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Three Essays on the Financial Capital Markets

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Abstract

This thesis is comprised of three integrated studies highlighting the financial capital markets and corporate finance decisions in response to market conditions.

The first study (Chapter 2) looks at the stock-like/bond-like behavior of Canadian income trusts, in particular how the sensitivities of income trusts' returns to stock and bond market factors change over time, around different events, and depending on corporate strategy and firm characteristics. We find that income trusts are priced more like bonds compared to matched corporations before a surprise announcement that removes the tax advantage of income trusts (the Tax Fairness Plan announcement), while they become more stock-like and have risk profiles similar to matched corporations after this event. Income trusts with characteristics related to the stronger ability to maintain cash distribution, more suitability to the trust structure, and higher tax shield prospect still behave more like bonds even after the Tax Fairness Plan announcement. This chapter shows how organizational structure choice and firm characteristics are related to an asset's risk profile, in particular, the pricing behavior as bond-like or stock-like.

The second study (Chapter 3) discusses a potential valuation premium for Canadian income trusts through looking at the valuation throughout the life cycle of the income trust structure. We find there is a valuation premium for the trust structure, as shown by the increase in valuation around the conversions into income trusts. The higher valuation of income trusts can be largely attributed to tax motives, as evidenced by the positive (negative) abnormal returns after positive (negative) tax-related events. However, we find a higher valuation premium enjoyed by income trusts early in the life cycle, which exists even after we account for tax and trust characteristics. Characteristics pertaining to the suitability of firms to the income trust structure also seem to deteriorate over time. The evidence suggests that other factors, including behavioral factors from both investors' and managers' sides, can influence income trusts pricing besides the tax rationale.

The third study (Chapter 4) investigates whether firms are able to diversify the maturity structure of their bond profiles given the availability of the offshore bond markets. I look

at average maturity, maturity structure, and the inverse of the Herfindahl index to explore the maturity diversification effect. This chapter finds that while the average maturity of offshore bonds is different from that of domestic bonds at the aggregate level, over the years, a firm issues new offshore bonds and new domestic bonds into similar maturity ranges. The degree of maturity diversification as measured by the inverse of the Herfindahl index is also lower in the years a firm issues new offshore bonds. By looking at how firms manage the yearly maturity structures of new and pre-existing offshore and domestic bonds, the study finds that new offshore bonds may diversify the maturity structure of pre-existing domestic bonds, but this happens only in the middle maturity ranges. Taken together, the study challenges the maturity diversification motivation and suggests that other motivations such as asset matching and foreign currency hedging also matter in bond maturity management with the presence of offshore bond markets.

Overall, the thesis shows an interrelationship between financial capital market conditions and firms' financing and strategical choices.

Keywords

Financial Capital Markets; Asset Pricing; Behavioral Finance; Corporate Bonds; Bond Maturity; International Finance

Co-Authorship Statement

Chapter 2 (Income Trusts: Valued Like Bonds or Equities?) and Chapter 3 (Behavioral Finance Meets Market Efficiency- the Case of Income Trusts) are co-authored works of the Ph.D. student and Dr. Stephen Sapp, the Co-author.

In Chapter 2, the Co-author defined the overall research questions and contributed in interpreting the results and writing the Introduction. The Ph.D. student performed data collection, designed the empirical tests, and wrote the chapter under the review of the Co-author.

In Chapter 3, the Co-author contributed to defining the overall research questions and the methodology, interpreting of the results, and partial writing of the chapter. The Ph.D. student contributed in performing data collection, designing the empirical tests, and partial writing of the chapter.

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Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1 General Introduction

Firms finance themselves through several channels, one of the most important being the issuance of stocks and bonds in the financial capital markets. Therefore, financial market conditions are a key factor in firms' financing choice. In this thesis, three integrated essays explore issues in the financial capital market from both the investors' and the firms' angles. Specifically, the thesis covers asset pricing and bond maturity management topics and aims to show an interrelationship between market conditions and firms' financing choice.

The first two studies (Chapters 2 and 3) focus on the pricing of Canadian income trusts. An income trust is a corporate structure that allows firms to avoid paying tax at the corporate level on the income distributed to unit holders. Income trusts therefore provide investors with sizeable regular distributions (like bonds) while also providing capital gains due to asset ownership (like stocks). This feature of income trusts allows us to study how investors price the hybrid attribution of financial assets (Chapter 2). The questions we investigate in Chapter 2 are whether investors treat such hybrid assets as stocks or bonds, or somewhere in between, and what characteristics determine the degree of this stock-like/bond-like behavior. Prior works also address the pricing behavior of hybrid assets, for example preferred stocks (Emanuel, 1983, Chan and Seow, 1997), convertible bonds (Stein, 1992 and Jen, Choi, and Lee, 1997), and real estate investment trusts (REITs) (Karolyi and Sanders, 1998, Clayton and MacKinnon, 2003) to show that hybrid assets are priced in between stocks and bonds. However, some empirical evidence, except for Baker and Wurgler (2012a), is provided regarding which factors impact the degree of this stock-like/bond-like behavior. Such knowledge would improve our understanding on the characteristics that are priced by the market for hybrid securities and high-dividend-paying assets.

Chapter 2 examines the stock-like/bond-like behavior of Canadian income trusts around an exogenous event that removes the tax advantage of income trusts and thus

decreases their ability to make regular payouts. This surprise announcement (the Tax Fairness Plan or TFP announcement) therefore serves as a shock that would presumably change the pricing behavior of income trusts towards being less bond-like. We find that income trusts, as a group, are priced more like bonds relative to a group of matched corporations in the years before the TFP announcement while becoming more stock-like and less bond-like after the TFP announcement. This part of the analysis sheds light on the practical question of how investors price Canadian income trusts and extends Halpern (2004), who also examines the sensitivities of Canadian income trust returns to the stock and bond market indices. Secondly, focusing on firm-specific characteristics, we find that after the TFP announcement, most income trusts behave more like stocks whereas the firms that were most suited, ex ante, to the income trust structure remained priced more like bonds. The characteristics that make an income trust remain priced more like bonds include having been formed from the selective spin-off of less than 100 per cent assets of a previous firm and having low market-to-book ratios, high tangibility, high dividend payout, low ROA, and higher prospective tax shields. This second part of the analysis extends papers such as Baker and Wurgler (2012) in showing the characteristics that drive the bond-like behavior of assets. This chapter therefore illustrates how tax policy, corporate structure, and firm characteristics, especially those related to future cash generating prospects, impact the risk profiles of assets, in particular whether investors perceive the assets as bond-like or stock-like instruments.

In the third chapter, we explore the role of rational and behavioral factors in the valuation of income trusts throughout the life cycle of the structure. The popularity of income trusts in Canada during the early 2000s until 2011, when they lost their tax privilege, provides us a setting to assess the potential impact of behavioral factors on asset valuation. Specifically, we are able to examine the valuation premium enjoyed by income trusts from the early stage where the structure starts to become more popular to when it matures in popularity and finally goes to demise. Behavioral papers such as Baker and Wurgler (2007), Scheikman and Xiong (2003), and Baker and Wurgler (2012b) address the pricing of assets that are new to investors and difficult to price. We

add to this literature by examining how investors price assets when their characteristics are not well understood such as in the case of Canadian income trusts (King, 2003).

We empirically examine the relationship between managers' strategic choice of corporate structure and share price. Managers are believed to make rational decisions to improve their firm's share price. Investors are believed to rationally value shares based on their future expected cash flows. Under the Efficient Markets Hypothesis (EMH), we would expect decisions to increase the future expected cash flows to investors to increase firm value by the amount of the increased cash flows. Behavioral finance suggests that other factors may influence how investors value assets. We test the EMH and the relationship between possible deviations and factors believed to influence valuations in behavioral finance within the context of income trusts—a structure designed to minimize taxes paid and maximize shareholder value. We document a valuation premium that peaks in the early 2000s where the income trust structure starts becoming popular through higher median earnings multiples (EV/EBITDA, P/E, market-to-book, and Q ratio) compared to matched corporations. We also find that investors react favorably to the conversions from corporations into income trusts through higher abnormal returns in the period prior to the actual conversions.

Attempting to explain this higher valuation premium using accounting characteristics, we find that income trusts have characteristics that demonstrate their suitability to the income trust structure (i.e., lower capital expenditures, more tangible assets, less depreciation use, lower leverage, less volatile cash flows, and less profitability compared to matched corporations). However, the suitability seems to deteriorate over time. The higher valuation premium can be explained by some, but not all of the characteristics related to suitability to the income trust structure. Also, when we account for accounting characteristics, the unexplained portions of earnings multiples are still higher in the earlier part of the life cycle for business income trusts, leaving room for other factors such as behavioral asset pricing to play a role in the pricing of income trusts. The results on the earlier pricing of income trusts therefore adds on the literature on the pricing of Canadian income trusts (Amoako-Adu and Smith, 2008, Doidge and Dyck, 2015) that focuses more on the pricing near the end of the life cycle, where only tax-

related evidence is found to impact the pricing. We go beyond the tax explanation to suggest that other factors, including behavioral factors could be at play, which resonates with investor sentiment hypothesis in Baker and Wurgler (2007): when assets are difficult to value, investor sentiment is more likely to impact pricing.

The fourth chapter studies the international bond market where I investigate how firms manage their bond maturity structures with the presence of the offshore bond market. This chapter studies whether firms issue offshore bonds to complement the domestic bond market in terms of maturity, or in other words, whether there is a maturity diversification impact of issuing offshore bonds. In a survey by Bancel and Mittoo (2004), foreign exchange risk hedging and keeping the source of funds close to the use of funds, tax, and market condition are important reasons why firms use the foreign capital market. This chapter investigates another possible motivation for firms to use the international financial market, namely, the maturity diversification effect. Through the evidence on how the offshore bond and domestic bonds issued by the same firm differ in terms of maturities, the chapter has implications on the maturity diversification effect as well as other motivations for firms to use the offshore bond market.

I compare the average and the structure of maturity of offshore bonds versus those of domestic bonds at the aggregate, firm, and firm-year levels. The structure of maturity of the bond profile is constructed as the proportion of bonds issued into each of the seven maturity bins (1-2 Year, 3-4 Year, 5-6 Year, 7-8 Year, 9-10 Year, 11-20 Year, and >21 Year). On aggregate, I find that average maturities of offshore bond and domestic bonds are significantly different. However, at the firm level, when taking all the bonds a firm ever issues throughout the sample period into consideration, I find that firms issue offshore bonds and domestic bonds into similar structures. This result provides a different viewpoint on how maturity of offshore bonds and that of domestic bonds differ. While previous papers conclude that maturities of offshore bonds and domestic bonds differ because their average maturities are different (Black and Munro, 2010, Gozzi, Levine, Peria, and Schmuckler, 2015), this chapter argues that in terms of maturity structure, offshore bonds and domestic bonds issued by the same firm do not differ.

At the firm-year level, I first examine the inverse of the Herfindahl index as a measure of maturity diversification degree. The chapter shows that in the years with new offshore bonds issued, a firm has a lower degree of maturity diversification as evidenced by the lower inverse of the Herfindahl index, while the opposite is true if a firm issues new domestic bonds. A closer look at the maturity structures of new offshore, pre-existing offshore, new domestic, and pre-existing domestic bonds reveals that the proportion of new offshore bonds is negatively related to the proportion of pre-existing domestic bonds only in the middle maturity ranges. The results on how firms manage their yearly bond maturity structure suggest a potential maturity diversification effect for pre-existing domestic bonds by issuing offshore bonds; however, this effect is not systemic and potentially happens only within a subgroup of firms. This chapter therefore challenges the maturity diversification effect, extending papers such as Bancel and Mittoo (2004) on why firms use the offshore market. Other motivations to use the offshore bond market such as hedging purpose and keeping the source of funds close to the use of funds are therefore important as they explain the similarity in structures between offshore and domestic bond maturities. While previous studies provide evidence based on foreign operations to support the hedging purpose (Kedia and Mozumdar, 2003), this chapter adds evidence based on bond maturity for the hedging purpose.

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Chapter 2

2 Income Trusts: Valued Like Bonds or Equities?

2.1 Introduction

As interest rates remain low, investors are increasingly looking for alternative investments with reliable cash flows (like bonds) but with more upside (like stocks) such as preferred stocks, REITs, and dividend-paying stocks. Understanding the risk of these types of assets becomes an important question for investors and portfolio managers. In this chapter, we examine the pricing of Canadian income trusts which have return characteristics of both bonds and stocks and have a long enough history to allow for interesting examinations of how investors price such hybrid assets.

The risk aspect of income trusts we focus on is their behavior as bonds or stocks and the characteristics that impact their bond-like/stock-like behavior. In asset pricing as well as in asset allocation, stocks and bonds have been the two risky asset classes most generally examined.[1] The literature on the pricing of stocks and bonds has developed quite separately because of the differences between the two asset classes. Stocks and bonds have been found to be sensitive to different sets of factors. For example, stock returns can be explained using the capital asset pricing model (CAPM) (Sharpe, 1964, and Lintner, 1965), the Fama French model (Fama and French, 1993), and various models that include macroeconomic factors (Lettau and Ludvigson, 2001, Vassalou, 2003, Petkova, 2006, Campbell, 1996), while bond returns are influenced by interest rate dynamics and credit risk (Vasicek, 1977, Merton, 1974). At the same time, efforts have been made to jointly price stocks and bonds since the two are related.[2] Both of them are claims on assets of the same firms and have been modelled to be both impacted, for

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[1] See, among many others, Brennan and Xia (2002), Campbell, Chan, and Viceira (2003), Liu (2006), Huggett and Kaplan (2016).

[2] See, for example, Keim and Stambaugh (1986), Fama and French (1993), Elton, Gruber, Agrawal, and Mann (2001), Lin, Wang, and Wu (2011), Bekaert, Engstrom, and Grenadier (2010), Gabaix (2012).

example, by stochastic risk aversion (Bekaert, Engstrom and Grenadier, 2010) and rare disaster risk (Gabaix, 2012). As a consequence, how stocks and bonds are related is a question important for portfolio management and asset pricing, but this topic has not been well studied.

To understand how stocks and bonds are linked, much effort has been spent on the aggregate level where the comovement between the two markets is examined (e.g., Shiller and Beltratti, 1992, and Campbell and Ammer, 1993, Connolly, Stivers, and Sun, 2005, 2007, Gulko, 2012, and Bansal, Connolly, and Stivers, 2014), while some studies look at individual assets and the roles of firm-specific characteristics. Scholars have found that larger size, longer age, lower volatility, higher profitability, lower growth (Baker and Wurgler, 2012), and high book-to-market ratio (Koijen, Lustig, and Van Nieuwerburgh, 2017) are associated with higher comovement of stocks with bond market performance. On the other hand, a longer maturity makes a bond behave more like the stock of the same firm (Bao and Hou, 2017). Also, profitability and asset growth, which are related to equity pricing, are able to predict returns for corporate bonds of the same firms (Chordia, Goyal, Nozawa, Subrahmanyam, and Tong, 2017). By studying the stock-like/bond-like behavior of Canadian income trust, we expand this literature by showing the roles of firm-specific characteristics on determining how stocks and bonds are related. Even though studying individual assets leaves a potential role for idiosyncratic risks, we feel that firm-specific factors provide additional insights into what investors value.

We examine a new set of characteristics related to corporate structure, tax shield prospect, and cash generating prospects that can potentially link the returns of stocks and bonds and determine the stock-like/bond-like behavior of assets. Our approach is unique in that we study the roles of firms' characteristics through examining assets with features of both stocks and bonds and the changes in their stock-like/bond-like behavior instead of looking at the cross-section of stocks or bonds as in previous studies. The questions we study are the following: How do investors value firms that have adopted a corporate structure that has characteristics of both bonds and stocks? How do changes in the value of the option to adopt or abandon this corporate structure impact the bond-like/stock-like

behavior of their prices? Do characteristics related to the ability to minimize tax expense and maintain cash payout outside of the structure impact the stock-like/bond-like feature of the firm's equity? We show in our study that stocks and bonds are linked together through characteristics related to organizational structure choice and the ability to save tax and generate future cash flows.

Canadian income trusts provide an interesting case study as they have many characteristics similar to both bonds and equities. Income trusts are designed to return as much capital to investors as possible in exchange for the firms not having to pay corporate taxes on their profits. Comparable to the master limited partnership (MLP) structure in the United States, an income trust is a flow-through structure where the firm does not pay corporate tax in exchange for the investors being paid out the vast majority of the profits and having to pay only personal taxes on the earnings.[3] Although income trusts do not guarantee their distributions, the firms make a strong commitment to paying regular distributions to their investors. As illustrated in Figure 2-1, the average payout ratio of income trusts is approximately 80 per cent whereas it is only 15 per cent for the equity firms in the matched sample in 2006. In terms of pricing, we would therefore expect income trusts to behave like bonds which also have a commitment to a certain cash payment to their investors at regular intervals. Unlike bonds, income trusts are not in default if they fail to make these cash payments, and these cash payments can increase (decrease) as the firms are more (less) profitable. Since the unit-holders are the ultimate owners of the firm's assets, they can also benefit from capital gains on their shares, so they are similar to equities in this regard. As a result, the pricing of income trusts should, theoretically, fall somewhere between stocks and bonds.

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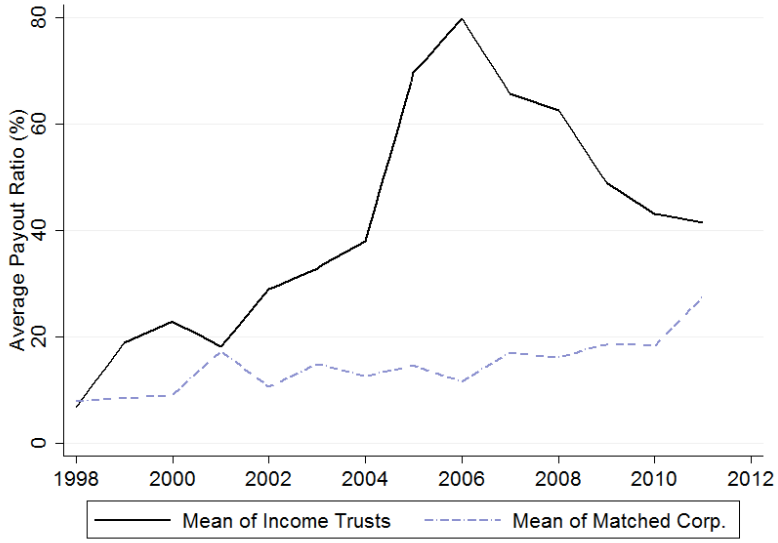
[3] For references on the tax treatment of MLPs, see Guenther (1992) and Michaely and Shaw (1995).

Figure 2-1: Dividend Payout per Share of Income Trusts and Matched Corporations



This figure illustrates the average payout ratios for Canadian income trusts and matched corporations from 1998 to 2011. Payout ratio is calculated as dividends per share/earnings per share expressed in percentage (datatype WC09504 from the Worldscope database).

There has been little evidence on the risk profiles of income trusts.[4] Although Halpern (2004) examines the sensitivities of income trust returns to stock and bond market factors, the study is limited to a static examination of risk loadings for the period before 2004 and considers only industry classification for firm characteristics. Our study is designed to build on Halpern (2004) by carefully looking at the risk profiles of income trusts cross-sectionally and over time to identify the relationship between the profile of each income trust and investors' valuations. To examine which factors influence investors' valuations, we have the advantage of the Tax Fairness Plan announcement (TFP), an event which unforeseeably impacted the cash generating abilities of our firms and their future outlook in 2006.

Because income trust is an organizational structure that became popular for firms in the Canadian market in the late 1990s, peaking in the early 2000s and drying up in 2006, there are many interesting aspects to the time varying nature of their loadings to stock and bond risk factors. To examine how income trusts are priced, we compare the pricing of income trusts to a group of ordinary corporations that are matched to each income trust using accounting data at the end of 2005. We look at firms with the closest size in the same industry and determine whether income trusts are priced differently. Since the main difference between our matched firms and the income trusts is that the income trusts pay more to their shareholders due to the absence of corporate taxes, our first hypothesis is that we expect the pricing of income trusts to be much more bond-like than equity-like.

Secondly, we examine the changes in sensitivities of income trust returns to stock and bond market factors around a surprise announcement by the government of Canada to remove the favorable tax treatment for existing income trusts in Canada starting in

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[4] In practice, investors have been advised to treat income trusts as equities, or more specifically, mutual funds, however with the noted difference that "*the pricing of an income trust is yield-based, meaning that it is dependent substantially on expected distributions*" (Beck and Romano, 2004). Professionals warn investors to avoid treating cash flow from income trusts as cash flow from bonds: "*One explanation for the popularity of income trusts is that investors rather fallaciously compare the return from income trusts to the return received from investing in bonds*" (Certified General Accountants Association of Canada, 2006). These excerpts highlight that income trusts should be priced more like bonds than the ordinary equities, but certainly not completely like bonds.

2011 referred to as the Tax Fairness Plan (or TFP) on October 31, 2006. The event is an exogenous shock allowing us to examine the role of changes in the size of expected cash distributions on the value of the income trust structure as well as the corresponding risk profile of these assets. We argue that the TFP announcement changes expected future cash distributions to the investors and not the underlying business risk, allowing for a clear examination of the impact of characteristics that are related to the ability to raise cash flows and suitability to the income trust structure on the sensitivities of the assets' prices to risk factors. As shown in Figure 2-1, income trust payout ratios decrease dramatically after this announcement. Due to the expected decrease in payouts and higher valuation of the conversion option, the degree of comovement of income trusts to the bond market is expected to be lower and the degree of comovement to the stock market is expected to be higher.

To identify the stock-like and bond-like pricing behavior, we employ the stock and bond market factors as in Fama and French (1993) and Carhart (1997). We find that prior to the TFP, income trusts comove less with stock market related risk factors and more with bond market related factors compared to matched corporations. Specifically, income trusts have lower betas to the excess stock market returns (RM-Rf) and the size factor (SMB), and higher beta to the term structure of interest rate (TERM) compared to matched corporations prior to the TFP. After the TFP announcement, income trusts' betas to stock market factors RM-Rf and SMB increase significantly, while their betas to bond market factor TERM decrease significantly. As one would expect, there is no significant change in sensitivities to those factors for our matched corporations before and after the TFP. The risk profiles of income trusts and our matched corporations become not significantly different after the TFP announcement, supporting our hypothesis.

We also examine specific characteristics of income trusts to determine if pricing depends on certain characteristics of each income trust. In other words, are income trusts valued as a class or do investors recognize the value of differences in their corporate policies even though they are part of a larger population called income trusts? For example, if an income trust were created by the spinning off of some assets from a larger corporation, is it valued differently from the conversion of an entire company to an

income trust? Would income trusts that are more likely to be tax avoiders and with different room for tax shield prospect have different risk profiles? The hypothesis is that some income trusts have assets that are more suited to the income trust structure and have prospects to pay out high distribution even in the absence of the tax advantage, and we would expect these firms to be priced more like bonds and those firms which were less suited to the income trust structure to be priced more like equities. We find evidence that while in general, firms behave more like stocks after the TFP announcement, firms which have structures consistent with the ideal structure for income trusts (consisting of a subset of a previous firm's assets, having high book-to-market ratio, high tangibility, high dividend payout, low ROA, and higher prospective tax shields) remain priced more like bonds. Our results provide new evidence on the roles of firms' characteristics on the stock-like/bond-like behavior of asset prices and thus have implications on the characteristics that can link the returns of stocks and bonds.

Apart from expanding the works on the link between stock and bond pricings, this study also adds to the topic of the determinants of sensitivities to risk factors—a question fundamental to asset pricing (Elton, 1999). Factor-based asset pricing has become popular with models such as the CAPM (Sharpe, 1964, and Lintner, 1965), the Fama and French three-factor model (Fama and French, 1993), and the Carhart four-factor model (Carhart, 1997). Studies have examined the characteristics of the betas in these factor-based models—they are not static and may change over time (Campbell and Mei, 1993, and Jagannathan and Wang, 1996). Consistent with such time-varying asset pricing models, we find that the sensitivities to stock and bond market factors change over time, and they change not only with macroeconomic risk factors as suggested by studies such as Jagannathan and Wang (1996) but also with variation in expected cash flows and firm-level characteristics. Our results also extend papers such as Barberis, Shleifer, and Wurgler (2005), Ball and Kothari (1991), Patton and Verardo (2012), Foerster and Karolyi (1999), and Lewis (2017) on beta changes around events. In our case, tax policy change is the event that has an impact on the risk profiles of assets.

Finally, our study is related to the literature on the pricing of hybrid assets. Hybrid assets possess characteristics similar to bonds and equities (and possibly other types of

financial securities), and most studies in this literature conclude that hybrid assets comove with both the stock and the bond markets. Examples are the studies on REITs (Karolyi and Sanders, 1998, and Clayton and MacKinnon, 2003), mandatory redeemable preferred stocks (Chan and Seow, 1997), high-dividend-paying stocks (Baker and Wurgler, 2012), and also Canadian income trusts (Halpern, 2004), where returns of the hybrid assets are often found to be sensitive to both stock and bond market movements. Scholars are also interested in the conditions that make the hybrid assets change their stock-like/bond-like behavior. Emanuel (1983) built a model where firm value and expectation on dividend suspension impact the bond-like characteristic of preferred shares. Chan and Seow (1997) show that mandatory redeemable preferred stocks of high-rated issuers are more bond-like. Kwan (1996) also finds that ratings impact the comovement of bonds with equities of the same firm. Our study exploits an unexpected event (the TFP announcement) that presumably changes the bond-like/stock-like characteristic of a hybrid asset class, which goes beyond previous studies where only a static setting is examined. Through such a setting, we show which characteristics make hybrid assets behave more or less like stocks versus bonds, including expected cash flows and the suitability of the business to provide steady cash distributions to investors. The findings of those new characteristics help guide investors to better understand their risk exposure if the assets they hold share similar characteristics. While income trusts have a similar tax incentive to pay out distributions as REITs, our study differs from those on REITs in that the underlying assets of income trusts are operating firms and not real estate properties. Therefore, our study is applicable when considering the stock-like/bond-like behavior of firms, especially dividend-paying firms. We also differ from studies on preferred stocks in that preferred stock is a class of security issued by a corporation while we study the stock-like/bond-like behavior of an organizational structure. The study therefore adds new understanding on the pricing of hybrid assets.

This chapter proceeds as follows. First, we give a brief introduction on the income trust structure in Canada and the TFP announcement in Section 2.2. The literature review follows in Section 2.3. Section 2.4 develops the hypothesis while Section 2.5 describes the data. Section 2.6 provides empirical results and Section 2.7 concludes.

2.2 A Primer on the Canadian Income Trust Market

2.2.1 The Income Trust Structure

Income trusts are investment entities that own underlying assets such as properties (i.e. REITs), pipelines and oil wells (i.e. energy trusts), and operating firms (i.e. business trusts). Those assets will typically generate income such as rents from real estate, royalty from the properties, and the profits from the business of the firms. In the case the underlying asset is an operating firm, the trust structure is set up such that there will be a trust in between the investors (i.e. the unit holders) and the firm. The trust will sell units to the investors and use the proceeds to acquire the underlying assets, which will be under the forms of equity and internal debt (King, 2003, Doidge and Dyck, 2015).

The income generated from the underlying operating firms or assets will be distributed by the trust to the investors in a way such that double taxation is avoided. The earnings generated from the assets are not taxed before it is distributed to the end investors. Investors are taxed only on the distributions from the income trusts at the personal level, and the personal tax depends on each investor's tax bracket. This is different from investing in a corporation's stock in that a corporation's operating profits is taxed at the corporate level and after the income is distributed to the investor (for example in the form of dividends), the investor is taxed on the dividend received. Although the dividend tax has been reduced to make taxation of dividend-paying corporations more comparable to that of income trusts, there is still a discrepancy between the tax treatments for the two organizational forms, especially for tax-exempt and foreign investors. In general, tax treatment for income trusts has been more advantageous.

The tax environment discussed above has been one of the important differences between an income trust and a traditional corporation. While an operating company can convert itself to a trust to get advantage of the tax shield on trusts, there could be differences as to how the company will operate as a trust. The company may not have as much incentive to use leverage and other techniques to reduce tax. Another consequence of being structured as a trust rather than a traditional corporate form is that a trust may

not be growth-focus because it will pay out almost all of its income to investors and does not retain money for future investment. In term of corporate control, holders of income trusts may not have the same voting rights entitled to holders of common equities. Those can be the reasons why not all firms choose to be structured as income trusts despite the tax advantage they enjoy from being organized this way.

2.2.2 The Tax Fairness Plan (Halloween Massacre)

With a concern of the situation that Canadian companies are taking advantage of the special tax treatment for income trusts to avoid paying corporate tax and potentially create a distortion for the Canadian economy, the TFP was announced after market close on October 31, 2006 by the Minister of Finance, Jim Flaherty (Department of Finance, 2006). From 2011, all income trusts except for passive REITs are subjected to taxation that resembles the tax on corporations. That is, income from the income trusts will be taxed before being distributed to investors. In the investors turn, they are taxed once more similar to when they receive dividends from corporations. This means that the tax benefits enjoyed by income trusts holders will no longer exist, which causes the value of those trusts to decrease.

Following is an example to illustrate the tax consequences of this announcement. Supposed there is a sole investor with a personal tax rate of 46% (the highest marginal tax rate) investing in a firm with an annual income of $1, the whole of which will be distributed to the investor. Before the TFP, if the firm has been structured as an income trust, there is no firm-level tax for this $1 before it is distributed to the investor. The total tax collected by the government will be 46% of $1, which will be $0.46. If the firm has been structured as a corporation, the firm first has to pay a corporate tax of 32%[5] on the

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[5] The personal income tax rate of 46% is the average top personal income tax rate (Government of Canada, 2006, Backgrounder for the TFP, *https://www.fin.gc.ca/n06/data/2006-061e.pdf)*. The corporate tax rate of 32% is based on an expected figure for 2010 corporate tax rate in 2006 (Government of Canada, 2006, Budget 2006/ Budget Plan - Chapter 3 - Building a Better Canada/ Opportuniy, *https://fin.gc.ca/budget06/bp/bpc3b-eng.asp*).

$1, or $0.32, before the net income of $0.68 can be distributed to the investor. In turn, the investor will pay dividend tax on the after-tax dividend distributed by the firm. The dividend tax can be set up with a dividend tax credit such that the investor will pay a dividend tax of $0.14. In total, the government collects $0.32 in corporate tax and $0.14 in dividend tax, or $0.46.

The tax treatments will be comparable between income trusts and corporations under those schemes. However, as the investors of income trusts also include pension funds and foreign investors, the tax treatments are not compatible between the two structures. For example, as pensions and RRSPs are tax-exempt entities, paying personal income tax of 0%, the government collects $0 in tax if the firm has been organized as an income trust and $0.32 if the firm has been organized as a corporation. Therefore, the TFP was proposed such that income trusts also pay tax at the firm-level to bring the government tax revenues for the two structures closer for different types of investors.

The Halloween Massacre comes at a surprise to the market because the Canadian government had promised before that they would not tax income trusts. The Globe and Mail reported that "*Finance Minister Jim Flaherty apologized Monday for the "hardship" his surprise income trust tax has caused*"[6]. As a result, many income trusts were taken over while some converted themselves back into corporation forms.

2.2.3 Stock-like/Bond-like Characteristics

How can a firm, structured as an income trust, behave more like bonds compared to a similar firm (i.e. having a similar business and a similar cash flow risk) which adopts the corporate structure? How can the TFP announcement impact the bond-like/stock-like behavior of income trusts?

