Determinants of the Probability of a Dividend Declaration

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Abstract

What factors influence a company's dividend policy? Employing a logistic regression model with robust standard errors clustered by company to analyze the relationship between key financial indicators and the likelihood of dividend issuance. Using a dataset of 40683 observations across 4,525 firms, our analysis focuses on the impact of debt-to-equity ratio, return on assets (ROA), earnings per share (EPS), liquidity, and firm size. Results indicate that higher ROA significantly increases the probability of dividend issuance, while a higher debt-to-equity ratio has the opposite effect. EPS, liquidity, and size show no statistically significant impact. These findings offer insights into the determinants of dividend policy and suggest that profitability and leverage are primary drivers of dividend decisions, with implications for corporate finance strategy and investor expectations.

Question of Interest

The question that is addressed in this paper is what internal financial ratios influence the probability of issuance of dividend within a fiscal year. This paper uses data from the top North American markets with ranging liquidity and company maturity listings through the Toronto Stock Exchange (TSX), National Association of Security Dealers Automated Quotations Global Select (NASDAQ:GS) and New York Stock Exchange (NYSE).

Motivation

Dividend policy remains a cornerstone of corporate finance, reflecting the complex interplay of economic theories, corporate governance, and market dynamics. This research seeks to deepen our understanding of the determinants of dividend policy by drawing on foundational theories and addressing significant gaps in the existing literature.

This research builds upon and integrates several theoretical frameworks, including the Dividend Signaling Theory (Dewasiri et al., 2019), Agency Theory (Eisenhardt, 1989), and the Pecking Order Theory (Myers, 1984). Dividend Signaling Theory posits that dividend payments convey information about a firm's financial health and future profitability, which has significant implications for market behavior and asset pricing (Dewasiri et al., 2019). Agency Theory emphasizes the role of dividends as a governance tool to align management and shareholder interests, mitigating agency costs (Eisenhardt, 1989). Furthermore, the Pecking Order Theory underscores firms' preference for internal financing, such as retained earnings, which directly impacts dividend policies (Myers, 1984). Incorporating Game Theory offers a novel lens to analyze competitive behaviors among firms, highlighting how intra-industry rivalry influences dividend issuance as a strategic tool to attract capital.

Dividends are a primary mechanism for profit distribution and play a pivotal role in allocating capital across the economy. By understanding the factors influencing dividend declarations, this research sheds light on the efficiency of financial markets and capital distribution. Dividends serve as an essential governance mechanism to manage agency conflicts within firms. This study provides deeper insights into how dividend policies are used to improve governance practices, especially in different institutional and market contexts. As dividends are perceived as signals of financial stability and growth potential, understanding the determinants of dividend probability helps decode their impact on market behavior and asset pricing. This is particularly relevant in environments where information asymmetry between firms and investors is significant.

Insights into dividend determinants inform policymaking, particularly in areas like corporate taxation, executive compensation structures, and financial market regulations. Policymakers can leverage these findings to craft more effective regulatory frameworks that enhance market fairness and transparency. Modeling dividend probabilities has practical implications for high-frequency trading and equity pricing. By incorporating dividend probabilities into quantitative asset pricing models, this research contributes to the development of more accurate pricing mechanisms, benefiting both investors and financial institutions.

Through this research the aim is to bridge the gaps in the current understanding in North American major market dividend policy by combining robust theoretical foundations with empirical analysis.

Previous Research

Dividend policy has been a central topic in corporate finance research, with extensive debate on what drives firms' decisions to pay dividends. Scholars have investigated how various factors, including agency costs, market structure, ownership concentration, and macroeconomic conditions, influence dividend policy. This review synthesizes key contributions to the field, providing a foundation for understanding the determinants of dividend payouts and their implications for corporate governance and market dynamics.

Brockman and Unlu (2009) examine the role of creditor rights in shaping dividend policy. Using a dataset of 120,507 firm-year observations across 52 countries from 1990 to 2006, they find that firms in countries with weaker creditor rights exhibit lower probabilities and amounts of dividend payouts. This phenomenon reflects a strategic response to agency costs of debt, where firms restrict dividends to retain earnings as a buffer for creditors. The authors argue that creditor rights influence the balance of power between debt and equity claimants, supporting the substitute hypothesis. However, their study's reliance on a baseline model and the exclusion of post-2006 data, notably the 2008 financial crisis, limits the scope of its conclusions.

