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Preferred Stock – Debt or Equity?

A study on the characteristics of preferred stock and the effects of default risk

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Abstract

There has been previous research on the subject of preferred stock and its classification as debt or equity. This thesis adds to the discussion by incorporating a comprehensive measure for financial standing. In this thesis, preferred stock returns of 74 companies are regressed on the returns of bond and common equity and a measure of default probability. The result of the study is that the majority of preferred stock in the sample is debt-like, albeit with significant equity components. There is also a clear tendency of preferred stock issued by companies with poor financial standing to be equity-like and vice versa. From these results it is concluded that there is room to criticize the current classification of preferred stock as equity.

Keywords: Preferred stock, Debt, Equity, Distance to default, Hybrid Assets

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1. Introduction

1.1 Background

Preferred stock was invented in the 19th century when railway companies issued shares with preference to dividends as a way to satisfy investors. In the 1970s and 80s issuance of preferred stock was limited and mainly done by utilities to fund investments in infrastructure. Preferred stock was, more or less, forgotten by issuers and investors as dividends on preferred stock were (and still are) not tax deductible in contrast to interest payments (Principal Global, 2017). However, in the 1990s its prominence grew along with changes in the way regulatory capital was managed and decreases in interest rates affecting sovereign and corporate bond yields (Meketa, 2015). This development led to the significant growth over the last 30 years across the globe, a growth of such magnitude that from 1999 to 2005 preferred stock issues were comparable in size to those of common stock (Kallberg et al., 2013). The adoption of preferred stock as corporate financing has increased to such an extent that a key part of the TARP 2008 capital purchase program included 250 billion dollars' worth of preferred stock to support the US financial sector (Kallberg et al., 2013).

For the less risk averse individual, investments in preferred stock are quite attractive. They are safer than common equity, give a higher return than bonds along with being more liquid and accessible to retail investors. For the issuers it is an even better deal. They serve to shift debt to equity, and for corporations with large amounts of debt this is a substantial advantage. By issuing preferred stock corporations with restrictive debt covenants that regulate debt ratios will be able to generate more capital without breaking said covenants (Heinkel & Zechner, 1990). This, along with the fact that in the post 2008 world where additional regulation such as Basel III and IV force banks to keep higher capital reserves thus leaving them less capital to lend, contributes to the increased prominence of preferred stock (Hull, 2015).

Another, perhaps unexpected, effect of the changes and additions to the regulatory environment for capital reserves is the shift in the dominating issuing sector. Before the 1990s the majority of preferred stock was issued by utilities, something that has changed rapidly. According to S&P (2018) financial services make up 75% of all preferred stock listed on United States markets with utilities only comprising 2.5%. This shift in issuing sectors exacerbates the problem of corporations shifting debt to equity with the addition of another dimension of complications, namely the inclusion of preferred stock as regulatory capital. In a financial system where usage of preferred stock has shifted to sectors of the economy that contribute to the systematic risk of our entire financial system, investigating the true nature of this asset type is imperative.

1.2 Problem discussion and Purpose

Most of the research done on the subject of preferred stock leads to an unavoidable conundrum as to the nature of hybrid assets, whether they should be classified as debt or equity. There seems to be a wide pertaining view amongst economists, lawyers and accountants that the classification of preferred stock leads to regulatory and practical dilemmas that are difficult to solve. Clarke and Kahn (1990) discuss this dilemma and point out the significant effects a binary classification has on financial statements. Classification as equity leads to lower levels of debt and a higher net income, along with a lower profit since dividends are not tax deductible. (Clarke & Kahn, 1990)

Preferred stock in most developed countries is typically classified as equity. The classification however does depend on the characteristics of each issue such as whether dividends are mandatory or whether there is a maturity date. In this thesis, the authors do not aim to explore preferred stock from the perspective of accounting or law rather there will be an attempt to add to the discussion on classification by studying asset performance in practice.

It is our opinion that the main issue with the current classification of preferred stock is the one discussed by Clarke and Kahn (1990). However, another aspect is the fact that under the Basel III regulation preferred stock is included in “Tier 2” capital and under some circumstances even included as “additional Tier 1” capital (Hull, 2015). We believe that letting banks maintain part of their capital reserves in an asset with a hybrid nature presents a situation where levels of acceptable risk might be exceeded. This, in combination with preferred stock being used to keep debt ratios smaller presents a systematic risk to the financial system as a whole. Especially if we assume that Emanuel (1981) was right in his assumption that any rational issuer of preferred stock would never defer payments no matter the nature of said preferred stock and therefore any deferred dividend payment would lead to a deteriorated reputation in capital markets, which by extension might spell bankruptcy for an indebted and publicly listed corporation.

These problems exacerbate the urgency of discussing and testing the binary classification used at this time. In a world where preferred stock is, as discussed above, allowed as part of regulatory capital and is employed to shift debt to equity, there needs to be a theoretical and empirical answer as to whether preferred stock is debt or equity. At this time, there is no clear consensus in literature or academia on the empirical nature of preferred stock and studies on the subject are decades old and do not reflect the changes in the market. This thesis will therefore by using empirical methods aim to explain whether preferred stock is debt- or equity-like and what the effect of default risk is on said characteristics.

1.3 Literature review

The inspiration for the main analytical framework of this thesis was derived from the article by Chan and Seow (1997) named "Debt and Equity Characteristics of Mandatorily Redeemable Preferred stock". This article is a product of the discussion raised by Clarke and Khan (1990) in their article "Is it equity? Is it debt? Or is it both?" where the implications of classifying a hybrid asset as either debt or equity are presented. Clarke and Kahn (1990) discuss the reasonability of the current classification as equity and the implications this has on financial statements across all issuing corporations. Clarke and Kahn (1990) approach the subject from a theoretical accounting perspective something that is out of the scope of this thesis. They conclude that classification as either debt or equity will greatly affect balance sheets and key performance ratios and that the magnitude of these effects warrants further discussion on the subject of classification.

In the article by Chan and Seow (1997) the authors attempt to, with quantitative methods, investigate whether mandatorily redeemable preferred stocks in the US behave more like debt or equity. Their model regresses preferred stock returns against those of common stock and a bond where the coefficients are then compared. This regression is then performed on the full sample and subsamples based on credit ratings with the conclusion that preferred stock in general and especially those with lower credit rating more closely resembles equity and vice versa.

Other authors attempting to answer the question of debt/equity are Emanuel (1981) and Bildersee (1973). Emanuel created a model based of the Black-Scholes model for the valuation of European call options. Emanuel's key assumption is the idea that even though issuers of preferred stock technically are able to defer payments any rational economic actor would never defer payments unless default was imminent. With these assumptions, his model is applied to preferred stock with success and arrives at the conclusion that preferred stock from corporations in good financial standing tend to be debt like and vice versa, a similar conclusion as Chan and Seow (1997).

Bildersee (1973) applies the Markovitz market model in his attempt to analyse preferred stock. The idea of the author was to calculate the effects of changes in the underlying market on preferred stock and compare this to the effects of bond indices on the same preferred stock. This way the beta-values/coefficients could be compared in terms of sample means to conclude whether preferred stock is more equity- or debt-like. Bildersee (1973) arrives at the result that preferred stock with low beta-value, that is, low systematic risk, tends to be more debt-like and the ones with high beta-values tend to be equity-like.

