, with higher scores indicating higher levels of secrecy. For example, in 2018, the three countries with the highest scores were The Bahamas, Liberia and Thailand, with scores of 85, 80 and 80, respectively.

Table 1, Panel B presents CTHI values and Haven Scores from the TJN for the countries in our dataset (Janský et al., 2022). Like the FSS, the Haven Score can theoretically range from 0 to 100, with higher scores indicating a higher allowance for tax abuse within the jurisdiction's laws. For example, in 2018, the three countries with the highest scores were The Bahamas, Bermuda and the Cayman Islands, all with scores of 100. One of the benefits of this dataset is that it includes information from low-income countries that are often excluded in other projects.

Table 2 (Appendix) presents descriptive statistics. Here, means and standard deviations can be seen for our variables of interest, discussed in section 3. In addition, percentile tabulations show alternative measures of the distribution in our data and allow inference of sample medians. Table 2 shows the average non-US stock is traded at a price of USD 25.50, possesses annual volatility of 2.4%, a trading volume of USD 31 million, a quoted spread of 0.5%, and a price impact of 0.2%.

The results of our regressions are shown in Tables 3-5 (Appendix). In general, our analysis reveals that non-US stocks from countries with higher levels of financial secrecy have lower liquidity and higher information asymmetry. Specifically, we find that a one-standard-deviation increase in financial secrecy is associated with a 0.2% decrease in liquidity and a 0.1% increase in information asymmetry.

In Table 3, we incorporate a multivariate model to show the effect of financial secrecy on four separate measures of liquidity: Quoted spread, effective spread, depth and MQI. These measures are represented by DV in our model:

$$DV_{i,t}, = \beta_0 + \beta_1 FSS_{j,t} + \beta_2 Log(Political_{j,t}) + \beta_3 Log(GDP_{j,t}) + \beta_4 (1/Price_{i,t}) + \beta_5 Return\ Volatility_{i,t} + \beta_6 Log(Volume_{i,t}) + \beta_7 Log(Market\ Cap_{i,t}) + Industry\ FE + Year\ FE + \varepsilon_{i,j,t} \quad (1)$$

Hence, in each case, we control for political risk, GDP to capture macroeconomic effects, market price, price volatility, trading volume, and market capitalisation. Harris and Raviv (1990) have asserted that in addition to price-based measures of liquidity (e.g., the bid-ask spread), this market characteristic should be measured by quantity-based measures, motivating the additional analysis pertaining to depth. We do not include firm fixed effects, as the variation in country is small over time, and there is only one value per country each year. This means that the variation in FSS is not primarily driven by differences between individual firms, but rather by differences between countries. In this case, using firm fixed effects in the regression analysis would not be appropriate because there is not enough within-group variation to estimate the

effects of the liquidity or information asymmetry variables. (Firm fixed effects are typically used when there is substantial variation within firms over time, and when the effects of interest are estimated by comparing changes within firms over time.) As a robustness check, the standard errors are clustered by year to account for any correlation or heterogeneity within each specific year. As can be seen in the Table, FSS loads at less than 1% statistical significance levels in each model; in all cases, the sign of the coefficient corresponds to higher levels of secrecy reducing market liquidity, supporting H_1.

Note that we have included the political risk rating of each country as a governance control variable, sourced from Worldwide Governance Indicators (WGI).[2] This additional control variable helps to capture the potential influence of country-specific factors on our results, beyond the effects accounted for by the industry and year fixed effects regressions. These indicators have found widespread application across myriad scholarly investigations (Kaufmann, Kraay & Mastruzzi, 2011; Ruiz-Cantero et al., 2019; Handoyo, 2023). Specific to our article, Eleswarapu and Venkataraman (2006) pinpoint the critical role of political stability in influencing information risk and investor participation, thereby significantly impacting trading costs. By using the political risk measure from WGI, we aim to capture this key factor identified in the literature as a crucial determinant of trading costs. This measure is particularly relevant to our research question as it encapsulates the broader implications of political stability on governance, providing a comprehensive perspective on the macro-level institutional environment.

In Table 4, we look at regressions showing the effect of financial secrecy on three separate measures of information asymmetry: Realised spread, price impact and PIN. Controls are conducted similarly to the regressions in Table 3. As can be seen in the Table, FSS is statistically significant at 1%, 5%, and 10% levels for realised spread, price impact and PIN, respectively; in all cases, the sign of the coefficient corresponds to higher levels of secrecy increasing information asymmetry, supporting H_2.