An income trust can behave more like bonds than stocks (compared to a similar corporation with the same business risk) due to several factors. A firm organized under

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[6] See "Flaherty says sorry to stung investors," *The Globe and Mail*, November 7, 2006.

the income trust structure can have a higher incentive to payout cash distributions compared to if it has been organized as a corporation because of the tax advantage of the income trust structure- the firm will not have to pay tax on the distributed income. Furthermore, the investors of income trusts may resemble bond investors (e.g. pension funds) and thus are more sensitive to changes in the bond market than to changes in the equity market. When the TFP announcement takes place, investors seeking for high yield may stay away from income trusts that will be less likely to continue providing high distributions outside of the trust structure, leaving those unable to generate steady cash flows to be owned by investors who are more concentrated on equity growth. Those investors seeking for yield stay with firms that could generate steady cash flows, creating an investor base that is still sensitive to the bond market for those firms. This also helps explain the heterogeneity in why there is a change in stock-like/bond-like behavior after the TFP announcement.

To see how an income trust changes its stock-like/bond-like behavior around the TFP announcement, and why the degree of change varies cross-sectionally across income trusts, we could also use the following analogue. Presumably, an income trust always has the choice of either remaining an income trust or converting to a corporation. If we consider income trusts a type of investment similar to the investors holding a perpetual coupon paying bond[7] and the firm holding a conversion option to convert from an income trust to a corporation, the degree of bond-like/stock-like behavior can be considered a function of how investors value this conversion option. The value of an income trust to the investors will then be the value of the bond less the value of the option. The higher the value of converting into a corporation, the higher the likelihood that an income trust will convert, and thus the stronger it will comove with the equity market. The value of the

[7] Here, we hypothesize that investors expect to receive steady cash distributions from the investment in income trusts just like how they expect to receive payments from a bond that pays coupons perpetually.

option is higher if the cost of being structured as an income trust is high compared to the benefits (of preferable tax treatment)[8].

The TFP announcement which necessarily eliminates the tax advantage of the income trust structure arguably increases the value of the conversion option, as the benefits of remaining an income trust decreases. This makes income trusts behave more like stocks in general. For firms less suited to the income trust structure, the value of the conversion option becomes even higher now as tax advantage is expected to be eliminated. Thus, the changes towards being more stock-like for those firms will be stronger. Whereas, the benefit of the tax treatment may not have been high for some firms if they could, for example, provide steady cash flows or maintain low tax expenses outside of the trust structure. As a result, the changes towards being more stock-like for those firms will be less strong. The TFP announcement therefore provides an experimental setting where we can study the effect of firm characteristics related to the ability to generate cash flows and to keep tax expenses low on the bond-like/stock-like behavior of an asset.

2.3 Literature Review

Our study builds on the asset pricing literature that examines how different assets are priced, specifically how different factors can be used to explain price changes in equity and bond markets. We will start with a brief discussion of some of the main factors considered in the valuation models for different asset classes by themselves building on the asset pricing literature. Then, we will discuss some of the research looking at how

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[8] It is not costless to convert from a corporation to an income trust. As discussed in Section 2.1.1, the two structures are not similar. The income trust structure generally suits firms coming from mature industries generating stable cash flows. A firm needing more growth may not find the structure ideal since it has the needs to retain the income to invest and grow. As a result, the firm may have to forgo investment opportunities if it adapts the income trust structure, where it has the incentive from tax advantage to pay out virtually all of its income. The boards may also have concerns about the governance, efficiency, or can be conservative as to changing the organizational structure of the firm (King, 2003, Edgar, 2004, Doidge and Dyck, 2015).

equity and bond prices are related and how they are valued jointly. We will also give a review of the literature on varying beta and finally the works on the pricing of Canadian income trusts.

2.3.1 Equity and Bond Pricing Separately

Equity is a form of security that helps firms tap into the capital market by entitling equity holders to a fraction of ownership of the firm and thus, a fraction of the firm's assets after serving all financial obligations such as debt repayments. The first asset pricing model for equities is the capital asset pricing model (CAPM) by Sharpe (1964) and Lintner (1965), who use covariance with market beta as the only priced risk factor. However, empirical findings challenge the notion that the market risk is the only risk factor, leaving room for other factors to explain asset prices. The consumption-based capital asset pricing model (CCAPM) by Breeden (1979) uses the covariance with aggregate consumption instead of the market as the main source of risk. Non-arbitrage pricing theory (APT model) by Ross (1976) provides the theoretical background to investigate multiple factors that are related to movements in asset returns. Notably, Fama and French's (1993) three-factor model uses "small-minus-big" market value (SMB) and "high-minus-low" book-to-market value (HML). The four-factor model uses the momentum factor UMD (Jegadeesh and Titman, 1993, Carhart, 1997). Other factors related to the macroeconomic economy (Lettau and Ludvigson, 2001, Vassalou, 2003) and innovations in state variables (Petkova, 2006, Campbell, 1996) considered in equity pricing models include the difference between long and short term interest rates, expected and unexpected inflation, the difference between the yields of high and low rated bonds (Chen, Roll and Ross, 1986), labor income (Mayers, 1972, Fama and Schwert, 1977, Jagannathan and Wang, 1996), industrial production (Chen et al. 1986), the profitability factor, which is the difference between return of high-low ROE portfolios (Chen, Novy-Marx, and Zhang (2011), the investment factor, which is the difference between return of high-low investment (PPE) portfolios (Chen et al. 2011), liquidity (Pástor and Stambaugh, 2003), and innovations in the dividend yield, term spread, default spread, and short-term T-bill (Campbell, 1987,

Campbell and Shiller, 1988, Fama and Schwert, 1977, Fama and French, 1989, Petkova, 2006). Another discussion on the factors can be found in Cochrane (2005).

Corporate bonds, on the other hand, entitle the bond holders to a promised stream of coupon and principal repayments. Bond returns then comprise the Treasury yields and the yield spreads; the latter depends on the creditworthiness of the issuer, the maturity of the bonds, the options attached to the bonds, tax treatment to the bond holders, and also the liquidity of the bonds (Fabozzi, 2005). The term structure of interest rate dictates how the maturity of a bond impacts its price (Fama and French, 1993). Researchers have modelled the dynamics of interest rate (the Treasury yield part) using stochastic processes. The models differ in terms of the sources of variation in the interest rate. For example, the one-factor Vasicek (1977) model takes interest rate as a stochastic process with one stochastic driver and a drift exhibiting a mean-reversion tendency. An example of the two-factor model is the two-factor Hull-White model where the two stochastic variables represent dynamics in the level and the slope of the yield curve.[9] The interest rate is also explained by macroeconomists as a result of the macroeconomic condition; therefore, it can be impacted by macroeconomic factors such as lagged interest rate, lagged inflation, output, unemployment, and exchange rates (Taylor 1993, Cochrane, 2005).

Theoretical models used to price credit risk are usually classified as either structural models or reduced form models. Structural models model explicitly the value of the firm and the process that makes default occur. The basic Merton's model (Merton, 1974) assumes that the value of the firm's total assets follows a geometric Brownian motion and default occurs if, at maturity, value of the firm's assets is less than debt obligation. This makes the debt claim equal to holding the safe claim on debt obligation and shorting a put option on the firm's asset with strike price equal to debt obligation. In this model, equity can be viewed as a call option on the firm's asset, with strike price equal to the debt obligation. Using the Black and Scholes (1973) option pricing model,

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[9] Other one-factor model examples are Cox-Ingersoll-Ross (1985), Ho-Lee (1986), and Hull-White (1990). Other multi-factor model examples are Longstaff-Schwartz (1992), Chen (1996).

the prices of debt and equity can be calculated, which depend on the volatility of the firm's assets, the firm's leverage, and time to maturity.[10] Reduced form models, on the other hand, do not model the firm's value or how default occurs. Instead, the default event is taking an unpredictable event that follows a stochastic process and occurs depending on the state of the economy. The Jarrow and Turnbull (1995) model, for example, specifies that default events follow a Poisson process, and a fixed recovery amount is paid at maturity. Duffie and Singleton (1999) assume that a partial amount of the firm's debt obligation is paid at the time of default.

Volatility can also matter in the pricing of bonds if one considers bond holders to be holding a safe claim to the bond repayment and a short position on a put option written on the firm's asset with strike price equal to the bond repayment as in the Merton's model. Value of the bond should decrease with volatility since option value should increase with volatility. Intuitively, since value to bond holders is bounded from below, as volatility of the firm's assets increases, more value is geared towards equity holders and less towards bond holders. Liquidity impacts bond returns especially because liquidity in the bond market tends to be low (Collin-Dufresne, Goldstein, and Martin, 2001, Li, Wang, Wu, and He (2009), de Jong and Driessen, 2012, Lin, Wang, and Wu, 2011, Bao, Pan, and Wang, 2011). Scholars have also considered jumps, i.e. large negative changes, in firm's value and changes in business climate (Collin-Dufresne et al., 2001).

2.3.2 Joint Pricing of Bonds and Stocks

Some studies value both stock and bond markets jointly. Bonds and stocks are linked since, if one considers the prices of stocks to be the sum of discounted dividends, the macroeconomic factors that impact the yield curve drive the prices of both stocks and bonds. Furthermore, both stocks and bonds are claims on the assets of the same

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[10] Further developments include the Black-Cox model, where the default event can occur whenever the value of the firm falls below a time-dependent threshold (Black and Cox, 1976), the Leland and Toft (1996) model, where leverage can be reduced by issuing new equity on coupon date, the extension by Collin-Dufresne and Goldstein (2001), where leverage is assumed to be constant, and the extension of Hurd (2009) to generalize the process of the firm's assets as a time-changed Brownian motion.

underlying firms. Empirically, Keim and Stambaugh (1986) use three stock and bond market variables to predict stock returns, long-term bonds, and government bonds. Fama and French (1993) show that stock returns are sensitive to two bond market factors: the maturity risk and the default risk factors. Therefore, bond market factors explain common variation in stock returns. However, the 25 portfolios sorted on size and book-to-market have similar sensitivities to bond market factors, which means that their bond market factors do not explain cross-sectional differences in stock returns. Elton, Gruber, Agrawal, and Mann (2001) find that bond spreads and returns comove with the same systematic factors as stock returns. They argue that this is mainly because the changes in the prices of risks in the capital market impact both stock and bond markets. Lin et al. (2011) show that the same equity-based liquidity factors price both stock and bond returns, which has implications on unifying pricing theory for financial assets.

Theoretical models that price both stocks and bonds or use both stock and bond market factors in pricing assets can be found in Bekaert, Engstrom, and Xing (2009), Bekaert and Engstrom (2010), Bekaert, Engstrom, and Grenadier (2010), Gabaix (2012), Lettau and Wachter (2011), and Koijen et al. (2017) among others. Bekaert, Engstrom, and Grenadier (2010) present a model with stochastic risk aversion and accommodating the stock-bond return relationship. Lettau and Watcher (2011) consider both the term structure of interest rate and returns on growth and value stocks in modelling the stochastic discount factor. Gabaix (2012) introduces a rare disaster risk that impacts the pricing of stocks, bonds, and options. Koijen et al. (2017) find that value stocks (with high book-to-market ratio) comove more with bond market factors than growth stock (low book-to-market); they argue this is because of the differences in the cash flow (dividends) between the two groups of stocks. As dividends of value stocks fall more than dividends of growth stocks during recessions, and bond yield factors predict future macroeconomic activity, bond market factors can predict stock returns. They then build a factor model to explain the cross-section of stock returns with bond market factor as one of the three explanatory factors.

The literature to explain the comovements of stocks and bonds is also relevant in specifying how stock and bond returns are linked and in determining the economic forces

behind the variations in the comovements. Early works such as Shiller and Beltratti (1992) and Campbell and Ammer (1993) characterize the relationship between the two markets. In Campbell and Ammer (1993), inflation shock is the only factor that can produce a negative correlation between stock and bond markets, whereas real interest rates and expected excess return component load with a similar sign on stocks and bonds. Recent works attempt to determine the economic sources behind the varying comovement between stock returns and bond returns. Evidence on changing risk aversion impacting the comovement related to the "flight-to-safety" effect can be found in papers such as Connolly et al. (2005, 2007), Gulko (2012) and Bansal et al. (2014). Connolly et al. (2005) find that correlation between stock and Treasury bonds decreases as stock market volatility increases. Gulko (2012) finds that stocks and Treasury bonds have a negative relationship during times of financial crises. Theoretically, Baele, Bekaert, and Inghelbrecht (2010) build a dynamic factor model to explain the relationship between stock and bond returns, especially when it is negative. They examine fundamental as well as non-fundamental factors and find that the non-macrovariables such as stock and bond market illiquidity factor are most useful in explaining comovement between bond and stock returns. Campbell, Sunderam, and Viceira (forthcoming) build a model where the term structure of interest rate is related to the comovement between stock and bond markets. Within this literature, Baker and Wurgler (2012) is the closest to our work as they study the relationship between bond-like stocks and bonds. They find that large stocks, long-list stocks, low-volatility stocks, stocks from profitable and dividend-paying firms, and those with growth opportunities comove positively with government bonds. Such a relationship persists through periods of negative comovement between the overall stock and bond markets. Meanwhile, more speculative stocks have weaker comovement with bonds.

2.3.3 Pricing of Alternative Assets and Hybrid Assets

Economic factors employed to study returns of stocks and bonds are also used to explain returns on alternative assets, such as derivatives, collectibles, and real estates. The prices of derivatives such as options, forwards, and futures are derived from the price of the

underlying assets. Therefore, factors that impact the prices of the underlying stock or bond will also drive prices of the derivatives. Furthermore, depending on the type of the derivative contract and its specifications (e.g., the strike price and time to expiration), other factors such as market volatility (e.g., in option pricing) and interest rates (e.g., in forwards and futures) also determine the price of the derivative (Hull, 2006). Stock and bond market factors such as returns on the S&P 500 Index and Treasury bill rates have also been used in the valuation of collectibles such as wine, paintings, and violins (Frey and Eichenberger, 1995, Burton and Jacobsen, 1999, Agnello, 2002, Ashenfelter and Graddy, 2003).

In addition to stocks and bonds, a firm can issue hybrid securities that have characteristics of both bonds and equities. While preferred shares are often classified as equities, they can deliver a stream of dividends that is subordinate to the coupon from bonds. Emanuel (1983) employs the option pricing theory to model preferred stock with the possibility that dividend from preferred stocks be omitted if firm value falls below some amount. When the dividend is more/less likely to be suspended (i.e., firm value is low/high), preferred stock behaves more/less like equity than bond. Chan and Seow (1997) find that mandatorily redeemable preferred stocks are sensitive to both stock and bond market movements. Convertible bonds are bonds that can be exchanged into stocks. Therefore, their prices can be sensitive to both the movements in bond prices and stock prices of the issuers. Convertible bonds have been argued to be an alternative when it is not preferable to issue either debt or equity (Stein, 1992 and Jen et al., 1997). Bonds of different seniorities have also been found to comove differently with stocks. Kwan (1996) finds that bonds comove more with equities if they are issued by firms with lower credit rating, indicating that lower rated bonds are more like equities than higher rated bonds. Bao and Hou (2017) provide evidence that bonds maturing later in the maturity structure should be considered as more senior bonds and have greater comovement with equity. The studies on the pricing of REITs using stock and bond market factors imply that REIT is a hybrid product that is between stock and bond in terms of risk exposures (Karolyi and Sanders, 1998, Clayton and MacKinnon, 2003).

2.3.4 Change in Risk Loadings

This part reviews works on changes in risk loadings around events. Barberis et al., (2005) examine the change in betas around inclusions into the S&P 500 Index to show the impact of sentiment on the pricing of stocks. They find that after inclusion to the index, a stock's beta with the index goes up. This indicates that when a stock is viewed as belonging to a certain group, and not necessarily when its fundamentals change, investors price it together as other stocks in that group. Ball and Kothari (1991) find an increase in market beta increases on earnings announcement day. Patton and Verardo (2012) also find that daily betas estimated from intraday prices increase on earning announcement days then decrease afterwards. The authors use a learning model to explain the results where investors infer about other firms in the market when a firm announces its earnings. Foerster and Karolyi (1999) study the change in betas to the global and domestic market around cross-listing events and find that local market beta drops in the post-listing period. Lewis (2017) finds that the changes in betas to the foreign market happen after cross-listing events, suggesting a role for cross-market correlation to explain increase in foreign market betas.

2.3.5 Pricing of Canadian Income Trusts

Scholars have examined the valuation of income trusts in different contexts. Amoako-Adu and Smith (2008) compare the reactions of income trusts prices and dividend-paying stock prices to the two tax-related announcements: the reduction of taxation of corporate dividends in November 2005 and the Tax Fairness Plan in October 2006. They find that the reactions to the two announcements are stronger for income trusts, suggesting that the tax status and not the dividend is the main driver for the valuation changes. Elayan, Li, Donnelly, and Young (2009) show that an income trust performs worse if it is held more by tax-exempt, low tax, and foreign investors, supporting the tax clientele hypothesis. Edwards and Shevlin (2011) examine trust price changes around the TFP to estimate the effect of tax benefit to the clientele investors. They document a significant abnormal return of -13 per cent due to the announcement, which represents the amount investors are willing to pay for the favorable tax treatment to income trusts. They also perform a

cross-sectional analysis by grouping the trusts into those with growth prospects versus those without growth prospects and REITs versus non-REITs. Trusts with growth prospects perform better during the TFP, indicating that growth trusts are now less constrained to use their resources to invest in projects rather than paying them out. Klassen and Mescall (2012) show that income trusts have higher earnings ratios, meaning that there is a premium for the tax advantage of holding income trusts. Doidge and Dyck (2015) find that income trusts with prospective tax shields fare better around the TFP announcement. Less attention has been paid to the risk profiles of Canadian income trusts. Halpern (2004) is the closest to our study to address the role of stock and bond market factors on the pricing of income trusts. The paper finds that during the period before 2004, income trusts were sensitive to both stock and bond market factors, with the beta on the excess return on 5-year Canadian government bond index higher than the beta on the TSX/S&P index.

2.4 Hypothesis Development and Methodology

To examine the bond-like/stock-like behavior of income trusts, we first focus on the comparison between income trusts and a matched sample of corporations before and after the TFP announcement. We also look at how the TFP announcement leads to changes in sensitivities to different market factors for income trusts and for the group of matched corporations. The TFP announcement heightens the value of the conversion option, making the income trusts' prices behave more like equities. We then consider the differences in changes in risk loadings across types of income trusts—not all income trusts are created equally. Business versus energy versus real estate investment trusts have different characteristics and are based on the cash generating ability of different assets, which may also impact the valuation of the conversion option. The value of the conversion option may also depend on the firm's corporate strategy where the firm adopts the income trust structure through either converting all of the assets or less than 100 per cent of the assets to a trust. Different ultimate outcomes of the income trust after the TFP announcement can also be related to how the income trusts have been suited to

the structure. Consequently, we consider different aspects of the set of income trusts related to how the income trust is suited with the structure and how these differences may impact the value of the option to convert to a corporation and hence the degree of sensitivities to stock and bond market factors.

2.4.1 Sensitivities to Stock and Bond Market Factors of Income Trusts and Matched Corporations

To study whether income trusts behave more like bonds or stocks, we examine the sensitivities of their returns to different risk factors related to movements in the stock and bond markets. We expect a role for both bond and equity factors in the pricing of income trusts with the role of bond factors to be larger for income trusts than for regular corporate equities. We therefore form our hypothesis and employ the five factors on stock and bond pricing in Fama and French (1993) and also the additional momentum factor of Carhart (1997) for the testing. Fama and French (1993) use three stock market factors: the excess return on the market (MKT), the difference between returns of a portfolio of small stocks and a portfolio of big stocks (SMB), the difference between returns of a portfolio of high book-to-market firms and a portfolio of low book-to-market firms (HML), and two bond market factors—the term premium (TERM) and the default premium (DEF)—to explain returns of stocks and bonds. The SMB factor is to represent risk factor related to size, and the HML factor is to represent risk factor related to growth as proxied by the book-to-market ratio. The UMD factor developed by Carhart (1997) accounts for the fact that stocks that have performed well in the last few months continue to perform well in the next month (Jegadeesh and Titman, 1993, Carhart, 1997). TERM is the return on a long-term government bond index minus the one-month T-bill rate of the previous month, which proxies for unexpected change in long-term bond returns. The reason for the term structure of interest rate to appear is that the discount rate will change with the level and slope of the interest rate curve, which are the two most important determinants of interest rates. Term spread has been used in Fama and French (1989) and Campbell and Shiller (1991) to predict bond returns. DEF is constructed as the differences in returns between the low and the high rating bonds and is interpreted by

Fama and French (1993) as the default probability that changes with economic conditions. Chen et al. (1986) study stock returns and use the default factor to proxy for the change in the premium required to compensate for risks. Gebhardt, Hvidkjaer, and Swaminathan (2005) conclude that betas to the default and term factors are significant in pricing bonds even after controlling for other bond characteristics.

In Fama and French (1993), excess returns on market, the size factor and the book-to-market factor capture most of the common variation in stock returns. In their five-factor model for stock portfolios, MKT has loadings of around 1 for stock portfolios, SMB loadings take both signs and are higher for small stocks; HML loadings have taken both signs and are higher for high book-to-market portfolios. Loadings of MKT, SMB, and HML are close to zero for bond portfolios. Loadings on the momentum factor UMD take both signs and are higher for mutual fund portfolios with higher returns in Carhart (1997). In Fama and French (1993), TERM and DEF load positively when used alone but load insignificantly negative when used with stock market factors to explain stock returns. Without stock market factors, loadings on TERM are all positive and close to 1 for stock portfolios and long-term bond portfolios. Baker and Wurgler (2012) interpret a higher loading on the excess return on a long-term government bond after controlling for excess stock market return as an indication of bond-like behavior. Loadings on the default factor DEF are positive and get smaller as one moves from small stocks to big stocks and government bonds (Fama and French, 1993).

Based on evidence from previous studies, we would interpret higher betas on RM-Rf, SMB, and DEF or lower betas on HML and TERM as indications of a stock-like behavior. The expected sign on UMD in indicating a stock-like/bond-like behavior is unclear. The first hypothesis regards the sensitivities to different bond and stock markets factors of income trusts and matched corporations:

H1a: Income trust returns are sensitive to both stock and bond market factors, with bond market factors adding power to explain the returns of income trusts.

H1b: Income trusts have lower sensitivities to stock market factors and higher sensitivities to bond market factors compared to other similar ordinary equities.

To test hypothesis H1a we examine the CAPM in (1.1), the Fama and French (1993) four-factor model in (1.2), and the four-factor model augmented with bond market factors in (1.4) to price income trusts. Model (1.3) looks at only bond market factors. The models estimated are the following:

$R_{i,t} - R_{f,t} = a + b * (R_{M,t} - R_{f,t}) + e_{i,t}$ (1.1)

$R_{i,t} - R_{f,t} = a + b * (R_{M,t} - R_{f,t}) + s * SMB_t + h * HML_t + u * UMD_t + e_{i,t}$ (1.2)

$R_{i,t} - R_{f,t} = a + m * TERM_t + d * DEF_t + e_{i,t}$ (1.3)

$R_{i,t} - R_{f,t} = a + b * (R_{M,t} - R_{f,t}) + s * SMB_t + h * HML_t + u * UMD_t + m * TERM_t + d * DEF_t + e_{i,t}$ (1.4),

where R_{it} is monthly return of the income trust i in month t. R_{ft} is the risk-free rate. SMB_t, HML_t, and UMD_t are the Fama-French risk premiums. For bond market factors, $TERM_t$ and DEF_t are the term and default factors for the bond markets.

To test hypothesis H1a, we examine the significance of stock and bond market factors in explaining the returns of income trusts. We will see in models (1.3) and (1.4) if bond market factors yield significant results in explaining income trust returns, and whether adding bond market factors in model (1.4) add power to the tests compared to the models with only stock market factors in (1.1) and (1.2). If income trusts are sensitive to bond market factors, the coefficients of TERM (m) and DEF (d) will be significant. In model (1.4), we expect that the adjusted R-squared where bond market factors are used in addition to stock market factors will be higher than that in model (1.2), where only stock market factors are used. This will indicate that bond market factors add powers besides stock market factors in explaining income trusts' returns. Besides R-squared, we also employ the Gibbons, Ross, and Shaken (1989) or GRS test to evaluate the fitness of the pricing models. The Gibbons et al. (1989) test examines whether the intercept from an asset pricing model is significantly different from zero. A better fit model will have

insignificant intercept so that all risks are accounted for and the test statistic, which follows an F distribution, will be small.

To test hypothesis H1b, we compare the results in the four models to the results for a matched sample of regular corporations for the whole sample period and for the periods before and after the TFP announcement. We expect that bond market factors do not add as much power in explaining matched corporations' returns compared to the case of income trusts. The pricing of income trusts would be somewhere between bond-like and stock-like whereas it would be more stock-based for the regular corporations. Therefore, the price of an income trust will comove more with the bond markets than the price of an ordinary equity. More specifically, we expect that the coefficients for RM-Rf, SMB, and DEF for income trusts are lower and less significant while the coefficients for the bond market factor TERM are higher and more significant compared to those of matched corporations. For H1b, we also formally test how being an income trust, as opposed to being a corporation, makes the sensitivities to stock and bond market factors different. We introduce the variable $D_{i,t}^{IT}$, which is a dummy for being an income trust for the firm i in month t. Model (1.5) estimates the impact of being a trust on risk loadings and it is run for the both the pre- and post-TFP periods.

$$R_{i,t} - R_{f,t} = a_0 + b * (R_{M,t} - R_{f,t}) + s * SMB_t + h * HML_t + u * UMD_t + m * TERM_t + d * DEF_t + a_1 * D_{i,t}^{IT} + b^{IT} * D_{i,t}^{IT} * (R_{M,t} - R_{f,t}) + s^{IT} * D_{i,t}^{IT} * SMB_t + h^{IT} * D_{i,t}^{IT} * HML_t + u^{IT} * D_{i,t}^{IT} * UMD_t + m^{IT} * D_{i,t}^{IT} * TERM_t + d^{IT} * D_{i,t}^{IT} * DEF_t + e_{i,t} \quad (1.5),$$

where $D_{i,t}^{IT}$ is the dummy for whether the firm i is organized as an income trust in month t. b^{IT}, s^{IT}, h^{IT}, u^{IT}, m^{IT}, and d^{IT} indicate the difference in the risk loadings for RM-Rf, SMB, HML, UMD, TERM, and DEF factors, respectively, due to being an income trust. We expect to see lower sensitivities to the stock market factors (negative b^{IT}, negative s^{IT}, and positive h^{IT}) and higher sensitivities to the bond market factors (positive m^{IT} and negative d^{IT}) as suggestive of a bond-like characteristic for income trusts versus matched corporations.

2.4.2 Changes in Stock-like/Bond-like Behavior around the TFP Announcement

In this part, we examine how the risk profiles of income trusts change due to changes in the tax treatment of income and distributions. These would be impacted by the announcement from the Canadian government to suspend the special tax status of treats that is the Tax Fairness Plan on October 31, 2006.

H2a: We would expect to see a decrease in the returns around the announcement of changes in government policy related to a removal of the preferred tax treatment of income trusts.

H2b: We would expect income trusts to comove more with the stock market and less with the bond market after the TFP announcement.

To test this hypothesis, we examine the changes in equity and bond-related factors around the TFP event. The method is adapted from Foerster and Karolyi (1999) where they estimate the change in market beta after the cross-listing event.

$$R_{it} - R_{ft} = a^{PRE\_TFP} + b^{PRE\_TFP} * (R_{M,t} - R_{f,t}) + s^{PRE\_TFP} * SMB_t + h^{PRE\_TFP} * HML_t + u^{PRE\_TFP} * UMD_t + m^{PRE\_TFP} * TERM_t + d^{PRE\_TFP} * DEF_t + a^{TFP} * D_{it}^{TFP} + a^{Ch\_POST\_TFP} * D_{it}^{POST\_TFP} + b^{Ch\_POST\_TFP} * (R_{M,t} - R_{f,t}) * D_{it}^{POST\_TFP} + s^{Ch\_POST\_TFP} * SMB_t * D_{it}^{POST\_TFP} + h^{Ch\_POST\_TFP} * HML_t * D_{it}^{POST\_TFP} + u^{Ch\_POST\_TFP} * UMD_t * D_{it}^{POST\_TFP} + m^{Ch\_POST\_TFP} * TERM_t * D_{it}^{POST\_TFP} + d^{Ch\_POST\_TFP} * DEF_t * D_{it}^{POST\_TFP} + e_{it} \quad (2.1),$$

where D_{it}^{TFP} is the dummy for the month of November 2006, $D_{it}^{POST\_TFP}$ is the dummy for the period after the TFP announcement. The decrease in excess monthly returns of income trusts on the event month (November 2006) will be evidenced by a significantly negative a^{TFP}. We expect to see higher comovement to the stock market (positive and significant $b^{Ch\_POST\_TFP}$ and $s^{Ch\_POST\_TFP}$, negative $h^{Ch\_POST\_TFP}$) and lower comovement to the bond market (negative $m^{Ch\_POST\_TFP}$ and positive $d^{Ch\_POST\_TFP}$) after the TFP

announcement to remove the tax advantages of Income Trusts. We will run these models on both the income trust and the matched firms' sample. We expect to see no significant changes in risk loadings for matched corporations since they are not impacted by the tax changes proposal.

2.4.3 Changes in Stock-like/Bond-like Behavior around the TFP Announcement by Trust Characteristics

Industry

Grouping stocks by industry is one of the most popular ways scholars find comovement in returns (King, 1966, Fama and French, 1997, Chan, Lakonishok, and Swaminathan, 2007). In the case of income trusts, the ability to pay steady income as well as the value of adopting the income trust structure is usually associated with the industry a trust is in. Therefore, categorizing income trusts by industry can potentially give more insights on the risk of trusts related to the stock and bond factors. We examine how the change in risk loadings of income trusts around the TFP announcement vary with industries.

H3a: Returns of income trusts coming from industries that are less suitable for the trust structure (i.e., business trusts compared to energy) have stronger change to become more stock-like after the TFP announcement.

The Ultimate Fate of the Income Trust

We examine whether the outcome of income trusts after the TFP is related to the changes in risk profiles after the TFP announcement. This will shed light on how much the risk profiles depend on corporate strategy and how efficient the market is at being able to foresee the ultimate fate of the income trusts. Income trusts that will ultimately have no change, reorganize, or be acquired are expected to have been more suitable for the trust structure and have lower value of the conversion option and hence will have lower changes in risk profiles. Those that will ultimately convert to corporations are

expected to have stronger change towards being more stock-like since they can survive outside of the trust structure and the value of the conversion option to them is high.

H3b: Income trusts are expected to have stronger changes towards being more stock-like if they would convert to corporation, be acquired, have no change, or reorganize, in that order.

Adoption of the Trust Structure

We examine how the sensitivities to different risk factors depend on corporate strategy, i.e., how firms choose to become income trusts. Some IPOed as income trusts, some converted themselves from corporations, among which some were converted wholly while some were spun-off partially from the initial corporations. We hypothesize that firms that were spun-off partially have been more suitable for the trust structure, as the assets have been selectively chosen to be suited to the structure compared to those spun-off wholly. Therefore, the value of the conversion option to those partially spun-off is low.

H3c: Income trusts that have been spun-off wholly will have stronger change towards being more stock-like after the TFP announcement compared to spun-off partially from the initial corporations.