Malik et al. (2013) focus on the Karachi Stock Exchange to analyze the factors influencing dividend decisions of financial and non-financial firms from 2007 to 2009. Utilizing a probit model, they demonstrate that liquidity, leverage, earnings per share, and firm size positively impact the likelihood of dividend payments, while growth opportunities have a negative effect. The short time frame and overlap with the global financial crisis introduce potential biases, as macroeconomic shocks during the period may have suppressed dividend activity. Despite these limitations, the study provides valuable insights into dividend behavior in an emerging market context.

Kuhlmann and Rojahn (2017) explore the relationship between ownership concentration and dividend payouts in German firms from 2007 to 2014. Their probit model reveals that controlling shareholders with stakes exceeding 50% reduce dividend probabilities, while those with 25–50% stakes increase payouts. The study underscores the influence of shareholder identity on corporate dividend decisions but finds limited significance for certain ownership categories, such as ETF or managerial ownership. These findings highlight the nuanced role of ownership structure in shaping dividend policies, though the study's narrow geographic focus limits its generalizability.

Pandey (2003) investigates dividend behavior among Malaysian firms, employing multinomial logit analysis and Lintner's framework. The study finds substantial variation in payout ratios across industries, with higher dividends in plantation and consumer sectors. The findings suggest that past dividends and current earnings are key determinants of payout decisions, indicating limited stability in Malaysian dividend policies. However, the research's focus on a single market and lack of macroeconomic considerations restricts its applicability to broader contexts.

Denis and Osobov (2008) analyze dividend policies across six countries from 1989 to 2002, emphasizing the role of profitability, growth opportunities, firm size, and the earned/contributed equity mix. Their findings highlight the consistency of these determinants across markets, though they caution that the study's emphasis on developed markets may not fully capture dynamics in emerging economies. Additionally, the sample's exclusion of smaller firms and industries with missing data limits its representativeness.

The literature demonstrates that dividend policy is influenced by a complex interplay of factors, including creditor rights, ownership structure, firm characteristics, and market-specific

conditions. While existing studies provide valuable insights, they also reveal methodological and contextual limitations, such as restricted time frames, regional focus, and underexplored macroeconomic impacts. Building on this foundation, future research should adopt broader datasets and more robust models to capture the dynamic nature of dividend policies across diverse markets.

Data Identified and Used

The data being used to estimate the probability of dividend issuance as posed by the research question is retrieved using the built in excel function for CapitalQ, using names from companies from Toronto Stock Exchange (TSX), National Association of Security Dealers Automated Quotations Global Select (NASDAQ:GS) and New York Stock Exchange (NYSE) retrieved with the company screener tab on CapitalQ. The functions for retrieving information are as given below, with C2 being the "Year" variable.

Financial Ratio	Formula
Dividend	=@CIQ(B2, "IQ_DPS_GROSS_ABS", "FY"+C2)
DebtToEquity	=@CIQ(B2, "IQ_TOTAL_DEBT_EQUITY", "FY"+C2)
EPS (Normalized)	=@CIQ(B2, "IQ_EPS_NORM", "FY"+C2,)
Liquidity (Quick Ratio)	=@CIQ(B2, "IQ_QUICK_RATIO", "FY"+C2)
Market Cap (Size)	=@CIQ(B2, "IQ_MARKETCAP", "1/1/"+C2)
Return on Assets (ROA)	=@CIQ(B2, "IQ_RETURN_ASSETS", "FY"+C2)

As seen above, the variables collected and used in the final model were the following: dividend per share, debt to equity, earnings per share, quick ratio, market cap and return on assets. The dataset range is from 2013-2023 with 4,525 unique companies across the listings on the Toronto Stock Exchange (TSX), National Association of Security Dealers Automated Quotations Global Select (NASDAQ:GS) and New York Stock Exchange (NYSE).

This dataset needed extensive cleansing to run effective models on the dataset. First, looking into the dataset, there were listings from Toronto Stock Exchange Venture (TSXV) and National Association of Security Dealers Automated Quotations Global Market (NASDAQ:GM) that made their way past the stock screening done on the CapIQ equity listings, so deleting the rows these were on was essential as the logistic model is very sensitive to an abundance of 0's so getting rid of the lower market cap stocks was essential as the goal was to target mature North American companies. When doing a mass scrape using the built in excel function, there were many companies without years being listed. Some have been listed post start date of 2013, so this required deleting the rows that returned "NM" and "NULL" values. There were additional problems with ETF's and mutual funds being included on the listings of these exchanges as they do not have any internal financial ratios so there was criteria, where if all the regressors (dividend per share, debt to equity, earnings per share, quick ratio, market cap and return on assets) then the row would be deleted and the ETF's and mutual funds were deleted from there. Next, since we only wanted companies that were currently listed as to improve the relevance over time, the companies with multiple marketcap = 0 were deleted as this indicates that they have been delisted from the exchange. The CompanyName variable needed to be changed so I encoded each company name to give each company it's own CompanyNum. Finally, the dummy variable "Divi" was created which was = 1 when the dividend per share was greater than 0.