Table 5 extends our analysis to changes in both dependent and independent variables. Regressions using the first difference of variables, which measure changes in the variables over time, are generally considered to be less susceptible to displaying spurious relationships between variables than regressions using the level variables. This is because first differencing eliminates time-invariant unobserved heterogeneity that may cause spurious correlations between variables. Therefore, using first differences of variables can be a more robust approach to testing causal relationships. Note that in order to use available data for first differencing regressions, we computed the difference between 2013 and 2011, 2015 and 2013, and 2018 and 2015. As a result, the first differencing regressions contain a total of 885 observations.

The results of these regressions, as shown in Table 5, indicate that the coefficients (quoted spread and effective spread) on the change in the FSS for non-US stocks are positive and significant. This suggests that an increase in spreads is associated with an increase in the country's FSS. This finding provides further evidence for the robustness of the relationship between spreads and FSS and supports the conclusion that increasing financial secrecy accountability can lead to an increase in spreads.

[2] See World Bank, 'Worldwide governance indicators', https://www.worldbank.org/en/publication/worldwide-governance-indicators.

4.2 Supplemental analysis

According to the TJN, the increasing number of tax havens have a negative impact on global tax revenues by enabling wealthy individuals and corporations to shift their profits to lower tax jurisdictions and avoid paying their fair share of taxes. This practice fosters unjust competition among nations and weakens the ability of governments to furnish essential public services and tackle social disparities.

The TJN developed the CTHI to address corporate tax-dodging activities specifically. The index ranks countries based on their facilitation of corporate tax avoidance, considering a range of indicators such as tax rates, tax incentives and loopholes that allow companies to shift profits to lower tax jurisdictions. The CTHI supplies a ranking of the 50 most complicit jurisdictions in enabling corporate tax avoidance.

Apart from the CTHI, the TJN has also developed the Haven Score, a broader measure of financial secrecy and tax haven activities across all sectors, not just corporate taxation. The Haven Score uses a set of 20 indicators to evaluate jurisdictions on their level of financial transparency and their provision of offshore financial services. The Haven Score ranks 130 jurisdictions based on financial secrecy and tax haven activities.

To examine the relation between liquidity, CTHI and Haven Score, we first regress both the quoted and effective spreads on CTHI and Haven Score along with several control variables. We show the regression results in Table 6 (Appendix). The coefficients of the regressions for the CTHI and Haven Score are positive and highly significant. The positive coefficients indicate that non-US stocks from countries with higher tax haven indexes and scores tend to exhibit wider quoted and effective spreads, suggesting that these stocks provide lower liquidity. In order to fully assess liquidity and gain a more comprehensive view of the tax effects, we consider not only the spread but also the depth and MQI. The regression results for depth and MQI are presented in Table 7 (Appendix). Consistent with the results from spreads, the coefficients of regressions for depth and MQI are negative and highly significant, indicating that depth and MQI for non-US stocks from countries with higher corporate tax haven indexes and scores are lower than those for stocks from countries with lower corporate tax haven indexes and scores.

Building on the significant empirical association between our liquidity measures and tax haven scores that we established in the previous section, we delve into a deeper analysis of the relationship. Specifically, we aim to identify the haven indicators that are driving this association. The Haven Score is constructed from 20 indicators that assess the tax and legal systems of each country, each reflecting different mechanisms that multinationals use to avoid taxes. These indicators are divided into five categories, each accounting for 20% of the overall score: Legal and Accounting Complexity Index, Loopholes and Gaps, Transparency, Anti-Avoidance and Double Tax Treaty Aggressiveness.

To find out which component of tax haven scores drives the results, we regress our measures of liquidity on the five categories of tax haven scores and on the control variables. We show the regression results in Table 8 (Appendix). The results show that both the quoted and effective spreads are positively and significantly related to two (Anti-Avoidance and Double Tax Treaty Aggressiveness) of the five tax haven categories.

Regarding Anti-Avoidance, one of its indicators is Controlled Foreign Company (CFC) rules. They garner much attention in international tax discussions; one can surmise that they would cause scepticism regarding investments. In fact, they have been a common topic of study since the TCJA (e.g., Clausing, 2020). Regarding Double Tax Treaties, these also attract a lot of attention and would be salient to investors. For example, Beer and Loeprick (2018) focus on Sub-Saharan Africa and assert that investors are not attracted to areas that engage in treaty shopping, an activity that would have resulted in a high score within this category, consistent with our regression analysis.

5. CONCLUSION

We investigate the relationship between a country's level of financial secrecy and market liquidity for non-US stocks listed on the NYSE from 2011 to 2019. Our findings suggest that non-US stocks from countries with lower levels of financial secrecy have better market quality, including narrower spreads, higher market quality indices, smaller price impacts of trades, and lower probabilities of information-based trading. The results also indicate that changes in the liquidity measures are significantly related to changes in the level of financial secrecy of the country over time.