The authors Sorensen and Hawkins (1981) in their article "A theory of preferred stock" grew out of a regulatory change allowing insurance companies to include preferred stock with sinking fund[1] as part of their portfolios. In 1971, according to the authors, The Fed allowed insurance companies and banks to keep preferred stock with sinking funds as part of their capital requirements. This led Sorensen and Hawkings (1981) to attempt to valuate preferred stock using a multiple regression model including all preferred stock issued between 1975 and 1981 as data. The results of the study were that the significant positive variables were the average dividend yield of preferred stock, the absolute change in dividend yield and a dummy for whether the preferred stock was refundable. The significant negative variables were credit rating and whether there was a sinking fund present.

Across the literature credit ratings are a frequently recurring subject albeit in different ways. Chan and Seow (1990) divide their data into categories based of credit rating to explore the debt/equity-likeness of corporations of different risk levels. In their article, they find that preferred stock with higher credit rating tend to be more debt-like and vice versa ceteris

[1] Sinking funds are a type of provision done to repay the bond by the issuer

paribus. Strawser (2011) explores the effect on credit rating of different types of preferred stock with the result that redeemable preferred stock tends to lead to lower credit ratings ceteris paribus. Sorensen and Hawkins (1981) also use credit rating as a variable in their attempts to explain the yield of preferred stock and the effects of this were explained earlier.

2. Theory

2.1 Preferred stock

Preferred stock is a type of asset which shares characteristics of both equity and debt, in other words a hybrid asset. Similar to bonds, preferred stock generally pay its holders a fixed amount of income, in the form of dividends, and are therefore likened to fixed income securities. However, unlike bonds, the issuer can decide to withhold the dividend without facing bankruptcy (Bodie, Kane & Marcus, 2014). Since preferred stock is classified as equity most debt instruments, including bonds, are senior to preferred stocks, meaning they are paid before holders of preferred stock are paid. Furthermore, while bond interest payments are tax deductible, dividends to preferred stockholders are not since they are paid after tax. Hence, the issuer of preferred stock is not given the benefit of tax deductibility, leading to preferred stock being a more expensive source of finance ceteris paribus (Sorensen & Hawkings, 1981).

Preferred stock is similar to common stock in the sense that owning preferred stock issued by a company implies owning a share in the company, albeit with weaker or no voting rights. On the other hand, preferred stock is senior to common stock when it comes to dividend payments and in the event of liquidation of the company, which means all obligations to holders of preferred stock must be met before common stock holders get any payments. (Bodie, Kane & Marcus, 2014)

Preferred stock can be cumulative or non-cumulative. In contrast to debt, the company can decide to withhold dividends (Miller, 2007). In the case of an unpaid dividend, for cumulative preferred stock, all previous unpaid dividends must be paid before any dividends are paid to the common shareholders. For non-cumulative preferred stock, unpaid dividends are seen as expired. In the Basel III regulations non-cumulative preferred stock is considered additional Tier 1 capital and cumulative stock is considered Tier 2 (Hull, 2015).

Preferred stock may also be callable, meaning that they can be purchased back by the issuer at par value at a specific date. This option is usually exercised if the interest rates fall and the repurchase is often followed by an issue of a new series of preferred stock with a lower yield (Miller, 2007). Preferred stock may also be convertible, meaning it can be converted to common shares. The conversion can be initiated by the investor, the board of directors or be automatically converted at a set date. (Miller, 2007)

2.2 Equity or debt?

The classification of preferred stock in terms of debt or equity is regulated by the International Financial Reporting Standards (IFRS), specifically in IAS 32 where classification of financial instruments is treated.

> *A financial instrument is an equity instrument only if (a) the instrument includes no contractual obligation to deliver cash or another financial entity and (b) if the instrument will or may be settled in the issuers own equity instruments*
>
> (IAS 32, 2014)

This part of the classification discepts the cash flows from issuer to owner and the nature of this obligation. In terms of preferred stock the cumulative/non-cumulative status is not relevant here. The most important factor in classification is the outflows from the issuer being voluntary. If it is possible for the issuer to not only defer dividends but not to pay them at all is the important factor in classifying an asset as equity.

The second important part in classification is the way the asset matures, stated in the quote below;

> *If entity issues (preferred) shares that pay a fixed rate of dividend and that have a mandatory redemption feature at a future date, the substance is that they are a contractual obligation to deliver cash and therefore, should be recognised as a liability*
>
> (IAS 32, 2014)

The result of this is that preferred stock with a contractual maturity date is classified as debt and that preferred stock with call provisions is classified as equity.

With these rules one might think that if the criteria, named above, are fulfilled then a preferred stock issue will be classified as equity. However, this is not necessarily true. There is one very important principle in regards to classifying assets in particular and accounting in general, the principle of materiality. Materiality is the principle that economic reality precedes the legal technicalities, which means that in principle classification should be based on economic reality rather than anything else.

2.3 Debt and equity characteristics of mandatorily redeemable preferred stock

Chan and Seow (1997) build, upon the thinking of Emanuel (1983), an analytical model to valuate preferred stock. Emanuel (1983) shows in his article that preferred stock sometimes behaves more like debt than equity, especially for firms with stronger finances, which by extension means that poor performing corporations, according to Emanuel, have their preferred stock act more like common equity. This result from Emanuel´s model lead Chan and Seow (1997) to think of preferred stock as assets with limited upside potential along with a smaller downside. The technical model from Emanuel´s argument was combined with the theoretical arguments of the FASB conceptual framework along with previous research in the accounting field having difficulty arriving at a consensus on the proper classification of preferred stock.

Chan and Seow (1997) theorize that preferred stock performance can be decomposed into debt and equity components. They expressed the preferred stock returns as follows

$$\boldsymbol{P = \beta_1 \times D + \beta_2 \times E} \qquad \textbf{(2.1)}$$

In this formula, *P* is the return on the preferred stock, *D* return on a bond and *E* return on common stock. Where B1 and B2 are the respective coefficients for the marginal effect on the preferred stock return of each asset class. These coefficients correspond to the debt and equity components of the preferred stock. Chan and Seow (1997) ran the following model to find said coefficients

$$\boldsymbol{P = \beta_0 + \beta_1 \times D + \beta_2 \times E + \varepsilon} \qquad \textbf{(2.2)}$$

With this model estimated, the coefficients are used by Chan and Seow (1997) to test the debt and equity characteristics of the sample mean of both coefficients. In this context B1=0 would mean that the preferred stock is equity-like and a B2=0 results in it being debt-like.

$$\boldsymbol{H0_1}: \beta_1 = 0 \qquad \boldsymbol{H1_1}: \beta_1 \neq 0$$

$$\boldsymbol{H0_2}: \beta_2 = 0 \qquad \boldsymbol{H1_2}: \beta_2 \neq 0$$

If rejected these null hypotheses mean that both coefficients have a marginal effect that is statistically significant and that the preferred stock at least has elements of both debt and equity. By extension, if we cannot reject the null hypothesis we have to conclude that the coefficient has no effect. To test whether the preferred stock is more debt/equity-like the following hypothesis was used.

$$\boldsymbol{H0_3}: \beta_1 = \beta_2 \quad \boldsymbol{H1_1}: \beta_1 \neq \beta_2$$

If the hypothesis above is rejected it would mean that the preferred stock is not equal parts debt and equity. The preferred stock can therefore be said to more closely resemble the characteristic of the asset with the highest coefficient. If the hypothesis is not rejected we conclude that both characteristics are equally important.