Variable Name	Mean	Median	Standard Deviation	Skew	Kurtosis
Divi	0.443035	0	0.496751	0.229353	-1.947397
ROA	1.057259	2.7219	23.02965	11.057253	491.067707
DebtToEquity	128.75879	44.3815	603.694573	22.184742	648.525203
EPS	20.815694	0.66005	954.451575	58.967615	3533.810626
Liquidity	4.794193	1.00621	56.020106	30.814995	1021.590341
Size	16202.250	1613.30297	109610.8178	23.097076	637.282486

Empirical Approach and Results

Using the data obtained and cleaned, this logistic regression analysis will be used to extract and examine several coefficients in search of correlation between our dependent and independent variables. The following logistic regression format will be used

$$P(Divi = 1) = \frac{1}{1+e^{-(\beta_0+\beta_1 DebtToEquity+\beta_2 ROA+\beta_3 EPS+\beta_4 Liquidity+\beta_5 Size)}}$$

Where the dependent variable is Divi, which is 1 if a dividend has been issued in the year and 0 if it has not.

Variable	Coefficient	Standard Error
DebtToEquity	-.0003775***	(.0001071)
ROA	.0917341***	(.0074799)
EPS	-.0000987**	(.0000424)
Liquidity	-.0001933	.0005725
Size	0.000000556	(0.000000775)
Cons	-.3929988	(.0388391)

Robust standard errors in parentheses

From this regression, we can interpret what each of the regressors will do with each unit increase in their respective metric. The biggest effect of the bunch is Return on Assets (ROA) as with one unit increase in ROA results in a 9.6% increase in probability of a dividend payment. One unit increase in debt-to-equity (DebtToEquity) results in a −0.0373% decrease in the odds of a company issuing a dividend. Interestingly, earnings-per-share (EPS) while in theory should increase the dividend probability, the inverse is true. With every unit of EPS that increases, we see a −0.00987% decrease in the odds of a dividend being issued. This negative relationship suggests that firms with higher EPS might prefer reinvesting profits instead of paying dividends. This deviates from (Malik et al,. 2013) which shows that when EPS in companies listed on the Karachi Stock Exchange have the probability of a dividend payment increase when EPS goes up which is an interesting difference from major North American stock exchanges. Liquidity has a very small and statistically insignificant effect on dividend issuance, with a negative change of 0.0193%. The effect of Size on the probability of issuing a dividend is virtually zero, with a negligible percentage change in odds of 0.0000556%.

The results highlight the significant roles of profitability (ROA and EPS) and leverage (Debt-to-Equity) in determining the likelihood of dividend being issued. The negative relationship between Debt-to-Equity and the outcome emphasizes the risks associated with high leverage, while the positive relationship between ROA and the outcome supports the view that more profitable firms are better positioned to navigate financial challenges. The insignificant effects of liquidity and firm size suggest that these factors may not be as critical in this specific context, although they could hold importance in different financial settings or under alternative modeling specifications.

Next, what was needed was to ensure the model avoided multicollinearity. The Variance Inflation Factor was performed on the regressors to help identify if any regressors had issues with multicollinearity.

Variable	Variance Inflation Factor
Size	1.02
EPS	1.02
ROA	1.00
DebtToEquity	1.00
Liquidity	1.00

Mean VIF: 1.01

The VIF values are all close to 1, indicating that there is no significant multicollinearity among the independent variables. Generally, VIF values greater than 10 indicate problematic multicollinearity, so values here suggest that multicollinearity is not a concern in the model.

Next was to compare the same model but with only Canadian based listings on the Toronto Stock Exchange vs the American based listings National Association of Security Dealers Automated Quotations Global Select and New York Stock Exchange.