Going further, we explore tax characteristics underlying financial secrecy and look specifically at a country's status as a tax haven for multinational corporations. We find that liquidity is lower, and information asymmetry is higher, in countries marked by higher haven indexes and scores. Weak anti-avoidance qualities, and double tax treaty aggressiveness, appear especially influential in creating these market inefficiencies.

Altogether, our results regarding financial secrecy and tax havens present an alternate perspective from the theory that cross-listing, with its associated expectations for corporate governance, is enough to ensure liquid markets. In turn, these findings have several implications for investors, policy-makers, and academics. First, investors can benefit from investing in non-US stocks from countries with lower levels of financial secrecy, as they are associated with higher market liquidity and lower trading costs. Second, policy-makers should focus on improving the level of financial transparency and disclosure in their countries, as it can help attract more foreign investment and enhance the liquidity and quality of their domestic financial markets. Prior attempts by policy-makers have had mixed results, as noted by the work of Johannesen and Zucman (2014) and Casi, Spengel and Stage (2020) and may need to invoke notions of third-party monitoring (Chan and Lam, 2018). Academics would not only want to continue this line of research, but also will want to include financial secrecy in models of trading cost determinants.

However, further research is needed to provide a more comprehensive understanding of the relationship between financial secrecy and market liquidity in other markets and to consider other factors that may affect market liquidity, such as political stability and economic development. In addition, competing factors would need to be explored. For example, if a jurisdiction is characterised by high levels of financial secrecy, it may deter investment into individual companies but attract assets through illicit mechanisms. An examination of this trade-off would be useful to policy-makers attempting to effect change. Finally, future studies should replicate these analyses as more data from the TJN become available. For example, given the limited number of time periods, we cannot reliably include year fixed effects in the first differencing regressions due to a lack of within-group variation. This is a natural challenge when embarking in a direction

that has been less studied, but it highlights a promising line of inquiry in the years to come as more observations become available.

Overall, this study contributes to the literature on market liquidity and financial regulation and provides insights for investors and policy-makers to improve market quality and efficiency.

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7. APPENDIX

Table 1: Financial Secrecy Scores, CTHI and Tax Haven Score by Country

Panel A. Financial Secrecy Scores

The Financial Secrecy Score published by the Tax Justice Network ranks countries and territories based on their levels of financial secrecy and offshore financial activities. The score ranges from 0 to 100, with a higher score indicating a greater level of financial secrecy.

Country	2011	2013	2015	2018
Australia		47	43	51
Bahamas	83	80	79	85
Belgium	59	45	41	44
Bermuda	85	80	66	73
Brazil		52	52	49
Canada	56	54	46	55
Cayman Islands	77	70	65	72
Chile			54	62
China			54	60
Denmark	40	33	31	53
Finland		29	31	53
France	54	41	43	52
Germany	57	59	56	59
Greece		39	36	58
Hong Kong	73	72	72	71
India	53	46	39	52
Indonesia				61
Ireland	44	37	40	51
Israel	58	57	53	63
Italy	49	39	35	49
Japan	64	61	58	61
Liberia	81	83	83	80
Luxembourg	68	67	55	58
Marshall Islands			79	73
Mexico			45	54

Monaco	75	75	74	78
Netherlands	49	50	48	66
Norway		42	38	52
Panama	77	73	72	77
Philippines	73	67	63	65
Portugal	51	39		
Puerto Rico				77
Russia		60	54	64
Singapore	71	70	69	67
South Africa		53	42	56
Spain	34	36	33	48
Sweden				45
Switzerland	78	78	73	76
Thailand				80
Turkey			64	68
United Kingdom	45	40	41	42

Panel B. CTHI and Tax Haven Score

	CTHI					Haven				
Country	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Bahamas	1378	1378	1378	1378	1378	100	100	100	100	100
Belgium	822	822	822	822	822	68	68	68	68	68
Bermuda	2653	2653	2653	2653	2653	100	100	100	100	100
Cayman Islands	2534	2534	2534	2534		100	100	100	100	
China	659	659	659	659	659	58	58	58	58	58
Denmark	226	226	226	226	226	52	52	52	52	52
Finland	237	237	237	237	237	55	55	55	55	55
France	525	525	525	525	525	56	56	56	56	56
Germany	461	461	461	461	461	52	52	52	52	52
Greece	54	54	54	54	54	39	39	39	39	39
Hong Kong	1372	1372	1372	1372	1372	73	73	73	73	73
Ireland	1363	1363	1363	1363	1363	76	76	76	76	76
Italy	302	302	302	302	302	51	51	51	51	51
Liberia	71	71	71	71	71	49	49	49	49	49
Luxembourg	1795	1795	1795	1795	1795	72	72	72	72	72
Monaco	207	207	207	207		68	68	68	68	
Netherlands	2391	2391	2391	2391	2391	78	78	78	78	78
Panama	405	405	405	405	405	72	72	72	72	72
Singapore	1489	1489	1489	1489	1489	81	81	81	81	81
South Africa	184	184	184	184	184	47	47	47	47	47
Spain	403	403	403	403	403	55	55	55	55	55
Sweden			365	365	365			56	56	56
Switzerland	1875	1875	1875	1875	1875	83	83	83	83	83
United Kingdom	1068	1068	1068	1068	1068	63	63	63	63	63