2.4 Merton model and distance to default

The Merton model is a well-known credit risk model developed by Merton in 1974 (Merton, 1974). The model is based on the Black Scholes model for the valuation of European call options and is a useful model as the only inputs needed can be readily found in financial statements along with the fact that distance to default, one of the key outputs from the model, is comparable across companies and currencies. Distance to default measures the number of standard deviations the asset value has to decrease for default to happen (Hull, 2015). A lower value of distance to default indicates a higher probability of default.

The basis of Merton's model is the idea that defaults occur when the nominal value of debt is greater than the value of assets; otherwise the company would have enough money to pay its debtors and avoid default. The model treats default as a long call option written on the firm's asset value, $\boldsymbol{A_T}$, with the face value of debt, K, as its strike price. (Merton, 1974)

$$\boldsymbol{max}[\boldsymbol{A_T} - \boldsymbol{K}, \boldsymbol{0}] \qquad \textbf{(2.3)}$$

By using the standard Black Scholes formula (equation (2.4) below), assuming the asset follows a normal distribution, it is possible to calculate firm equity. By using the formulas below where A is asset value, K is debt, r is the risk-free interest rate, $\boldsymbol{\sigma_A}$ is asset volatility and T is time. (Hull, 2015)

$$\boldsymbol{E_0 = A_0 \times N(d_1) - K \times e^{-r \times T} \times N(d_2)} \qquad \textbf{(2.4)}$$

where

$$\boldsymbol{d_1 = \frac{ln(A_0/K) + (r + \sigma_A^2/2) \times T}{\sigma_A \times \sqrt{T}}} \qquad \textbf{(2.5)}$$

$$\boldsymbol{d_2 = \frac{ln(A_0/K) + (r - \sigma_A^2/2) \times T}{\sigma_A \times \sqrt{T}}} \qquad \textbf{(2.6)}$$

Since the equity value is observable and total assets usually are not, one has to solve for total assets and asset volatility. This requires another equation since there are two unknowns. Using Ito’s lemma (Hull, 2015) we get the following equation:

$$\boldsymbol{\sigma_E \times E_0 = N(d_1) \times \sigma_A \times A_0} \qquad \textbf{(2.7)}$$

where $\boldsymbol{\sigma_E}$ is the volatility of equity.

Using these formulas one can solve for asset value and asset volatility. After solving for total assets and asset volatility distance to default is calculated using equation (2.8)

$$\boldsymbol{DD = \frac{ln(A_0/K) + \mu_A^* \times T}{\sigma_A \times \sqrt{T}}} \qquad \textbf{(2.8)}$$

where DD is the distance to default and $\boldsymbol{\mu_A^*}$ is the drift rate.

2.5 Panel data

Panel data includes both cross-sectional and time dimensions. There are several benefits of using panel data. According to Brooks (2014) the most important advantage, in comparison to pure cross-sectional or pure time series data, is that one can deal with more complex problems. Combining cross-sectional and time series data increases the number of observations which leads to an increased number of degrees of freedom. This allows for a more comprehensive study of the relationship between variables over time. Furthermore, the problem of multicollinearity which may arise with time series regressions will be mitigated.

By using an appropriate structured panel data model one may also remove the problem of omitted variables bias caused by heterogeneity, a common problem when using cross-sectional data (Brooks, 2014).

A panel of data can be balanced or unbalanced. If the data set contains the same number of time series observations for each cross-sectional unit the data set is balanced, whereas if some cross-sectional units have fewer time series observations or observations at a different point in time, the data set is unbalanced. A balanced panel is preferred since when dealing with unbalanced panels the econometrics software in use will automatically account for the missing values (Brooks, 2014).

The simplest way when dealing with panel data is to run a single pooled regression, meaning the time index is dropped and all observations are considered as an individual cross-sectional unit (Brooks, 2014). This is seldom an appropriate way since, for instance, there is often some dependence between two following time periods for a specific firm.

Other than pooling there are two main approaches when running panel data regressions; fixed effects models and random effects models. Fixed effects models allow for firm (time) specific intercepts which do not vary over time (firms), while all slope estimates are fixed both cross-sectional and over time. The random effects model, also known as the error components model, allow for, as with fixed effects, firm (time) specific intercepts, which are constant over time. However, in contrast to fixed effects, the firm (time) specific intercepts in the random effects model are seen as the random deviation from the global intercept.

One way to estimate a model with fixed effects is to use a dummy variable for each cross-sectional unit (point in time). Each dummy will then capture the unit (time) specific intercept. However, with this method the number of parameters to estimate will be large, especially if the number of cross-sectional units (points in time) is large, which will reduce the power of the test. Another way, which does not include estimation of many new variables, is to transform all variables by removing the time- (unit-) mean of each unit (period) from the values of each variable. This is called the within transformation. (Brooks, 2014)

The random effects model uses a generalized least squares (GLS) procedure where a weighted mean is removed from each variable, instead of the whole mean as in the fixed effects model. The weights are determined in such a way as only what is required to ensure no cross-correlations in the error term is removed (Brooks, 2014). The random effects model has the advantage, compared to fixed effects model, of saving degrees of freedom, and hence should be more efficient. (Brooks, 2014)

2.6 Returns

The main data in this thesis will be prices with dividends included and this presents some issues. To alleviate said issues returns will be used rather than prices, as variables in the regression model, since prices often have inconvenient statistical properties namely having a unit root (Brooks, 2014). Having a unit root may cause non-stationarity which means that the mean and variance of the errors are not constant. The most common solution for this problem is to compute the returns of each asset, rather than to use their prices, by using formula (2.9) below

$$\boldsymbol{r = \frac{P_t}{P_{t-1}} - 1} \qquad \textbf{(2.9)}$$

Not only is this a strong measure to avoid non-stationarity, it also has the effect of improving the distributional properties of the data along with standardizing it. Since prices of an asset cannot reach negative values the distribution of these will be very dissimilar to a normal distribution, something we know to be inconvenient when performing regression analysis. The distribution of returns on the other hand resembles a bell curve, albeit with higher kurtosis, another helpful property of using returns rather than prices. (Brooks, 2014)

3. Method

To investigate what drives preferred stock returns and whether preferred stock is more debt- or equity-like the model derived Chan and Seow (1997) is used as a starting point. Chan and Seow (1997) used an OLS linear regression model where the return on preferred stock was regressed on the return on equity and the return on debt.

$$\boldsymbol{P = \beta_0 + \beta_1 \times D + \beta_2 \times E + \varepsilon} \qquad \textbf{(3.1)}$$

This model is expanded by including a measure of default risk and the time to maturity of the bond. A default risk measure is included since previous studies (e.g. Emanuel, 1981; Chan & Seow, 1997) has shown that the debt and equity components of the preferred stock is different for companies with different credit ratings, that is, different default risk. The measure of default risk included in the model is distance to default. By including distance to default, not simply by dividing the sample into subsamples of high and low credit rating as done by previous studies (e.g. Chan & Seow, 1997), but incorporate it in the debt and equity variables, we are able to see how the magnitude of the debt and equity components of preferred stock change with the change in default risk.

Since the value of a bond approaches its nominal value as it approaches maturity, the time to maturity is also included as a variable in the model. This variable is incorporated in the bond variable in the same way as the distance to default variable.