Canadian Regression Output

Variables	Coefficient	Standard Error
DebtToEquity	-.0002308	.0002777
ROA	.0773076**	.0284053
EPS	.0076141	.0087006
Liquidity	.0003392	.0006512
Size	.0000488***	.0000127
Cons	-1.077206***	.1237685

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The Canadian model suggests that ROA, EPS, and Size are more significant and have a more direct relationship with dividend issuance than in the original model, especially with EPS now positively influencing dividend payouts. The Debt-to-Equity ratio continues to have a negative effect on dividend issuance, but with a smaller magnitude, and Liquidity remains a weak predictor in both models. The Canadian context appears to favor profitability and firm size as key factors in dividend decisions, while the original model had more emphasis on profitability (ROA) and less clear relationships for EPS and size.

United States Regression Output

Variables	Coeffcient	Standard Error
DebtToEquity	-.0004226***	.0001202
ROA	-.0004226***	.0068141
EPS	-.0001208	.0001078
Liquidity	-.001302	.0050523
Size	.00000001	.0000000438
Cons	-.2929927***	.042189

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

ROA and EPS have negative relationships with dividend issuance in the U.S., whereas in the other models, these variables generally had positive relationships. Debt to Equity has the strongest negative effect on dividend issuance in the U.S., showing that companies with higher leverage are less likely to pay dividends, which aligns with the other models but with greater strength. Liquidity shows a more pronounced negative effect in the U.S., suggesting that firms with higher liquidity may choose to reinvest rather than distribute profits as dividends. Size remains a negligible predictor of dividend issuance in all models. U.S. firms seem to exhibit a stronger preference for reinvestment of profits and more sensitivity to leverage, with profitability

(ROA) and earnings (EPS) being less likely to lead to dividend payouts than in Canada or the original model.

The regression models for Canada and the United States reveal notable differences in the factors influencing dividend issuance. In the Canadian model, Return on Assets (ROA), Earnings Per Share (EPS), and firm Size have significant positive relationships with dividend payouts, with EPS now playing a direct role in promoting dividend distribution. The Debt-to-Equity ratio maintains a negative effect, though it is weaker than in the U.S., while Liquidity remains an insignificant predictor in both models. This suggests that Canadian firms prioritize profitability and size when making dividend decisions. In contrast, the U.S. model shows that both ROA and EPS have negative associations with dividend payouts, indicating that U.S. firms are less likely to distribute dividends based on profitability or earnings. The Debt-to-Equity ratio exerts the most significant negative impact on dividends, highlighting a strong preference for reinvesting profits in the U.S., particularly among more leveraged firms. Liquidity also negatively affects dividend issuance in the U.S., reinforcing the idea that firms prefer reinvestment over distribution. Overall, while Canadian firms lean towards profitability and size as key factors for dividend issuance, U.S. firms exhibit a stronger aversion to paying dividends, focusing more on leverage and reinvestment.

Conclusion

This study has provided valuable insights into the internal financial ratios that influence the probability of dividend issuance in North American markets. By examining data from the Toronto Stock Exchange (TSX), NASDAQ Global Select (NASDAQ:GS), and New York Stock Exchange (NYSE), this research has highlighted the critical role of profitability and leverage in shaping corporate dividend policies. The findings show that higher return on assets (ROA) significantly increases the likelihood of dividend payouts, suggesting that more profitable companies are better positioned to distribute profits to shareholders. Conversely, higher debt-to-equity ratios decrease the probability of dividend issuance, indicating that firms with greater leverage face more financial constraints, which limits their ability to pay dividends.

Interestingly, the relationship between earnings per share (EPS) and dividend issuance revealed a negative association, suggesting that firms with higher EPS may prioritize reinvesting profits overpaying dividends. This finding contrasts with previous studies conducted in emerging markets, such as Karachi, where EPS was found to positively influence dividend payouts (Malik, Gul, Khan, Rehman, & Khan, 2013). Liquidity and firm size, on the other hand, demonstrated minimal to insignificant effects, suggesting that these factors may have less influence in the context of mature North American markets.

The Canadian and U.S. models of dividend issuance, while both emphasizing profitability and leverage, show key differences in the factors influencing dividend payouts. In the Canadian model, profitability, particularly Return on Assets (ROA), and firm size are significant predictors of dividend issuance, with a positive relationship suggesting that more profitable and larger firms

are more likely to distribute dividends. In contrast, the U.S. model shows a negative relationship between ROA and Earnings Per Share (EPS) with dividend payouts, indicating that U.S. firms with higher profitability or earnings tend to reinvest rather than distribute profits. The Debt-to-Equity ratio has a stronger negative effect in the U.S., highlighting the higher sensitivity to leverage, where firms with more debt are less likely to pay dividends. Liquidity, while weak in both models, demonstrates a more pronounced negative effect in the U.S., suggesting a greater tendency for firms to retain cash for reinvestment. These differences reflect the more conservative dividend practices of U.S. firms, which prioritize reinvestment and debt management over shareholder payouts, whereas Canadian firms appear to place greater emphasis on profitability and firm size when making dividend decisions.