Table 2: Descriptive Statistics

Political rating is the country political risk rating from Worldwide Governance Indicators, Price is the share price, Return volatility is the standard deviation of daily closing quote-midpoint returns, Dollar trading volume is the mean daily dollar trading volume, Quoted spread is the time-weighted mean quoted spread, Effective spread is the trade-weighted mean effective spread, Realised spread is the difference between the execution price and the midpoint of the bid-ask spread, expressed as a percentage of the midpoint, Depth is the mean quoted depth Market quality index is measured by the ratio of the time weighted mean quoted depth to the time-weighted mean quoted percentage spread, and Price impact is the mean price impact.

			Percentile				
Variable	Mean	Standard deviation	Min	25	50	75	Max
Political rating	0.59	0.71	-2.01	-0.05	0.99	1.10	1.63
Price ($)	25.50	35.84	0.09	4.99	13.90	35.07	716.40
Return volatility	0.0243	0.0130	0.0032	0.0146	0.0214	0.0311	0.1382
Dollar trading volume ($ in thousands)	31313	105904	2	1092	6971	32831	3566390
Market value of equity ($ in millions)	5842	13550	1	255	1071	4806	199719
Quoted spread	0.0491	0.0969	0.0016	0.0126	0.0213	0.0493	2.5410
Effective spread	0.0315	0.0647	0.0015	0.0093	0.0132	0.0292	2.0502
Realised spread	0.0167	0.0490	0.0007	0.0029	0.0052	0.0130	1.6947
Depth (in hundreds)	8102	26540	261	749	1708	5416	444559
Market quality index (in thousands)	412	1418	0	11	51	233	26909
Price impact	0.0152	0.0232	-0.0137	0.0061	0.0083	0.0158	0.5266
PIN	0.0603	0.0860	0.0001	0.0100	0.0270	0.0752	0.9246

Table 3: Regression Analysis for Financial Secrecy and Liquidity

This Table shows the OLS results of the following regression model: Quoted Spread$_{i,t}$, Effective Spread$_{i,t}$, Depth$_{i,t}$, or MQI$_{i,t}$ = β_0 + β_1 Financial Secrecy Score$_{j,t}$ + β_2 Political$_{j,t}$ + β_3 Log(GDP$_{j,t}$) + β_4 (1/Price$_{i,t}$) + β_5 Return Volatility$_{i,t}$ + β_6 Log(Volume$_{i,t}$) + β_7 Log(Market Cap$_{i,t}$) + $\varepsilon_{i,j,t}$; where Quoted Spread$_{i,t}$ is the mean quoted spread of stock i in year t, Effective Spread$_{i,t}$ is the trade-weighted mean effective spread of stock i in year t, Depth$_{i,t}$ is the mean quoted depth of stock i in year t, Market Quality Index$_{i,t}$ is measured by the ratio of the time weighted mean quoted depth to the time-weighted mean quoted percentage spread of stock i in year t, Financial Secrecy Score$_{i,t}$ is an annual score of a country's financial system, specifically country j in year t, that is published by the Tax Justice Network, Political$_{j,t}$ is the political rating of country j in year t from the Worldwide Governance Indicators, GDP$_{i,t}$ is the GDP per capita of country j in year t, Price$_{i,t}$ is the mean stock price of stock i in year t, Return Volatility$_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, Volume$_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market Cap$_{i,t}$ is the market value of equity of company i in year t, and $\varepsilon_{i,t}$ is the error term. Standard errors are adjusted for both heteroscedasticity using Huber-White estimators and clustering by year, addressing potential correlation or heterogeneity within each specific year. The significance levels of the coefficients are denoted by ***, **, and *, indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variables	(1) Quoted Spread	(2) Effective Spread	(3) Depth	(4) MQI
Financial Secrecy	0.0848**	0.0445**	-0.3216***	-1.6203***
	(3.29)	(3.09)	(-5.68)	(-5.61)
Political	-0.0212***	-0.0125***	-0.0098*	-0.0656*
	(-3.99)	(-4.06)	(-1.88)	(-1.88)
Log(GDP)	0.0095**	0.0051**	0.0113**	0.0661*
	(3.02)	(2.77)	(2.59)	(2.27)
Price	-0.0294***	-0.0219***	0.0606***	0.6237***
	(-5.00)	(-5.50)	(4.86)	(7.10)
Volatility	-0.1227	0.0167	0.5216	3.8246
	(-0.59)	(0.13)	(0.82)	(1.20)
Log(volume)	-0.0151***	-0.0118***	0.0421***	0.2557***
	(-12.47)	(-12.69)	(5.51)	(7.48)