Several control variables are also included in the model. Inclusion of control variables in the model will not aid in answering the research question of this thesis, however, their importance should not be understated. The goal of their inclusion is to reduce variance in the error term and improve the results of the theoretically important variables. The first control variable is the dividend yield of the preferred stock. The dividend yield was included in the studies by both Sorensen and Hawkins (1981) and Miller (2007) in their attempts to valuate preferred stock and is defined as the dividend over price ratio. The dividend yield is used as a way of controlling the effects of changing dividends on the preferred stock price.

Since this thesis has a global perspective with companies from 20 different countries and different countries have different performing stock markets, country specific characteristics are something that should be controlled for. Since there are countries with only a single company included in the sample, including a dummy variable for each country does not work. Therefore, dummies were only included for each of the two countries with the most preferred stock in the sample, namely USA and Canada.

According to Miller (2007) it is expected that cumulative preferred stock would generate higher returns than their non-cumulative counterparts and therefore a dummy variable for whether the preferred stock is cumulative or not is added to the model.

The last variable added to the model is the change in distance to default. It is added since it is believed that changes in default risk will affect the price of the preferred stock.

Given the variables stated above we run the two following regressions using pooled panel data:

$$\boldsymbol{P = \beta_0 + \beta_1 \times S + \beta_2 \times B + \beta_3 \times C + \beta_4 \times DY + \beta_5 \times CDD + \beta_6 \times USA + \beta_7 \times Canada + \varepsilon} \quad \textbf{(3.2)}$$

$$\boldsymbol{P = \beta_0 + \left(\beta_1 + \beta_2 \times DD + \beta_3 \times DD^2\right) \times s + \left(\beta_4 + \beta_5 \times DD + \beta_6 \times DD^2 + \beta_7 \times T + \beta_8 \times T^2\right) \times B + \beta_9 \times C + \beta_{10} \times DY + \beta_{11} \times CDD + \beta_{12} \times USA + \beta_{13} \times Canada + \varepsilon} \quad \textbf{(3.3)}$$

Where *P*, *S* and *B* is the return on preferred stock, common stock and bond respectively, *DD* is the distance to default, *C* is a dummy for whether the preferred stock is cumulative or not, *DY* is change in dividend yield, *CDD* is the change in distance to default, *USA* and *Canada* are dummy variables for whether the preferred stock is issued by an American respectively Canadian company and $\boldsymbol{\varepsilon}$ is the error term. Robust standard errors are used since there is heteroscedasticity present. By studying the correlation matrix, no multicollinearity could be found. Running a redundant fixed effects test and a Hausman test indicates that fixed period effects should be used. However, when using fixed period effects, a lot of information is lost wherefore no period or cross-sectional effects are used.

The first test in this thesis, using regression 1, is to see whether preferred stock have components of debt and equity. The hypotheses are stated below

$$\boldsymbol{H0_1}: Preferred\ stock\ have\ no\ characteristics\ of\ equity\ (\beta_1 = 0)$$

$$\boldsymbol{H1_1}: Preferred\ stock\ have\ characteristics\ of\ equity\ (\beta_1 \neq 0)$$

$$\boldsymbol{H0_2}: Preferred\ stock\ have\ no\ characteristics\ of\ debt\ (\beta_2 = 0)$$

$$\boldsymbol{H1_2}: Preferred\ stock\ have\ characteristics\ of\ debt\ (\beta_2 \neq 0)$$

We also want to investigate which of the components have the largest influence on preferred stock returns. This is done by comparing the debt and equity coefficients. The null hypothesis is stated below

$$\boldsymbol{H0_3}: There\ is\ no\ difference\ between\ debt\ and\ equity\ (\beta_1 = \beta_2)$$

$$\boldsymbol{H1_3}: There\ is\ a\ difference\ between\ debt\ and\ equity\ (\beta_1 \neq \beta_2)$$

Furthermore, using regression 2, the change in the equity coefficient due to different values of distance to default and the change in the debt coefficient due to different values of distance to default and time to maturity is investigate.

4. Data

4.1 Data selection and collection

The time period of the study is five years from 2013-01-01 to 2018-01-01, giving 60 time observations per company and variable using monthly data. As of April 2018, there are 1431 active preferred stock available globally on DataStream that match the time period. Many companies have issued several series of preferred stock and therefore, for each company, only the senior preferred stock was included in the sample, resulting in an exclusion of 615 preferred stock. Another 742 companies were excluded since they either lacked common equity, bond or the data for the assets was unavailable. For the remaining companies, we were able to match the preferred stock with common equity and a bond, giving a total sample of 74 companies from 20 different countries. As for companies with several bonds outstanding the bond senior was selected.

Monthly data on prices for preferred stock, common equity and a bond for each of the 74 companies included in the sample was retrieved from DataStream. All prices were retrieved in domestic currency. To remove the part of the price changes due to changes in conversion rates, and hence be able to compare assets from different countries, US dollar conversion rates were retrieved for each currency in the sample. Monthly data on the dividend yield for each preferred stock was also collected from DataStream.

To compute distance to default monthly data on short term debt, long term debt and number of shares outstanding for each company were retrieved from DataStream. Furthermore, monthly data on three-months T-bills were retrieved as proxy for the risk-free rate.

4.2 Data manipulation

The prices of preferred stock, common equity and bond were converted to US dollar using the conversion rates. Using equation 2.9 the returns on each asset were calculated.

Before distance to default could be calculated, total assets and asset volatility had to be estimated. Equation 2.7 was simplified to equation 4.1, since equity can be seen as half of total assets and N(d1) is in most cases close to one. Equation 4.1 was then inserted in equation 2.5 and 2.6. Market value of equity was calculated by multiplying the price of equity with the number of shares. Since the Merton model uses a single zero-coupon bond as debt a synthesized zero-coupon bond had to be estimated. Since default tends to happen when the asset value is between short term debt and total debt, the debt was estimated to be the value of short term debt plus half of the value of long term debt (Nilsson, 2018). By minimizing the squared difference between the right-hand side and the left-hand side of equation 2.4 total asset values can be estimated.

$$\boldsymbol{\sigma_A = \frac{\sigma_E}{2}} \qquad \textbf{(4.1)}$$

Using the estimated total assets distance to default was calculated using equation 2.8. This procedure was done for all companies for each point in time. The change in distance to default and dividend yield were also calculated.

4.3 Outliers and extreme values

The data used in this thesis has issues with rather large outliers and the variables affected in particular are the preferred stock, common stock and bond returns. Seeing as the aim of the thesis is to explain what drives preferred stock in general rather than on an individual basis means that some of the corporations in our data have observations that need to be adjusted. There is an understanding on behalf of the writers that adjustment of extreme values might compromise the results of the model. However, we argue that large amounts of volatility on an individual company basis present larger obstacles than the loss of information caused by their exclusion. The 0.5% highest and 0.5% lowest returns were removed from the preferred stock, bond and common stock returns across the entire panel. The result of this was that the 22 highest returns and lowest returns were removed from each asset and substituted with the average return of the asset across the sample period. This means that out of 4439 observations 44 were removed from the panel.