Prospect to Lower Tax Expenses Outside of the Income Trust Structure

We also examine how the changes in loadings to risk factors around the TFP announcement are related to the potential for a firm to keep tax expenses low when the tax advantage for the income trust structure would be eliminated. We examine two groups of characteristics that may indicate whether there is potential for a firm to lower its tax expense outside of the trust structure. The first group of characteristics we examine is based on Dyreng, Hanlon, and Maydew (2008), where they examine the characteristics of tax-avoiding firms. Following their paper, we examine the size based on net sales, market-to-book ratio, tangibility, dividend payout, and return on assets. Among the

variables, size and leverage are shown to be correlated with long-run tax avoidance. Conclusions on other characteristics are inconclusive in Dyreng et al. (2008). The second group of variables is related to the prospect to employ tax shields as studied in Doidge and Dyck (2015). In our study, we look at the amount of tax shields (debt and non-debt) used by the income trust (trust tax shields), the median tax shields used by corporations in the same industry (industry tax shields), and whether an income trust has used less than or more than the amount of tax shields used by a median corporation in the same industry. All characteristics are measured in 2005.

We hypothesize that an income trust will have lower changes towards being more stock-like after the TFP announcement if it has the prospect of lowering its income tax expense in the future. The prospect is measured by larger firm size and higher leverage (following Dyreng et al., 2008), and larger room for prospective tax shields (following Doidge and Dyck, 2015).

H3d: Income trusts that have characteristics of tax-avoiding firms have lower changes towards being more stock-like after the TFP announcement.

H3e: Income trusts that have higher prospective tax shields have lower changes towards being more stock-like after the TFP announcement.

Hypotheses H3a, H3b, H3c, H3d, and H3e will be tested using the cross-sectional univariate test where we will estimate the changes in each risk factor loading separately for each income trust and compare the average across groups of income trusts. The changes in each risk factor are estimated separately via the coefficient $d_i^{Ch\_POST\_TFP}$ using the model:

$$R_{it} - R_{ft} = a_i^{PRE\_TFP} + d_i^{PRE\_TFP} * RiskFactor_t + a_i^{TFP} * D_{it}^{TFP} + a_i^{Ch\_POST\_TFP} * D_{it}^{POST\_TFP} + d_i^{Ch\_POST\_TFP} * RiskFactor_t * D_{it}^{POST\_TFP} + e_{it} \quad (3.1)$$

For income trusts in less suitable industries (i.e., business as opposed to energy, those spun-off wholly as opposed to those spun-off partially, and those that would eventually convert into corporations), we expect that the increase in comovement with the stock market (increase in RM-Rf, SMB, decrease HML loadings) and the decrease in comovement with the bond market (decrease in TERM and increase in DEF loadings) after the TFP announcement are stronger.

2.4.4 Changes in Stock-like/Bond-like Behavior around the Conversion from Corporations

We study returns of income trusts that were converted from corporations to determine how the pricing of those firms changes around the conversions. To be able to convert to an income trust, the firm has likely been a tax avoiding firm with stable cash flows since its inception, so it is a logical decision to convert. This suggests that before the conversion, the firm should have been priced as a regular equity unless the market also prices in tax avoidance and being a tax avoider makes you more bond-like in valuation than equity-like. Therefore, in terms of risks, we expect to see returns of firms which convert to the income trust structure to comove more with the bond market and less with the stock market after the conversions. If that is not the case, it is likely that the converted firms have likely been long-term tax avoiders, so there is no real change in their risk profile due to changes in tax paid following the conversion. In terms of valuation, since there are higher expected cash distributions from those firms due to the tax treatment to income trusts, we expect firms that converted into income trusts to experience a boost in valuation at conversions. The formal hypothesis will examine how risk loadings (betas) with the factors change as a firm converts to an income trust structure, as well as the potential boost in valuation on the conversion date.

H4: We expect the relative role of equity factors to be larger for income trusts before they convert (i.e., while they are still regular corporations), and the relative role of bond factors to be larger after the conversions.

We estimate a pooled regression that could capture the change in factor betas after the conversion:

$$R_{i,t} - R_{f,t} = a^{PRE\_CV} + b^{PRE\_CV} * (R_{M,t} - R_{f,t}) + s^{PRE\_CV} * SMB_t + h^{PRE\_CV} * HML_t + u^{PRE\_CV} * UMD_t + m^{PRE\_CV} * TERM_t + d^{PRE\_CV} * DEF_t + a^{CV} * D_{it}^{CV} + a^{Ch\_POST\_CV} * D_{it}^{POST\_CV} + b^{Ch\_POST\_CV} * (R_{M,t} - R_{f,t}) * D_{it}^{POST\_CV} + s^{Ch\_POST\_CV} * SMB_t * D_{it}^{POST\_CV} + h^{Ch\_POST\_CV} * HML_t * D_{it}^{POST\_CV} + u^{Ch\_POST\_CV} * UMD_t * D_{it}^{POST\_CV} + m^{Ch\_POST\_CV} * TERM_t * D_{it}^{POST\_CV} + d^{Ch\_POST\_CV} * DEF_t * D_{it}^{POST\_CV} + e_{i,t} \quad (4.1)$$

Since the estimation window is shorter (we take one year before and after the conversions into income trusts), and weekly data on the Fama-French factors for the Canadian market are not available, we use daily returns to estimate betas. R_{it} is daily return of the income trust i in day t. R_{ft} is the risk-free rate. SMB_t, HML_t, UMD_t are the Fama-French risk premiums. For bond market factors, $TERM_t$ and DEF_t are the term and default factors for the bond markets. D_{it}^{CV} is the dummy if the time t is the actual conversion day. $D_{it}^{POST\_CV}$ is the dummy for the post-conversion period. b^{PRE_CV}, s^{PRE_CV}, h^{PRE_CV}, u^{PRE_CV}, m^{PRE_CV} and d^{PRE_CV} are factor loadings for market beta, SMB, HML, UMD, term and default factors, respectively, before the conversions. $b^{Ch\_POST\_CV}$, $s^{Ch\_POST\_CV}$, $h^{Ch\_POST\_CV}$, $u^{Ch\_POST\_CV}$, $m^{Ch\_POST\_CV}$ and $d^{Ch\_POST\_CV}$ are the changes in factor loadings for market beta, SMB, HML, UMD, the term structure of interest and default factors, respectively, due to the conversions. The period examined is one year before and one year after the actual conversion days. The coefficients a^{PRE_CV}, a^{CV}, and $a^{Ch\_POST\_CV}$ are designed to capture the valuation not related to risks before, on, and after the actual conversion days, respectively.

We expect to see the sensitivities to stock market factors decrease (negative $b^{Ch\_POST\_CV}$ and negative $s^{Ch\_POST\_CV}$) and the comovement with the bond market increase (positive $m^{Ch\_POST\_CV}$ and negative $d^{Ch\_POST\_CV}$) as a firm converts from the corporate structure to the income trust structure.

2.5 Data

Our list of Canadian income trusts is compiled from several sources including Datastream, the CFMRC database, and the reviews from the Toronto Stock Exchange. Prices and accounting data are from Datastream for the income trusts and all of the other listed firms in Canada. From the SEDAR website, we hand collect data on how income trusts became listed (i.e., conversion or IPO) and their ultimate fate. Income trusts are matched by industry and size (net sales) in 2005 for the TFP test. We choose net sales since it is a measure of size not likely to be impacted by a firm's organizational structure.

For stock market factors, we use returns on the S&P TSX Composite Index for stock market return. We use data from Frazzini and Pedersen (2013)[11] for other Fama-French factors of the Canadian market (SMB, HML, UMD). For bond market factors, we calculate the TERM factor as the total returns on the Canadian benchmark 10-year government index (datatype BMCN10Y) taken from Datastream less the one-month Canadian treasury bill rate of the previous month (datatype CNTBB1M) sourced from Bank of Canada (BOC). As our TERM factor is measured as the returns on the bonds, a positive correlation with the TERM factor means a higher comovement with the bond market.

For the DEF factor, we use returns on Canadian corporate bonds with maturity of 10 years or longer sourced from Thompson Reuters (datatype TRCNCTP) for long-term Canadian corporate bond returns. The changes in the Canadian benchmark 10-year government bonds total return index is deducted from changes in Canadian corporate bonds total return index to get the DEF factor. This data is available from 2002 onwards so we will miss data points in the period before 2002 for tests that include the DEF factor. DEF decreases when the returns on corporate bonds are relatively lower than the returns on government bonds, which means that credit spread increases. If an asset has lower

[11] Frazzini and Pedersen (2013) study financial assets (equities, bonds, and futures) in markets worldwide to show that low-beta assets have better performance because of the overweighing of high-beta assets due to funding constraint of investors. A betting against beta (BAB) factor, constructed as long low-beta assets and short high-beta assets, produces positive returns even when accounting for other risk factors (SMB, UMD, and HML).

return when credit spread increases, which will be represented by a positive beta to the DEF factor, we would interpret it to be more stock-like than bond-like. The reasoning is that those securities with less seniority (stocks) will be more subject to credit risk than those with higher seniority (bonds).

As of 2006, our sample records 213 non-REIT income trusts and 34 REITs. We report the summary statistics of the excess returns on income trusts and matched corporations, as well as the risk factors in Table 2-1. Table 2-2 provides pairwise correlations among risk factors before and after the TFP announcement.

Table 2-1: Summary Statistics

	Pre-TFP					Post-TFP				
	Obs	Mean	S.D.	p25	p75	Obs	Mean	S.D.	p25	p75
Returns of Non-REIT Income Trusts	6986	-0.022	(0.097)	-0.061	0.017	6391	-0.019	(0.141)	-0.077	0.036
Returns of Matched Corporations	6986	-0.009	(0.164)	-0.081	0.045	6391	-0.017	(0.145)	-0.085	0.041
RM-Rf	6986	-0.018	(0.038)	-0.041	0.010	6391	-0.018	(0.054)	-0.042	0.018
SMB	6986	0.002	(0.020)	-0.011	0.018	6391	-0.001	(0.039)	-0.019	0.018
HML	6986	0.009	(0.031)	-0.008	0.022	6391	0.004	(0.027)	-0.005	0.022
UMD	6986	0.017	(0.048)	-0.002	0.037	6391	-0.001	(0.060)	-0.012	0.030
TERM	6986	-0.025	(0.016)	-0.039	-0.012	6391	-0.016	(0.023)	-0.034	-0.002
DEF	5616	0.003	(0.005)	-0.000	0.006	6391	-0.001	(0.017)	-0.008	0.008

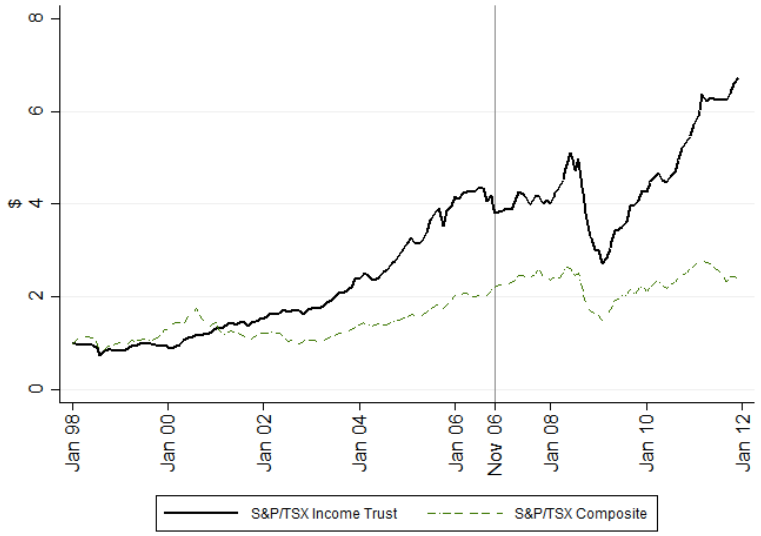
This table reports the descriptive statistics for the monthly returns on the group of non-REIT income trusts and stock and bond market risk factors.

Table 2-2: Correlation among Market Risk Factors

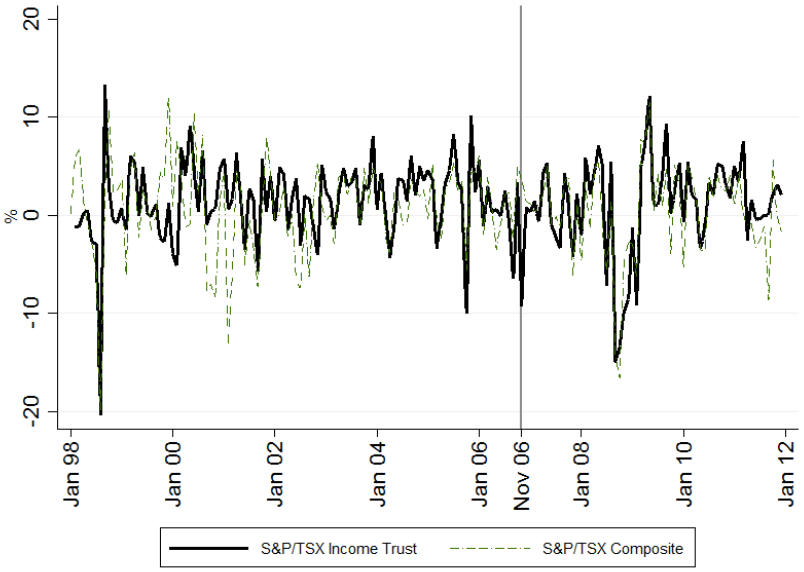
	RM-Rf	SMB	HML	UMD	TERM	DEF
RM-Rf	1	0.454***	-0.213*	-0.211	0.0424	0.658***
SMB	0.0239	1	-0.0807	-0.401***	0.0531	0.523***
HML	-0.527***	-0.0606	1	-0.0278	-0.145	0.0295
UMD	-0.0194	-0.0577	0.0310	1	-0.0810	-0.147
TERM	0.274***	0.130	0.0769	0.0567	1	-0.0293
DEF	0.269*	0.0327	0.00388	-0.00136	0.428***	1

This table reports Pearson correlations among stock and bond market risk factors for the period before (lower half of the table) and after (upper half of the table) the TFP announcement

Figure 2-2: Comparative Performance of the Income Trust Sector and the Overall Stock Market



a) Figure 2-2a shows how an $1 investment grows over the period 1998-2011 if it is invested in the income trust sector (using the S&P/TSX Income Trust Index) compared to if it is invested in the overall Canadian stock market (using the S&P/TSX Composite Index). Nov 06 marks the event month after the TFP announcement on market close on October 31, 2006.



b) Figure 2-2b shows how the monthly S&P/TSX Income Trust Index and the monthly S&P/TSX Composite Index change relative to each other.

2.6 Empirical Results

2.6.1 Sensitivities to Stock and Bond Market Factors

In Figure 2-2, we illustrate comparative performance between income trusts and the overall stock market from 1998 to 2011. At a glance, the income trust group (as proxied by the S&P/TSX Income Trust index) starts to outperform the overall stock market in the early 2000s until after November 2006 when they seem to move in tandem. There are more instances where income trusts and the overall stock market move in opposite directions in the period before November 2006 than in the period after November 2006 (Figure 2-2b).

Table 2-3 examines the loadings on stock and bond market factors for income trusts and for matched corporations as specified in Models 1.1-1.4. REITs are excluded from our sample. Panel (a) reports the comparison from 1995 to 2011 (or 2002-2011 for models using the DEF factor), while panel (b) and (c) report the comparisons for the sub-periods before and after the TFP, respectively. We report the results only for those income trusts that have been matched with corporations,[12] although including income trusts that do not have matched corporations yields similar results. Columns (2b) and (6b) in Panel (a) and (b) are added to examine models with only stock market factors when DEF is not missing. The purpose of the addition is for comparison with the results of the models with the DEF factor included.

We observe in all three panels that both the groups of income trusts and matched corporations are sensitive to stock and bond market factors. Our results for the pre-TFP period (Table 2-3b) are in line with Halpern (2004) in that our stock market beta is about 0.5 when examined for the period before 2006 while stock market betas in Halpern (2004) range from 0.4 to 0.5 for different groups of income trusts. Both Halpern (2004) and our study report positive and significant loadings on the interest rate factor of close to 1 (excess return on 5-year government bond index in Halpern (2004) and TERM in our

[12] We cannot match cases when, for example, an income trust is IPOed in the middle of a year and does not have data on net sales for the full year, while it still has price data for that particular year.

study, which is the return on the 10-year government bond index less the 1-month Canadian T-bill rate of the previous month). We also find that when stock market factors are included, the bond market factor TERM is still significant in explaining returns of income trusts before the TFP announcement but becomes insignificant in explaining returns of income trusts post-TFP and insignificant in explaining returns of matched corporations in all periods. The results therefore lend support to H1a.

Tables 2-3a and 2-3b show that the inclusion of bond market factors improves adjusted R-squared only for the group of income trusts, and this is likely driven by the results in the pre-TFP period. Adjusted R-squared increases when we include the TERM and DEF factor to Model (1.2) in the tests of all periods (Table 2-3a) and the pre-TFP period (Table 2-3b), but not for the tests in the post-TFP period (Table 2-3c). For matched corporations, the inclusion of bond market factors does not increase the performance of adjusted R-squared. The results on adjusted R-squared performance support Hypothesis 1a in showing that adding bond market factors improves performance of our pricing model only for the group of income trusts before the TFP announcement.

Table 2-3: Sensitivities to Stock and Bond Market Factors Separately for Income Trusts and Matched Corporations

a. All Periods	Income Trusts					Matched Corporations				
	(1)	(2a)	(2b)	(3)	(4)	(5)	(6a)	(6b)	(7)	(8)
RM-Rf	0.869***	0.849***	0.884***		0.911***	1.008***	0.932***	0.934***		0.935***
	(28.36)	(27.82)	(25.61)		(26.31)	(32.37)	(28.41)	(27.10)		(23.67)
SMB		0.553***	0.563***		0.602***		0.599***	0.594***		0.600***
		(12.93)	(11.85)		(12.50)		(11.94)	(11.71)		(11.56)
HML		0.637***	0.634***		0.666***		0.346***	0.330***		0.337***
		(20.11)	(14.94)		(16.07)		(7.25)	(7.10)		(7.13)
UMD		-0.0804***	-0.0932***		-0.0762**		0.00766	0.0128		0.0169
		(-3.46)	(-3.02)		(-2.51)		(0.27)	(0.40)		(0.52)
TERM				0.493***	0.292***				0.296***	0.0765
				(8.43)	(5.26)				(4.54)	(1.19)
DEF				2.343***	-0.264*				2.609***	-0.0303
				(16.36)	(-1.74)				(20.63)	(-0.20)
Constant	-0.00713***	-0.0107***	-0.0106***	-0.0131***	-0.00449**	0.00480***	0.00108	0.00122	-0.00692***	0.00271
	(-6.75)	(-9.75)	(-8.66)	(-7.44)	(-2.50)	(3.51)	(0.76)	(0.86)	(-3.73)	(1.43)
Observations	13553	13553	12183	12183	12183	13553	13553	12183	12183	12183
Adjusted R^2	0.108	0.154	0.157	0.064	0.160	0.088	0.105	0.117	0.053	0.117
GRS statistic	45.952	102.691	85.247	67.942	8.118	12.377	.608	.782	13.498	2.036
GRS p-value	0.000	0.000	0.000	0.000	.004	0.000	.436	.377	0.000	.154

This table examines loadings on stock and bond market factors for income trusts and matched corporations separately using their monthly returns. The base model estimated is $R_{i,t} - R_{f,t} = a + b * (R_{M,t} - R_{f,t}) + s * SMB_t + h * HML_t + u * UMD_t + m * TERM_t + d * DEF_t + e_{i,t}$ (1.4) (columns (4) and (8)), where columns (1) and (5) examine the CAPM, columns (2a) and (6a) estimate the four-factor Fama-French model, and columns (3) and (7) examine only bond market factors. Columns (2b) and (6b) are added to examine the four-factor Fama-French model when there are data for the DEF factor. Excess stock market return, RM-Rf, is the return on the S&P/TSX Composite minus the one-month Canadian treasury bill rate; SMB, HML, UMD are returns on the zero-investment portfolios on the Canadian market from Frazzini and Pedersen (2013) representing the size, the book-to-market, and the momentum factors of the stock market, respectively. TERM is the changes in the Canadian benchmark 10-year government bonds total return index less the one-month Canadian treasury bill rate of the previous month. DEF is changes in the total return index for Canadian corporate bonds with maturity of 10 years or longer minus the changes in the Canadian benchmark 10-year government bonds' total return index. The sample spans from 1995 to 2011 and includes income trusts and their matched corporations only in the years the income trusts adopt the trust structure (i.e., we do not count a firm before it converted into an income trust or after it has abandoned the trust structure after the TFP). For models that include DEF, the sample spans from 2002 onwards due to data availability. Panel (a) is for all periods, while Panel (b) and (c) estimate the models for the pre- and post-TFP period, respectively. REITs are excluded. Newey-West standard errors with 2 lags are estimated to account for autocorrelation and heteroskedasticity in the error terms; *t* statistics are reported in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$.

Table 2-3 (Continued)

b. Pre-TFP	Income Trusts					Matched Corporations				
	(1)	(2a)	(2b)	(3)	(4)	(5)	(6a)	(6b)	(7)	(8)
RM-Rf	0.577***	0.721***	0.809***		0.776***	0.881***	0.955***	0.937***		0.936***
	(17.88)	(19.24)	(13.80)		(13.94)	(17.14)	(16.34)	(11.04)		(10.16)
SMB		0.301***	0.303***		0.355***		0.606***	0.533***		0.542***
		(5.94)	(3.97)		(4.60)		(5.78)	(4.70)		(4.80)
HML		0.490***	0.360***		0.290***		0.348***	0.251***		0.239**
		(12.82)	(5.32)		(4.37)		(4.30)	(2.60)		(2.46)
UMD		0.0266	0.0548		0.00231		0.0150	0.0673		0.0546
		(1.25)	(1.36)		(0.06)		(0.32)	(0.84)		(0.66)
TERM				0.968***	0.796***				0.351**	0.156
				(11.87)	(10.48)				(2.30)	(1.04)
DEF				0.175	-0.634**				0.751	-0.231
				(0.54)	(-2.06)				(1.55)	(-0.46)
Constant	-0.0111***	-0.0141***	-0.0128***	0.00306	0.00843***	0.00646***	0.00302	0.00349	0.00137	0.00801
	(-9.34)	(-11.45)	(-8.05)	(1.13)	(2.88)	(3.04)	(1.25)	(1.16)	(0.30)	(1.46)
Observations	6986	6986	5616	5616	5616	6986	6986	5616	5616	5616
Adjusted R^2	0.050	0.074	0.068	0.021	0.078	0.041	0.049	0.046	0.002	0.046
GRS statistic	78.602	109.56	43.123	.811	4.333	9.2	1.71	1.449	.073	1.745
GRS p-value	0.000	0.000	0.000	.368	.037	.002	.191	.229	.787	.187

c. Post-TFP	Income Trusts				Matched Corporations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RM-Rf	1.046***	0.881***		0.939***	1.079***	0.916***		0.920***
	(24.44)	(19.98)		(20.04)	(28.01)	(22.18)		(19.04)
SMB		0.581***		0.622***		0.584***		0.589***
		(10.23)		(10.40)		(10.25)		(9.73)
HML		0.458***		0.482***		0.377***		0.394***
		(8.17)		(8.64)		(6.38)		(6.47)
UMD		-0.0566		-0.0416		-0.0240		-0.0172
		(-1.42)		(-1.07)		(-0.62)		(-0.44)
TERM			0.349***	0.0461			0.399***	0.0978
			(4.89)	(0.66)			(5.35)	(1.29)
DEF			2.545***	-0.303*			2.728***	-0.0283
			(16.67)	(-1.72)			(20.58)	(-0.17)
Constant	-0.000887	-0.00526***	-0.0100***	-0.00394*	0.00243	-0.00156	-0.00624***	0.0000301
	(-0.53)	(-3.21)	(-4.51)	(-1.86)	(1.39)	(-0.90)	(-2.83)	(0.01)
Observations	6391	6391	6391	6391	6391	6391	6391	6391
Adjusted R^2	0.159	0.190	0.095	0.190	0.158	0.183	0.102	0.183
GRS statistic	.272	9.658	23.715	3.792	1.91	.786	8.647	0
GRS p-value	.602	.002	0.000	.051	.167	.375	.003	.989

When we look at the results for the GRS tests, we observe in Table 2-3b that the models using stock market factors perform significantly worse than models using bond market factors for income trusts prior to the TFP announcement. The GRS statistics for models with only stock factors in columns (1), (2a), and (2b) of Table 2-3b are high compared to those of matched corporations. After the TFP announcement, the GRS statistics for models with only stock factors perform comparably well compared to those of matched corporations (Table 2-3c). Therefore, we can conclude from the analysis on the fitness of models with stock and bond market factors that bond market factors are more significant in the pricing of income trust before the TFP announcement, and that stock market factors are more significant in the pricing of income trust after the TFP announcement. The results therefore support hypothesis H1a.

While Tables 2-3a, 2-3b, and 2-3c are more descriptive in nature, Table 2-4 provides formal tests for whether there are differences in risk factor loadings between income trusts and matched corporations before and after the TFP announcement. A dummy for being a trust is interacted with the risk factors to examine the possible impact of being a trust on the risk factor loadings. Table 2-4 therefore corresponds to Model (1.5). We find that in the period before the TFP announcement, income trusts comove significantly less with the stock market (a lower beta to excess stock market return of around 0.2 and a lower beta to SMB of around 0.3 in columns (1), (2), and (4), Table 2-4 and significantly more with the bond market (higher beta to TERM by about 0.6 in columns (3) and (4)). This suggests that before the TFP announcement, income trusts are priced more like bonds and less like stocks compared to matched corporations.

In the period after the TFP, there is no significant difference between the pricing of income trusts versus non-trust corporations. Taken together, the results support hypothesis H1b that income trusts behave more like bonds and less like stocks compared to ordinary equities before the TFP announcement, while they behave similarly to matched corporations after the announcement.

Table 2-4: Risk Loadings Due to Being an Income Trust

	Pre-TFP				Post-TFP			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RM-Rf	0.881***	0.955***		0.936***	1.079***	0.916***		0.920***
	(17.14)	(16.34)		(10.16)	(28.01)	(22.18)		(19.04)
SMB		0.606***		0.542***		0.584***		0.589***
		(5.78)		(4.80)		(10.25)		(9.73)
HML		0.348***		0.239**		0.377***		0.394***
		(4.30)		(2.46)		(6.38)		(6.47)
UMD		0.0150		0.0546		-0.0240		-0.0172
		(0.32)		(0.66)		(-0.62)		(-0.44)
TERM			0.351**	0.156			0.399***	0.0978
			(2.30)	(1.04)			(5.35)	(1.29)
DEF			0.751	-0.231			2.728***	-0.0283
			(1.55)	(-0.46)			(20.58)	(-0.17)
D_ITx(RM-Rf)	-0.304***	-0.235***		-0.159	-0.0334	-0.0348		0.0197
	(-5.01)	(-3.38)		(-1.48)	(-0.58)	(-0.58)		(0.29)
D_ITxSMB		-0.305***		-0.187		-0.00331		0.0335
		(-2.62)		(-1.37)		(-0.04)		(0.39)
D_ITxHML		0.142		0.0514		0.0815		0.0882
		(1.59)		(0.44)		(1.00)		(1.07)
D_ITxUMD		0.0117		-0.0523		-0.0326		-0.0243
		(0.23)		(-0.57)		(-0.58)		(-0.44)
D_ITxTERM			0.617***	0.641***			-0.0494	-0.0517
			(3.56)	(3.81)			(-0.48)	(-0.50)
D_ITxDEF			-0.576	-0.403			-0.183	-0.275
			(-0.99)	(-0.68)			(-0.91)	(-1.12)
D_IT	-0.0175***	-0.0171***	0.0016	0.0004	-0.0033	-0.0037	-0.0038	-0.0039
	(-7.21)	(-6.30)	(0.32)	(0.07)	(-1.37)	(-1.56)	(-1.21)	(-1.30)
Constant	0.00646***	0.00302	0.00137	0.00801	0.00243	-0.00156	-0.00624***	0.0000301
	(3.04)	(1.25)	(0.30)	(1.46)	(1.39)	(-0.90)	(-2.83)	(0.01)
N	13972	13972	11232	11232	12782	12782	12782	12782
adj. R^2	0.045	0.057	0.011	0.059	0.158	0.187	0.099	0.187

We examine in this table how risk factor loadings are explained by being an income trust, and how the impact changes with time.

$$R_{i,t} - R_{f,t} = a_0 + b * (R_{M,t} - R_{f,t}) + s * SMB_t + h * HML_t + u * UMD_t + m * TERM_t + d * DEF_t + a_1 * D_{i,t}^{IT} + b^{IT} * D_{i,t}^{IT} * (R_{M,t} - R_{f,t}) + s^{IT} * D_{i,t}^{IT} * SMB_t + h^{IT} * D_{i,t}^{IT} * HML_t + u^{IT} * D_{i,t}^{IT} * UMD_t + m^{IT} * D_{i,t}^{IT} * TERM_t + d^{IT} * D_{i,t}^{IT} * DEF_t + e_{i,t} \quad (1.5),$$

where D_IT is a dummy for whether the firm i is organized as an income trust in year t. b^{IT}, s^{IT}, h^{IT}, u^{IT}, m^{IT}, and d^{IT} indicate the values of the risk loadings due to being an income trust. Excess market return, RM-Rf, is the return on the S&P TSX Composite minus the one-month Canadian treasury bill rate; SMB, HML, UMD are returns of the zero-investment portfolios on the Canadian market from Frazzini and Pedersen (2013) representing the size, the book-to-market, and the momentum factors of the stock market, respectively. TERM is the changes in the Canadian benchmark 10-year government bonds total return index less the one-month Canadian treasury bill rate of the previous month. DEF is changes in the total return index for Canadian corporate bonds with maturity of 10 years or longer minus the changes in the Canadian benchmark 10-year government bonds' total return index. The period before the TFP announcement spans from 1995 to Oct 2006 for tests that do not include the DEF factor and spans from 2002 to Oct 2006 for tests that include DEF. The period after the TFP announcement spans from Dec 2006 to Dec 2011. REITs are excluded. Monthly returns are used in the models. Newey-West standard errors with two lags are estimated to account for autocorrelation and heteroskedasticity in the error terms, *t* statistics are reported in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$.

2.6.2 TFP Announcement

Table 2-5 examines the changes in sensitivities of income trusts returns (REITs excluded) to stock and bond market factors due to the TFP announcement, which will complement the previous analyses in Table 2-3 and Table 2-4. We make it clear in Table 2-5 how the risk loadings change for income trusts and corporations around the TFP announcement. Model (2.1) is tested for the case of the Halloween Massacre event on October 31, 2006, and the results are reported in Table 2-5. First, we observe a drop in valuation for income trusts in November 2006 at an average of 13% after other risks are accounted for, supporting hypothesis H2a. After the TFP announcement, monthly returns on income trusts comove significantly more with the stock market (positive and significant coefficients on D_PostTFPx(RM-Rf) in columns (1) and (2), and (4), positive and significant coefficients on D_PostTFPxSMB in columns (2) and (4)) while they comove significantly less with the bond market (negative and significant coefficient on D_PostTFPxTERM in all specifications). That translates to an increase in stock market beta of 0.163, an increase in beta to size factor of 0.267, and a decrease in beta to interest rate risk of 0.75 after all other risks are accounted for. On the other hand, the group of matched corporations does not exhibit a clear or significant change in risk loadings on RM-Rf, SMB, and TERM around the TFP announcement. Both income trusts and matched corporations, however, exhibit similar increases in sensitivities to the default factor through positive coefficients on D_PostTFPxDEF in all specifications. Income trusts have higher positive coefficients on the change in DEF factor, indicating a stronger move towards being more stock-like.