Log(MCap)	0.0074***	0.0052***	-0.0279***	-0.1531***
	(7.99)	(8.02)	(-4.42)	(-5.60)
Constant	0.0477	0.0766**	-0.1868**	-1.6440***
	(0.99)	(2.45)	(-2.98)	(-4.64)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3,281	3,281	3,281	3,281
Adjusted R^2	0.1851	0.1867	0.1175	0.1496

Table 4: Regression Analysis for Financial Secrecy and Information Asymmetry

This Table shows the OLS results of the following regression model: Realised $Spread_{i,t}$, Price $Impact_{i,t}$, or $PIN_{i,t} = \beta_0 + \beta_1$ Financial Secrecy $Score_{j,t} + \beta_2$ $Political_{j,t} + \beta_3$ $Log(GDP_{j,t}) + \beta_4$ $(1/Price_{i,t}) + \beta_5$ Return $Volatility_{i,t} + \beta_6$ $Log(Volume_{i,t}) + \beta_7$ $Log(Market\ Cap_{i,t}) + \varepsilon_{i,j,t}$; Realised $spread_{i,t}$ is the realised spread of stock i in year t, Price $impact_{i,t}$ is the mean price impact of stock i in year t, $PIN_{i,t}$ is the probability of informed trading of stock i in year t, Financial Secrecy $Score_{i,t}$ is an annual score of a country's financial system, specifically country j in year t, that is published by the Tax Justice Network, $Political_{j,t}$ is the political rating of country j in year t from the Worldwide Governance Indicators, $GDP_{i,t}$ is the GDP per capita of country j in year t, $Price_{i,t}$ is the mean stock price of stock i in year t, Return $Volatility_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, $Volume_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market $Cap_{i,t}$ is the market value of equity of company i in year t, and $\varepsilon_{i,t}$ is the error term. Standard errors are adjusted for both heteroscedasticity using Huber-White estimators and clustering by year, addressing potential correlation or heterogeneity within each specific year. The significance levels of the coefficients are denoted by ***, **, and *, indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variables	(1) Realised Spread	(2) Price Impact	(3) PIN
Financial Secrecy	0.0195*	0.0318***	0.0216*
	(1.91)	(7.13)	(1.97)
political	-0.0085**	-0.0056***	-0.0160***
	(-3.08)	(-7.65)	(-4.31)
Log(GDP)	0.0035*	0.0023***	0.0059**
	(2.10)	(5.25)	(2.85)
Price	-0.0155***	-0.0087***	-0.0144**
	(-5.15)	(-6.56)	(-2.32)
Volatility	0.0614	0.0312	-0.3665**
	(0.61)	(0.64)	(-2.44)
Log(volume)	-0.0095***	-0.0037***	-0.0324***
	(-11.11)	(-11.90)	(-23.04)
Log(MCap)	0.0036***	0.0028***	0.0085***
	(6.48)	(9.73)	(8.17)

Constant	0.0737** (3.10)	-0.0001 (-0.02)	0.3974*** (18.28)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	3,281	3,281	3,247
Adjusted R^2	0.1933	0.1886	0.5379

Table 5: Regression Results for Spreads Using Changes in Variables

This Table shows the results of the following regression model: ΔQuoted spread$_{i,t}$, ΔEffective spread$_{i,t}$ or ΔRealised spread$_{i,t}$ = β_0 + β_1 ΔFinancial Secrecy Score$_{j,t}$ + β_2 ΔPolitical$_{j,t}$ + β_3 ΔLog(GDP$_{j,t}$) + β_4 Δ(1/Price$_{i,t}$) + β_5 ΔReturn volatility$_{i,t}$+ β_6 ΔLog(Dollar trading volume$_{i,t}$) + β_7 ΔLog(Market Cap$_{i,t}$) + $\varepsilon_{i,t}$; where Quoted spread$_{i,t}$ is the time-weighted mean quoted spread of stock i in year t, Effective spread$_{i,t}$ is the trade-weighted mean effective spread of stock i in year t, Realised spread$_{i,t}$ is the realised spread of stock i in year t, Financial Secrecy Score$_{j,t}$ is the Financial Secrecy Score of country j in year t, Political$_{j,t}$ is the political rating of country j in year t, GDP$_{i,t}$ is the GDP per capita of country j in year t, Price$_{i,t}$ is the mean stock price of stock i in year t, Return Volatility$_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, Volume$_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market Cap$_{i,t}$ is the market value of equity of stock i in year t, and $\varepsilon_{i,t}$ is the error term. Δ denotes changes in variables between year t and t-1. Standard errors are adjusted for heteroscedasticity (Huber-White estimators). ***, **, and * indicate that the coefficients are statistically significant at 1%, 5%, and 10% levels, respectively.