4.4 Data critique

The data used in this thesis is exclusively secondary data gathered from DataStream, and despite the fact that the data we use is simple to understand and grasp for anyone remotely familiar with the subject there are still issues surrounding secondary data. Most of the complications in this regard stem from the fact that accounting data collected from

DataStream is not always defined homogeneously due to the intricacies of accounting principles in different countries. These issues are however isolated to the accounting data as prices are very well defined and easy to understand. In general though, it is believed by the authors that DataStream would strive to make accounting data available on their platform to be comparable to that of different countries. By extension these differences in definition on national level could be assumed to enable cross national comparisons an assumption that should alleviate this issue.

In the opinion of the authors the most significant issue in terms of data is the rather small sample of preferred stock that is included in the thesis (74). It could be argued that a sample of 74 from 1431 preferred stock is too small and that the size of the sample might severely impede any efforts to draw realistic conclusions that can be extrapolated to any preferred stock. However, to simply assume that the 1431 preferred stock is all unique is not necessarily a very good assumption. The fact that this model only requires one of each asset, the amount of useful preferred stock decreases when secondary listings along with every multiple issue are removed. With the previous measures, we arrive at 810 corporations with preferred stock.

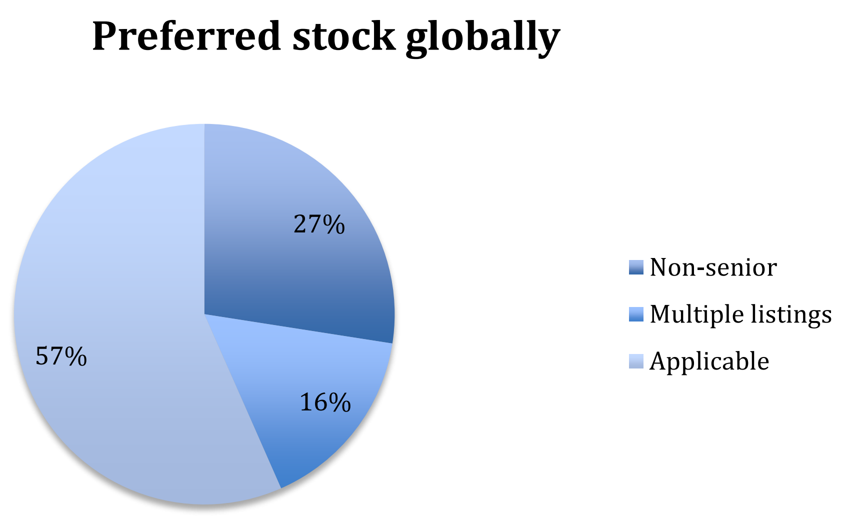

Figure 1. *Preferred stock in DataStream.*

We believe the comparatively small sample to be caused by two main reasons, the first being the requirement of all three assets and the second the relatively long time frame. With regards to the first cause requiring corporations to have equity, bonds and preferred stock will create a bias towards larger companies with good access to financial markets. The second is caused by the inherent trade-off between a shorter timespan to increase the number of subjects and having a long time span to increase the amount of observations available to each subject. The amount of preferred stock issued increases yearly and if the time period had been set to 2015-01-01 until 2018-01-01 we would have started with almost 1700 preferred stock rather than the 1400 we got.

4.4.1 Selection Bias

Nonetheless, a sample of 74 preferred stock from a population of 810 is small enough for there to be ample concern regarding sample bias. For this reason, an effort was made to compare the sample to the population in terms of the following metrics; debt over asset ratio, revenue, total asset value, nationality and sector. The aim, being to compare the sample to the population to see if the sample corporations can be said to represent the population in an adequate manner. The financial comparisons follow in the table below:

	Sample	World
Average debt/asset	27%	51%
Average revenue	13 100 000	4 700 000
Average asset value	70 300 000	21 200 000

Table 1. *Corporate financials*

From table 1 we can conclude that the sample used contains preferred stock of corporations that are approximately three times larger and half as indebted as that of the population as a whole, a result that is not entirely surprising considering the requirements of our sample. It could reasonably be assumed that larger corporations would have better access to financial markets and therefore a larger presence of exchange listed equity and debt. The consequences of this skewed sample could affect the results of this thesis where said results will be more applicable to large corporations.

With regards to the second comparison namely nationality the sample might also be misrepresenting the population. The nationality of all preferred stock available during our timeframe on DataStream can be seen in the diagram below.

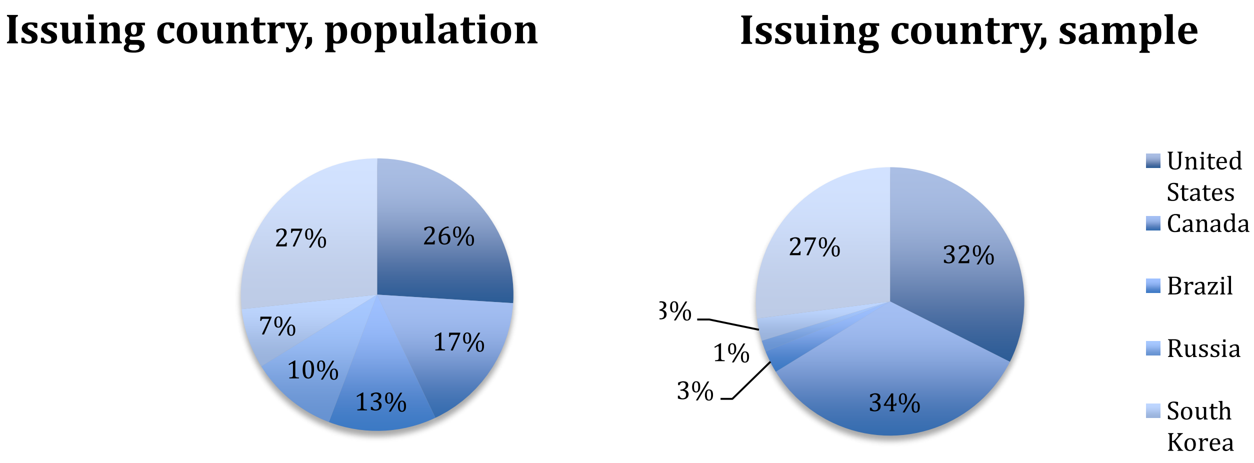

Figure 2. *Issuing country, population and sample.*

The five largest users of preferred stock are in order of size, the United States, Canada, Brazil, Russia and South Korea. In terms of nationality the sample chosen is composed of approximately 66% of preferred stock from USA and Canada whereas in the population these two nations make up 42%. This means that the US and Canada are overrepresented at the expense of Brazil, Russia and South Korea which might affect the applicability of our conclusion on preferred stock on the aforementioned markets.

Thirdly, the sample is also skewed with regards to sector, where there is a noticeable difference in the share of bank issued preferred stock when comparing our sample to the population.