The results suggest that the changes in risks for income trusts after the TFP announcement are in the direction of more stock-like and less bond-like, while there is no significant change in the risk profiles of matched corporations after the event, supporting hypothesis H2b. The results therefore lend support to the theory that lower expected cash distribution after the TFP announcement heightens the value of the conversion option, causing lower comovement with the bond market and higher comovement with the stock market for income trusts.

Table 2-5: Risk Loading Changes around the TFP Announcement

	Income Trusts				Matched Corporations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RM-Rf	0.577***	0.721***		0.776***	0.881***	0.955***		0.936***
	(17.88)	(19.24)		(13.94)	(17.14)	(16.34)		(10.16)
SMB		0.301***		0.355***		0.606***		0.542***
		(5.94)		(4.60)		(5.78)		(4.80)
HML		0.490***		0.290***		0.348***		0.239**
		(12.82)		(4.37)		(4.30)		(2.46)
UMD		0.0266		0.00231		0.0150		0.0546
		(1.25)		(0.06)		(0.32)		(0.66)
TERM			0.968***	0.796***			0.351**	0.156
			(11.87)	(10.48)			(2.30)	(1.04)
DEF			0.175	-0.634**			0.751	-0.231
			(0.54)	(-2.06)			(1.55)	(-0.46)
D_TFP	-0.163***	-0.122***	-0.154***	-0.130***	-0.0267***	0.0106	-0.0208**	-0.000308
	(-21.91)	(-14.81)	(-20.52)	(-13.02)	(-2.77)	(0.87)	(-2.14)	(-0.02)
D_PostTFP	0.0102***	0.00884***	-0.0131***	-0.0124***	-0.00403	-0.00458	-0.00761	-0.00798
	(4.97)	(4.31)	(-3.73)	(-3.43)	(-1.46)	(-1.54)	(-1.51)	(-1.35)
D_PostTFPx(RM-Rf)	0.469***	0.160***		0.163**	0.198***	-0.0399		-0.0158
	(8.75)	(2.77)		(2.24)	(3.08)	(-0.56)		(-0.15)
D_PostTFPxSMB		0.280***		0.267***		-0.0219		0.0470
		(3.68)		(2.74)		(-0.18)		(0.37)
D_PostTFPxHML		-0.0316		0.192**		0.0293		0.155
		(-0.47)		(2.21)		(0.29)		(1.36)
D_PostTFPxUMD		-0.0832*		-0.0439		-0.0390		-0.0718
		(-1.84)		(-0.78)		(-0.64)		(-0.78)
D_PostTFPxTERM			-0.618***	-0.750***			0.0476	-0.0578
			(-5.71)	(-7.29)			(0.28)	(-0.34)
D_PostTFPxDEF			2.370***	0.330			1.977***	0.203
			(6.62)	(0.93)			(3.94)	(0.38)
Constant	-0.0111***	-0.0141***	0.00306	0.00843***	0.00646***	0.00302	0.00137	0.00801
	(-9.34)	(-11.45)	(1.13)	(2.88)	(3.04)	(1.25)	(0.30)	(1.46)
N	13553	13553	12183	12183	13553	13553	12183	12183
adj. R^2	0.140	0.167	0.092	0.173	0.090	0.105	0.055	0.117

The above table investigates the changes in the sensitivities of monthly returns on stock and bond market factors around the TFP announcement. The model estimated is:

$$R_{it} - R_{ft} = a^{PRE\_TFP} + b^{PRE\_TFP} * (R_{M,t} - R_{f,t}) + s^{PRE\_TFP} * SMB_t + h^{PRE\_TFP} * HML_t + u^{PRE\_TFP} * UMD_t + m^{PRE\_TFP} * TERM_t + d^{PRE\_TFP} * DEF_t + a^{TFP} * D_{it}^{TFP} + a^{Ch\_POST\_TFP} * D_{it}^{POST\_TFP} + b^{Ch\_POST\_TFP} * (R_{M,t} - R_{f,t}) * D_{it}^{POST\_TFP} + s^{Ch\_POST\_TFP} * SMB_t * D_{it}^{POST\_TFP} + h^{Ch\_POST\_TFP} * HML_t * D_{it}^{POST\_TFP} + u^{Ch\_POST\_TFP} * UMD_t * D_{it}^{POST\_TFP} + m^{Ch\_POST\_TFP} * TERM_t * D_{it}^{POST\_TFP} + d^{Ch\_POST\_TFP} * DEF_t * D_{it}^{POST\_TFP} + e_{it} \quad (2.1),$$

where D_{it}^{TFP} indicates the event month (Nov 2006) and $D_{it}^{POST\_TFP}$ indicates the period after the TFP announcement. Excess market return, RM-Rf, is the return on the S&P TSX Composite minus the one-month Canadian treasury bill rate; SMB, HML, UMD are returns of the zero-investment portfolios on the Canadian market from Frazzini and Pedersen (2013) representing the size, the book-to-market, and the momentum factors of the stock market, respectively. TERM is the changes in the Canadian benchmark 10-year government bonds' total return index less the one-month Canadian treasury bill rate of the previous month. DEF is changes in the total return index for Canadian corporate bonds with maturity of 10 years or longer minus the changes in the Canadian benchmark 10-year government bonds total return index. $b^{Ch\_POST\_TFP}$, $s^{Ch\_POST\_TFP}$, $h^{Ch\_POST\_TFP}$, $u^{Ch\_POST\_TFP}$, $m^{Ch\_POST\_TFP}$, and $d^{Ch\_POST\_TFP}$ indicate the changes in values of the risk loadings after the TFP announcement. REITs are excluded. Monthly returns are used in the models. Newey-West standard errors with two lags are estimated to account for autocorrelation and heteroskedasticity in the error terms. *t* statistics are reported in parentheses, $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

2.6.3 TFP Announcement and Trust Characteristics

The analysis on the change in betas in Model (2.1) is based on a pooled regression of all income trusts. This method might put higher weights on income trusts with higher sensitivities to the stock and bond market factors. We account for this bias by estimating the changes in risk factor loadings separately for each income trust using Model (3.1). The estimation is performed separately for each risk factor since including all of them will cause difficulties with the number of observations for income trusts that have few observations before or after the TFP announcement (e.g., those abandoning the trust structure early after the TFP announcement). Table 2-6a examines whether the changes in risk loadings for each income trust are significant on average through the t-test for the means of the changes. For the non-REIT income trusts, we confirm the results in Table 2-5 that there is a significantly positive increase in stock market beta of 0.268 on average and a significantly negative decrease in beta to TERM factor of 0.978 on average. The results on SMB and DEF are not significant in this test.

In this part, we will also examine how the sensitivities of income trusts to stock and bond market factors vary with different characteristics of the income trust. We test hypotheses H3a, H3b, and H3c on how suitability to the income trust structure based on characteristics may create differences in the changes in risk profiles of income trusts. Table 6a reports the results for changes in betas after the TFP announcement by industry (REITs, energy, and business), subsequent fates after the TFP announcement, and whether an income trust has been spun-off from 100 per cent of the assets or less than 100 per cent of the assets of a previous company. The categorization by industry and by the subsequent fate do not disentangle changes in betas greatly, except that we observe no changes in risk for REITs. We find that income trusts that have been spun-off from 100 per cent of the assets of the previous corporations have stronger change towards being more stock-like—they have significant increase in stock market beta and significant decrease in beta to TERM factor—while there is no significant change for those converted partially from the previous corporations.

Table 2-6a also reports differences in the changes in loadings to risk factors around the TFP announcement based on characteristics related to tax avoidance following

Dyreng et al. (2008). This serves to test hypothesis H3d that firms with characteristics of long-term tax avoiders will have lower changes towards being more stock-like upon the removal of the tax advantage for income trusts. We find that income trusts with low market-to-book ratios, high tangibility, high dividend payout, and low ROA have less tendency to become more stock-like. They have insignificant increases in stock market betas and lower decreases in betas to the TERM factor. The changes in risk loadings related to size are inconclusive since large firms have more significant increase in betas to ExcMKT but have lower decreases in betas to TERM. In Table 6b, we also examine the relationship between leverage and changes in risk loadings. Income trusts with high leverage also have less tendency to become more stock-like. Therefore, our analysis lends support to H3d in terms of leverage and not to a great extent in terms of size that long-term tax avoiders maintain their bond-like behavior after the TFP announcement. We do find strong evidence that income trusts that are more likely to be more mature and of dividend-paying type firms are more likely to maintain their bond-like characteristics upon removal of the tax advantage.

Table 2-6b reports the degrees of being more stock-like for groups of income trusts with different tax shield prospects, which tests hypothesis H3e. The analysis employs tax shield prospects proxied by debt (total debt) and non-debt (depreciation expense) measures. We find that cross-sectionally, income trusts that have used lower debt and non-debt tax shields compared to other income trusts prior to the TFP announcement (i.e., having Total Debt/Total Assets and (Total Debt + Depreciation Expense)/Total Assets lower than the median for the income trusts) have lower changes towards being more stock-like after the TFP announcement. They have insignificant and lower increases in coefficients to ExcMKT and lower reduction in coefficients to TERM after the TFP announcement. In addition, if the median tax shields of corporations in the same industry have been high, the income trust also has less tendency to become more stock-like. And finally, when there is more room for the income trust to use debt and non-debt tax shields, it has less tendency to become more stock-like. If an income trust's tax shield is lower than median tax shield of the industry, the increases in loadings to ExcMKT are lower and not significant, while the decreases in loadings to TERM are lower in magnitude. The results in Table 2-6b therefore support H3e that if an income

trust has a higher tax shield prospect, it will have lower tendency to become more stock-like. Investors therefore expect the firm to be able to maintain its bond-like risk profile even after the tax advantage has been removed, possibly through the use of debt and non-debt tax shields.

In summary, the cross-sectional analysis provides evidence from classifying income trusts that their characteristics are related to their risk profiles in terms of bond-like/stock-like characteristics. In particular, how they become trusts can impact the stock-like/bond-like characteristics of the asset. However, we do not find evidence for different changes in risk profiles from grouping income trusts by industry and subsequent fate after the TFP announcement.

Table 2-6: Univariate and Cross-sectional Tests

a) Trust Characteristics

	ExcMKT	SMB	HML	UMD	TERM	DEF
NonREITs	0.268**	0.243	0.313**	-1.141***	-0.978***	-0.252
N	180	180	180	180	180	180
%Pos	62.8	70.6	54.4	11.1	23.9	55
By Industry						
REIT	0.063	-0.103	0.708	-0.622***	-0.866	-4.034
N	28	28	28	28	28	28
Bus	0.278**	1.004*	0.14	-0.958***	-0.777***	-0.888
N	129	129	129	129	129	129
Ener	0.24*	-1.682	0.752***	-1.603***	-1.489***	1.354
N	51	51	51	51	51	51
By Subsequent Fates						
NoChange	0.974**	0.984**	0.097	-0.629***	-0.675*	3.094
N	13	13	13	13	13	13
Acquired	0.035	0.998	0.641*	-1.601***	-1.257***	-4.072**
N	63	63	63	63	63	63
Converted	0.306***	-0.326	0.155	-0.912***	-0.819***	1.555
N	103	103	103	103	103	103
By Percentage Assets Spun-off						
100Assets	0.551**	3.109	0.864*	-1.332***	-1.451***	-3.133
N	26	26	26	26	26	26
Less100Assets	0.037	0.121	0.054	-1.314***	-0.413	-0.926
N	59	59	59	59	59	59
By Characteristics at the End of 2005						
SmallSize	0.138	1.203	0.243	-1.276***	-1.12***	-1.264
N	86	86	86	86	86	86
LargeSize	0.345**	0.475*	0.345*	-1.041***	-0.947***	-0.606
N	87	87	87	87	87	87
LowMTB	0.207	0.604*	0.279	-1.209***	-0.592**	-0.101
N	81	81	81	81	81	81
HighMTB	0.181*	0.2	0.206	-1.095***	-1.285***	-0.942
N	82	82	82	82	82	82
LowTangibility	0.314*	0.44	0.215	-1.232***	-1.027***	0.448
N	76	76	76	76	76	76
HighTangibility	0.048	0.34	0.353	-0.951***	-0.882***	-1.52
N	77	77	77	77	77	77
LowDivPayout	0.285***	1.266	0.326	-1.357***	-1.142***	-2.174
N	76	76	76	76	76	76
HighDivPayout	0.158	0.58**	0.21	-0.826***	-0.685***	0.277
N	77	77	77	77	77	77
LowROA	0.308	0.732**	0.078	-1.079***	-0.877***	-0.028
N	85	85	85	85	85	85
HighROA	0.155*	0.959	0.442***	-1.189***	-1.181***	-1.826
N	86	86	86	86	86	86

This table presents the results for the univariate test on changes in betas to risk factors. The changes in sensitivities to market factors (betas) are estimated for each individual market factor and each income trust using the regression: $R_{it} - R_{ft} = a_i^{PRE\_TFP} + d_i^{PRE\_TFP} * RiskFactor_t + a_i^{TFP} * D_{it}^{TFP} + a_i^{Ch\_POST\_TFP} * D_{it}^{POST\_TFP} + d_i^{Ch\_POST\_TFP} * RiskFactor_t * D_{it}^{POST\_TFP} + e_{it}$ (3.1). We then test the significance of the changes using a t-test with the null hypothesis that the mean of beta changes for individual income trusts, $d_i^{Ch\_POST\_TFP}$, equals zero. We summarize the changes by groups of income trusts in different industries, fates after the TFP, percentage assets spun-off from previous corporations, and firm characteristics.

b) Debt and Non-Debt Tax Shields

	ExcMKT	SMB	HML	UMD	TERM	DEF
By Trust Tax Shields						
Lo Debt Tax Shield	0.152	0.548***	0.276	-1.205***	-0.708***	0.097
N	86	86	86	86	86	86
Hi Debt Tax Shield	0.318*	1.132	0.245	-1.052***	-1.354***	-1.886
N	87	87	87	87	87	87
Lo Debt & Non-Debt Tax Shield	0.125	0.48*	0.105	-1.183***	-0.823***	-1.094
N	86	86	86	86	86	86
Hi Debt & Non-Debt Tax Shield	0.341*	1.213	0.414*	-1.08***	-1.232***	-0.706
N	86	86	86	86	86	86
By Industry Median Tax Shields						
Lo Ind Debt Tax Shield	0.448***	0.181	0.59***	-1.411***	-1.051***	-0.189
N	90	90	90	90	90	90
Hi Ind Debt Tax Shield	0.088	0.305	0.036	-0.871***	-0.906***	-0.316
N	90	90	90	90	90	90
Lo Ind Debt & Non-Debt Tax Shield	0.507***	0.217	0.704***	-1.447***	-1.082***	-0.179
N	87	87	87	87	87	87
Hi Ind Debt & Non-Debt Tax Shield	0.043	0.267	-0.053	-0.854***	-0.882***	-0.321
N	93	93	93	93	93	93
By Tax Shields Compared to Industry Median (Trusts Excl.)						
Lo Debt Tax Shield Compare Ind	0.049	0.46**	0.034	-0.989***	-0.811***	0.165
N	72	72	72	72	72	72
Hi Debt Tax Shield Compare Ind	0.413***	0.098	0.499**	-1.243***	-1.09***	-0.531
N	108	108	108	108	108	108
Lo Debt & Non-Debt Tax Shield Compare Ind	0.06	0.481**	-0.013	-0.926***	-0.751***	0.474
N	73	73	73	73	73	73
Hi Debt & Non-Debt Tax Shield Compare Ind	0.409***	0.081	0.536**	-1.288***	-1.133***	-0.748
N	107	107	107	107	107	107

This table presents the results for the univariate test on changes in betas to risk factors. The changes in betas are estimated for each factor and each individual income trusts using the regression: $R_{it} - R_{ft} = a_i^{PRE\_TFP} + d_i^{PRE\_TFP} * RiskFactor_t + a_i^{TFP} * D_{it}^{TFP} + a_i^{Ch\_POST\_TFP} * D_{it}^{POST\_TFP} + d_i^{Ch\_POST\_TFP} * RiskFactor_t * D_{it}^{POST\_TFP} + e_{it}$ (3.1) and we test the significance of the changes using a t-test with the null hypothesis that the mean of beta changes for individual income trusts, $d_i^{Ch\_POST\_TFP}$, equals zero. We then summarize the changes by groups of income trusts by how many tax shields the income trust has used before the TFP announcement, the median tax shields used by corporations in the same industry, and if there is room for the income trust to increase tax shields to be comparable to a medium firm in the industry. *Debt Tax Shield* is calculated as Total Debt 2005/ Total Assets in 2005. *Debt & Non-Debt Tax Shield* is calculated as (Total Debt in 2005 + Depreciation Expense in 2005)/ Total Assets in 2005. *Low/High Debt (& Non-Debt) Tax Shield* for an income trust means the income trust has Debt (& Non-Debt) Tax Shield lower/higher than the 50^{th} percentile of the tax shields of all income trusts. *Low/High Ind Debt (& Non-Debt) Tax Shield* means the income trust is in an industry that has Debt (& Non-Debt) Tax Shield lower/higher than the 50^{th} percentile of the tax shields of all industries. Income trusts are excluded from calculation of the industry median. *Low/High Debt (&Non-Debt) Tax Shield Compare Ind* is a dummy for whether the income trust has used less/more than the median tax shield used by corporations in the same industry.

2.6.4 Conversions to Income Trusts

Table 2-7 examines valuations around conversions for income trusts. A total of 64 conversion cases including REITs from 2001 to 2006 are in the initial sample. However, only those occurring after 2002 are examined in the tests that include the DEF factor due to data availability. We look at how sensitivities to risk factors change after the conversions where the underlying business should not change and only the expected cash flows to investors are changed due to the tax savings. The returns are taken daily one year before and one year after the conversions.

We find in Table 2-7a that there is little change to the risk profiles of converted corporations after the conversions, except for a slightly significant increase in the sensitivities to the TERM factor of 0.153. This change is as expected, for a firm would be more committed to a steady distribution to investors, making the unit more bond-like for investors. However, as the increase in comovement with bond market is only significant at the 10 per cent level, it is also suggested that shares of converted corporations may have already been priced relatively more like bonds than equities before the actual conversions. We also do not find a significant change in valuation on the conversion day. Our data on conversion cases has limitation in that we can only identify the dates of the actual implementation of the conversions and not the announcement dates. Therefore, we are cautious about inferring from the results on valuation changes around conversions. Overall, the results lend weak support to hypothesis 4 that converted firms have higher comovement with the bond market after the actual conversions.

Table 2-7: Risk Loading Changes around Conversions into Income Trusts

	(1)	(2)	(3)	(4)
RM-Rf	0.617***	0.812***		0.725***
	(21.75)	(23.83)		(13.01)
SMB		0.797***		0.667***
		(9.89)		(7.16)
HML		0.275***		0.329***
		(2.74)		(4.12)
UMD		0.0205		0.0714
		(0.47)		(1.58)
TERM			0.755***	0.257***
			(12.52)	(3.81)
DEF			-0.662**	-0.410
			(-2.30)	(-1.44)
D_Conversion	0.00356	0.00294	0.00435	0.00300
	(1.04)	(0.88)	(0.93)	(0.67)
D_PostConversion	-0.000996	-0.000509	0.00395**	0.00217
	(-0.78)	(-0.36)	(2.16)	(1.25)
D_PostConversionx(RM-Rf)	0.0233	0.0385		-0.0386
	(0.51)	(0.74)		(-0.43)
D_PostConversionxSMB		0.0450		0.0882
		(0.42)		(0.67)
D_PostConversionxHML		0.0327		-0.0568
		(0.29)		(-0.57)
D_PostConversionxUMD		0.105		0.0918
		(1.55)		(0.96)
D_PostConversionxTERM			0.192***	0.153*
			(2.80)	(1.67)
D_PostConversionxDEF			-0.555	-0.465
			(-1.08)	(-0.89)
Constant	-0.00785***	-0.00301***	-0.00399***	0.00120
	(-9.82)	(-3.46)	(-2.61)	(0.83)
Observations	31717	31717	22942	22942
Adjusted R^2	0.029	0.039	0.035	0.058

This table estimates the models that use stock and bond market factors to explain excess return on converted income trusts around the conversions. The model is:

$$R_{it} - R_{ft} = a^{PRE\_CV} + b^{PRE\_CV} * (R_{M,t} - R_{f,t}) + s^{PRE\_CV} * SMB_t + h^{PRE\_CV} * HML_t + u^{PRE\_CV} * UMD_t + m^{PRE\_CV} * TERM_t + d^{PRE\_CV} * DEF_t + a^{CV} * D_{it}^{CV} + a^{Ch\_POST\_CV} * D_{it}^{POST\_CV} + b^{Ch\_POST\_CV} * (R_{M,t} - R_{f,t}) * D_{it}^{POST\_CV} + s^{Ch\_POST\_CV} * SMB_t * D_{it}^{POST\_CV} + h^{Ch\_POST\_CV} * HML_t * D_{it}^{POST\_CV} + u^{Ch\_POST\_CV} * UMD_t * D_{it}^{POST\_CV} + m^{Ch\_POST\_CV} * TERM_t * D_{it}^{POST\_CV} + d^{Ch\_POST\_CV} * DEF_t * D_{it}^{POST\_CV} + e_{it} \quad (4.1)$$

where Excess market return, RM-Rf, is the daily return on the S&P TSX Composite minus the one-month Canadian treasury bill rate; SMB, HML, UMD are returns of the zero-investment portfolios on the Canadian market from Frazzini and Pedersen (2013) representing the size, the book-to-market, and the momentum factors of the stock market, respectively. TERM is the changes in the Canadian benchmark 10-year government bonds' total return index less the one-month Canadian treasury bill rate of the previous day. DEF is changes in the total return index for Canadian corporate bonds with maturity of 10 years or longer minus the changes in the Canadian benchmark 10-year government bonds total return index. Daily returns are used. REITs are included. Newey-West standard errors with lags of 30 trading days are estimated to account for autocorrelation and heteroskedasticity in the error terms. *t* statistics are reported in parentheses, $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

2.6.5 Robustness Checks

We perform a number of additional robustness checks. Firstly, the S&P/TSX Composite Index does include income trusts as constituents, which may bias our results. For example, there may be more income trusts included in the index after the TFP announcement, causing an increase in stock market beta of income trusts with the index after the TFP. We use the S&P/TSX Equity Index, which is the S&P/TSX Composite excluding income trusts as an alternative. This index has been formed only since December 2005; therefore, we do not use the index in the main tests. Results for the robustness check using the S&P/TSX Equity Index are reported in Table 2-8. We still observe the changes in risk loadings to the stock and bond market factors as expected.

Secondly, we check for the impact of the 2008 financial crisis on our results. As illustrated in Figures 2-2a and 2-2b, both income trusts and the overall stock market are impacted negatively by the crisis. It is possible that the higher comovement with the stock market is impacted by the crisis that drives down the valuation of both income trusts and the overall stock market. We restrict the sample to last only until August 2008. The results are reported in Table 2-9. The signs of the changes in betas remain unchanged although the significance for change in betas to TERM is lowered in column 4.

We also check for the impact of extreme values on returns, which could be due to the inclusion of penny stocks in the sample, and we use different proxies for the stock market return using Canadian stock market returns from Frazzini and Pedersen (2013) instead of the changes on the S&P TSX index. Unreported results are similar, indicating that income trusts are priced more like bonds before the TFP announcement and more like equities after the TFP announcement. There could also be concerns that the comovement between the stock and bond markets drives our results; that is, if the stock and bond markets move opposite to each other, an increase in betas to stock market is associated with a decrease in betas to the bond market. However, the correlation between RM-Rf and TERM is non-negative as reported in Table 2-2, mitigating concern about the impact of the stock and bond market comovement.

Table 2-8: Robustness Check with Stock Market Returns Excluding Income Trusts

	Income Trusts				Matched Corporations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RM-Rf	0.561***	0.449***		0.326***	0.969***	0.782***		0.836***
	(9.11)	(4.48)		(2.89)	(8.90)	(4.24)		(4.67)
SMB		0.301**		0.147		0.753***		0.875***
		(2.17)		(1.08)		(3.94)		(5.37)
HML		-0.448**		-0.858***		0.250		0.232
		(-2.24)		(-2.67)		(0.82)		(0.66)
UMD		-0.210*		-0.467**		0.298*		0.252
		(-1.74)		(-2.26)		(1.82)		(0.97)
TERM			0.968***	1.203***			0.351**	-1.611***
			(11.87)	(3.57)			(2.30)	(-2.73)
DEF			0.175	-3.279***			0.751	2.375
			(0.54)	(-3.16)			(1.55)	(1.43)
D_TFP	-0.159***	-0.171***	-0.154***	-0.182***	-0.0317***	-0.00919	-0.0208**	-0.00625
	(-19.93)	(-12.49)	(-20.52)	(-12.32)	(-2.98)	(-0.44)	(-2.14)	(-0.32)
D_PostTFP	0.0240***	0.0173***	-0.0131***	-0.0289**	0.00688	0.0131*	-0.00761	0.0711***
	(7.61)	(4.48)	(-3.73)	(-2.01)	(1.35)	(1.91)	(-1.51)	(3.15)
D_PostTFPx(RM-Rf)	0.465***	0.416***		0.592***	0.0949	0.123		0.0718
	(6.20)	(3.80)		(4.85)	(0.82)	(0.65)		(0.39)
D_PostTFPxSMB		0.303**		0.495***		-0.148		-0.267
		(2.02)		(3.32)		(-0.74)		(-1.53)
D_PostTFPxHML		0.930***		1.364***		0.154		0.188
		(4.47)		(4.17)		(0.50)		(0.53)
D_PostTFPxUMD		0.161		0.432**		-0.313*		-0.262
		(1.26)		(2.05)		(-1.86)		(-0.99)
D_PostTFPxTERM			-0.618***	-1.156***			0.0476	1.708***
			(-5.71)	(-3.37)			(0.28)	(2.87)
D_PostTFPxDEF			2.370***	3.003***			1.977***	-2.397
			(6.62)	(2.85)			(3.94)	(-1.43)
Constant	-0.0249***	-0.0226***	0.00306	0.0249*	-0.00436	-0.0146**	0.00137	-0.0711***
	(-9.34)	(-6.47)	(1.13)	(1.75)	(-0.91)	(-2.20)	(0.30)	(-3.17)
N	8291	8291	12183	8291	8291	8291	12183	8291
adj. R^2	0.167	0.197	0.092	0.197	0.136	0.159	0.055	0.159

This table reestimates the results in Table 5 regarding the changes in risk loadings after the TFP announcement for income trusts and matched corporations using the S&P/TSX Equity Index as the proxy for Canadian stock market return. This index excludes income trusts and thus can account for the impact of including and dropping out of income trusts to the S&P/TSX Composite Index in our results**.** REITs are excluded. Newey-West standard errors with 2 lags are estimated to account for autocorrelation and heteroskedasticity in the error terms. *t* statistics are reported in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$.

Table 2-9: Robustness Check before the 2008 Financial Crisis

	Income Trusts				Matched Corporations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RM-Rf	0.577***	0.721***		0.776***	0.881***	0.955***		0.936***
	(17.88)	(19.24)		(13.94)	(17.14)	(16.34)		(10.16)
SMB		0.301***		0.355***		0.606***		0.542***
		(5.94)		(4.60)		(5.78)		(4.80)
HML		0.490***		0.290***		0.348***		0.239**
		(12.82)		(4.37)		(4.30)		(2.46)
UMD		0.0266		0.00231		0.0150		0.0546
		(1.25)		(0.06)		(0.32)		(0.66)
TERM			0.968***	0.796***			0.351**	0.156
			(11.86)	(10.48)			(2.30)	(1.04)
DEF			0.175	-0.634**			0.751	-0.231
			(0.54)	(-2.06)			(1.55)	(-0.46)
D_TFP	-0.163***	-0.122***	-0.154***	-0.130***	-0.0267***	0.0106	-0.0208**	-0.00031
	(-21.91)	(-14.81)	(-20.52)	(-13.01)	(-2.77)	(0.87)	(-2.14)	(-0.02)
D_PostTFP	0.00505*	0.0138***	-0.0328***	0.0183**	-0.0130***	-0.00491	-0.0347***	0.000386
	(1.71)	(3.75)	(-5.35)	(2.35)	(-3.69)	(-1.15)	(-4.72)	(0.04)
D_PostTFPx(RM-Rf)	0.432***	0.408***		0.392***	0.0727	0.0359		0.0358
	(6.09)	(5.41)		(4.14)	(0.90)	(0.40)		(0.29)
D_PostTFPxSMB		0.152*		0.166		-0.162		-0.0840
		(1.76)		(1.58)		(-1.21)		(-0.60)
D_PostTFPxHML		0.131		0.393***		-0.0848		0.0474
		(1.39)		(3.59)		(-0.65)		(0.34)
D_PostTFPxUMD		-0.0454		-0.102		-0.00987		-0.103
		(-0.48)		(-0.95)		(-0.09)		(-0.75)
D_PostTFPxTERM			-1.032***	-0.109			-0.586***	0.0934
			(-6.68)	(-0.68)			(-2.77)	(0.42)
D_PostTFPxDEF			1.404***	1.046***			0.971*	0.616
			(3.67)	(2.63)			(1.77)	(1.05)
Constant	-0.0111***	-0.0141***	0.00306	0.00843***	0.00646***	0.00302	0.00137	0.00801
	(-9.34)	(-11.44)	(1.13)	(2.88)	(3.04)	(1.25)	(0.30)	(1.46)
N	10385	10385	9015	9015	10385	10385	9015	9015
adj. R^2	0.103	0.127	0.065	0.137	0.051	0.059	0.017	0.063

This table reestimates the results in Table 5 using months before Sep 2008 to account for the impact of the 2008 financial crisis on the comovement between income trusts and the overall stock market. REITs are excluded. Newey-West standard errors with 2 lags are estimated to account for autocorrelation and heteroskedasticity in the error terms. *t* statistics are reported in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$.

2.7 Conclusion

We examine in this chapter the role of stock and bond market factors in the pricing of Canadian income trusts—a special vehicle that allows firms to avoid paying corporate tax through income distributions to unit holders. Since the structure provides the advantage of higher cash payouts to the investors with similar underlying business compared to a firm that does not adopt the structure, the pricing of income trusts is expected to be more bond-like than ordinary equities yet cannot be done completely as bonds. Along with the unexpected Tax Fairness Plan announcement that effectively removes the tax advantage of the structure for existing income trusts, our sample provides a unique setting where we can study the changes in sensitivities to risk factors due to changes in tax policies, corporate structure, and firm characteristics related to cash generating prospects.

We find that income trusts comove significantly less with the stock market (significantly lower loadings on excess return on the stock market RM-Rf of about 0.2, and lower loadings on the size factor SMB also of around 0.2), and significantly more with the bond market (significantly higher loading on the term structure of interest rate TERM of about 0.6) compared to matched corporations in the period before the TFP announcement. After the TFP announcement, income trusts comove more with the stock market and less with the bond market. The differences in risk loadings in the pre-TFP period reverse and the pricing of income trusts becomes similar to that of matched corporations. The results illustrate the impact of tax policy and corporate structure on the bond-like/stock-like characteristic of assets.

We also find evidence that income trusts have stronger change towards being more stock-like if they are originally spun-off from 100 per cent of the previous corporations compared to those spun-off selectively from less than 100 per cent assets. Income trusts with low market-to-book ratios, high tangibility, high dividend payout, and low ROA and higher prospective tax shields in 2005 have weaker changes towards being more stock-like after the TFP announcement and thus are expected to be more bond-like even in the absence of the tax advantage for income trusts. We find that income trusts comove slightly more with the bond market after the conversions to income trusts from

ordinary corporations. These results suggest a link between corporate strategy and firm characteristics related to future cash generating capability and sensitivities to stock and bond market factors. An investor may infer about the risk of a firm through how its assets are formed, its tax saving prospect, and expected cash generating ability in the future.