Dependent variables	(1) Quoted Spread	(2) Effective Spread	(3) Realised Spread
Financial Secrecy	0.0994**	0.0550**	0.0575***
	(2.31)	(2.16)	(2.88)
Political	0.0289**	0.0152**	0.0126**
	(2.51)	(2.17)	(2.34)
Log(GDP)	0.0634**	0.0249	0.0137
	(2.02)	(1.30)	(1.05)
Price	-0.0049*	-0.0045**	-0.0034**
	(-1.90)	(-2.44)	(-2.55)
Volatility	0.8987**	0.6036***	0.4167**
	(2.19)	(2.60)	(2.26)
Log(volume)	-0.0179***	-0.0121***	-0.0094***
	(-3.79)	(-4.32)	(-4.20)

Log(MCap)	0.0346***	0.0207***	0.0136***
	(4.22)	(4.27)	(3.54)
Constant	0.0073***	0.0022	0.0027**
	(3.05)	(1.56)	(2.46)
Observations	885	885	885
Adjusted R^2	0.0867	0.0828	0.0778

Table 6: Regression Analysis for Tax Haven and Spread

This Table shows the OLS results of the following regression model: Quoted Spread$_{i,t}$, or Effective Spread$_{i,t}$, = β_0 + β_1 CTHI$_{j,t}$ or Haven Score$_{j,t}$ + + β_2 Political$_{j,t}$ + β_3 Log(GDP$_{j,t}$) + β_4 (1/Price$_{i,t}$) + β_5 Return Volatility$_{i,t}$ + β_6 Log(Volume$_{i,t}$) + β_7 Log(Market Cap$_{i,t}$) + $\varepsilon_{i,j,t}$; where Quoted Spread$_{i,t}$ is the time-weighted mean quoted spread of stock i in year t, Effective Spread$_{i,t}$ is the trade-weighted mean effective spread of stock i in year t, CTHI$_{j,t}$ is the Corporate Tax Haven Index of country j in year t, Haven Score$_{j,t}$ is a measure of how much tax abuse is allowed by country j in year t, Political$_{j,t}$ is the political rating of country j in year t from the Worldwide Governance Indicators, GDP$_{i,t}$ is the GDP per capita of country j in year t, Price$_{i,t}$ is the mean stock price of stock i in year t, Return Volatility$_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, Volume$_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market Cap$_{i,t}$ is the market value of equity of company i in year t, and $\varepsilon_{i,t}$ is the error term. Standard errors are adjusted for both heteroscedasticity using Huber-White estimators and clustering by year, addressing potential correlation or heterogeneity within each specific year. The significance levels of the coefficients are denoted by ***, **, and *, indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variables	(1) Quoted Spread	(2) Quoted Spread	(3) Effective Spread	(4) Effective Spread
CTHI	0.0332***		0.0173***	
	(7.49)		(7.60)	
Haven Score		1.5210***		0.7657***
		(9.20)		(9.90)
Political	0.0269**	0.0202**	0.0129**	0.0098**
	(3.75)	(4.30)	(3.18)	(3.56)
Log(GDP)	-0.0174**	-0.0150**	-0.0089**	-0.0076**
	(-4.23)	(-4.52)	(-3.96)	(-4.18)
Price	-0.0335**	-0.0324**	-0.0228**	-0.0223**
	(-3.80)	(-3.43)	(-3.92)	(-3.60)
Volatility	0.0640	-0.0506	0.1925	0.1353
	(0.28)	(-0.21)	(1.26)	(0.84)
Log(volume)	-0.0107**	-0.0110**	-0.0078**	-0.0079**
	(-3.94)	(-4.12)	(-4.01)	(-4.13)

Log(MCap)	0.0064**	0.0072**	0.0038*	0.0042**
	(3.06)	(3.27)	(2.69)	(2.88)
Constant	0.2621***	0.1712***	0.1668***	0.1205***
	(6.98)	(7.16)	(7.56)	(8.08)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	923	923	923	923
Adjusted R-squared	0.1393	0.1383	0.1662	0.1639