Despite some limitations, such as the exclusion of emerging market firms and the focus on mature companies, this research contributes to the understanding of dividend policies in developed financial markets. Policymakers and financial institutions can leverage these findings to refine regulatory frameworks and improve asset pricing models, enhancing the efficiency and transparency of financial markets. Future research could expand this study by incorporating a broader set of market conditions and exploring additional financial indicators to further refine the understanding of dividend determinants.

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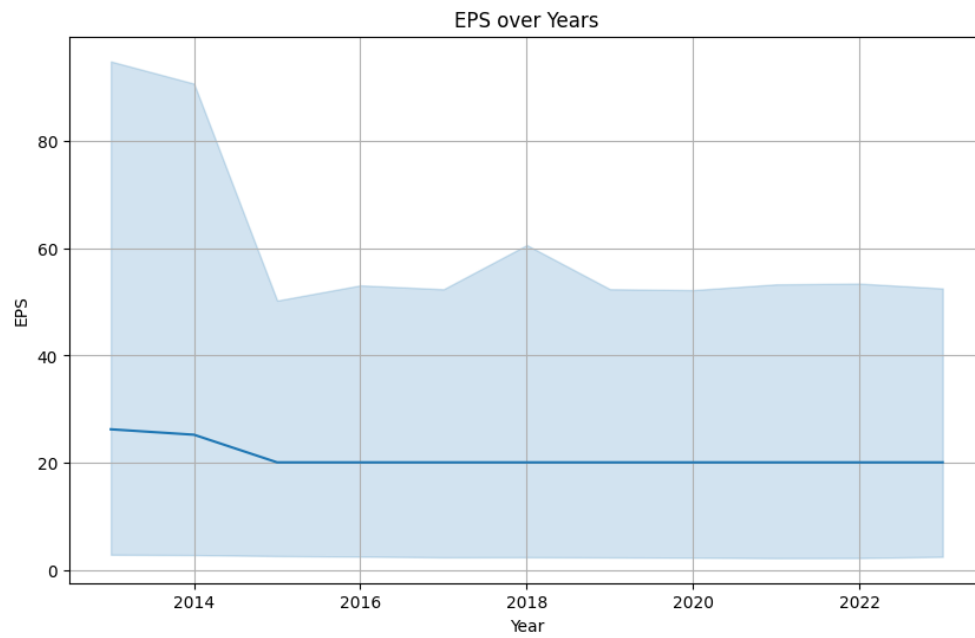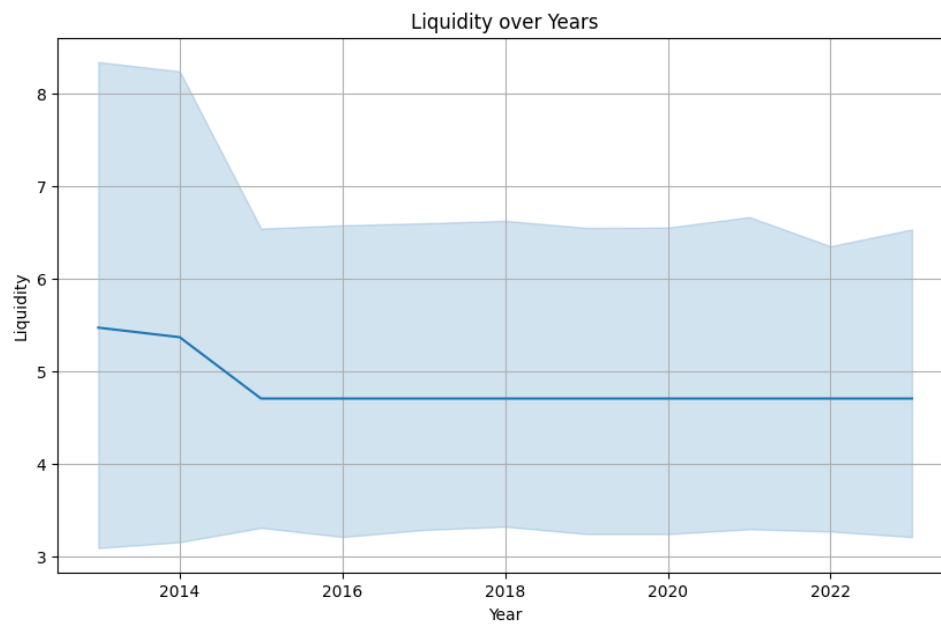
A01: Debt-to-equity over Years