Taken together, our results are indicative that not all equities are created equally. Although income trusts are classified as equities, they have changing risk profiles that are impacted by factors such as changes in expected cash flows and corporate strategy. Therefore, our work has implications on asset allocation and risk management. By showing that tax policy and firm characteristics are relevant to the sensitivities to stock and bond market factors, we recommend that investors be aware of the risk and diversification properties of the assets in their portfolios based on characteristics and not only the security classification.

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Appendix 2-A: Matching Method

We match income trusts with control corporations by industry and net sales in year 2005, employing the restriction that the matched corporation is alive during the years that the income trust exists. Our classification of industry is based on the *Industry Classification Benchmark* (*ICB*) with data taken from Datastream. There are 41 sectors in total including the REIT sector. A firm that assumes the income trust status will be matched with a corporation that is never an income trust in the exact same industry and with the closest net sales (i.e., smallest absolute value of the difference in size). We use non-replacement method to avoid duplication in the matched sample. However, up to only ten different control corporations will be used. In case multiple income trusts compete for a control corporation, priority will be given to the largest income trust in the industry. There are 214 income trusts including 30 REITs matched in 2005.

Table 2-A1: List of Industries and Sectors for the Income Trusts
This table lists the sectors and industries for the group of income trusts to match. The industry classification is based on the ICB system with data taken from Datastream.

Industry	Sector	Industry	Sector
Basic Materials	Chemicals	Industrials	Aerospace & Defense
	Forestry & Paper		Construction & Materials
	Industrial Metals & Mining		Electronic & Electrical Equipment
	Mining		General Industrials
Consumer Goods	Automobiles & Parts		Industrial Engineering
	Beverages		Industrial Transportation
	Food Producers		Support Services
	Household Goods & Home Construction	Oil & Gas	Oil & Gas Producers
	Leisure Goods		Oil Equipment & Services
Consumer Services	Food & Drug Retailers	Real Estate Investment Trusts	Real Estate Investment Trusts
	General Retailers	Technology	Software & Computer Services
	Media		Technology Hardware & Equipment
	Travel & Leisure	Telecommunications	Fixed Line Telecommunications
Financials	Financial Services (Sector)	Utilities	Electricity
	Real Estate Investment & Services		Gas, Water & Multiutilities
Health Care	Health Care Equipment & Services		

Table 2-A2: Characteristics of Income Trusts versus Matched Corporations
This table compares the characteristics of the income trust sample and the matched corporations from 2000 to 2010. A t-test is used to test the difference between characteristics of the two samples, $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

	MV	TA	NetSales	NI	NTA	DY	DivPayoutSh
2000	40.11	-445.07	-720.39	-6.35	32.59	11.93***	63.96**
2001	145.49	-459.39	-710.55*	-13.75	26.63	6.94**	6.35
2002	131.18	-16.66	-250.93**	4.48	100.62	8.12***	51.15***
2003	135.88	95.68	-162.73*	9.84	107.39*	8.04***	46.45***
2004	203.07**	72.99	-140.66*	7.45	124.10**	7.20***	52.43***
2005	-83.45	-229.08	-251.57**	8.07	1.65	8.33***	63.63***
2006	-298.96	-251.7	-299.69**	12.06	-15.09	10.41***	71.85***
2007	-462.87	-320.66	-371.14**	-27.27	-86.55	9.13***	48.22***
2008	-95.74	-114.63	-204.12	45.12*	78.02	13.39***	54.15***
2009	-49.24	-272.3	-202.38*	-1.22	39.56	5.81***	39.01***
2010	-258.54	-543.35	-350.68**	-38.55*	-84.28	4.46***	24.13**

Chapter 3

3 Behavioral Finance Meets Market Efficiency—the Case of Income Trusts

3.1 Introduction

Are capital markets efficient? Are managers rational? Are investors rational? Although we would like to assume the answer to all of these questions is "yes," there are many examples suggesting that this is not always the case. In this chapter, we use a unique example to examine several facets of these questions. Specifically, we can study how managers make corporate financial decisions and how investors react to these decisions as well as how these relationships vary over time. This allows us to study market efficiency from the two most important perspectives—the corporate managers and the investors. Although most academic research separates how managers make decisions and how investors value assets, we explicitly acknowledge that they are not independent. We assume that any pattern in how investors value assets will be observed by managers and managers will rationally take advantage of these patterns. This study is therefore designed to contribute to the growing area of behavioral finance (both behavioral corporate finance and behavioral asset pricing). The corporate structure we focus on is income trusts because they are a structure that was designed to minimize the taxes paid by corporations. As Edgar (2004) argues, beyond tax minimization there is no other rationale for the income trust structure to exist. Looking at their characteristics, one can see few differences beyond their tax status from the standard corporate structure. Income trusts should therefore be valued differently from regular equity firms and the difference should be a result of income trusts paying virtually no taxes—these firms make larger payouts to investors, so investors will be willing to pay more for these assets. An increase in valuation for the same assets obtained simply by changing corporate structure makes the structure an attractive and rational alternative for managers, if possible. We therefore examine questions such as: How large is the premium for being an income trust? What factors contribute to the valuation premium? What characteristics are required to become an income trust? Have these changed over time?

The increase in valuation for income trusts has been studied in previous research.[13] In previous studies of income trusts the increase in value has been related to the increase in fundamental value due to the increased cash flows resulting from the lower effective tax rate paid by income trusts. Consequently, we should expect to see a boost in valuation of, theoretically speaking, about 30 per cent.[14] Although researchers have found an increase in valuation for income trusts, the premium has been less than this theoretical 30 per cent (e.g., Amoako-Adu and Smith, 2008, and Klassen and Mescall, 2012). An important caveat of these results is that most existing studies of the valuation of income trusts have focused on the changes in firm valuation as the tax advantage of the structure was being phased out. Consequently, they have used event studies to look at the changes in prices resulting from the announcement of changes in tax rules directly or indirectly focused on income trusts and their dividend paying ability. We go beyond these studies by examining how, if at all, the valuation premium for income trusts evolved over time, how these may have been related to managers' decisions to adopt this structure, and how their prices reacted to different tax policy related announcements, which broadens the scope of the previous studies.

The adoption of the income trust structure was clearly a rational decision by managers observing an increase in valuation simply by converting to an income trust. Assuming markets are efficient, we would expect the market price to incorporate all relevant information, but behavioral finance suggests that aspects of manager and investor decision-making may impact valuation, in particular deviations from the efficient price over time. Specifically, behavioral corporate finance suggests that firms in a particular industry or having a specific structure will achieve the highest valuations (potentially overvaluations) when they are new and not as well understood (for a survey

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[13] A similar increase in valuation for a specific structure was observed during the tech bubble in the late 1990s. There was a surge in technology firms publicly listing their shares to take advantage of the high valuations at the time, and there was also evidence that firms changed their name to appear more tech-related in order to receive a higher valuation (e.g., Cooper, Dimitrov and Rau, 2001). Consequently, there is evidence consistent with managers observing patterns in equity pricing and responding accordingly.

[14] The tax savings from converting to an income trust should be the decrease in taxes from the standard corporate tax rate of over 30% to the tax rate for income trusts of 0% since income trusts are flow-through entities with no taxes being paid at the firm level.

of this growing literature see Baker and Wurgler, 2012). The valuations will decrease as the firms and structures mature because 1) investors begin to gradually improve their understanding of the assets and 2) managers may start to overuse the structure causing saturation. Our study provides a unique opportunity to examine these issues as the income trust structure went from "birth" to "death" over a long enough period to provide sufficient data but a short enough period to ensure comparability (taking off in 2000 and collapsing in 2006).

Even though the income trust structure was established in 1985, growth did not really take off until 2001. There was a rapid increase in its use from 2001 to 2005 with firms either doing their initial listing (IPO) as an income trust or converting from standard equity to an income trust. In late 2006, the structure lost the tax advantage for all except for REITs. At their peak, income trusts constituted about 10 per cent of the market value of the Toronto Stock Exchange and in some years, trusts were the majority of IPOs in the market. Much of the motivation for the use of the income trust structure and its improved valuations was the tax advantage, but there were also those who suggested other factors led to the increase in their valuation such as novelty, decreased cost of capital versus regular equity firms, and liquidity (income trusts provided regular cash payments which were also valued by investors). This leaves multiple avenues to explore regarding the source of the valuation premium for income trusts.

To allow us to make relatively clear statements about the role of the income trust structure in our analyses, we matched a regular equity firm to each income trust. Comparing income trusts to a matched sample of firms of similar size in the same industry, we can more clearly identify the differences between these firms. Since not all firms would be ideally suited to the income trust structure, we expect to find (and do find) substantial differences between our income trusts and regular equity firms. However, we find that the size of these differences peaked around 2002 and decreased afterward. Looking at the valuation premium for income trusts, we find that as the structure became more popular in 2000, the valuation premium for business trusts started to increase and was substantially higher than the predicted premium based purely on the

tax advantages of the income trust structure.[15] The premium peaked in 2002 and gradually declined until income trusts and regular equity firms were valued with a premium of roughly the size of the tax advantage in early 2006 and virtually vanished by the end of 2006 when their tax advantage was removed. Since there were few tax changes over the 2000-2006 period, it appears that there were factors beyond just the tax advantage of income trusts which influenced their valuation over time. Some of these factors could be related to firm-level characteristics based on the changes in their characteristics over the same period.

Since we assume managers observed this increase in valuation and it may have impacted the attractiveness of the income trust structure, these results suggest there may have been a shift in the type of firms becoming income trusts over time. Managers saw the valuation advantages of this structure and thus made their corporate structure decision increasingly on the valuation impact and less on the applicability of their business to the corporate structure. Firms most ideally suited for the income trust structure have been argued to be similar to those ideal for a leveraged buyout (e.g., King (2003), Halpern and Norli (2006)), i.e., having mature and stable cash flows, little need for capital expenditures, and being in later life cycle stages. We find that our income trusts do differ from their matched counterparts in each of these dimensions; however, we find the differences decrease for firms entering the market as income trusts from 2002 on.

With substantial suggestive evidence consistent with many of the predictions of a behavioral role in the corporate financial decisions being made by firms and the pricing of these assets, we formally examine the role of different factors in explaining the valuation premium of income trusts versus regular equities. In our regressions, we examine the role of the factors believed to be related to the "ideal" income trust firm to determine their role in explaining the valuation premium assuming that in the post-2002

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[15] Although most discussions surrounding the valuation of income trusts focus on the P/E ratio and hypothesize an increase in the P/E ratio for income trusts, we consider the EV/EBITDA multiple as it evaluates the valuation difference before taxes are removed from the operating income. This allows our measure to capture the valuation impact of the tax advantage. For the P/E ratio if the earnings increase by 30% due to a decrease in taxes paid and the valuation increased by 30%, the P/E ratio would be unchanged, but we would see an increase in the EV/EBITDA multiple as EBITDA would be unaffected by the change in tax.

years it is possible that the firms listed at income trusts were less ideally suited to this structure and thus less deserving of the valuation premium. We are not the first to examine whether securities prices are affected by more than just fundamentals, but we are, as far as we know, the first to examine how it evolves over the life cycle of a corporate structure, especially considering the role of potential behavioral factors in both corporate finance and asset pricing.

After studying the growth in number and valuations of income trusts, we end our study by examining the ultimate crisis of the structure—the surprise announcement by the Canadian federal government to eliminate the tax advantage of the income trust structure. Tax rates essentially went from 0 per cent to 31.5 per cent over night. There were no other major reforms, so any observed changes in prices were truly just about taxes. Since we found some firm valuations where the premium was higher than the tax difference and there were differences in the suitability of firms to the income trust structure, we study market efficiency using the reactions to this announcement for firms and how the reaction relates to their suitability for the structure, their earlier valuation premium, and their ultimate fate following their loss of their tax advantage (e.g., converting to regular equity, being acquired or failing).[16] We study the factors influencing the market reaction and find some factors play a significant role in all reactions (positive or negative) and some play a significant role in only one or the other.

The rest of the paper discusses the relevant literature in Section 3.2. The hypotheses, their motivation, and models used in their testing are presented in Section 3.3. The fourth section discusses the data used with the fifth and sixth sections discussing the results and concluding.

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[16] This was not the only announcement over the sample period which brought the future of the structure into question so we consider the other announcements as well allowing us to consider both positive and negative shocks. The impact of the announcements was different because they did not completely remove the tax advantage of trusts (unlike the announcement in October 2006); they simply brought it into question.

3.2 Motivation for the Study of Income Trusts

The academic literature has studied extensively how managers choose between different sources and uses of scarce financial resources. A key goal for managers is increasing the value of the firm. Shareholders are happy because it means their investment is generating higher returns, management is happy as it likely means higher compensation, and it is good for the firm itself as it means improved potential to raise capital in the future. These relationships highlight the important interrelationship between managers and investors which we examine in this study. Income trusts provide a great test case because income trusts are a tax-motivated corporate structure designed to increase the cash flows to investors (and thus increase the share price) and were conceived, grew up, and ultimately reached a crisis within a short period of time. Empirically, we will study how these relationships develop and are utilized by both managers and investors in a manageable window. Before doing that, it is important to understand why income trusts and to place our analysis within the literature.

Over the past couple of decades, we have seen many booms (bubbles?) and busts. Many theories exist regarding bubbles and what creates them, but the increase in valuation of income trusts does not fit the pattern of a bubble. Their increase in valuation was, at least partially, related to a true increase in the fundamental value of the asset to investors. We want to study the role played by both this increase in fundamental value and any other possible explanations for the increase in value of income trusts over regular equity firms. Income trusts grew in popularity over the early 2000s because they traded at a premium to similar standard equity firms and, unlike tech stocks, at least part of the source of the valuation premium was clearly visible to investors.[17] Examining pricing patterns and determining whether stocks are over- or undervalued is challenging as we do not have any pricing models to identify the "correct" price. To address this problem, we use a matched sample of regular equity firms of the closest size in the same industry to obtain estimates for the "correct" price against which we compare the trusts' price to

[17] Unlike the situation for technology companies in the period preceding the bursting of the bubble where investors were unclear of the exact sources of value (Warren Buffett was famous for his avoidance of the tech sector because he could not clearly determine their source of value), we can see that the tax savings of income trusts should contribute substantially to their value relative to standard equities.

estimate the premium paid. We will also complement the matching method by comparing valuation of income trusts with average valuation of firms in the same industry. Income trusts can provide unique insights into the source of these premiums because some firms converted to income trusts, which allows us to estimate the differences in valuation for the same firm under one structure and then under the other. This is an ideal matching of income trusts and standard equity firms as they are the same firm with the only significant difference being its tax situation. Therefore, studying income trusts allows us to examine the impact on firm value of changes in corporate structure.

3.2.1 What is Special about Income Trusts?

Income trusts allow firms to avoid paying corporate taxes because income trusts are designed as a flow-through entity—they pay out most of what they earn, and therefore do not have to pay taxes on the earnings. The investors to whom the profits "flow through" pay the taxes on the income they receive. Income trusts can hold different types of assets such as equities, debt instruments, royalty interests, real estate, energy production facilities, and manufacturing facilities, but the key is that the trust must pass-through the cash flows it receives from some asset or group of assets to the owners of the trust.

The main attraction of income trusts is that they consistently pay cash flows to their investors and these cash flows are higher than would be possible using other corporate structures. This was especially attractive when cash yields on bonds were low (as has been the case since the early 2000s). The attraction for managers is the increase in valuation for their assets due to the absence of taxes on corporate profits. Other sources of value which have been proposed are related to the novelty of the structure, a decrease in the cost of capital due to the more debt-like characteristics of trust ownership, and an increase in liquidity.[18]

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[18] As Keynes (1936) states, people value money for both "the transaction of current business and its use as a store of wealth." Thus, they will sacrifice the ability to earn interest on money that they want to spend in the present. Consequently, investors will pay a premium to obtain cash today. The income trust structure provides a regular stream of cash flows to investors potentially leading to a liquidity premium in the valuation as Krishnamurthy (2002) finds that on-the-run Treasury issues trade at a premium to other bonds, which is likely related to their increased liquidity over the off-the-run bonds.

Because of the relative simplicity of either converting from a regular equity structure to an income trust or simply doing an IPO as an income trust, using income trusts allows our study to examine the role of various financial and behavioral factors in valuing firms over the life cycle of the income trust structure. A key aspect of this analysis is how decision-making by firms and market valuations changed as more and more firms started to adopt the income trust structure.[19] Conventional wisdom is that the premium is due to the tax advantage of income trusts, but behavioral finance suggests that there could be more.

The evolution of income trusts started in 1985 with the first income trust. While the income trust structure has enjoyed a long history in the real estate industry, it was not until the late 1990s that it started to gain popularity in other sectors of the Canadian equity market. A crucial part of the valuation of income trusts is the nature of the underlying assets the income trust is using to generate the cash flows it sends to its owners. We focus on the three main types of income trusts in Canada: real estate trusts (or REITs), energy and resource trusts, and business trusts. We do not examine investment trusts as they are generally flow-through entities for the returns on financial assets (e.g., mutual funds) rather than the returns on business-related assets. For REITs, the underlying investments are income-producing properties. Energy and resource trusts have cash flows based on the production of energy and resource assets. Business trusts are based on manufacturing assets, in general. Although the underlying risk is comparable to that for corporations operating in similar lines of business, income trusts differ because of the regular cash payouts to their investors. These payouts must be the majority of the profits to avoid taxation at the corporate level.

Because of the flow-through nature of income trusts, another characteristic of trusts which needs to be evaluated is their cost of capital. In a fundamental valuation of a firm, it is both the size of the cash flows and the cost of capital which influence the

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[19] As discussed in Baker and Wurgler (2012), when firms enter a certain class they start to be valued as a class rather than on an individual basis. Did we start to see this in the income trust sector and, if so, what were the implications of this? We are also able to observe how firms in this sector were able to grow as a result of the lower cost of capital they would have as a result of their use of significant quantities of debt (or debt-like) instruments to raise capital allowing them to outbid rivals in the quest for acquisitions to grow.

valuation. Up to this point, the focus of the discussion in the literature has been on the cash flows, but the discount rate is equally important. The reason for the need to discussion this is that the income trust structure is such that each unit owned by an investor is essentially a combination of subordinated high-yield debt and high-risk equity. This means that investors get a relatively stable series of high yield cash flows and the potential for capital gains. For the firm, this means the firm gets a tax-minimizing way of paying out excess cash with lower costs of financial distress then for comparable types of high yield debt. Further, the unit holders (similar to the subordinated debtholders) are likely to be much more cooperative than ordinary subordinated debt holders since the benefits of doing so accrue to the equity portion of their units. Units in an income trust therefore share many of the risks inherent in stock ownership despite having many characteristics which look like debt. This means that income trusts could have an increase in valuation over regular equity firms related to i) their lower tax payments, ii) their lower cost of capital, iii) their increased liquidity provided to investors, and iv) the novelty of the structure. On the other hand, a deterioration of the suitability to the income trust structure due to overuse of the structure, and the correction in pricing as investors start to be aware of the risk characteristics of the structure may bring a decrease in valuation premium over time. Most studies focus on the impact of the tax advantage, but we examine the potential role for the others as well.

3.2.2 Development of the Income Trust Market

Pre-1995, over 90 per cent of income trusts were traditional real estate or royalty trusts. However, after the rapid market decline in the mid-1990s, interest in the structure started to increase. By the early 2000s, trusts had become an increasingly important part of the Canadian market. Investors were attracted by the relatively high yield of trusts and firms were attracted by the higher valuations for adopting this structure. Established publicly-traded corporations from a broad cross section of industries converted to the trust structure; some firms spun off specific assets as trusts and some firms entered public markets through IPOs as trusts.

Since we propose a potential role for novelty in the valuation of trusts and there are specific characteristics which define the optimal firms suitable for this structure where many are related to “mature” firms, we also consider the “life cycle” for the income trust structure in addition to the “life cycle” for firms mentioned earlier. For the income trust structure, “adolescence” would be between 1985 and 1999 when the structure was first used and was being experimented with—at this time, it was mainly used for energy and real estate trusts. Young adulthood could be said to have started in 2000 through to 2005. The start of this phase coincided with the surge of interest following the bursting of the tech bubble. The trust structure provided a new opportunity for investors looking for yield and new opportunities for mangers looking to raise capital or monetize their assets at favorable prices. As in people in young adulthood, this period is characterized by the identity of the structure being developed, regulations being developed, and valuation practices being developed. Concerns about the future of income trusts started near the end of this phase in 2005.

Problems started to appear on the horizon on September 8, 2005 when the Canadian Department of Finance suggested in a white paper that the government could have lost hundreds of millions in tax revenues from firms being structured as income trusts as opposed to corporations. This release was closely followed by the chief executive officer (CEO) of Canada's largest bank mentioning he was not opposed to their converting into a trust to increase their valuation and improve the returns to their investors. By September 19, 2005, the Department of Finance was forced to take action and it announced that it was suspending advance tax rulings. Since advance tax rulings were essential for future trusts, it caused an immediate slump in the trust market. In November 2005, the government announced that it would not tax trusts and the advance tax rulings would resume. These announcements were the mid-life crisis for the income trust structure and provided both a negative and positive shock to determine the magnitude of the tax related valuation premium for income trusts.

Because of these conflicting announcements in 2005, all parties, during the Canadian general election in 2006, promised to leave the tax status of income trusts unchanged. Nevertheless, on October 31, 2006, following the election, the finance minister of the new government announced a new 34% tax on income trust distributions

to be phased in over the next five years to stem the growing number of companies converting to trusts. This announcement was such that it effectively removed the tax advantage of trusts by 2011 and caught the markets by surprise. One could argue that the period from 2006 to 2011 was the retirement phase of the income trust structure.

Below is a timeline of some of the key events in the development of the income trust market:

1985	First business trust conversion (Enermark Income Fund)
1986-1997	Predominantly energy trusts and REITs being formed
1998-2000	Some activity in the trust sector with business trusts being more actively considered
2001	Income trusts begin to attract significant interest with many new listings
2002	Importance of income trusts in the Canadian market recognized with S&P and the TSX creating three trust indices
2003	First large scale IPO as an income trust (Yellow Pages Income Fund—the third largest IPO in the decade)
2003-2004	Establishment of limited liability for income trusts
2005-2006	S&P announces inclusion of trusts in S&P/TSX Composite Index
2005-2006	Canadian government starts raising concerns about the tax losses and other issues associated with the increased use of this structure in Canada
2006	After several announcements suggesting concerns about the structure, in October 2006 the Canadian government announces the cessation of the favorable tax treatment for trusts.

The growth in the income trust market is well illustrated in Figure 3-1. In Figure 3-1a, we can see the slow growth until 2000, the rapid growth until 2006 and the decline afterwards. It is important for our study to note that the growth mainly occurred in the areas of energy and, especially, business income trusts. The number of real estate income trusts (REITs) was relatively stable over this period. Looking at their role in Canadian markets, the total number of IPOs in 2000 was fairly large due to the ongoing tech boom. In 2000, technology firms provided over 57 per cent of the IPOs with a small portion of

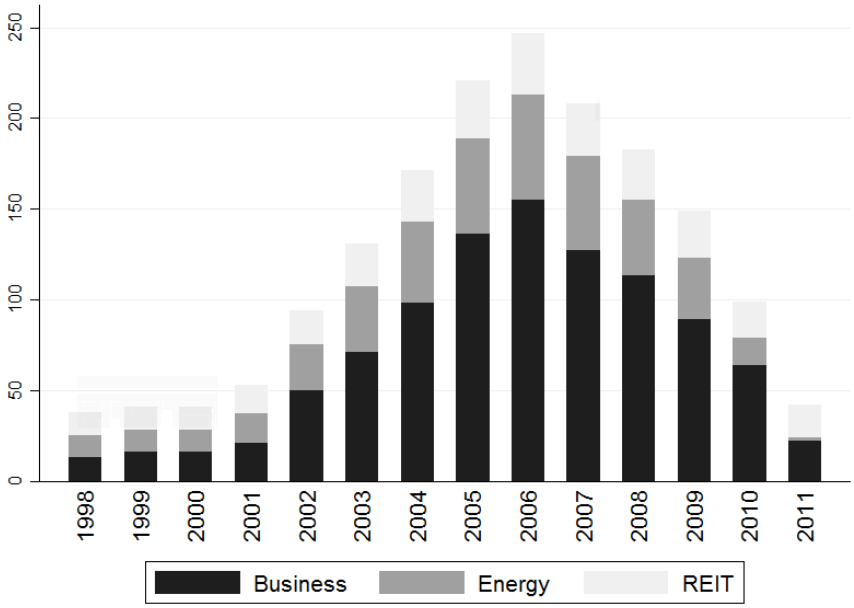
the remaining IPOs being related to income trusts. In 2001, there was a general decrease in all IPO activity due to the dot.com crash and 9/11. In 2002, the market rebounded, and it was a result of the income trust sector with over 85 per cent of the market value of all IPOs coming from income trusts. In 2003, the market for IPOs continued to grow though it was becoming more balanced with only about half from income trusts. This trend continued in 2004, 2005, and 2006 with income trusts accounting for about 60 per cent of all IPOs over this period. Figure 3-1b demonstrates the surge in market value for the income trusts. From the end of 2001 to the end of 2004, the total market capitalization for income trusts increased by a factor of four, and by October 2006, the market capitalization of these entities exceeded $207 billion (more than 10 per cent of the domestic market).

Probing the structure of the income trust market a bit further, Figure 3-1c illustrates the number of income trusts which were the result of a conversion of an already existing firm with a standard equity structure into an income trust as well as the number for which their initial public listing was as a trust. Although the majority did an IPO to become a trust, the interest of managers and investors in this structure is clear by the number of firms that converted to become trusts. The separation of income trusts into those that did an IPO using all of their assets versus those that did not in Figure 3-1d allows us to identify which used this structure selectively for assets which may have been better/worse suited for public markets using a standard equity structure. The relative number of firms listing only a portion of their assets was increasing later in the sample suggesting some differences in the types of firms becoming income trusts later in the period.

The situation with income trusts in Canada therefore provides a novel opportunity to study the phenomenal growth and decline of a corporate structure with a couple of surprise announcements during their lifetime to observe how markets react to both positive and negative shocks.

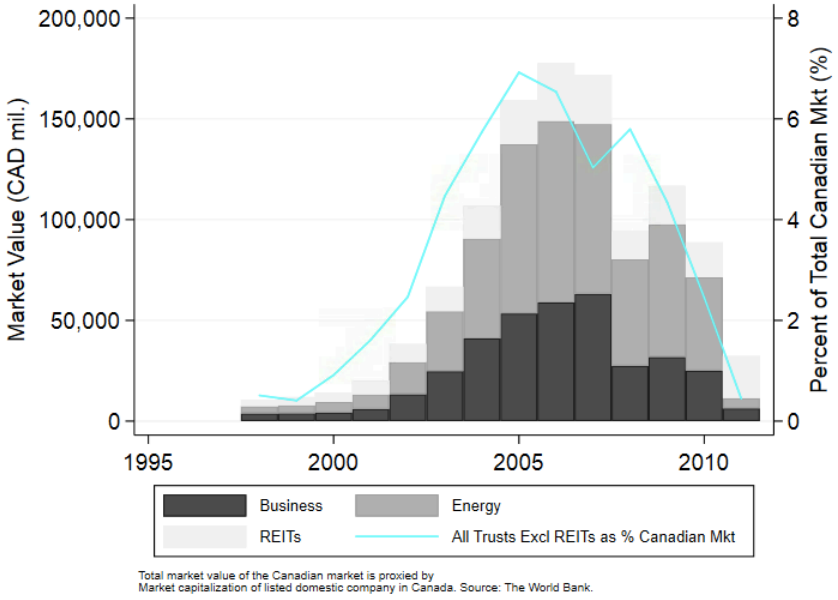
Figure 3-1: Growth in the Use of Income Trust Structure

a) Number of Income Trusts by Type by Year from 1998 to 2012



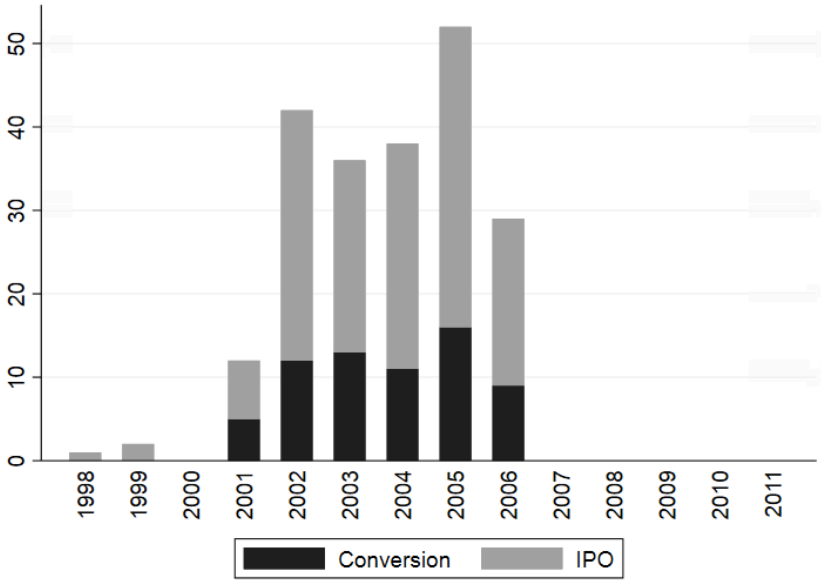
This figure shows the number of business, energy, and real estate income trusts, excluding the investment trusts. The list of income trusts is obtained from the CFMRC database, the TSX Reviews, and Datastream.

b) Market Value of Income Trusts



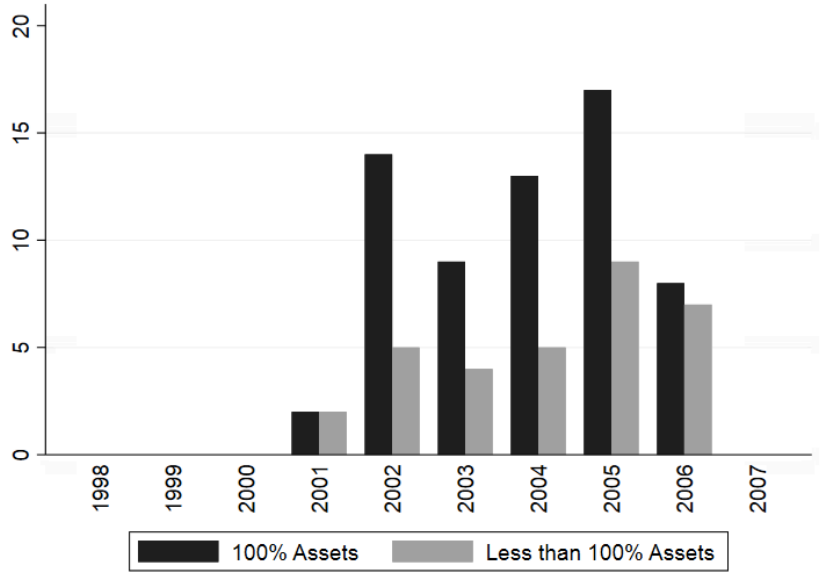
This figure shows the market value of each type and the corresponding percentage of the overall market capitalization of the income trust market by type by year from 1998 to 2012. The number and market capitalization of income trusts is obtained from the CFMRC database, the TSX Reviews, and Datastream, excluding the investment trusts. The overall market capitalization for the Toronto Stock Exchange was from the World Bank.

c) Number of New Income Trusts by Conversions and IPOs



This figure shows the number of income trusts which were the result of conversion from regular equity and the number resulting from IPOs from 1998 to 2012. The number of income trusts is obtained from the CFMRC database, the TSX Reviews, and Datastream, excluding the investment trusts. How the firms became income trusts was hand-collected from regulatory filings.

d) Number of New Income Trusts by Percentage Assets Spun-Off



This figure shows the number of income trusts created by an IPO using 100% of a firm's assets and those created using less than 100% of one firm's or multiple firms' assets from 1998 to 2012. The number of income trusts is obtained from the CFMRC database, the TSX Reviews, and Datastream, excluding the investment trusts. The percentage of assets involved in the IPO was hand-collected from regulatory filings.