Table 7: Regression Analysis for Tax Haven and Depth and Market Quality Index

This Table shows the OLS results of the following regression model: $Depth_{i,t}$, or $MQI_{i,t}$, = $\beta_0 + \beta_1 CTHI_{j,t}$ or Haven $Score_{j,t} + \beta_2 Political_{j,t} + \beta_3 Log(GDP_{j,t}) + \beta_4 (1/Price_{i,t}) + \beta_5$ Return $Volatility_{i,t} + \beta_6 Log(Volume_{i,t}) + \beta_7 Log(Market\ Cap_{i,t}) + \varepsilon_{i,j,t}$; where $Depth_{i,t}$ is the mean quoted depth of stock i in year t, Market Quality $Index_{i,t}$ is measured by the ratio of the time-weighted mean quoted depth to the time-weighted mean quoted spread of stock i in year t, $CTHI_{j,t}$ is the Corporate Tax Haven Index of country j in year t, Haven $Score_{j,t}$ is a measure of how much tax abuse is allowed by country j in year t, $Political_{j,t}$ is the political rating of country j in year t from the Worldwide Governance Indicators, $GDP_{i,t}$ is the GDP per capita of country j in year t, $Price_{i,t}$ is the mean stock price of stock i in year t, Return $Volatility_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, $Volume_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market $Cap_{i,t}$ is the market value of equity of company i in year t, and $\varepsilon_{i,t}$ is the error term. Standard errors are adjusted for both heteroscedasticity using Huber-White estimators and clustering by year, addressing potential correlation or heterogeneity within each specific year. The significance levels of the coefficients are denoted by ***, **, and *, indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variables	Depth	Depth	MQI	MQI
CTHI	-0.1786***		-0.8789***	
	(-7.65)		(-8.09)	
Haven Score		-8.6089***		-42.5228***
		(-7.91)		(-8.39)
Political	0.1335**	0.1749**	0.6760**	0.8818**
	(3.59)	(3.27)	(3.64)	(3.29)
Log(GDP)	-0.0015	-0.0141	-0.0135	-0.0751
	(-0.08)	(-0.63)	(-0.13)	(-0.67)
Price	0.1246***	0.1180***	0.7052***	0.6730***
	(6.34)	(5.08)	(7.72)	(6.06)
Volatility	-1.7904	-1.1350	-9.1437	-5.9041
	(-1.59)	(-0.93)	(-1.58)	(-0.95)
Log(volume)	0.0617***	0.0636***	0.3253***	0.3346***
	(5.59)	(5.75)	(5.97)	(6.11)

Log(MCap)	-0.0479**	-0.0518**	-0.2458**	-0.2651**
	(-3.82)	(-3.81)	(-3.85)	(-3.84)
Constant	-0.0678	0.4399	-0.5019	2.0038
	(-0.32)	(1.52)	(-0.49)	(1.41)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	923	923	923	923
Adjusted R-squared	0.2103	0.2126	0.2166	0.2192