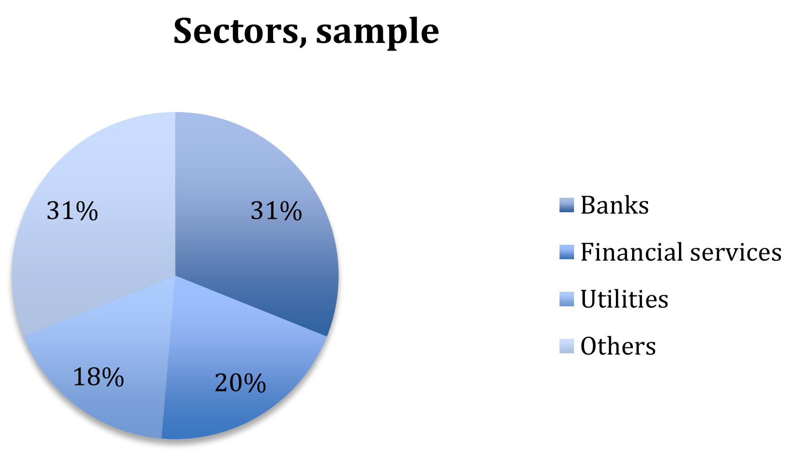

__Figure 3.__ Distribution of sectors in sample.

In the sample 31% of all preferred stock were issued by banks in contrast to the full population where banks only make up 11% of all issues. With regards to other sectors the sample and population are quite similar, with financial services and utilities having close to equal shares.

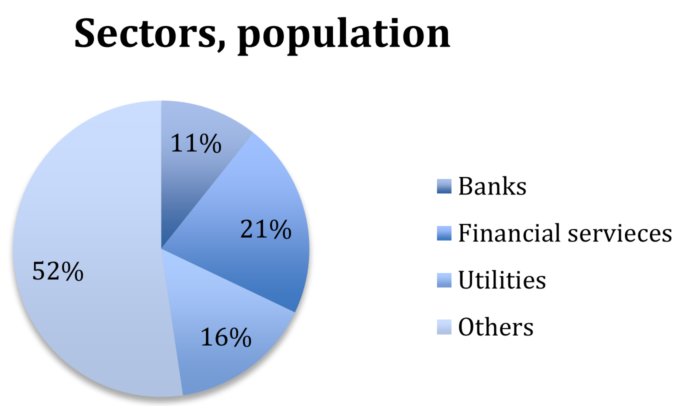

__Figure 4.__ Distribution of sectors in population.

In conclusion, the data in this thesis is skewed towards large and financially strong banks in Canada and the United States. It is important to note that the results of the model might therefore not be fully extendable to other contexts than those.

5. Results

5.1 Regression 1

In table 2 the results from the first regression are presented. In this model, preferred stock is regressed against stock and bond returns along with five control variables. The control variables are monthly change in distance to default as a percentage, the change in dividend yield of the preferred stock each month, a dummy variable for whether the preferred stock is cumulative or not, a dummy for whether the preferred stock is issued in the United States or elsewhere and another dummy which is identical to the one for USA but for Canada rather than the US.

Dependent variable	Independent variable	Coefficient
Preferred stock		
	Bond	0.42***
	Stock	0.29***
	Change in distance to default	0.10
	Change in dividend yield	-0.01
	Cumulative	0.15
	USA	-0.14
	Canada	-0.39
	Constant	-0.07

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 2. *Result from regression 1 using robust standard errors. Complete regression output is found in Appendix.*

The hypotheses consider the question of whether the preferred stock contains both debt and equity characteristics. These hypotheses are rejected if the coefficients are statistically significant at a 95% level. The test statistics are shown in table 3.

Test 1	
$H0_1$	Bond = 0
$H1_1$	Bond ≠ 0
Coefficent	0.42***

Test 2	
$H0_1$	Stock = 0
$H1_1$	Stock ≠ 0
Coefficent	0.29***

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3. *Results from test 1 & 2. Complete test statistics are found in Appendix.*

From table 2 and 3 we can conclude that both stock and bond are significant at a 95% level, both with p-values smaller than 5%. This means that both stock and bond will have a statistically significant effect on the returns of the preferred stock. Their marginal effects, 0.42 for bond and 0.28 for stock, tell us that an increase of 1 in these variables will increase the preferred stock return by the value of their coefficients, 0.42 and 0.28 respectively. We can therefore conclude that the preferred stock in the sample have both debt and equity characteristics, rather than being one or the other.

As evident from table 2, neither of the control variables in the model can be said to have any significant effect on the returns of the preferred stock. This however does not mean that they are irrelevant but rather that we cannot find any significant effect on the preferred stock returns by these variables. By extension, there is no conclusive effect from nationality, change in distance to default, change in dividend yield and whether the preferred stock is cumulative or not. For the variables USA and Canada, we can conclude that preferred stock issued in these countries do not yield different returns than that of the rest of the sample. The change in distance to default does not have any significant effect on the return of the preferred stock, which should be interpreted as changes in distance to default do not affect preferred stock returns. There is no significant effect on preferred stock return from dividend yield, which means that the relationship between price and dividend does not affect the returns. As for the last of the control variables, cumulative, there is no significant effect derived from the cumulative/non-cumulative status of the preferred stock.

The third hypothesis tests the relationship between the respective coefficients bond and stock. Namely it will test the magnitude of each coefficient in relation to the other so as to conclude whether the preferred stock is more like debt or equity. This is done with the following hypothesis. The test statistics are shown in table 4.

Test 3	
$H0_3$	Bond = Stock
$H1_3$	Bond ≠ Stock
F-value	8.43**

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4. *Results from test 3. Complete test statistics are found in Appendix.*

The result of the test above is that we reject the null-hypothesis as the p-value is smaller than 5%. Since the estimated coefficient of bond is larger than that of stock, we can conclude that the coefficient for bond is significantly larger than that of stock, and that preferred stock in our sample therefore tend to be more debt-like.

The results from regression 1 are as follows, preferred stock has both debt and equity characteristics and tend to be more debt-like.

5.2 Regression 2

The results from the second regression are stated in table 5. As evident from the table, none of the control variables are significant, which is interpreted in the same way as in regression 1. All the coefficients including the return of the stock are significant at a 5% level. Together, these coefficients indicate how the marginal effect of common stock returns on preferred stock returns changes when the value of distance to default increases. The coefficient stock can be explained in terms of the marginal effect of the common stock returns on those of the preferred stock when distance to default equals zero. This means that an increase in common stock return of 1 will increase the preferred stock returns with 0.41. The coefficient "Stock*Distance to default" indicates that the marginal effect of the common stock returns on preferred stock returns decreases with 0.03 percentage points per unit of distance to default. That is, when distance to default increases the effect of common stock return on preferred stock return decreases. The coefficient "Stock*Distance to default^2" measures the non-linear change in marginal effect from distance to default. Since this coefficient is positive and smaller than that of "Stock*Distance to default", the change in the stock coefficient decreases when distance to default grows.

As for the bond return variables, the coefficients for the variables including time to maturity are insignificant, indicating that we cannot say that bonds with different time to maturity have different effects on the preferred stock returns. The other variables including bond are all significant and these coefficients are interpreted in the same way as those of the stock. Where bond has a marginal effect of 0.24, which means that when distance to default is zero an increase of 1 in bond returns leads to an increase of 0.24 for the preferred stock returns. "Bond*Distance to default" is a measure of the effect of increases in distance to default on the marginal effect of the bond returns. This means that each added unit of distance to default leads to a rise of the bond coefficient of 0.05 percentage points. In the same way that "Bond*Distance to default" explains the linear relationship between bond and distance to default, "Bond*Distance to default^2" explains the nonlinear effect of increases in distance to default on the size of the bond coefficient. Since this coefficient is negative and smaller than that of "Bond*Distance to default", the change in the Bond coefficient decreases when distance to default grows.