3.3 Literature Review

3.3.1 Behavioral Asset Pricing

The growth of the income trust sector has been characterized as "phenomenal" and was thought to be influenced by high investor sentiment towards high-yield investment alternatives (Hayward, 2002, King, 2003, Aggarwal and Mintz, 2004). This suggests that behavioral factors could also drive the valuation of income trusts besides the fundamental ones. Below we discuss the channels through which behavioral factors may impact the pricing of income trusts.

Studies have found that investors react differently to new asset classes often providing higher valuations due to the novelty. King (2003) addresses the concern that investors may not fully understand the complexity of the income trust structures. Baker and Wurgler (2007) make the point that there are certain firms that are more sensitive to investor sentiment, for example, young and small startup firms. Those firms attract a great level of investor excitement, and they are difficult to value. When investors are not certain about the business or the structure, there will be grounds for overconfidence, representativeness, and conservatism[20] to impact the pricing. During the Internet bubble, for example, investors do not have the time or expertise to examine the stocks carefully and are attracted by any technology firm, overvaluing the stocks and creating a bubble (Scheikman and Xiong, 2003, Baker and Wurgler, 2012). A channel for overvaluation of those difficult-to-value stocks to take place is through belief dispersions and limit to arbitrage, such as short-selling restriction. Since the trust structure is new and complex, there could be different beliefs on how to price income trusts, including assessing the associated risks thoroughly. Investors with negative prospects about trusts cannot perform short-selling on the trusts, leaving the market with optimistic investors and

[20] Overconfidence refers to the fact that people are overconfident in their judgments (Daniel, Hirshleifer, and Subrahmanyman, 1998, 2001, Alpert and Raiffa, 1982, Fischhoff, Slovic, and Lichtenstein, 1977, Barber and Odean, 2001, Daniel and Hirshleifer, 2015). Representativeness refers to the fact that people do not get the true probability of events, for example they rely too much on a small sample (Kahneman and Tversky, 1973, Barberis, Shleifer, and Vishny, 1998, a review by Hirshleifer, 2015).

creating overvaluation of income trusts.[21] Therefore, we would expect to see income trusts being priced differently over their life cycle, with mispricing being large when the structure is in its early days.

Related to the novelty of the structure, it has also been asserted that income trusts received higher valuations due to their return of capital to the investors. Business profits can be paid out in cash not only in the form of distribution but also as a portion of the cost of acquiring the unit (return of capital) so that the cost of acquiring the security is lower. This form of payout increases capital gain, which is not taxed until the units are sold (King, 2003). This form of capital gain should be preferable to share repurchasing by ordinary corporations since investors still receive cash and enjoy capital gain at the same time. Scholars have observed that investors favor cash dividend over non-cash forms of payout such as share repurchase and stock dividend (Long, 1978, Ben-David, 2010, and Baker and Wurgler, 2012). Behavioral explanations for this preference is the bird-in-hand theory and the mental accounting theory.[22] Tax deferral is another aspect that investors value in this return of capital in comparison to dividend payment. Capital gain tax is deferred into the future, as opposed to the immediate tax on dividend or distribution. Although investors will eventually have to pay tax on this capital gain, the deferral may give the investors more control over when to realize the gain and an option to gain interest on the deferred amount of tax. The bird-in-hand theory supports a possible overvaluation of this deferred tax. Investors may favor to keep money in their hand for longer instead of having to pay it back immediately as tax. Consequently, we may see differences in trust price sensitivity to different factors if investors are overvaluing the asset due to this return of capital.

There could also be another channel for income trusts to receive a valuation

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[21] The literature related to belief dispersions and limit to arbitrage can be found in DeLong, Shleifer, Summers, and Waldmann (1990), Ofek and Richardson (2003), Baker and Wurgler (2007), Yu (2011), Stambaugh, Yu, and Yuan (2012), among others.

[22] The bird-in-hand theory of Gordon (1959) and Lintner (1962) proposes that investors prefer to receive cash in the form of dividend instead of leaving it in the hands of managers because of the risk of not receiving the money back in the future. Therefore, a premium is paid for the money that is received now rather than later. The mental accounting explanation argues that investors prefer a series of small gains over one big gain, thus a gradual capital gain is preferred over a large capital gain (Shefrin and Statman, 1984, Kahneman and Tversky, 1979, Barberis and Thaler, 2003, and Ben-David, 2010).

premium in a way that is not fully rational. Long (1978), Baker and Wurgler (2004), and Li and Lie (2006) argue that investor sentiment and preference for dividends, as opposed to non-cash payment, vary over time. Managers then "cater" the distribution form to this varying investor preference so that cash dividend will be paid when investors overvalue cash returns (e.g., in pessimistic times). The growth of the income trust sector was during a period of low interest rate and the aftermath the dot-com bubble. A sentiment for "safety" may become high during such time (Baker and Wurgler, 2007). Thus, the valuation of dividend-paying investment alternatives such as income trusts and the sensitivities to different market factors may vary with time due to fluctuations of this sentiment.

3.3.2 Valuation of Income Trusts

We are not the first to study income trusts; however, we are the first, of which we are aware, to examine how their valuation may have changed over the life cycle of the structure. Most studies have focused on the role of taxes in their valuation (Edgar (2004) argues that trusts have no non-tax rationale for existence). The analyses have focused on the changes in income trust valuations around announced changes in their tax status. We go beyond this to try to improve our overall understanding of how different factors (economic and behavioral) influence how equities are valued by investors.

One of the first studies to examine the valuation of trusts was Amoako-Adu and Smith (2008) who analyze the valuation effects of the Canadian federal government's announcement on November 23, 2005 to reduce the taxes on corporate dividends and the announcement on October 31, 2006 to eliminate the tax-deductibility of income trust distributions. The price changes they found following these announcements provide insight into the role of taxes in how investors value trusts. Though high dividend stocks and income trusts reacted positively to the 2005 announcement, the abnormal returns were greater for income trusts. Following the later announcement in 2006, both securities reacted negatively with the decline bigger for income trusts. The larger price reactions by income trusts suggest the popularity of income trusts in Canada was mostly driven by their favorable tax treatment.

Diving more deeply into the role of taxes in income trust valuations, Klassen and Mescall (2012) use a matched set of income trusts and corporations and find that the tax rate paid by the marginal investors is lower for income trusts, which helps to explain why income trusts sell for higher prices than regular corporations. The difference in implied tax rates is less than the difference in official tax rates due to differences in the tax clienteles of income trusts and standard equity firms. Although they find this influences firm valuation, they do not estimate the size of the premium relative to tax rates.

Focusing on the tax shield associated with debt and how it would be impacted by the special tax treatment of income trusts, Doidge and Dyck (2015) use the October 2006 announcement to estimate the tax impact for firms with different degrees of leverage and different investor types (for a discussion of the role of investor types see the appendix 3-C). Because the income trust structure had investors paying the taxes, tax exempt investors received even larger benefits from the income trust structure than regular individual investors did. Beyond the differences in taxes paid by investors, there were also differences in the amount of taxes to be paid by the income trust depending on the amount of debt. Correcting for the capital structure and observed investor types for each firm, they find a lower fall in prices after the October 2006 announcement for firms for whom the tax advantage was less (i.e., those with fewer institutional investors and those with larger potential tax shields).

Although there are relatively few studies in the literature, they all highlight the significant role played by taxes in this structure and they focus on the events in late 2005 and 2006. The goal of our analysis is to go beyond focusing on the clear tax advantages of income trusts and see how all of the key differences between income trusts and regular equity firms influence their relative valuations over the life cycle of the structure. We discuss this in more detail below where we motivate our hypothesis.

3.4 Hypothesis Development

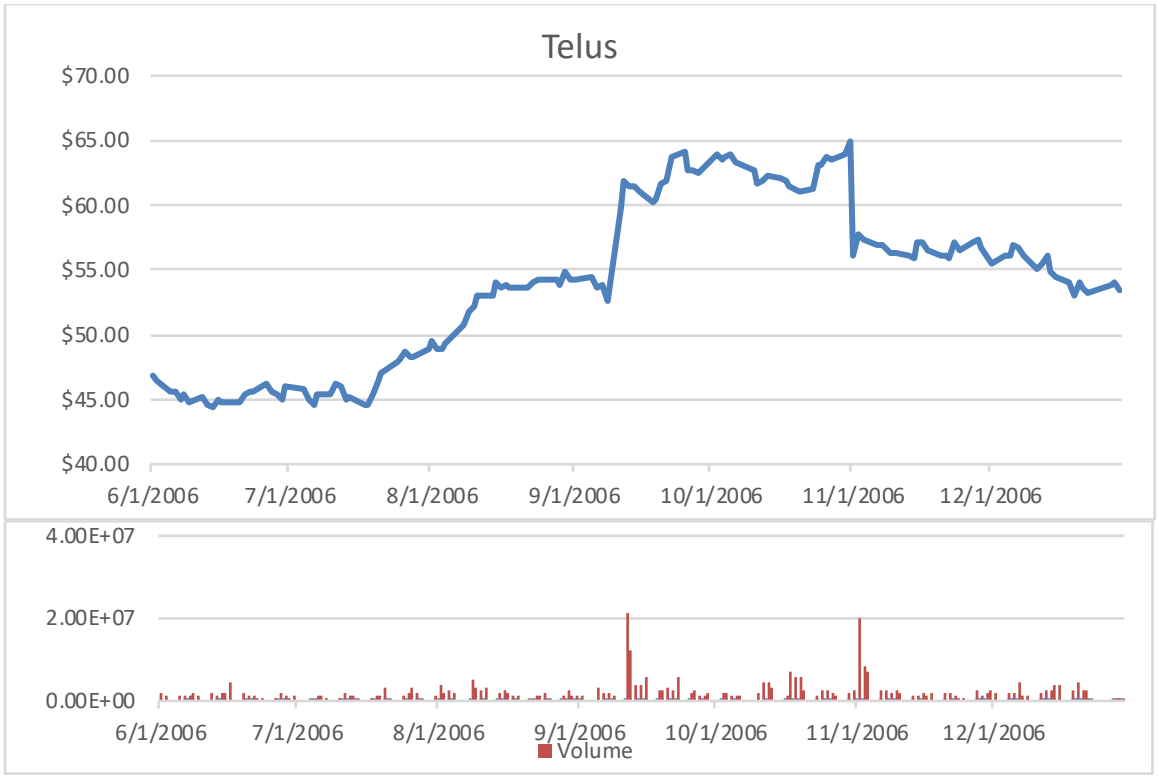
Our analysis is designed to use both univariate and multivariate tests to empirically examine how income trusts have been valued over time and relate this to potential reactions by managers to what they are observing with respect to these valuations. We define what we expect to see through a series of testable hypotheses.

3.4.1 Valuation of Income Trusts

Our analysis begins by confirming the popular assertion that income trusts are valued at a significant premium relative to similar equities. Conventional wisdom is that income trusts have valuation premiums of about one-third higher (i.e., roughly the amount of the difference in tax rates between equity firms and income trusts). Anecdotal evidence demonstrates that merely mentioning the possibility of converting to an income trust results in an increase in valuation though slightly less than one-third. For example, Telus formally announced its consideration of the trust structure on September 11, 2006: "Telus Corporation today announced that its Board of Directors has unanimously approved a proposal from Telus management to reorganize Telus in its entirety into an income trust." Both Telus and BCE had an increase in valuation of about 20 per cent (see Figures 3-2a and 3-2b). Although BCE did not formally announce its intention to consider conversion until October 11, 2006, the rumors of BCE's ultimate conversion had started with Telus's announcement—it had been known that both firms had been considering such a conversion for some time so Telus's announcement was viewed as confirmation that it was an option for these competitors.

Figure 3-2: Impact on Firm Valuation of the Possibility of Converting to an Income Trust

a) Telus Share Price and Trading Volume Around Conversion Announcement

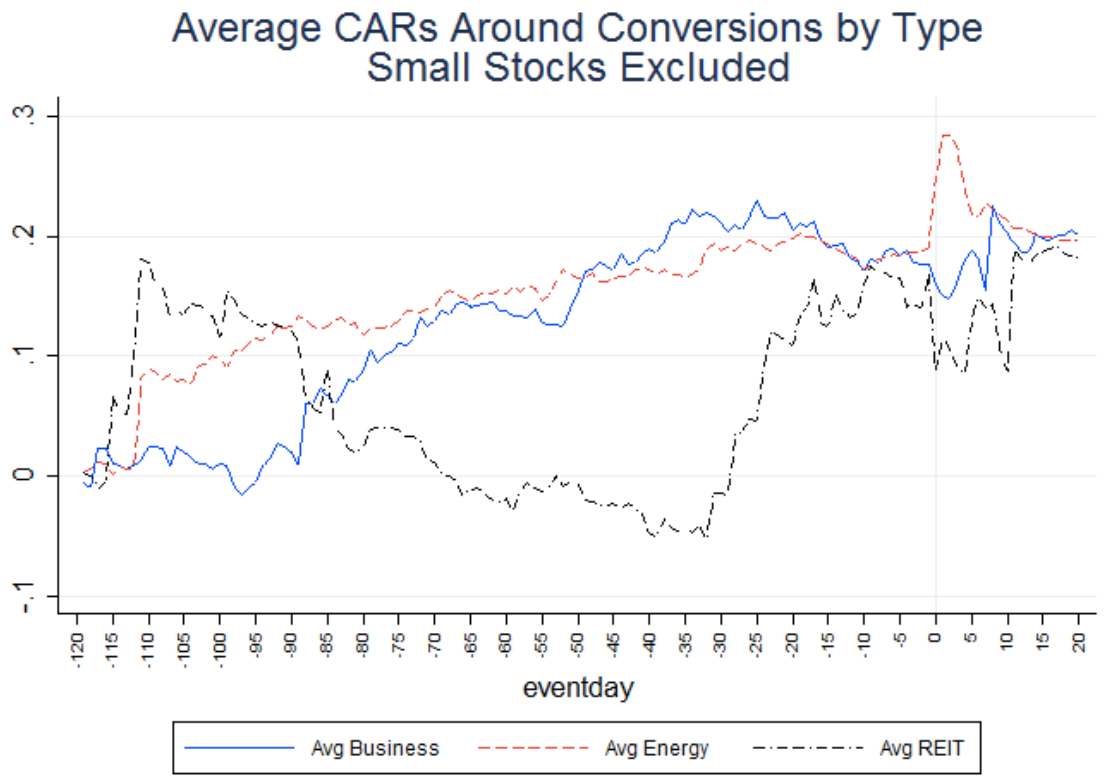


This figure highlights the increase in Telus share price and trading volume surrounding the company's announcement of its intention to convert to an income trust on September 11, 2006. One can also see the offsetting decline in share price (and increase in trading volume) following the announcement that the tax advantage for income trusts was to be discontinued on October 31, 2006.

b) BCE Share Price and Trading Volume Around Conversion Announcement

This figure highlights the increase in BCE share price and trading volume surrounding the Telus announcement of its intention to convert to an income trust on September 11, 2006. This announcement was viewed as confirmation that BCE was going to make a similar announcement (which it formally did in early October). One can also see the offsetting decline in share price (and increase in trading volume) following the announcement that the tax advantage for income trusts was to be discontinued on October 31, 2006.

c) Impact on Share Price of the Conversions from Equity to an Income Trust



This figure illustrates the cumulative abnormal returns around the actual conversions of a corporation to an income trust. The calculation of abnormal return is based on a CAPM model with changes in the S&P TSX Index to be the market return. Time 0 is the date on which the firm officially converted from a regular equity firm to an income trust. We go back 120 business days to ensure we have captured the majority of the announcement effects from the firm informing the market of its intention to convert. All returns are standardized to zero at time t-120.

Before examining potential sources for this increase in valuation, we confirm its existence leading to our first hypothesis:

H1: Income trusts are valued at a premium to comparable regular equity firms

Taxes are an obvious factor to consider in this premium, but we also consider other factors beyond taxes which may impact the valuations. Some of the relative costs/benefits across these structures which may influence the valuation premium for income trusts include the following: tax advantages of income trusts as a flow-through entity; liquidity provided by regular payouts to investors; lower cost of capital due to the more debt-like nature of the equity for income trusts; increased agency costs due to concerns about governance and oversight at income trusts; limited business growth opportunities as the majority of profits are paid out leaving little for capital expenditures (beyond what is available through depreciation expenses); lack of diversification as income trusts are generally concentrated in a single sector; and exposure to regulatory change if the government decides to remove some of the tax benefit. From a more behavioral perspective, investors may be overvaluing a firm in its early stages because they are unsure how to best value its characteristics. For example, investors may add extra value to income trusts due to the novelty of some of the features they are offering the market (i.e., the extra liquidity from the regular distribution payments of income trusts). As the structure matured and more firms adopted the structure (possibly even some for whom it was not suitable) the novelty of these features would decline as would the premium attributed to them, so another factor influencing valuation could be the stage of the income trust life cycle.

Next, we investigate the characteristics of firms using the income trust structure. Firms using this structure would ideally have characteristics similar to those for an optimal leveraged buy-out (LBO) target: stable operating cash flows, low capital expenditures, stable sales, low effective tax rates being paid, and a mature business model. This leads to our next hypothesis regarding the characteristics of income trusts:

H2: Income trusts will have characteristics similar to those for an LBO

Although we expect the firms adopting the income trust structure early in the structure's life cycle to have these characteristics, behavioral finance suggests that managers observing the boost in valuation obtained by adopting this structure may choose to adopt it for their firms even when the income trust structure is not ideal. Consequently, over time we expect to see firms rationally choose to become income trusts or to list some of their assets as an income trust even when they are less than ideally suited to the structure. They use the structure to take advantage of the valuation bump.

Hypothesis two allows us to empirically characterize the types of firms that became income trusts and whether they changed over time. Though the ideal characteristics for firms to succeed under this structure would not have changed over time, corporate behavioral finance suggests that we would expect to see changes in the characteristics of the firms adopting these strategies as managers observe the ability to get a higher valuation from this structure with few added costs (assuming the results from hypothesis H1 confirm the increased valuations for income trusts).

As income trusts gained wider acceptance and the valuation premium was observed more often, we would assume the potential existence of a class pricing effect—all income trusts received an increase in valuation even if they did not deserve it. This concept from behavioral asset pricing that was observed in the tech boom, suggests that we may find income trusts were actually mispriced (i.e., given a valuation premium even in cases where it was not deserved). We expect that we will see this through the changes in the characteristics of the income trusts over time and their relationship (or lack thereof) to firm valuations. Consequently, we wish to examine the following:

H3: Income trusts will trade at a premium to comparable corporations; however, as the number of key characteristics included in the newly listed income trusts changes over time, we expect to see the valuation premium decreasing—investors start to realize that all income trusts are not all created equal.

Related to the changes in the types of firms becoming income trusts, we may also expect to see differences related to the nature of firms and their valuations for firms which become income trusts through a conversion from a corporate structure, or for firms where they did an IPO but the firm was either based on 100 per cent of the firm's assets (or less than 100 per cent of one or several firms' assets) before the IPO.

3.4.2 Market Reactions to Significant Events

The final stage of the analysis considers how the valuations for income trusts changed as the level of uncertainty about the tax situation evolved. These analyses most directly extend the work from the previous studies. We consider all of the announcements directly related to government policy on the tax advantages of income trusts. Since one of the major sources of value for investors in income trusts is the tax structure, these announcements will have the largest impact on income trust valuation. (This intuition is similar to that for the studies mentioned earlier.)

Overall, we expect to see positive (negative) reactions around the announcements supporting (decreasing) the tax advantages associated with the structure. If all income trusts are not created equally, we expect to see the size of the market reaction depend on different firm level characteristics such as those examined above. The conditioning of the models on these firm-level characteristics was not part of the previous studies and therefore allows us to extend their results. We examine not only the impact of proposed tax changes on firm value but also the role of the suitability of a firm for the income trust structure and investor-level behavioral characteristics.

Amoako-Adu and Smith (2008) and Doidge and Dyck (2015) propose that markets are efficient and the valuations for income trusts change around these announcements but for different reasons, though both related to taxes. We also assume that markets are efficient, but we examine whether the market reaction to the announcements may be related to both the changes in taxes and other firm-level factors which may be the result of behavioral decisions by managers and/or investors. This leads to our final set of hypotheses.

H4: The size of the price change surrounding announcements related to income trusts' tax status will be:

- *more pronounced for firms with investors with lower tax rates (Doidge and Dyck, 2015)*
- *more pronounced for firms less suited to the income trust structure based on accounting criteria*
- *more pronounced for firms that ultimately fail, are acquired, or convert to regular equity, in that order*

Overall, we expect the market reaction to these announcements to depend on different factors. If markets are efficient, we would expect to see different reactions for firms which could survive without the structure and those that required the structure to be viable. We also expect there to be a role in the reaction for behavioral factors which had been related to the pricing premium before the announcements.

Table 3-1: Summary Statistics

	Obs	Mean	Median	S.D.	min	p25	75	max
EV/EBITDA	670	21.19	10.51	(117.56)	1.82	8.14	14.35	2450.89
P/E	670	40.43	14.68	(315.66)	1.29	10.71	22.79	7964.60
MTB	745	1.88	1.38	(1.74)	0.27	1.04	2.07	18.61
QRatio	745	1.40	1.23	(0.66)	0.48	1.03	1.56	5.97
MV ($mil)	825	605.02	245.42	(1148.44)	4.63	103.67	611.48	15354.73
TA ($mil)	759	628.69	299.77	(1013.57)	11.86	133.04	681.70	10401.80
NetSales ($mil)	759	265.86	125.31	(384.96)	0.00	36.66	320.87	2741.30
NI ($mil)	759	43.01	12.84	(150.89)	-257.82	4.61	37.20	2902.00
ETR (%)	642	6.39	0.00	(20.73)	0.00	0.00	7.33	418.45
NTA ($mil)	678	332.04	163.04	(575.37)	-92.20	70.55	358.84	5819.00
NTA/TA (%)	672	56.55	56.39	(22.31)	-16.75	42.78	69.79	168.76
CFVol (%)	637	4.52	3.56	(3.50)	0.02	2.19	5.93	23.91
CapEx/TA (%)	750	6.74	2.12	(11.11)	0.00	0.44	8.56	115.78
Depre/TA (%)	749	5.11	4.13	(4.40)	0.00	1.79	7.69	25.19
Lev (%)	759	22.14	20.08	(16.80)	0.00	10.19	30.76	87.62
LCStage (1-5)	757	2.56	3.00	(0.69)	1.00	2.00	3.00	5.00
DY (%)	825	9.99	9.70	(4.64)	0.00	7.66	12.50	27.27
DivPayoutSh (%)	228	70.96	80.95	(30.06)	0.00	59.91	94.53	100.00
CommonDiv/NI (%)	677	279.09	118.28	(2159.45)	0.00	86.31	181.01	50590.00
Chg_EBITDA (%)	607	65.13	21.00	(668.00)	-5228.67	-3.68	69.17	8037.96
Chg_NetSales (%)	619	759.01	21.07	(16664.39)	-100.00	3.67	58.47	414583.34
Chg_TA (%)	636	43.06	7.12	(312.87)	-63.86	-1.77	35.36	7694.74
ROE (%)	736	20.83	20.71	(41.37)	-432.49	11.62	33.58	213.53
ROA (%)	736	10.92	11.28	(15.31)	-146.80	7.07	16.69	73.38

This table reports the summary statistics of valuation multiples and characteristics of non-REIT income trusts from 1998 to 2011. Variable definitions can be found in the Appendix.

3.5 Data

To examine the valuations of income trusts, we assemble a complete list of trusts that traded on the Toronto Stock Exchange (TSX) between 1996 and 2011. The sources we use to compile the list of income trusts include the CFMRC database and the Toronto Stock Exchange's monthly reviews. We then identify those trusts with identification and accounting data available in Datastream over this period. Based on the accounting data in Datastream, we identify which trusts are investment trusts, which will be removed. The remaining set of income trusts has its maximum number of trusts in 2006 when we have 247 income trusts with 155 business trusts, 58 energy trusts, and 34 Real Estate Investment Trusts (REITs). For each trust, we hand-collected information on whether it was a conversion from equity or an IPO. If it was a conversion, we collect all of the information available for the firm before conversion. If it was an IPO, we examine whether the IPO was for all of the firm's assets, a subset of the assets, or a subset of the assets combined with a subset of the assets from another firm.[23] Figure 3-1 shows the growth in this structure over this period with the rapid growth between 2001 and 2006, especially in the area of business trusts, and the decline post-2006. Table 3-1 provides summary statistics for the characteristics of income trusts.

For our matched sample, we look at all of the Canadian regular equity firms in Datastream over this period for which we have the required accounting data. We match the equity firms to our set of income trusts based on industry[24] and net sales. We match on a year-by-year basis to obtain a set of matched firms for each income trust each year. To avoid the problem of duplicated matches, we use a non-replacement matching method. We supplement this data with information from Bloomberg on the cost of capital for our income trusts. We also hand-collect information on what happened to each income trust after the 2006 announcement. Tables 3-2 and 3-3 show the similarities and

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[23] The assets being offered in the IPO may provide a proxy for whether the IPO was to take advantage of the income trust structure and its higher valuations for some assets which would otherwise be undervalued. These structures may be less stable to changes in the income trust regulations than others.

[24] The industry classification is based on datatype ICBSN in Datastream, which uses the FTSE/DJ Industry Classification Benchmark (ICB) to classify industries.

differences between our set of income trusts and the corresponding matched firms. For these firms, we start by considering the most commonly used accounting data. We have also grouped the data by years because behavioral finance assumes a role for the life cycle of a structure in how investors value assets.

For the life cycle of the income trust structure, we view the period before 2002 as the infancy stage when income trusts are being valued as a novel structure and the rules regarding what makes for a good income trust are being followed well. The following period, 2002-2004, is a period in which the structure is maturing. Managers are identifying the structure as a way to possibly increase firm value, so we are seeing more income trusts with characteristics that may be starting to deviate from the optimal, and concerns about corporate governance are starting to appear. The period from 2005 to 2006 is one in which the structure was starting to be viewed with more concern—what firms were adopting this structure and how was the regulatory environment going to react as it was being proposed that the structure may be over-used. The period after 2006 is the period of decline for the structure.

A further feature which we investigate is the level of maturity of the firm. Since a firm ideally suited to the income trust structure is a mature firm (a firm having stable sales and cash flows, and requiring little capital expenditure), we also consider measures used to identify the life cycle for firms (LCStage). Following Dickinson (2011) and others, we use information from a firm's statement of cash flows to identify the firm's stage. Using a firm's cash flows, the patterns of operating, investing, and financing cash inflows and outflows provide insight into a firm's stage in its life cycle at a given point in time. The sign (positive or negative) of the net operating, investing, and financing cash flows, provides eight distinct cash flow patterns each of which can be associated with a stage. The eight classifications are collapsed into five practical life cycle stages: introduction, growth, maturity, shake-out, and decline. Appendix 3-B summarizes how the life cycle stage is classified based on the signs of the cash flows. We use these to identify the stage of each firm to determine if they are ideally suited for the income trust structure and how this has changed over time.

3.6 Results

Although conventional wisdom indicated that income trusts were valued at a premium to similar regular equity firms, the precise magnitude and source of this premium are not well understood. The tax savings of the income trust structure are well-known (about 30 per cent), but how much was the actual premium? Was there a role played by any other factors? In this section, we empirically test our sets of hypotheses to try to provide some answers to these questions.

3.6.1 Initial Evidence on Valuation Premium

We start by investigating our first set of hypotheses related to the premium with which income trusts are valued. Consequently, we are examining if income trusts are, in fact, valued more highly than their equity counterparts. Building on the anecdotal evidence of price increases for both BCE and Telus when Telus announced its intention to convert to an income trust (see Figures 3-2a and 3-2b), we obtain a starting point that income trusts are valued with, at least, a 20 per cent premium. To examine whether this is broadly the case and if it was the same over our entire sample period, we perform several comparisons.

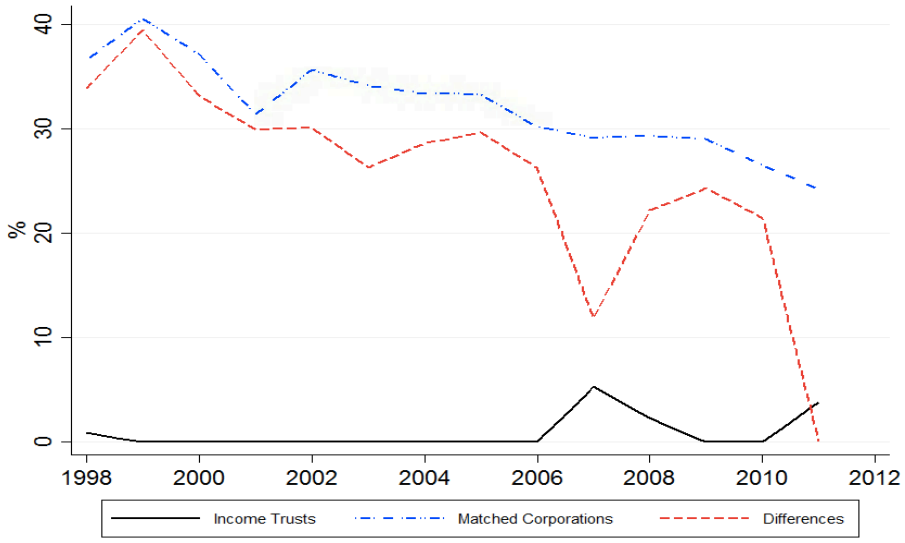
We start by looking at all cases in which firms converted from regular equity to income trusts. How did the market react to these events? Since the prices for our converting firms would start their major reactions on the day of the announcement (and not the day of conversion), we need to look at the change in share prices around the initial announcements. We do not have complete information on the announcement dates, so we go back 120 days before the actual conversion—this appeared to capture the overwhelming majority of conversions. In Figure 3-2c, we see a similar increase in share price of about 20 per cent for all firms converting from regular equity to a business or energy income trust. We do not focus on REITs due to their different financial structure. Although this increase in value of 20 per cent is less than the theoretical tax savings from the conversion, this may reflect the actual tax savings for the firms doing the conversion. It is likely that the firms which converted from equity to an income trust were already "tax avoiders" and thus had a structure such that the marginal tax rate they were paying was already less than the headline top tax rate. This means the increase in valuation could

be related to the actual tax savings these firms would have received from this conversion rather than the theoretical change in tax rates. Existing research into long-term tax avoiders suggests that these firms would very likely pay taxes of less than 20 per cent (e.g., Dyreng et al., 2007). This means their valuation premium is likely related to the tax advantage, but possibly more. Consequently, our results clearly demonstrate that Telus and BCE were not exceptions when their value increased upon the announcement of their intentions to convert to income trusts. Since it was their intention, and it was not clear if it was going to happen, the 20 per cent increase in value they observed was likely a fraction of what the value increase of converting to an income trust would have provided to their investors.