Table 8: Regression Results for Spreads Using Tax Haven Category Scores

This Table shows the OLS results of the following regression model: Quoted Spread$_{i,t}$ or Effective Spread$_{i,t}$, = $\beta_0 + \beta_1$ Category Score$_{j,t} + \beta_2$ Political$_{j,t}$ + β_3 Log(GDP$_{j,t}$) + β_4 (1/Price$_{i,t}$) + β_5 Return Volatility$_{i,t} + \beta_6$ Log(Volume$_{i,t}$) + β_7 Log(Market Cap$_{i,t}$) + $\varepsilon_{i,j,t}$; where Quoted Spread$_{i,t}$ is the time-weighted mean quoted spread of stock i in year t, Effective Spread$_{i,t}$ is the trade-weighted mean effective spread of stock i in year t, Category Score$_{j,t}$ (LACIT is an acronym for the Legal and Accounting Complexity Index of a given country in a specific year (i.e., country j in year t); Loopholes & Gaps refers to specific gaps or weaknesses in a country's tax laws or enforcement mechanisms that can be exploited for tax avoidance or evasion in the same country and year; Transparency measures the level of openness in a country's tax and financial systems for the same country and year; Anti-Avoidance measures indicate a country's commitment to combat tax avoidance using legal and regulatory measures in the same country and year, and Double Tax Treaty Aggressiveness refers to agreements between two countries to prevent double taxation of income earned by individuals or companies operating in both countries for the same country and year), Political$_{j,t}$ is the political rating of country j in year t from the Worldwide Governance Indicators, GDP$_{i,t}$ is the GDP per capita of country j in year t, Price$_{i,t}$ is the mean stock price of stock i in year t, Return Volatility$_{i,t}$ is the standard deviation of daily closing quote-midpoint returns of stock i in year t, Volume$_{i,t}$ is the mean daily dollar trading volume of stock i in year t, Market Cap$_{i,t}$ is the market value of equity of company i in year t, and $\varepsilon_{i,t}$ is the error term. Standard errors are adjusted for both heteroscedasticity using Huber-White estimators and clustering by year, addressing potential correlation or heterogeneity within each specific year. The significance levels of the coefficients are denoted by ***, **, and *, indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variables	(1) Quoted Spread	(2) Quoted Spread	(3) Quoted Spread	(4) Quoted Spread	(5) Quoted Spread	(6) Quoted Spread	(7) Effective Spread	(8) Effective Spread	(9) Effective Spread	(10) Effective Spread	(11) Effective Spread	(12) Effective Spread
LACIT	0.0007***					0.0001	0.0003***					-0.0000
	(7.59)					(0.95)	(9.12)					(-0.55)
Loopholes & Gaps		0.0007***				-0.0001		0.0003***				-0.0001
		(6.67)				(-0.65)		(6.94)				(-0.95)
Transparency			0.0013***			0.0012***			0.0007***			0.0007***
			(8.57)			(8.28)			(8.98)			(7.70)
Anti-Avoidance				0.0010***		0.0003				0.0005***		0.0003**
				(5.33)		(1.80)				(5.85)		(3.02)
Double Tax Treaty					0.0002	0.0002**					0.0001	0.0001*

					(1.38)	(3.25)					(1.45)	(2.65)
Political	0.0064	0.0387***	0.0144***	0.0332***	0.0410***	0.0116*	0.0040	0.0191***	0.0067**	0.0161***	0.0203***	-0.0080**
	(1.15)	(7.27)	(4.76)	(6.26)	(5.71)	(2.44)	(1.23)	(6.16)	(4.31)	(5.40)	(4.94)	(-4.12)
Log(GDP)	-0.0106**	-0.0194***	0.0073*	-0.0124**	-0.0160**	0.0032	-0.0055**	-0.0098***	0.0037*	-0.0063**	-0.0083**	0.0049**
	(-3.11)	(-6.10)	(2.50)	(-4.21)	(-3.60)	(1.05)	(-2.93)	(-5.16)	(2.22)	(-3.51)	(-3.15)	(3.29)
Price	-0.0335**	-0.0325**	-0.0323**	-0.0345**	-0.0336**	-0.0323**	-0.0229**	-0.0223**	-0.0222**	-0.0233**	-0.0229**	-0.0001
	(-3.52)	(-3.14)	(-3.45)	(-3.30)	(-3.23)	(-3.44)	(-3.65)	(-3.36)	(-3.61)	(-3.49)	(-3.43)	(-0.95)
Volatility	0.0147	-0.0080	-0.2025	0.0788	0.0901	-0.1764	0.1706	0.1581	0.0568	0.2000	0.2062	0.0007***
	(0.06)	(-0.03)	(-1.02)	(0.33)	(0.36)	(-0.81)	(1.02)	(1.01)	(0.43)	(1.25)	(1.27)	(7.70)
Log(volume)	-0.0104**	-0.0105**	-0.0101**	-0.0123**	-0.0108**	-0.0107**	-0.0077**	-0.0077**	-0.0075**	-0.0086**	-0.0079**	0.0003**
	(-4.07)	(-3.65)	(-3.99)	(-4.20)	(-3.68)	(-4.07)	(-4.07)	(-3.79)	(-4.05)	(-4.23)	(-3.81)	(3.02)
Log(MCap)	0.0072**	0.0067**	0.0078**	0.0093**	0.0074**	0.0080**	0.0042**	0.0039*	0.0045**	0.0053**	0.0043**	0.0001*
	(3.63)	(2.84)	(3.72)	(4.02)	(3.20)	(3.60)	(3.11)	(2.55)	(3.25)	(3.54)	(2.82)	(2.65)
Constant	0.1814***	0.2708***	-0.0842*	0.1421***	0.2597***	-0.0660*	0.1276***	0.1702***	-0.0102	0.1020***	0.1663***	-0.0152
	(6.41)	(12.04)	(-2.55)	(12.56)	(7.78)	(-2.39)	(7.53)	(11.79)	(-0.76)	(10.84)	(7.90)	(-0.88)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	923	923	923	923	923	923	923	923	923	923	923	923
Adjusted R^2	0.1315	0.1231	0.1483	0.1269	0.1162	0.1479	0.1564	0.1507	0.1730	0.1558	0.1454	0.1730