DebtToEquity over Years
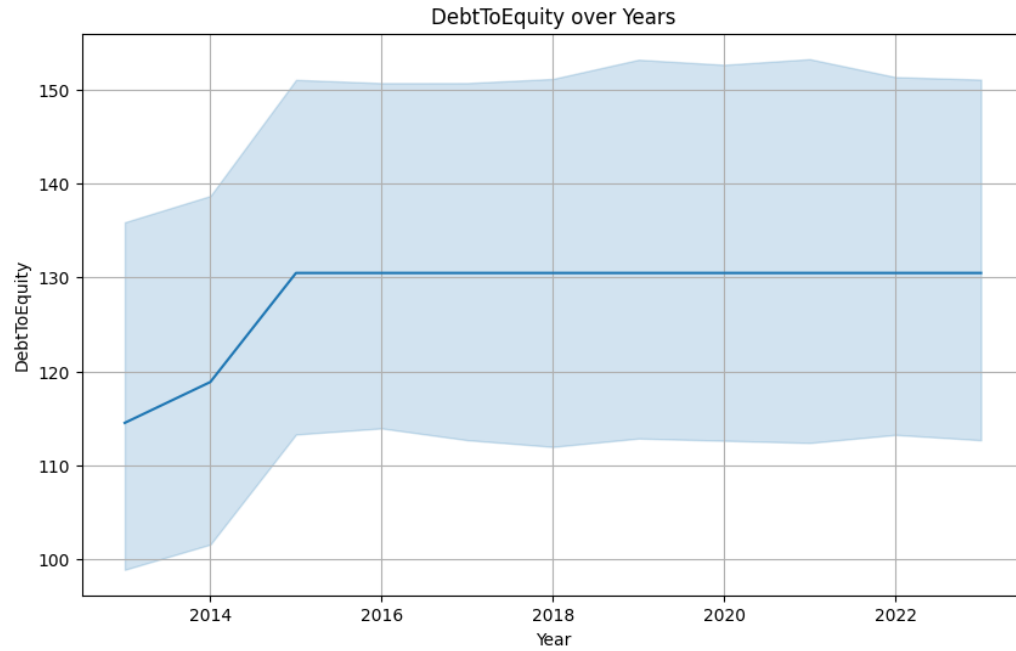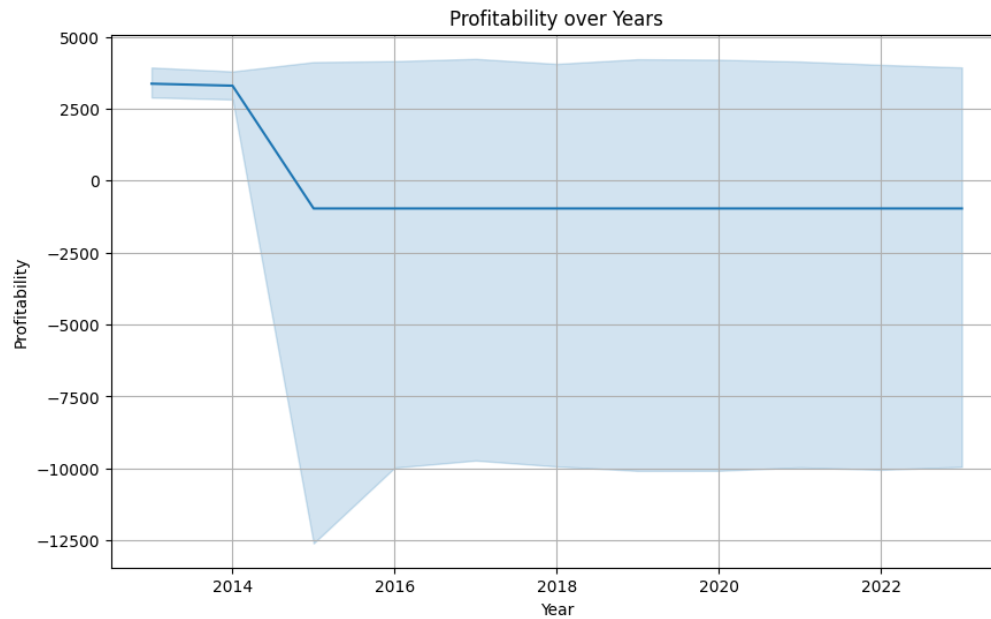