With strong evidence that there is an increase in valuation related to becoming an income trust, we try to more fully examine the expected size of a valuation premium for each income trust in our sample. We first consider the size of the median tax advantage in our sample. In Figure 3-3a, we can see that the size of the tax advantage enjoyed by income trusts based on a comparison of their effective marginal tax rates varied between more than 40 per cent and about 25 per cent. Consequently, the size of the tax advantage is not stable over time. This advantage for the cash flows for the income trust would be one way in which income trusts could provide a boost in valuation if they were efficiently priced using a fundamental valuation (e.g., a discounted cash flow valuation). Another way that income trusts could increase valuation is if, as suggested in the literature, income trusts have a lower cost of capital. In Figures 3-3b, we can see that the cost of capital (WACC) has been lower for income trusts (both energy and business) during their popular era (i.e., before 2006), while it was increased in the period after 2006 after the TFP announcement. The trend was driven by the increasing cost of equity for income trusts, while the cost of debt has been decreasing through time. These findings suggest that the cash flows are higher for income trusts due to the tax savings, but the value added to the firm may be somewhat enhanced by the low cost of capital when the income trust structure was in its growing time.

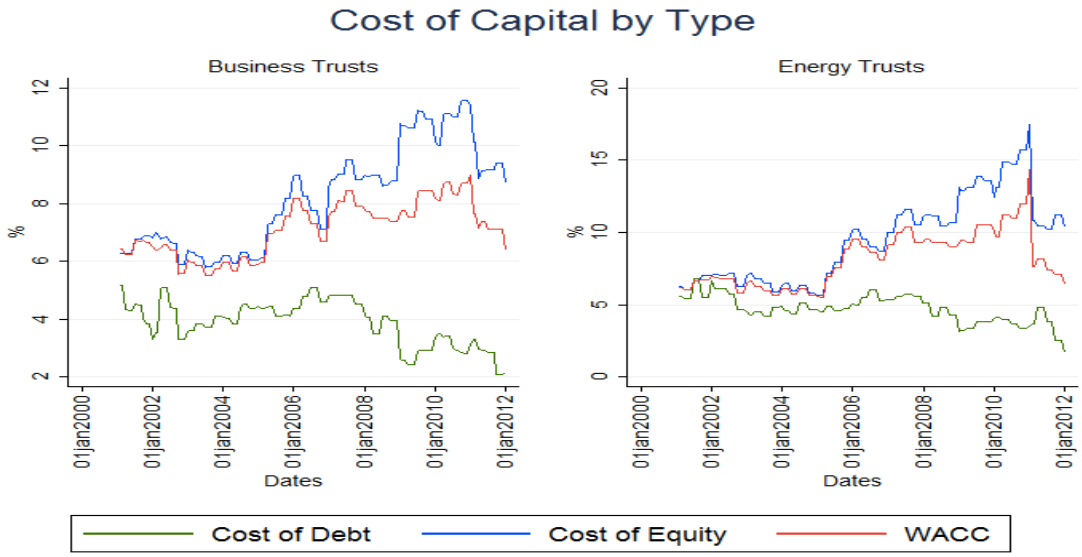
Figure 3-3: Factors Related to Fundamental Valuation of Income Trusts

a) Effective Tax Rates



We measure the effective tax rates paid by income trusts versus their matched sample using the income tax expense as a percentage of their pre-tax income using data from Datastream. The effective tax rate impacts the size of the cash flows which could be provided to investors from the income trust relative to the investors in the matched firms.

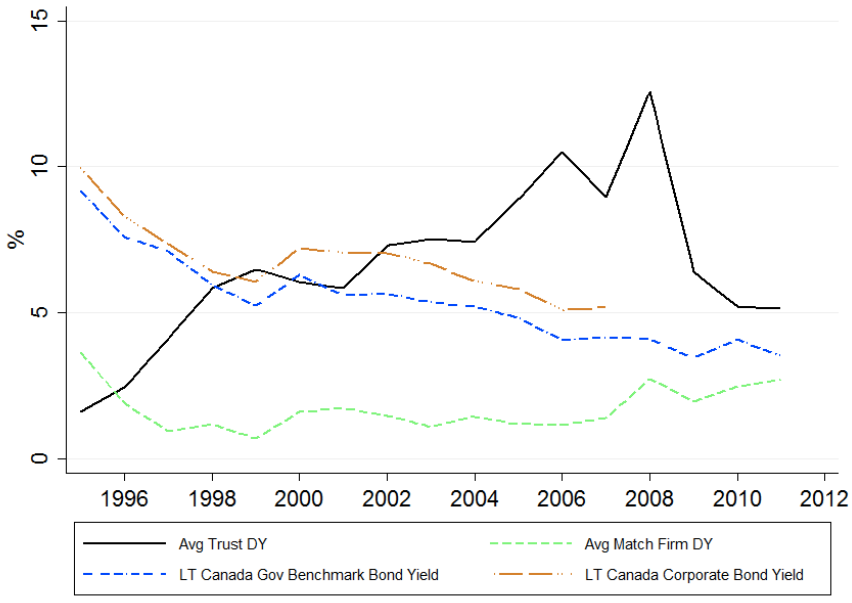
b) Cost of Capital



We use data on the Cost of Capital (Weighted Average Cost of Capital, WACC) for our income trusts and our matched sample obtained from Bloomberg for each firm in each year. This provides the discount rate at which the free cash flows would be discounted in a fundamental valuation of the firms.

Beyond the influence of factors related to the fundamental valuation, we also consider how the returns from income trusts compare to the other fixed income investments available over this period. The assets we compare the average dividend yield of income trusts to are the long-term Canadian government benchmark bond yield (data from Datastream item CNBBLT), long-term Canadian corporate bond yield (data from Datastream item CN13869), and average dividend yield of matched corporations. Although income trusts are not, technically speaking, a form of fixed income investment, they are argued to have been more similar to a fixed income investment than a standard equity investment. In Figure 3-4, we can see how the yields on income trusts outpaced those of the other asset classes starting in 2002 and going through to after they lost their tax advantage. Figure 3-4 therefore demonstrates the widening gap between the yields on Canadian government bonds and income trusts. The added yield over fixed income instruments would add value to this asset class.

Figure 3-4: Income Trust Dividend Yields versus Bond Yields



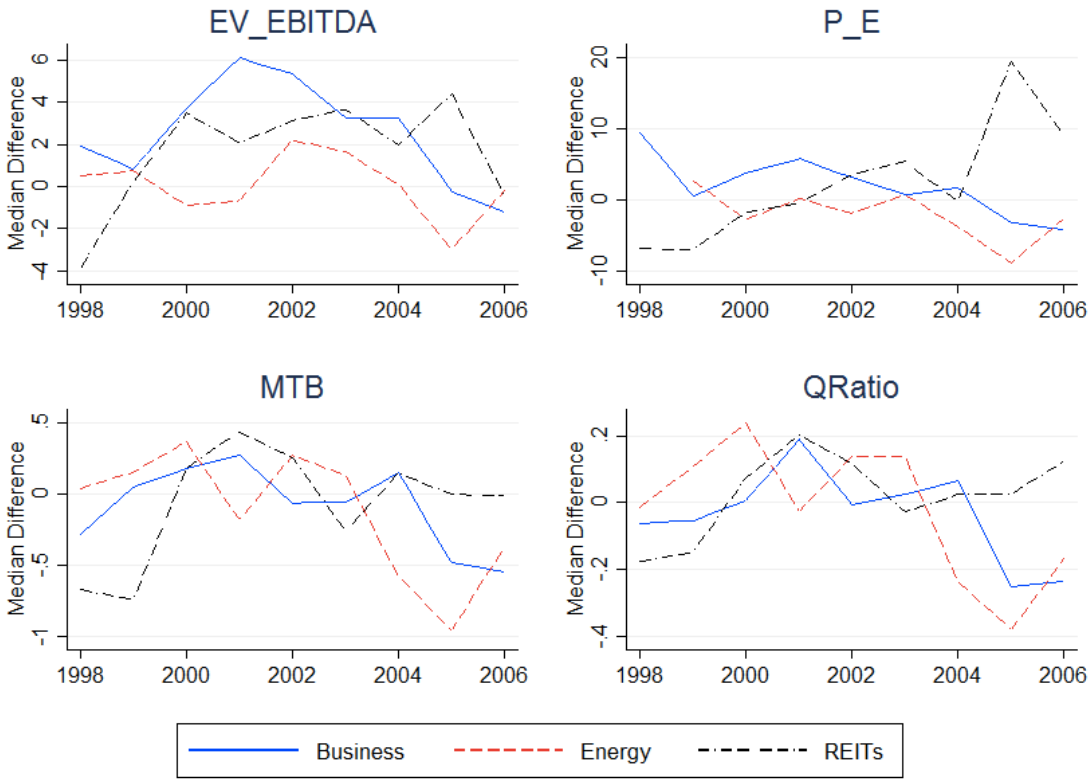
In this figure, we present the yields on alternative forms of fixed income investments over this period. The data for the long-term Canadian government bond yield and the long-term Canadian corporate bond yield (which was discontinued in 2007) are all from Datastream. The average dividend yields for the income trusts and the matched sample are also from Datastream.

The next stage of our analysis is to estimate the general premium for income trusts by comparing the valuations for our income trusts and our set of matched firms. Because of our matching, we are able to determine how much of a premium a similar firm would obtain if it were to restructure as an income trust. We start by comparing the EV/EBITDA[25] values for our two samples and conclude the valuation using multiples with a comparison of the P/E values. Since we assume that managers are rational, we would expect to see an increase in valuation for firms with the income trusts structure because trusts are able to avoid paying corporate taxes (a savings of, possibly, 30 per cent or more at this time). Comparing the EV/EBITDA multiples for our set of trusts and our set of matched regular equity firms, we find a substantial boost in firm value from the trust structure (see Figures 3-5a). We find significantly higher valuation multiples for income trusts over the early portion of our sample, between 2002 and 2004. (This is more than the maximum possible tax savings.) Despite the large premium in the early part of our sample, in the latter part of the sample the premium started to decrease. We also run a regression to explain the valuation premium by the differences in characteristics between income trusts and matched corporations, the results of which will be reported later in our regression analysis. When we obtain the residuals from the regressions for all income trusts, which is the unexplained parts of the valuation premium, we show that the average of the residuals by year still exhibits a decreasing trend (see Figure 3-5b).

[25] We also considered the P/Sales, and P/EBITDA as other measures of firm valuation, but we focus on the EV/EBITDA ratio as it is more clearly related to the cash flow generating ability of the firms (a key value for income trusts) and is not impacted by the relative values of debt and equity in estimating overall firm value.

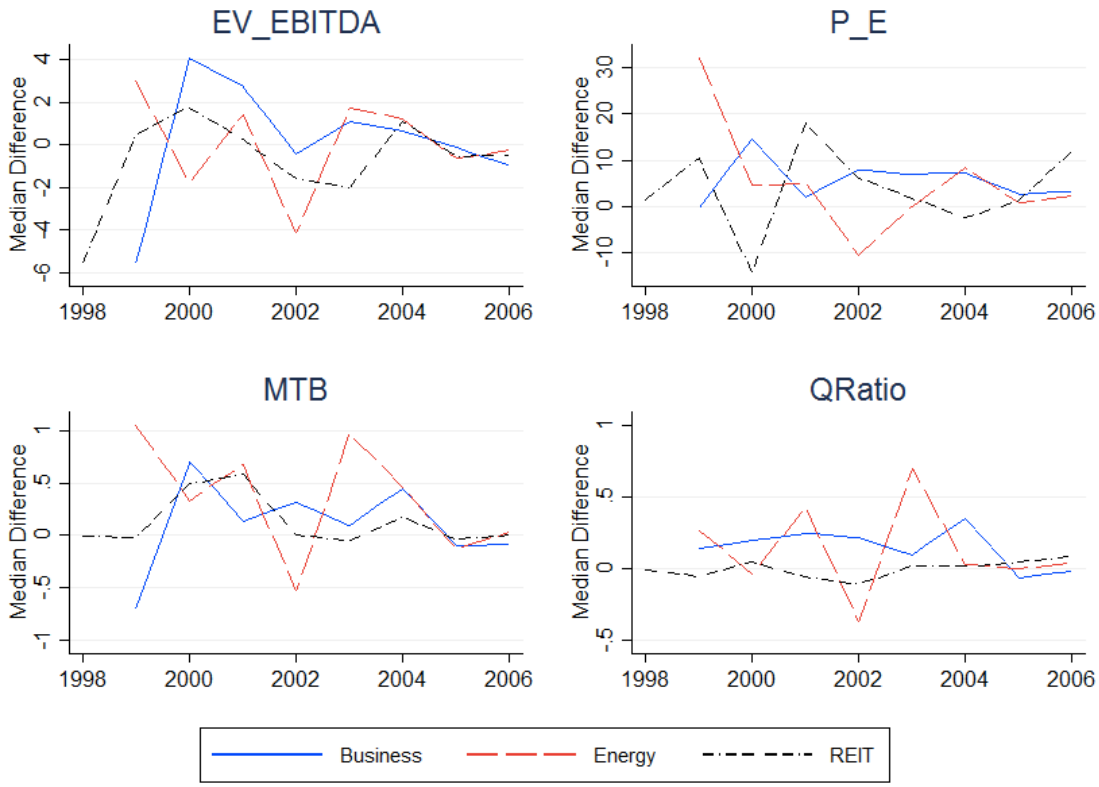
Figure 3-5: Valuation Premium for Income Trusts

a) Median Differences in Valuation Multiples between Income Trusts and Matched Corporations



These figures show the median higher in valuation multiples of income trusts compared to matched corporations. The EV/EBITDA values for both the income trusts and matched sample on industry and firm size were obtained from Datastream. Similarly, the P/E ratios were obtained using data from Datastream at the end of fiscal year stock price and earnings. The matching was performed on a year-by-year basis. The period shown is from 1998 to 2006.

b) Unexplained Portions of Differences in Valuation Multiples between Income Trusts and Matched Corporations



These figures graph the median by year of the residuals for the regression in Model (1) to illustrate the portion of difference in valuation between income trusts and matched corporations unexplained by firm characteristics. To avoid the impact of outliers on regression results, we exclude 2% highest and 2% lowest of valuation multiple difference in all cases.

Much of the discussion by academics and practitioners is focused on the P/E ratios, so we also compare these across our set of trusts and regular equities (see Figure 3-5a). Interestingly, for the business trusts we find an improvement only in the P/E ratios in the early part of the sample. After 2002, we do not find a significant improvement in the P/E ratios for these trusts. One advantage of using the P/E multiple is that the earnings from the income trust would be impacted by the tax advantage, so being an income trust would mean the earnings increased by 30 per cent (or the actual size of the tax savings for the trust). If the price were to also increase by 30 per cent, this would leave the P/E ratio intact and thus no different from the matched sample. Our findings therefore suggest that there was something beyond the tax savings which impacted the valuations for income trusts in the early stages of their life cycle, but the increase in valuation converged to the tax savings later in the sample. Table 3-2 has also confirmed the statistical significances of the differences in valuation multiples between income trusts and matched corporations through time. In the case of EV/EBITDA, we do find a higher average ratio for business trusts in 2002 and a decreasing trend for the differences in EV/EBITDA for all income trust types (business and energy) starting in 2005. The results from the valuation analysis using multiples suggests that there was more to the valuation premium for income trusts, especially early in their use; the price for income trusts has increased by roughly the same amount as the earnings were increased due to the tax advantage of trusts.

It is therefore important to try to understand the initial source of the premium as well as how and why the premium changed as the structure matured. The structure is relatively new, so we can assume that there was some degree of unfamiliarity on the part of investors potentially leading to a premium being paid for income trusts. This should not, however, have persisted forever. Using the tech boom as an example, the boost in valuation for this new segment of the market lasted for quite some time before the price correction occurred. With tech companies, the increase in valuation was due to expectations of higher growth, but with income trusts, it was the tax savings allowing earnings to be higher and possibly other factors such as the added value to investors of the regular returns through distributions. Investors value receiving regular cash payouts from the firm and are therefore willing to pay a premium for this. One could also argue

that rational managers saw the increase in valuation from adopting the income trust structure so started to both saturate the market as well as take advantage of the market so later entrants into this segment may not have been well-suited to the structure; rational investors may have valued them with a discount relative to other income trusts. The next section empirically investigates associated hypotheses.

3.6.2 Univariate Analysis of Characteristics of Income Trusts versus Equity

The fact that the valuation premium for income trusts appears to change over time sets up our tests for our second set of hypotheses—do the characteristics of income trusts change over time? The types of firms hypothesized to be most ideally suited to the income trust structure and thus listed as income trusts are firms with stable cash flows, low requirements for capital expenditures, large percentage of assets being tangible assets, and limited leverage, and in a more mature stage of their life cycle. The suitability of firms becoming income trusts later in the structure's life cycle (i.e., post 2004, for example) is something we can confirm using readily available information.

We look at the differences in certain firm-level characteristics between income trusts and a matched sample of regular equity firms over our sample period. In Table 3-3, we see the differences in many of these factors over our sample period. Focusing on the characteristics related to the optimality of the firm for the income trust structure, we find that, as expected, trusts had much lower effective tax rates and higher dividend payout. Income trusts also have lower capital expenditures, more tangible assets, less used depreciation, lower leverage, less volatile cash flows and less profitability (lower ROE and ROA) compared to the matched sample. Looking at how these values change over the years, we see that in most cases the differences between the income trusts and the matched sample were largest at the start of our sample and decreased over time, while the difference in effective tax rate has been quite stable from 2000 through 2006. We do note that, although we have attempted to match income trusts with corporations within the same industry with the closest match in net sales, the differences in size (total assets, net sales, net income) remain significant in some of the years.

Table 3-2: Valuation Premium of Income Trusts Relative to Matched Corporations

Business and Energy							
Year	EV/EBITDA	P/E	P/Sales	P/EBITDA	EV/Sales	MTB	QRatio
1998	4.23	9.44*	0.65	2.17	0.43	1.13	0.06
1999	9.79**	1.64	4.74*	9.76**	4.87	0.62	0.04
2000	3.21**	-3.89	2.22***	3.87***	2.63**	-0.01	-0.1
2001	2.44*	-131.94	44.86	2.09*	53.66	0.02	-0.04
2002	6.49**	9.42	3.21***	3.85**	6.05**	-0.40*	-0.22
2003	5.79***	-5.55	2.04***	3.99***	1.85***	-0.16	-0.14
2004	6.00**	-3.38	2.76***	4.63**	4.45***	-0.05	-0.14
2005	0.26	-7.92**	0.2	-0.55	0.82**	-0.83***	-0.51***
2006	-2.42***	-20.79***	-0.07	-2.58***	0.14	-0.73***	-0.49***
2007	-0.85	-3.6	-0.44	-1.83***	-0.18	-0.56***	-0.41***
2008	1.61**	-2.52**	0.08	0	0.28	-0.07	-0.08*
2009	5.40**	-3005.25	0.54	0.38	0.96**	-0.14	-0.13*
2010	5.71**	-0.88	1.59	2.18	2.70*	-0.19	-0.40***
2011	0.17	36572.98	0.3	-1.01	0.84	0.89	0.08
Business Only							
Year	EV/EBITDA	P/E	P/Sales	P/EBITDA	EV/Sales	MTB	QRatio
1998	6.71	9.44*	1.55	3.05	1.89	1.85	0.11
1999	8.32	4.1	2.74***	8.43**	3.13**	0.83	-0.03
2000	5.11**	-3.42	2.76***	5.24***	3.64**	-0.09	-0.21
2001	4.73**	-239.49	3.46***	3.92**	4.20**	0.24	0.02
2002	10.43**	21.31	5.31***	6.74***	9.43**	-0.43	-0.26
2003	8.30**	-11.1	2.84***	5.82***	2.59***	-0.24	-0.19*
2004	9.30**	-0.23	4.05***	7.64***	5.12***	0.09	-0.05
2005	1.81*	-2.58	1.10***	0.9	2.04***	-0.76***	-0.40***
2006	-2.24**	-23.67**	0.23	-2.46***	0.58	-0.73***	-0.48***
2007	0.04	-2.06	0.22	-0.93	0.51	-0.47**	-0.31***
2008	2.26**	-2.13	0.19	0.13	0.41	-0.15	-0.13**
2009	2.13	-1409.28	0.85*	1.33	1.13**	-0.36*	-0.24**
2010	7.85**	4.34	2.17*	3.49**	3.50*	-0.09	-0.37**
2011	0.73	39899.34	0.6	-0.11	0.98	0.99	0.16
Energy Only							
Year	EV/EBITDA	P/E	P/Sales	P/EBITDA	EV/Sales	MTB	QRatio
1999	12.74	-3.77	8.73	12.42	8.36	0.19	0.17
2000	-0.91	-4.92	1.05	0.92	0.44	0.17	0.16
2001	-0.86	-4.84	93.16	-0.54	111.36	-0.25	-0.1
2002	-0.99	-17.49	-1.19	-1.65	-1.02	-0.34	-0.12
2003	1.29	3.58	0.43	0.69	0.46	0	-0.02
2004	-1.25	-10.41**	-0.33	-1.62	2.86	-0.4	-0.34
2005	-3.04***	-18.92**	-1.91***	-3.55***	-2.03***	-0.97***	-0.74***
2006	-2.84***	-14.28***	-0.77**	-2.85***	-0.87*	-0.72**	-0.51***
2007	-2.88*	-8.15	-2.02***	-3.91***	-1.85***	-0.78**	-0.64***
2008	0.36	-3.20**	-0.16	-0.25	0.01	0.11	0.02
2009	13.27	-7067.72	-0.25	-1.67	0.53	0.35*	0.1
2010	-1.27	-21.77	-0.7	-2.17	-0.47	-0.53	-0.50**
2011	-4.01	-16.95	-2.38	-7.75	-0.45	0.01	-0.58

This table shows how the valuation premium for non-REIT income trusts (i.e., the amount higher in valuation multiples for income trusts compared to matched corporations) changes over the years. Variable definitions can be found in the Appendix. We omit the income trusts that have valuation multiples in the 2% highest and 2% lowest percentile in the comparison to avoid impact of outliers. A t-test for significance of the mean (different from zero) of the differences is employed for each valuation multiple in each year.

Table 3-3: Differences in Characteristics Between Income Trusts and Matched Corporations

Business and Energy

Year	MV	TA	NetSales	NI	ETR	NTA	NTA/TA	CFVol	CapEx/TA	Depre/TA	Lev	LCStage
1998	174.14	275.6	62.89	-11.47	-31.64	-25.3	0.01	-1.72	-10.07**	2.69**	5.4	0
1999	9.64	4.55	-19.24	-3.14	-34.76***	-7	0.02*	-6.03	-7.46***	0.59	-16	0.11
2000	146.62***	179.47**	-22.06	22.88**	-26.10***	107.81***	0.02**	-19.77	-4.66	-1.1	-6.16	0.35
2001	192.14***	275.07**	-2.9	11.84*	-24.83***	187.27***	0.02***	-11.55	-9.34***	-0.84	-6.03	0.1
2002	63.04	73.85	-58.46	7.45	-25.52***	151.34***	0	-8.81*	-8.89***	-1.49***	-1.02	-0.37***
2003	-7.9	-16.7	-106.10*	5.93	-22.04***	71.29	0	-11.52	-6.75***	-0.66	-1.55	0.05
2004	195.02**	83.29	-41.85	9.72	-21.72***	121.11**	0	-4.28**	-2.06	-1.08*	2.44	-0.17*
2005	-112.47	-168.63	-172.30**	13.39	-25.36***	-30.53	-0.00*	-547.61	-6.37***	-0.62	2.41	0.08
2006	-331.59	-167.45	-216.82*	1.38	-23.73***	-25.94	-0.01	-375.19	-6.17***	0.04	5.18***	0.16**
2007	-394.9	-171.91	-244.60*	-38.54**	20.31**	-37.86	-0.01***	-2.56***	-6.59***	0.19	8.04***	0.29***
2008	-307.19*	-262.4	-407.04**	-11.91	-18.23***	-99.42	-0.01***	-1.61***	-5.16***	-0.37	10.11***	0.30***
2009	-136.52	-172.24	-374.20**	-41.45**	-20.91***	-104.29	-0.01*	-1.31**	-4.99***	0.49	10.09***	0.33***
2010	-50.45	97.5	-98.07	-28.38*	264.79	51.07	-0.01	-1.30*	-1.92***	0.82	11.95***	0.18
2011	-148.05	333.41	-218.68	-70.99	3.92	360.77	-0.02	1.97	-1.72	5.87	15.60*	-0.2

Year	DY	DivPayoutSh	CommonDiv/NI	Chg_EBITDA	Chg_NetSales	Chg_TA	ROE	ROA
1998	10.51***	22.52	151.5	-125.74	-60.34	-6.51	5.84	-5.58
1999	12.67***	96.29**	229.02***	-77.18	8.78	-22.18	-6.87	-5.89**
2000	11.90***	60.67*	117.58***	30.02	6.52	4.89	-18.64**	-5.59
2001	9.86***	38.31	211.55***	-7.2	1.92	17.41	-20.92***	-7.77***
2002	8.36***	44.52***	487.69	-62.83	28.92	-22.28	-11.74***	-5.29***
2003	8.39***	49.89***	108.68***	-156.87	5530.17	-509.13	-26.27*	-7.12***
2004	7.37***	56.02***	130.26***	-101.27	19.39	8.66	-10.07***	-5.49***
2005	8.31***	65.11***	179.57***	-1370.62	112.64**	-31.96**	-9.08**	-6.33***
2006	10.62***	75.04***	432.92	-190.69**	-107.05**	10.47	8.23	-8.09***
2007	9.57***	51.56***	126.53***	-878.74	123.32	-717.31	-5.18	-4.65***
2008	15.06***	53.73***	165.45***	-94.60**	-18.28**	-17.92***	-5.06	-8.78***
2009	6.28***	27.10***	55.39	-7.46	6665.39	-13.92***	0.2	-7.05***
2010	4.41***	23.38***	415.98**	-2.16	-547.38	-39.96	-57.65	-6.72***
2011	2.72*	-2.31	98.86**	-194.11	106.1	10.26	18.2	10

Business Only

Year	MV	TA	NetSales	NI	ETR	NTA	NTA/TA	CFVol	CapEx/TA	Depre/TA	Lev	LCStage
1999	-24.72	-41.18	-28.45	-10.43	-34.30***	-51.91	0.02	-2.19	-5.77***	-0.56	-13.66	0.27
2000	178.97**	264.88**	-40.69	21.92	-20.03***	115.89**	0.01	-29.33	-4.45**	-3.16**	-4.17	0.46
2001	234.51***	163.87	-70.96	2.32	-21.82***	100.14	0.02	-19.01	-7.24***	-2.72**	-2.27	-0.13
2002	-80.48	-162.79	-151.90**	-5.37	-23.30***	55.14	0.01	-12.09	-7.90***	-2.27***	-2.33	-0.51***
2003	-234.47	-344.8	-210.05**	-13.97	-23.41***	-61.35	-0.01	-4.77**	-6.63***	-1.97	-3.32	0.06
2004	60.34	-199.69	-151.10**	-8.25	-17.01***	0.16	0	-5.72**	-1.88	-1.86**	2.39	-0.22*
2005	-437.82*	-530.74**	-356.04***	-23.57	-24.21***	-187.39*	0	-40.08	-2.86***	-0.98*	1.65	-0.02
2006	-790.72***	-608.52**	-418.62***	-23.03	-24.65***	-251.59	-0.01	-1.88***	-3.56***	-0.39	4.88**	0.05
2007	-813.28***	-656.63**	-505.50**	-58.44**	20.41	-247.43*	-0.01***	-2.46**	-3.52***	-0.07	7.58***	0.25**
2008	-644.72***	-698.35**	-749.23***	-55.72***	-17.42***	-316.11**	-0.01*	-1.06*	-2.51***	0.07	9.08***	0.11
2009	-755.77***	-925.59***	-676.05***	-62.55**	-20.06***	-352.98***	0	-0.92	-2.97***	0.28	6.56**	0.36***
2010	-369.62**	-322.43	-232.16**	-40.29**	347.55	-200.09**	-0.01	-0.98	-1.37**	0.66	11.53**	0.07
2011	-287.70*	179.79	-242.79	-87.71*	3.55	398.08	-0.02	2.87	-2.12	6.55	12.11	-0.22

Year	DY	DivPayoutSh	CommonDiv/NI	Chg_EBITDA	Chg_NetSales	Chg_TA	ROE	ROA
1999	12.00***	96.29**	184.04***	-103.84	-15.37*	-31.75	-9.91	-6.29**
2000	9.55***	49.28	114.19***	49.52	13.77	15.37	-22.94***	-10.71**
2001	6.71***	32.06	220.53*	-13.54	-0.14	-2.66	-14.02***	-7.04***
2002	7.43***	53.77***	71.07***	-94.84	63.93	-19.62	-13.85***	-6.53***
2003	7.48***	51.72***	89.52***	147.75*	127.17**	-828.95	-37.19*	-9.50***
2004	6.17***	58.89***	116.19***	-60.89	89.25*	-8.66	-10.48**	-7.34***
2005	8.02***	64.40***	126.28***	53.22	138.43**	-17.76	-13.04***	-8.01***
2006	9.50***	74.76***	546.66	-82.62*	3.56	40.89	16.21	-8.53***
2007	9.14***	48.59***	112.73**	-1504.07	181.09	-8.85	-5.27	-4.54***
2008	15.38***	48.74***	207.29**	-59.02*	0.29	-12.63***	-4.45	-11.18***
2009	6.21***	26.76***	-8.41	-30.6	9625.58	-12.64**	-1.78	-9.11***
2010	4.36***	22.61**	488.27*	-4.18	-0.1	-4.7	-72.21	-7.71***
2011	2.77	-2.56	105.66**	-219.82	117.72	11.49	18.48	11.16

Energy Only

Year	MV	TA	NetSales	NI	ETR	NTA	NTA/TA	CFVol	CapEx/TA	Depre/TA	Lev	LCStage
1999	78.36	82.95	-3.46	9.35	-35.68***	67.85	0.02	-9.88	-10.35	2.55	-20.01	-0.14
2000	76.52*	20.84	12.53	24.66**	-38.25***	92.98*	0.02**	-0.66	-5.04	2.72	-9.85**	0.14
2001	142.72	411.92**	80.87**	23.57*	-28.10***	281.65**	0.02***	-0.76	-11.93***	1.48	-10.67***	0.38*
2002	356.59***	536.83***	124.34***	32.54**	-31.74***	324.49***	0	-5.17***	-10.72***	-0.1	1.55	-0.09
2003	452.57***	629.25***	98.55***	45.11***	-19.53***	322.36***	0	-22.56	-6.98*	1.76	1.94	0.03
2004	487.95***	705.85***	187.05***	47.37***	-31.95***	359.83***	0	-2.01***	-2.46	0.6	2.55	-0.05
2005	646.69***	676.30***	256.43***	99.63***	-27.87***	345.19***	-0.01*	-1750.23	-14.42***	0.21	4.18*	0.31***
2006	750.67***	872.19***	258.86***	58.94**	-21.34***	517.48***	-0.01*	-1241.55	-12.28***	1.06*	5.89**	0.41***
2007	641.52	1028.86***	401.73***	10.75	20.01	478.00***	-0.01***	-2.80***	-13.99***	0.84	9.17***	0.39***
2008	477.56**	751.2	388.56**	89.94**	-19.71***	398.39	-0.01***	-2.88***	-11.19***	-1.41	12.50***	0.75***
2009	1334.22***	1616.98***	342.68***	8.68	-23.59***	558.88**	-0.02**	-2.20**	-9.77***	0.97	18.26***	0.28*
2010	1141.12*	1665.23*	402.55***	16.09	-28.63***	1001.91*	0	-2.56**	-3.97*	1.4	13.52**	0.60**
2011	1108.84	1715.96	-1.71	79.49	8.05	-310.83	-0.04	-6.13	1.82	-0.3	47.00*	0

Year	DY	DivPayoutSh	CommonDiv/NI	Chg_EBITDA	Chg_NetSales	Chg_TA	ROE	ROA
1999	14.01***		311.48**	-37.18	32.93	-12.61	-1.67	-5.22
2000	16.97***		123.80***	-8.98	-9.43	-16.07	-10.63	3.94
2001	13.54***	94.85	199.30***	4.57	4.91	46.41	-30.12**	-8.76
2002	10.27***	63.29	1212.25	-28.92	-8.03	-25.1	-7.89**	-3.04*
2003	10.26***	31.57**	141.61***	-608.56	14286.76	13.24	-6.48	-2.8
2004	9.98***	46.78***	159.52***	-158.22	-91.67	37.81*	-9.21	-1.55
2005	8.99***	50.51***	290.59**	-4574.27	51.73	-66.99**	0.07	-2.43
2006	13.28***	66.58***	154.89***	-439.45*	-361.67**	-60.13***	-10.94	-7.03*
2007	10.64***	75.64***	168.45***	648.22	-21.78**	-2472.36	-4.98	-4.92*
2008	14.31***	58.70***	90.64***	-176.71	-59.58***	-30.08**	-6.5	-3.2
2009	6.46***	60.67***	223.59***	45.34	-305.35	-16.88**	4.89	-2.15
2010	4.62***	28.67	144.88***	5.94	-2658.33	-175.96	-4.28	-3.09
2011	2.27	27.08	24.06	24.46	1.52	-0.79	15.71	-0.44

This table reports the differences in the characteristics of non-REIT income trusts versus matched corporations by years. Variable definitions can be found in the Appendix. Significance of the means of the differences for each year is tested using a t-test.