Dependent variable	Independent variable	Coefficient
Preferred Stock		
	Bond	0.24*
	Bond*Distance to default	0.05***
	Bond*Distance to default^2	-0.001**
	Bond*Time to maturity	-0.01
	Bond*Time to maturity^2	0.00
	Stock	0.41***
	Stock*Distance to default	-0.03***
	Stock*Distance to default^2	0.001***
	Change in distance to default	0.13
	Change in dividend yield	-0.01
	Cumulative	0.16
	USA	-0.13
	Canada	-0.37
	Constant	-0.07

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 5. *Result from regression 2 using robust standard errors. Complete regression output is found in Appendix.*

6. Analysis

6.1 Classification and default risk

The results from the first regression show that preferred stock tend to be more debt- rather than equity-like as the coefficient for debt is significantly larger than that for equity. However, as evident from the results of the second regression, the characteristics of preferred stock are different for different values of distance to default. To visualize the changes in the characteristics of preferred stock due to distance to default, the relationship between the coefficients of stock and debt and distance to default are shown in figure 5. In the figure the left y-axis is the coefficient value, the right y-axis is the cumulative distribution of distance to default and the x-axis is the distance to default. In the figure the tendency of debt/equity likeness to shift along with changes in distance to default is clearly illustrated. It is clear that preferred stock with lower distance to default tend to have larger coefficients for equity (equity-like) and that those with higher distance to default tend to have larger coefficients for debt (debt-like). This result is consistent with the conclusions made in previous studies by Chan and Seow (1997) and Emanuel (1981), both of who concluded that preferred stock issued by companies with high default risk tended to be equity like and that those with lower default risk tended to be debt-like.

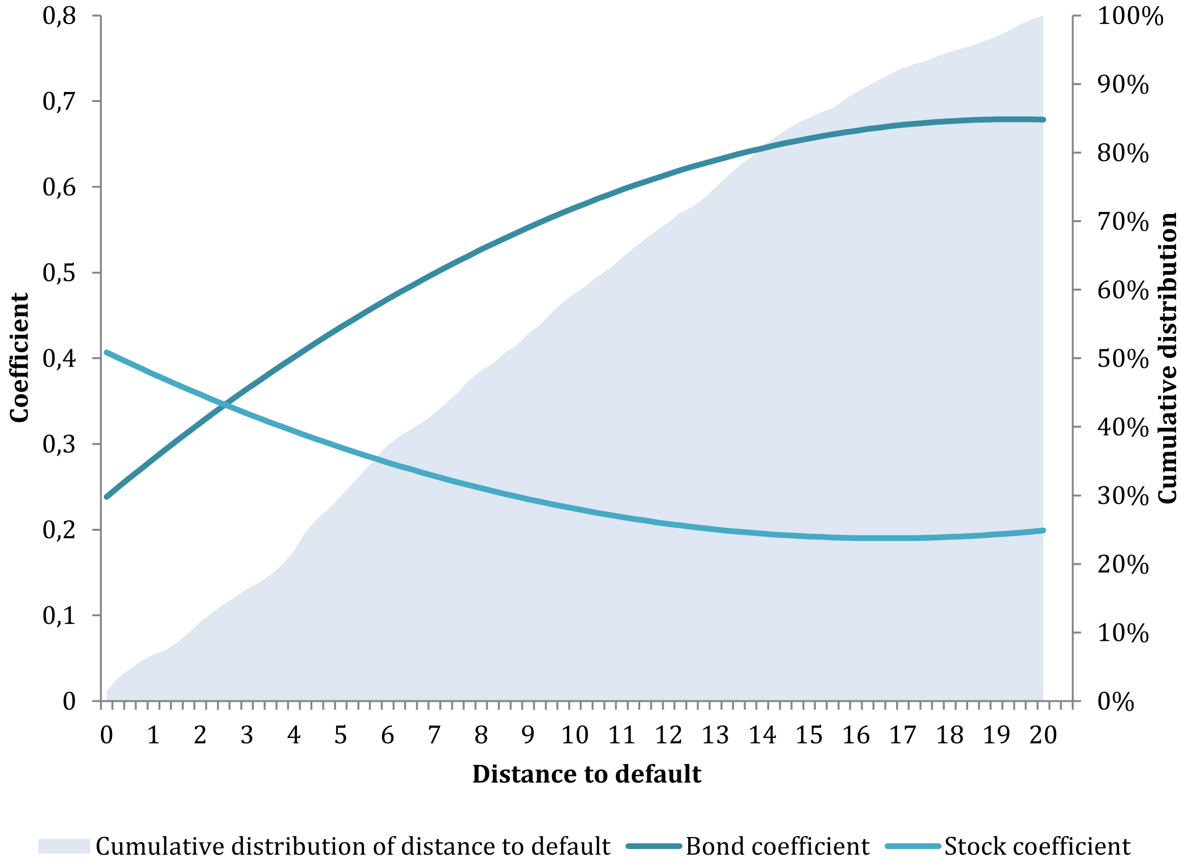

Figure 5. *Changes in coefficients of Stock and Bond for different values of distance to default and the cumulative distribution of distance to default.*

For a company with a distance to default of 2.5 the two coefficients coincide and the debt and equity components of the preferred stock are equal. A distance to default of 2.5 is however rather small as only 15% of the companies in the sample have a lower distance to default than 2.5. For the rest of the sample distance to default exceeds 2.5 and those preferred stock are thus more debt-like. A very important aspect of the figure is that the equity and debt components never reach zero no matter distance to default. The stock coefficient decline from 0.4 as the distance to default increases and is stabilized at a value of 0.2, the debt coefficient increases from 0.25 and stabilizes close to 0.7. This means that preferred stock always display both debt and equity characteristics and never become solely one or the other.

The result that the nature of the preferred stock returns shift along with changes in default risk is understandable when the nature of the asset is considered. Preferred stock pay the owner a fixed dividend on regular basis, the dividends are as explained earlier not legally compulsory but the issuer has a vested interest in paying the dividends. The urgency of paying dividends for the issuer are, if we assume that Emanuel (1981) is correct, even larger than just a vested interest and are always paid if the issuer is able to which is anytime the issuer is solvent. Since preferred stock pay a fixed dividend there is a limited upside to ownership as explained by Chan & Seow (1997). When the default risk is non-existent the price of the preferred stock will simply be the discounted value of future dividends. The price of the preferred stock will increase, thus affecting the returns, until it reaches the theoretical maximum where the share price equals the value of the discounted future dividends. Thus, there are only two factors driving preferred stock prices and they are the discount rate, the opportunity cost of buying the preferred stock, and the default risk, the probability of not getting future dividends.

When this reasoning is compared to the earlier results, where preferred stock is equity-like when default risk is high and debt-like when it is low we gain further understanding as to the nature of preferred stock. However, to understand this result the proxies for the debt and equity components are of the utmost importance. The shift from equity-like to debt-like should be understood in terms of the different volatilities of the underlying assets. When the default risk is high there are big shifts in the price of the preferred stock similar to how common equity prices perform. But as the default risk decreases and the price of the preferred stock approaches the theoretical maximum value, its volatility decreases as the shifts in price become smaller, similar to a bond.