A02: Divi over Years
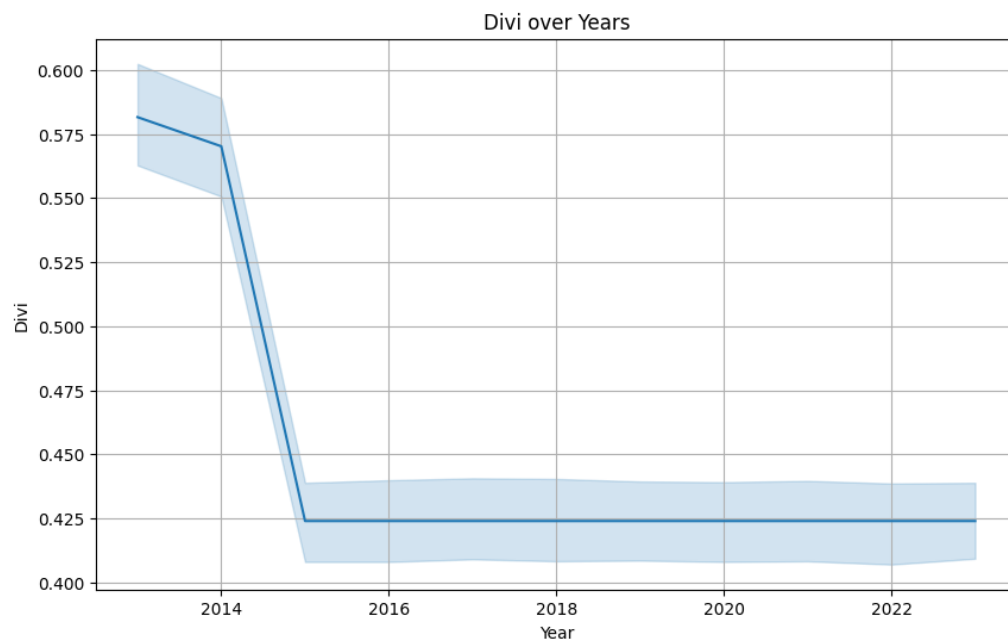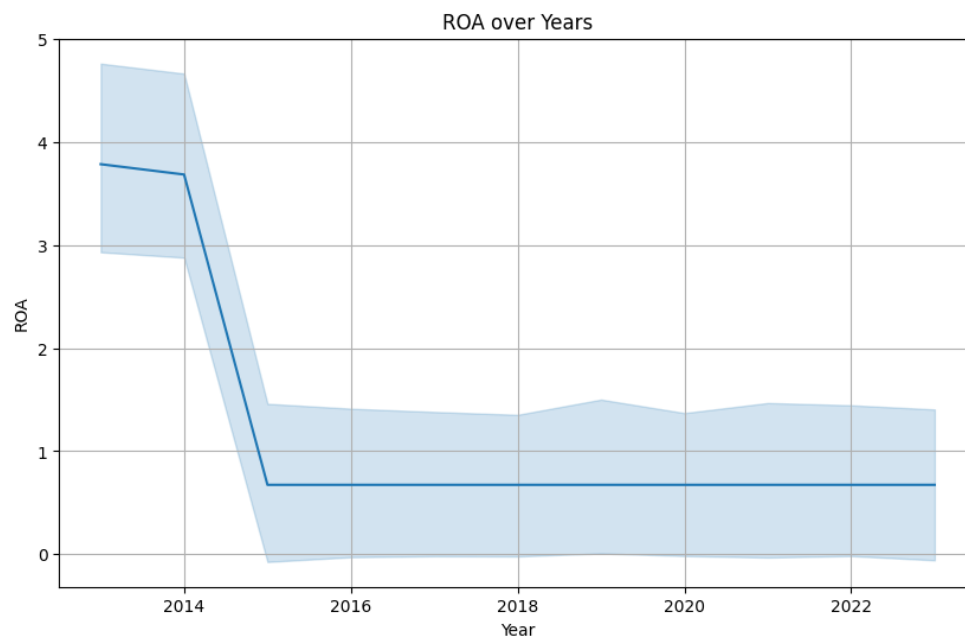

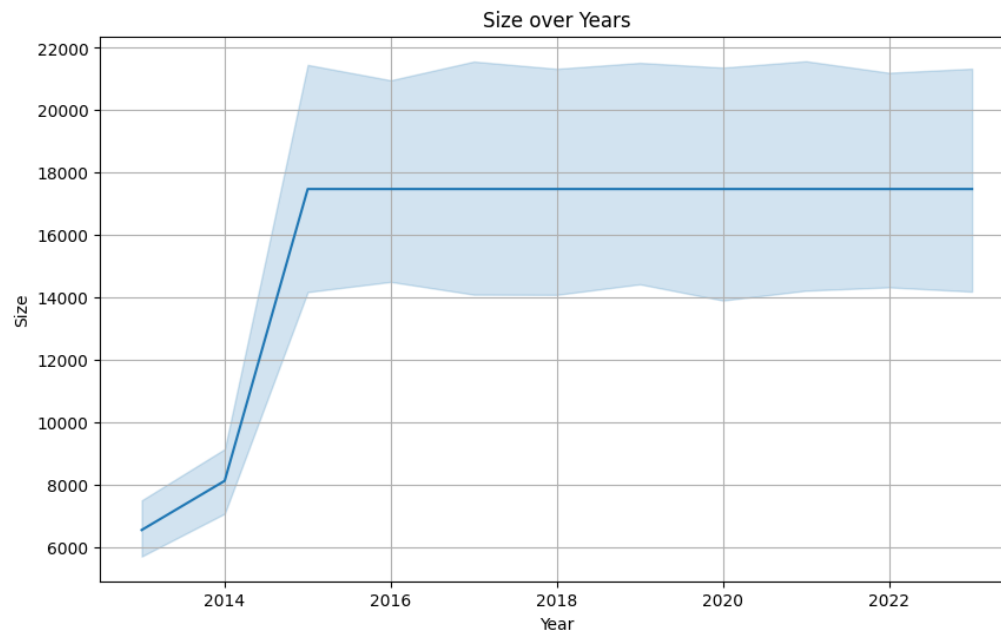Divi over Years

A03: EPS over Years

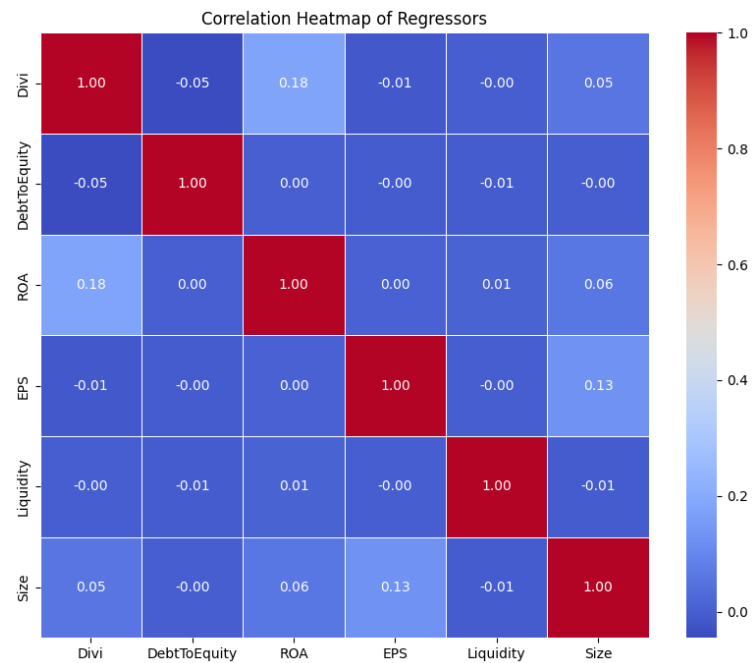## A04: Liquidity over Years

A05: Profitability over Years

A06: ROA over Years

A07: Size over Years

A08: Correlation Heat Map

Correlation Heatmap of Regressors

Appendix Tables

T01: Variance Inflation Factor: Canada

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. vif, uncentered
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Variable	VIF	1/VIF
Size	1.03	0.975574
EPS	1.02	0.982143
ROA	1.01	0.994171
DebtToEquity	1.00	0.995940
Liquidity	1.00	0.996528
Mean VIF	1.01	

T02: Variance Inflation Factor: United States

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. vif, uncentered
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Variable	VIF	1/VIF
Size	1.03	0.975574
EPS	1.02	0.982143
ROA	1.01	0.994171
DebtToEquity	1.00	0.995940
Liquidity	1.00	0.996528
Mean VIF	1.01	