6.2 Legal classification

With the result that preferred stock globally tends to be debt- rather than equity-like there is cause to criticize the legal classification used today. In most accounting standards materiality supersedes other principles and rules, which by extension makes a classification that disregards the empirical nature of an asset problematic. It should also be noted that the requirements for preferred stock to be classified as equity are abuseable. It is within the realm of possibility for preferred stock to be issued with contractual properties that live up to the rules stipulated in IAS 32 but lead to a situation where the asset in everything but name is a debt instrument. For instance, it is possible to implement generous redemption clause or huge increases in dividend after a certain date that give the asset a de facto maturity date or to simply have the interest on deferred dividends so high that their deferral is impossible. The examples above are exaggerated and materiality should control this type of behaviour but the principle is still valid and it illustrates a problem.

However, to simply shift binary classification cannot be said to alleviate the problems concerning the classification, as despite being debt-like on average there is still a significant equity component to each preferred stock. To simply classify preferred stock as debt therefore does not present a satisfactory solution. There should, in the opinion of the authors, be a shift towards a flexible framework for the classification of hybrid assets where the legal aspects from IAS 32 are combined with the empirical reasoning presented in this thesis.

6.3 Effects of misclassification

Considering the results of this thesis, that preferred stock tends to be more debt like, not only are there a lot of corporations with potentially misclassified preferred stock, but there is an urgent need to evaluate the current classification. As discussed by Clarke and Kahn (1990), the classification of preferred stock as equity has substantial implications for the financials of a corporation. The most significant effects being lower levels of reported debt, lower profit as dividends are not tax deductible and higher levels of reported equity. Lower levels of reported debt and higher levels of equity might lead to a situation where the financial statements to some extent can be said to be misleading, especially if Emanuel (1981) is assumed to be correct in the assumption that any rational issuer will never defer dividend payments unless bankruptcy is imminent.

This leads to a situation where despite dividends being optional and even non-cumulative their deferral is simply not feasible for issuers needing to further participate in capital markets. When preferred stock is classified as equity stakeholders could underestimate the effects of these de facto liabilities on the financial statement of the issuing corporation.

It should also be noted that the issues concerning underestimation of liabilities are further exacerbated for preferred stock issued by corporations in banking or financial services. These companies are allowed to keep part of their regulatory capital reserves in non-cumulative and cumulative preferred stock, something that might present systematic risk that regulators might not be comfortable with. Even if, for sake of argument, Emanuel's assumption is completely wrong, there is no significant link between preferred stock returns and their cumulative/non-cumulative status. A result which in turn could be interpreted as such that the market simply does not believe dividends will ever be deferred and therefore sees no need in attaching a price premium to cumulative preferred stock.

6.4 Limitations of the results

The results of this thesis have limitations mainly in terms of the chosen sample. The difference between the sample used and the population as a whole has already been explained in previous chapters and this difference presents limitations that really should be stated. There is a possibility that the sample does not necessarily represent the population as a whole and some of the conclusions made could be criticized from that perspective. The sample corporations tend to be larger, in better financial standing and are listed in some of the world´s most advanced financial markets. This means that to assume that, based of our sample, preferred stock globally would be debt- rather than equity-like is not necessarily wrong but at least should not be done lightly. It is possible that the population as a whole are debt-like as this thesis found but there is room for criticism of this conclusion. Preferred stock outside of the sample tends to have higher debt over asset ratios which in our method would mean lower distance to default. Knowing that in our model stock issued by corporations with lower distance to default tend to be more equity-like we should not make a blanket statement that preferred stock is one or the other.

7. Conclusion

In the first chapter of this thesis a multitude of dilemmas tied to the classification of preferred stock were presented. Not only were these difficulties presented but the effects of the current classification were also presented and discussed.

The questions raised by the discussion on the difficulties of classification and potential adverse effects of said classification are very difficult to fully answer. This thesis found that preferred stock belonging to the sample tend to be more debt-like, a result that conflicts with the current classifications and that the current classifications by that reasoning would not be satisfactory. However, these results should not be interpreted as an ironclad argument for the immediate reversal of the current classification. To simply reverse the classification and classify all hybrid assets as either debt or equity will not alleviate the problem.

This conclusion does not mean that there should be a change in the way we classify assets in the short or long term but that innovation in financial markets exacerbates the need for awareness of potential complications. Regulators and other stakeholders need to consider more aspects of hybrid assets to accurately perform their duties.

7.1 Future research

There is ample room for studies on the individual contractual aspects of preferred stock. It would be interesting to investigate the effects of these aspects such as redemption clauses and dividend increases on the returns and debt/equity characteristics of preferred stock. To further study preferred stock in the context of different nations might also yield interesting results as regulatory environments differ from nation to nation.

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Appendix

Regression 1

Linear regression

Number of obs	=	4,343
F(7, 4335)	=	97.71
Prob > F	=	0.0000
R-squared	=	0.2537
Root MSE	=	4.6086

Preferred_stock	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Stock	.2850736	.0154907	18.40	0.000	.254704	.3154433
Bond	.4163936	.037915	10.98	0.000	.3420609	.4907263
Change_in_distance_to_default	.0964516	.0702607	1.37	0.170	-.0412953	.2341985
Change_in_dividend_yield	-.0106409	.0071614	-1.49	0.137	-.0246809	.0033992
Cumulative	.1495517	.1645672	0.91	0.364	-.1730842	.4721875
USA	-.1410913	.1794971	-0.79	0.432	-.4929974	.2108149
Canada	-.3880841	.2021161	-1.92	0.055	-.7843351	.0081668
_cons	-.0652907	.2155892	-0.30	0.762	-.4879557	.3573744

Regression 2

Linear regression

Number of obs	=	4,343
F(13, 4329)	=	63.56
Prob > F	=	0.0000
R-squared	=	0.2655
Root MSE	=	4.5754

Preferred_stock	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Stock	.4068252	.0355303	11.45	0.000	.3371676	.4764828
Stock_x_Distance_to_default	-.0260969	.0058462	-4.46	0.000	-.0375584	-.0146354
Stock_x_Distance_to_default2	.0007854	.000205	3.83	0.000	.0003835	.0011873
Bond	.2383475	.1135643	2.10	0.036	.0157034	.4609916
Bond_x_Distance_to_default	.0454561	.0125746	3.61	0.000	.0208035	.0701088
Bond_x_Distance_to_default2	-.0011723	.0003612	-3.25	0.001	-.0018805	-.0004641
Bond_x_Time_to_maturity	-.0067237	.0075093	-0.90	0.371	-.0214458	.0079985
Bond_x_Time_to_maturity2	.000031	.0001193	0.26	0.795	-.0002029	.0002648
Change_in_distance_to_default	.1316149	.0811395	1.62	0.105	-.02746	.2906899
Change_in_dividend_yield	-.0099257	.0070824	-1.40	0.161	-.0238108	.0039594
Cumulative	.163355	.1640063	1.00	0.319	-.1581813	.4848914
USA	-.1326792	.1781813	-0.74	0.457	-.4820059	.2166475
Canada	-.3667946	.2016936	-1.82	0.069	-.7622173	.0286281
_cons	-.071107	.2147087	-0.33	0.741	-.492046	.3498319

Test 1

```
 test Stock=0

( 1)  Stock = 0

      F(  1,  4335) =  338.67
           Prob > F =    0.0000
```

Test 2

```
 test Bond=0

( 1)  Bond = 0

      F(  1,  4335) =  120.61
           Prob > F =    0.0000
```

Test 3

```
 test Stock=Bond

( 1)  Stock - Bond = 0

      F(  1,  4335) =    8.43
           Prob > F =    0.0037
```