Consequently, our analysis of the difference in accounting data suggests that most firms adopting the income trust structure were different from the regular equities and were suited to the structure. Consistent with behavioral finance we find that the suitability of the firms to this structure was decreasing over our sample period. This is consistent with the assumption that rational managers will view the valuation premium of this structure and therefore use it as much as possible when going public or considering making some of their assets public. In an efficient market, investors will recognize this. Even though there is a premium for income trusts due to the tax advantage, the reasons for an additional premium would be decreasing over time as the quality of firms for the income trust structure (as indicated by some of the features viewed as important for the optimal income trust structure) was decreasing, its novelty was decreasing, and the premium for liquidity would be decreasing. Since we see the valuation premium decreasing as our income trusts become less suited for the structure, this suggests that investors are rational and markets are efficient in valuing these firms. Since the valuation premium by 2006 is similar to the size of the tax advantages, it appears that at least part of the valuation premium must be coming from other sources. These results therefore suggest that researchers should proceed down several avenues to determine the identity of the factors which may influence how investors value assets, especially in a new asset class, and how this may (or may not) change over time.

3.6.3 Regression Results on Valuation Premium

We examine the sources of valuation premium by testing the following model, which explains the higher in trusts' valuation ratios compared to those of matched firms using the higher in effective tax rates and differences in other factors related to the suitability of a firm for the income trust structure.

$$\begin{aligned}\text{Dif Valuation Multiples}_{i,t} = {} & a_1 + b_1 * \text{Dif ETR}_{i,t} \\ & + c_1 * \text{Dif CFVol}_{i,t} + c_2 * \text{Dif CommonDiv/NI}_{i,t} + c_3 * \text{Dif ROE}_{i,t} \\ & + c_4 * \text{Dif NTA/TA}_{i,t} + c_5 * \text{Dif CapEx/TA}_{i,t} + c_6 * \text{Dif Depre/TA}_{i,t} \\ & + c_7 * \text{Dif Lev}_{i,t} + c_8 * \text{Dif LCStage}_{i,t} + c_9 * \text{Dif Size}_{i,t} \\ & + d_1 * \text{Sector}_i + \varepsilon_{i,t} \quad (1)\end{aligned}$$

where Dif $ETR_{i,t}$ is the effective tax rate of trust i minus that of the matched firm in year t. The effective tax rates are capped at zero. The remaining factors represent the differences between the values for the income trusts and their matched sample with respect to the factors believed to be related to the success of a firm taking on the income trust structure. $Sector_i$ include dummies for the sector of the income trust i, which is also the sector of the matched firm. Because there are multiple observations for the same firm over time, our standard errors are pooled for each firm to account for the decrease in independence between observations for the same firm over time.

Table 3-4 reports the results for Model 1 which compares the valuation for business and energy income trusts versus the entire matched sample. While we expect that income trusts that have lower effective tax rates than the matched sample would have larger valuation premiums, which would be evidenced by negative coefficients of Dif $ETR_{i,t}$, we do not find the expected results. This suggests that the differences in effective tax rate do not play a clear role in explaining the valuation premium. Factors related to the suitability of the income trust structure are found to play a role in determining the higher valuation of income trusts compared to matched corporations. Income trusts with more tangible assets and lower depreciation have a higher valuation premium. The evidence for other characteristics is mixed with the coefficients changing with different valuation multiples. In summary, those results suggest that other factors besides income tax can have a role in determining the higher valuation of income trusts compared to their matched corporations.

We obtain the residuals from this regression every year and replot them in Figure 3-5b. This unexplained portion of the valuation premium exhibits a pattern corresponding to the life cycle of the income trust structure for the group of business trusts. The unexplained portion peaks in early 2000s and fades in 2005. This suggests that factors other than tax and changes in accounting characteristics matter in the valuation premium of income trusts early in the income trust structure life cycle.

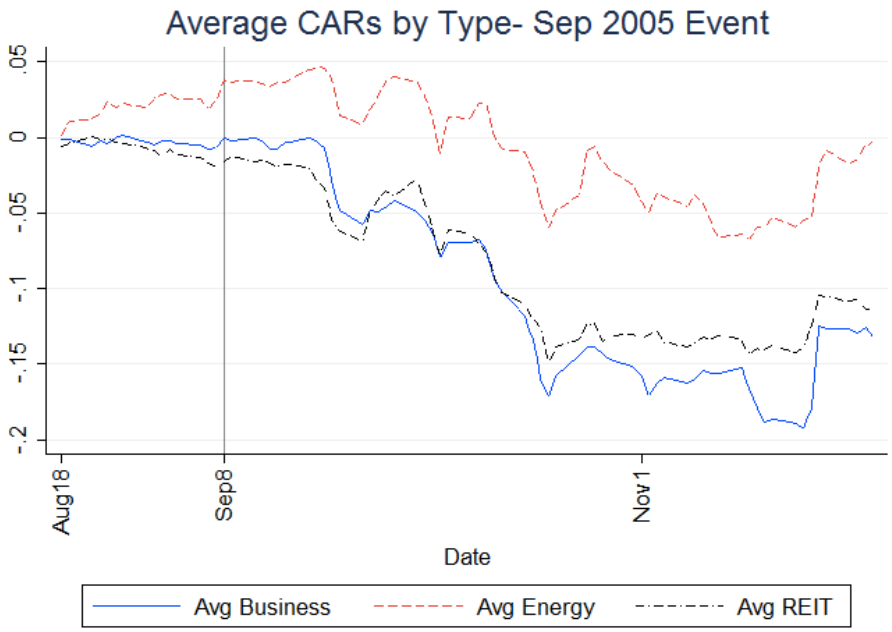
Table 3-4: Explaining Valuation Premium using Differences in Characteristics between Income Trusts and Matched Corporations

	Business				Energy			
	(1) EV/EBITDA	(2) P/E	(3) MTB	(4) QRatio	(5) EV/EBITDA	(6) P/E	(7) MTB	(8) QRatio
Dif ETR	-0.0400	0.377	-0.00194	-0.00107	0.0302	0.566***	0.00296	-0.000558
	(-1.55)	(1.47)	(-0.40)	(-0.44)	(1.21)	(2.83)	(0.32)	(-0.10)
Dif CFVol	0.00117*	-0.00724**	-0.000420***	0.0000168	-0.000179***	-0.00102***	-0.0000502***	-0.0000252***
	(1.81)	(-2.42)	(-3.60)	(0.28)	(-4.42)	(-3.98)	(-4.05)	(-3.68)
Dif CommonDiv/NI	-0.000171***	0.115**	-0.0000164*	-0.0000194***	-0.00193	-0.0438	-0.00156	0.0000380
	(-3.79)	(2.19)	(-1.72)	(-2.75)	(-0.39)	(-1.12)	(-0.87)	(0.04)
Dif ROE	-0.00691***	-0.0324***	0.0317***	0.0191***	-0.0420**	-0.392***	0.0598***	0.0319***
	(-3.09)	(-3.56)	(4.99)	(3.99)	(-2.30)	(-3.95)	(7.20)	(5.72)
Dif NTA/TA	0.0543***	0.236	0.00474***	0.00378***	0.0730***	0.156	0.0282***	0.0202***
	(8.23)	(1.29)	(3.80)	(2.74)	(3.21)	(1.60)	(3.74)	(4.36)
Dif CapEx/TA	0.124*	0.433	0.0322***	0.0181***	0.00623	-0.0314	0.0125	0.0108
	(1.73)	(1.44)	(2.96)	(3.35)	(0.22)	(-0.20)	(1.12)	(1.47)
Dif Depre/TA	-0.693**	-0.271	-0.0683**	-0.0403**	-0.568***	-0.185	-0.171***	-0.110***
	(-2.62)	(-0.47)	(-2.36)	(-2.26)	(-4.77)	(-0.35)	(-5.23)	(-3.96)
Dif Lev	0.0905***	0.640*	-0.00722	-0.0111***	0.00972	0.161	-0.0298**	-0.0253***
	(3.32)	(1.96)	(-1.35)	(-4.36)	(0.32)	(0.75)	(-2.39)	(-3.23)
Dif LCStage	-1.468**	-4.373	-0.188*	-0.0709	-0.284	0.554	-0.0714	0.0428
	(-2.30)	(-1.56)	(-1.96)	(-1.52)	(-0.51)	(0.19)	(-0.34)	(0.31)
Dif Chg_NetSales	-0.00327	-0.00116	-0.000751*	-0.000273	0.00000894***	-0.0000198	0.00000119	0.00000151**
	(-1.23)	(-0.23)	(-1.92)	(-1.31)	(3.44)	(-1.12)	(1.16)	(2.07)
Dif Net Sales	0.000369	-0.00232	0.000202***	0.000102***	-0.00350***	-0.0193***	-0.00123***	-0.000645***
	(1.56)	(-1.38)	(3.88)	(2.99)	(-2.76)	(-2.85)	(-2.86)	(-3.07)
Constant	-0.235	-13.33*	0.148	0.0314	0.413	11.14	0.397	0.0528
	(-0.22)	(-1.82)	(0.93)	(0.43)	(0.39)	(1.59)	(1.09)	(0.24)
N	254	250	242	246	137	141	137	135
adj. R^2	0.239	0.204	0.249	0.291	0.304	0.172	0.401	0.434

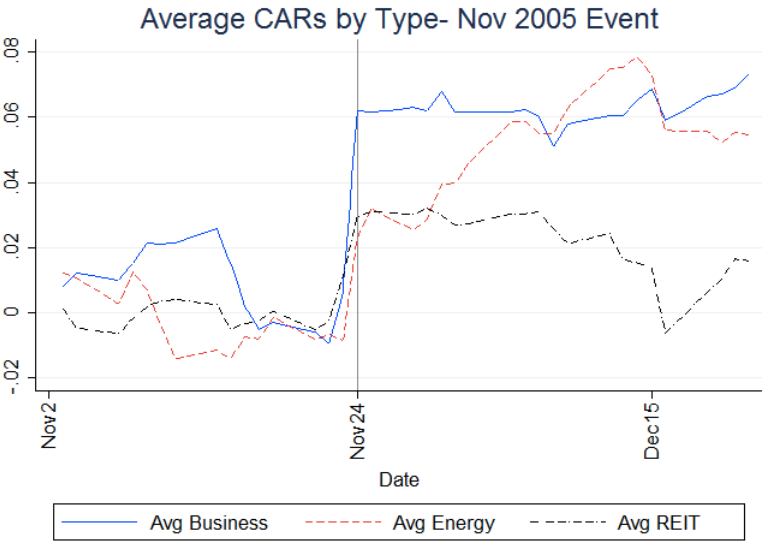
We examine which factors influence the higher valuation of a trust compared to the valuation of matched firms. We focus on the difference in effective tax rate and the factors believed to be important for firms suited to the trust structure. We estimate Model (1) using valuations based on the differences (higher) in the raw values of EV/EBITDA, EV/Sales, P/E, Market-to-Book, and Tobin's Q of income trusts versus their matched corporations. The model is estimated separately for business versus energy income trusts. Variable definitions can be found in the Appendix. We exclude the top and bottom 2% of the dependent variables to mitigate the impact of outliers.

Figure 3-6: Market Reactions to Changes in Tax Regulations

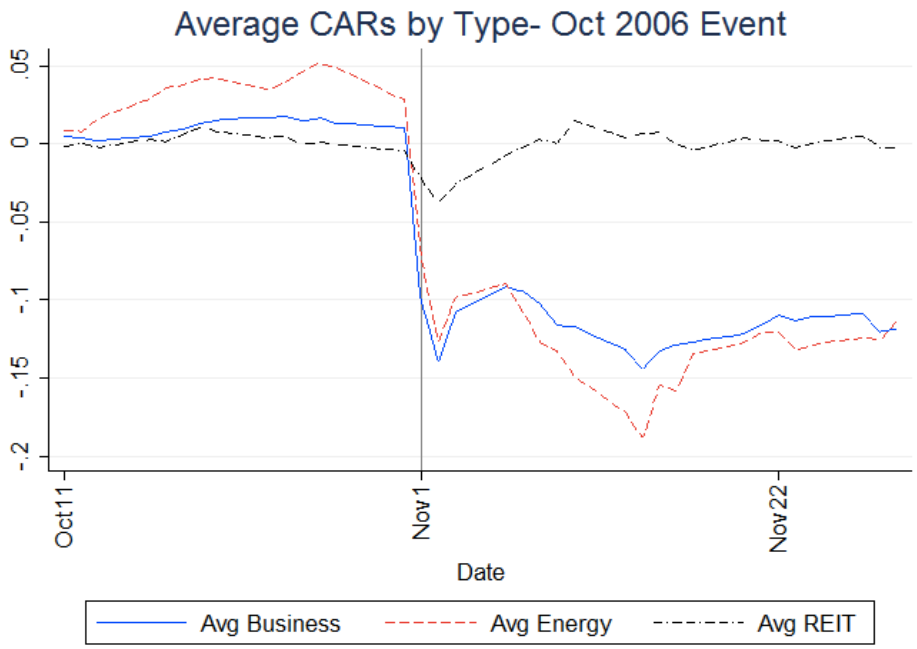
a) Market reaction around the September 2005 announcement by types



b) Market reaction around the November 2005 announcement by types



c) Market reaction around the Halloween Massacre (October 2006 announcement) by types



These figures illustrate cumulative abnormal returns (CARs) around tax policies related events. The prices are based on the prices of the income trusts obtained during the relevant periods in Datastream. The three periods are based on announcements negatively impacting income trusts in September 2005 (suspending advance tax rulings on new income trusts), positively impacting income trusts in late November 2005 (allowing the tax rulings to begin again), and negatively impacting income trusts in October 2006 (the removal of the tax advantage for non-REIT income trusts).

3.6.4 Reaction to the Tax-Related Announcements

We assume the value of firms that are less suited to the income trust structure will be most significantly impacted by the Tax Fairness Plan announcement on October 31, 2006. Specifically, the idea is that firms that are not well-suited to the income trust structure are less able to provide reliable, stable cash flows to their investors. These firms were issued as income trusts to take advantage of the valuation boost provided to income trusts and the tax advantages provided to income trusts but may not have had a sufficiently strong structure to be top quality income trusts. There were many examples of firms becoming income trusts but having a model requiring significant capital expenditures. Since the income trust structure is designed to allow only minimal re-investment in the company and growth, these firms were not ideally suited to the structure. In many instances, their ability to survive outside of this structure was therefore questionable. Consequently, we examine whether investor reaction to the TFP announcement was related to this as well.

In Figure 3-6, we can see the market reaction to positive and negative announcements. In Figures 3-6a and 3-6c, we see how threats of changes to the tax advantage of income trusts caused both a decrease in the valuation in 3-6a and the removal of the discount in 3-6c. The gradual decline in valuation in Figure 3-6a is consistent with the gradual nature of the threat to income trusts being revealed to the markets. It is interesting to see that the fall in value over the period in the Fall of 2005 was about 20 per cent (similar to the drop in October 2006), but the size of the rebound in November 2005 was less than the loss (note: the loss was eventually all earned back). The size of the rebound suggests that markets were not entirely convinced that the tax advantages of income trusts were truly safe.

Since the results in Figure 3-6 indicate differences in how the market reacted for business, energy, and real estate income trusts, it is important to see if there are other factors the market considers in determining how to react to this news. We see that the negative reaction to the announcement was less for firms that became trusts earlier in the sample. There was little difference in reaction if the firm had been a regular equity firm before converting or did an IPO to become a trust. The market did appear to be able to forecast the ultimate fate for each trust, and it did appear to influence the size of the

market reaction to the announcement. Overall, these results are suggestive that traders viewed the firms becoming trusts earlier in the sample as being less sensitive to this announcement and those which were going to be kept as independent entities but converting to equities as being the most sensitive to the loss of the tax advantage.

These results provide evidence that there are other factors which we should consider in evaluating the valuation premium for income trusts. There is clearly a tax advantage, but the influence of these other factors on how investors value income trusts after negative shocks indicates that markets incorporate many different sources of information when valuing stocks—fundamental and potentially behavioral.

To more formally examine these questions, we estimate a model with the dependent variable as the market reaction, which is the cumulative abnormal return for different event windows (event date 1, 2 and 10 days).[26]

$$\begin{aligned}\text{Market Reaction}_{i,t} = {} & a_1 + b_2 * ETR_{i,t-1} \\ & + c_1 * CFVol_{i,t-1} + c_2 * \text{CommonDiv/NI}_{i,t-1} + c_3 * ROE_{i,t-1} \\ & + c_4 * \text{NTA/TA}_{i,t-1} + c_5 * \text{CapEx/TA}_{i,t-1} + c_6 * \text{Depre/TA}_{i,t-1} \\ & + c_7 * Lev_{i,t-1} + c_8 * LCStage_{i,t-1} + c_9 * Size_{i,t-1} \\ & + e_1 * \text{Acquired Post-2006}_i + \varepsilon_{i,t} \quad (3)\end{aligned}$$

with explanatory variables as defined in Model (1) and (2) and measured in the year before the events. Effective tax rates are capped at zero. The accounting data are taken in the year before the events. Acquired Post-2006_i is the dummy for whether the income trust was eventually acquired after 2006. This variable is the actual measure of whether an income trust could survive outside of the trust structure.

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[26] The abnormal return calculation uses November 1, 2006 as the event date. An estimation window from the trading day -200 to trading day -16 is used to estimate the market beta for income trusts. The model estimated is $R_{i,t} = \alpha_i + \beta_i * MKT_t + \varepsilon_{i,t}$ (2), where $R_{i,t}$ is the return of the income trust i on day t; MKT_t is the changes of the S&P TSX index on day t.

Table 3-5: Characteristics to Explain Market Reaction for Income Trusts to Events

	Sep 2005	Nov 2005	Oct 2006			
	CAR (0,0)	CAR (0,0)	CAR (0,0)	CAR (0,1)	CAR (0,2)	CAR (0,10)
Acquired Post-2006	-0.106	-1.206*	2.012**	3.523***	2.303**	5.641***
	(-0.31)	(-1.74)	(2.44)	(2.95)	(2.31)	(3.39)
ETR	-0.000218	0.0353	0.114**	0.169**	0.187***	0.235**
	(-0.01)	(1.10)	(2.34)	(2.40)	(3.18)	(2.40)
CFVol	-40.22	-14.33	-54.45	6.634	-58.85	427.5
	(-0.65)	(-0.12)	(-0.37)	(0.03)	(-0.33)	(1.45)
CommonDiv/NI	0.000354	0.00736***	-0.000143	0.000873	0.00548	-0.00579
	(0.30)	(3.04)	(-0.03)	(0.13)	(0.95)	(-0.60)
ROE	0.0158	0.0171	0.0289	0.0286	0.0417	0.00890
	(1.34)	(0.74)	(1.24)	(0.84)	(1.48)	(0.19)
NTA/TA	0.0137	0.0126	0.0595*	0.0568	0.0901**	0.0607
	(1.02)	(0.70)	(1.88)	(1.24)	(2.35)	(0.95)
CapEx/TA	0.000241	-0.0226	0.0604	0.0170	-0.0165	-0.0573
	(0.01)	(-0.68)	(1.23)	(0.24)	(-0.28)	(-0.58)
Depre/TA	0.0378	-0.168*	-0.0296	-0.151	-0.159	-0.465*
	(0.80)	(-1.79)	(-0.24)	(-0.85)	(-1.08)	(-1.89)
Lev	-0.0156	0.00291	0.0869**	0.0760	0.0813*	0.235***
	(-1.09)	(0.11)	(2.18)	(1.31)	(1.68)	(2.92)
LCStage	-0.498*	0.793	0.297	0.233	0.0422	1.798
	(-1.68)	(1.31)	(0.43)	(0.23)	(0.05)	(1.29)
Size	-0.0142	-0.195	0.226	0.0316	0.168	-0.842
	(-0.10)	(-0.66)	(0.67)	(0.06)	(0.41)	(-1.23)
D_REIT	0.280	-3.183***	8.595***	12.72***	10.34***	18.55***
	(0.48)	(-2.70)	(5.29)	(5.41)	(5.26)	(5.67)
Constant	1.468	2.615	-20.73***	-24.38***	-23.33***	-29.06***
	(0.87)	(0.90)	(-5.13)	(-4.16)	(-4.77)	(-3.57)
N	111	112	137	137	137	137
adj. R^2	-0.011	0.155	0.336	0.289	0.308	0.410

Three events are examined: 08 Sep 2005, 23 Nov 2006, and October 31, 2006 announcements. All income trusts use the Cumulative Abnormal Returns (CAR %) for windows 0, 1, 2 or 10 days around the announcements. These are estimated using Model (2). Size is the log of Net Sales. All variables except for the dummy for being acquired post-2006 event (Acquired Post-2006) are measured in the year before the event. Variable definitions can be found in the Appendix.

Table 3-5 reports the results for Model 3. Firstly, we find that income trusts paying more income tax in 2005 are less impacted by the TFP announcement in October 2006, which is expected. We find that the market reaction is most sensitive to some accounting factors—tangibility, leverage, and the percentage depreciation but especially sensitive to both whether the firm was a REIT and the ultimate fate of the income trust. We continue to find a role played by leverage (likely less negative reaction as these firms are tax avoiders so the tax consequences for them are lower) more negative for firms using more depreciation (likely due to the nature of their assets being more suited for the income trust structure where the use of depreciation allows for investment in growth while paying minimal taxes). The sensitivity to the ultimate fate of the trust for both the events in 2005 and 2006 suggests that markets are efficient in identifying what firms will do in the future and pricing this into their reaction to news and other significant exogenous events. The role of being acquired is interesting as a less negative reaction for these firms indicates the market was pricing in the fact that their assets were such that they would continue to find valuable opportunities later, possible being purchased by financial partners.

In additional analyses reported in Table 3-6, we also consider ownership information due to the role played by institutional owners as well as industry dummies, percentage of assets spun-off from a corporation when an income trust was formed from a part of a business, and the year it became a trust. Following Doidge and Dyck (2015) we consider the effect of different owner types as the investors for the firm in the future. The type of owner is related to the size of the tax advantage enjoyed by trusts, and it is also important to understand the value or costs of the tax changes on the firm, not only the investors. For example, the tax implications of the change in taxes applied to income trusts would have been greatest for tax exempt investors for whom the change would mean a decrease in their return of roughly 30 per cent whereas the change in return would have been much lower for a regular Canadian investor (see the Appendix for a discussion). The percentage of assets spun-off from original business may matter since if an income trust has been formed as a selective part of a business, there can be a higher chance that its assets are more suitable to the trust structure. This will impact the valuation once the trust structure is no longer available to the firm. We also hypothesize

that income trusts that have been formed earlier are better suited to the trust structure. We do not find any of those additional variables to be important, and our results for other factors remain largely the same.

Table 3-6: Additional Checks on Market Reactions

	(1)	(2)	(3)	(4)
D_100Assets	1.345			
	(0.74)			
Become Trust Btw 02 and 04 vs. Bf 02		-1.606		
		(-1.60)		
Become Trust Af 04 vs. Bf 02		-1.777		
		(-1.14)		
Inst Own			-0.0391	
			(-1.23)	
Acquired Post-2006	2.184	2.074**	1.964**	2.171**
	(1.48)	(2.50)	(2.40)	(2.61)
ETR	0.111	0.120**	0.135***	0.117**
	(0.84)	(2.32)	(2.88)	(2.43)
CFVol	-187.8	-40.00	-55.59	23.70
	(-0.57)	(-0.27)	(-0.39)	(0.16)
CommonDiv/NI	0.00386	-0.0000364	0.00392	-0.000804
	(0.37)	(-0.01)	(0.84)	(-0.17)
ROE	0.0289	0.0282	0.0365	0.0211
	(0.73)	(1.20)	(1.60)	(0.86)
NTA/TA	0.0597	0.0435	0.0748**	0.0517
	(0.89)	(1.28)	(2.44)	(1.61)
CapEx/TA	0.0632	0.0583	0.0663	0.0360
	(0.69)	(1.19)	(1.36)	(0.70)
Depre/TA	-0.206	-0.0357	-0.0546	0.0139
	(-0.68)	(-0.29)	(-0.46)	(0.10)
Lev	0.108	0.0727*	0.0744*	0.0933**
	(1.26)	(1.77)	(1.88)	(2.35)
LCStage	0.812	0.186	0.686	0.328
	(0.55)	(0.26)	(1.00)	(0.47)
Size	-0.127	0.0285	0.382	0.117
	(-0.19)	(0.08)	(1.14)	(0.33)
D_REIT		8.130***	9.162***	
		(4.93)	(5.79)	
Constant	-21.24**	-17.03***	-23.74***	-19.07***
	(-2.65)	(-3.56)	(-5.95)	(-3.94)
Sector Dummy	N	N	N	Y
N	52	137	127	137
adj. R^2	-0.126	0.340	0.399	0.378

We check for the role of institutional owners, industry dummies, percentage of assets spun-off from a corporation when an income trust was formed from a part of a business, and the year it became a trust in explaining the abnormal return of the day of the TFP announcement (CAR(0,0) on Nov 1, 2006 (%)). Size is the log of Net Sales. All variables except for the dummy for being acquired post 2006 event (Acquired Post-2006) are measured in 2005. Variable definitions can be found in the Appendix.

3.7 Conclusions

The preliminary analyses presented in this study suggest some interesting potential contributions to the literature in both behavioral corporate finance and asset pricing. These contributions raise some questions for further investigation which we continue to examine. The contributions start with our documentation of a valuation premium for firms adopting the income trust structure. Most of the existing studies focusing on income trusts (e.g., Amoako-Adu and Smith (2008), Doidge and Dyck (2015)) have examined which characteristics appear to be able to explain the market reaction to the October 2006 announcement, but little time has been spent studying which factors, beyond taxes, are related to the income trust valuation premium and thus what factors could explain the size of the market reaction to the announcement for our set of firms. Looking only at the valuation premium near the end of the income trust life cycle, there is little remaining evidence of the significant valuation which motivated so many firms to adopt this structure, so these studies do not consider factors beyond taxes as the motivation for income trusts having been so attractive to managers.

Our study demonstrates that there are interesting forces at play which go beyond taxes to explain what factors are valued by investors in relation to income trusts. Specifically, we find a substantial valuation premium which decreases over time. Although over the entire sample period we find a role played by factors related to the suitability of the firm for the income trust structure, the results indicate the presence of other factors. When we look at the stability of the relationships over time, we see how the premiums decrease, and we therefore attribute part of the size of the premium to a premium paid by investors for the liquidity provided to investors by the regular distribution payments of trusts and the novelty of this structure. Both of these decrease over time, especially as the quality of firms entering the market using this structure started to deteriorate—managers were rationally observing how investors were valuing the characteristics of this structure and thus adopted it to obtain the higher valuation.

To formally examine the sources of the premiums, we examine the role of several factors in the size of the premium and how this changes over the life cycle of income trusts. We also find that the deterioration in the characteristics of the income trusts

believed to be important for their survival corresponds to a large portion of the decrease in the valuation premium. This suggests that there was, in fact, a premium for income trusts beyond that for the increased tax efficiency of this structure. Though we cannot confirm whether it is for liquidity, it is a plausible explanation. In our analysis of the market reaction to different events, we do not find evidence of these factors playing a role at the end of the sample.

Since our results suggest that some firms were better suited for the income trust structure than others and this led to differences in the size of the valuation premium across firms, we also examine the relationship between the market reaction to the October 2006 announcement that income trusts would be losing their preferential tax treatment. For firms that were less ideally suited to the income trust structure we would expect the market reaction to be larger than for those which were better suited—those firms which took advantage of the structure for the higher valuation may have been lower quality firms. Consequently, we examine the relationship between our factors measuring income trust suitability and the market reaction. We find significant differences in market reaction based on some, but not all, of the key characteristics.

Looking at the final stages of the income trust life cycle, we also consider the ultimate fate for our income trusts once the preferential tax treatment has ended. Some trusts were able to convert to regular equity firms on their own, some were acquired by other trusts, and then the new, larger, entity converted; others were purchased by private equity or strategic partners and taken private, while other firms failed. Here we find evidence that the market reaction was impacted by the trust's ultimate fate. Consequently, it appears that investors are able to rationally value firms and their valuation depends on different, rational factors. Similarly, managers observe this behavior and correspondingly make their decisions regarding different financial decisions based on what they observe.

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Appendix 3-A: Variable Definition

Variable	Description
CapEx/TA (%)	Capital Expenditure/Total Assets
CFVol (%)	Cash Flow Volatility, calculated as standard deviation of operating cash over total assets (expressed in %) in the previous five years.
Chg_EBITDA (%)	EBITDA Growth, calculated as (EBITDA(n)-EBITDA(n-1))/EBITDA(n-1)
Chg_NetSales (%)	Net Sales Growth, calculated as (Net Sales(n)-Net Sales(n-1))/Net Sales(n-1)
Chg_TotalAssets (%)	Total Assets Growth, calculated as (Total Assets(n)-Total Assets(n-1))/Total Assets(n-1)
Depre/TA (%)	Depreciation, calculated as Depreciation, Depletion, and Amortization/Total Assets
DivPayoutSh (%)	Dividend payout per share, calculated as Dividend per Share/Earnings Per Share
CommonDiv/NI (%)	Payout Ratio, calculated as Common Dividend as percentage of Net Income
DY (%)	Dividend Yield
ETR (%)	Effective Tax Rate, calculated as 100*Income Tax/Pretax Income, capped at 0, exclude negative Pretax Income
EV/EBITDA	Enterprise Value/EBITDA, calculated as (Market Value + Total Liabilities)/EBITDA, exclude negative EBITDA
EV/Sales	Enterprise Value/Net Sales Ratio, calculated as (Market Value + Total Liabilities)/Net Sales
P/E	Price/Earnings Ratio=Price per Share/EPS, exclude negative EPS
Inst Own (%)	Institutional Ownership, which is the total percentage of shares held by investment banks, institutions, government, pension funds, or another company
LCStage	Life Cycle Stage. 1=Introduction, 2=Growth, 3=Mature, 4=ShakeOut, and 5=Decline. (Life cycle stage is calculated using cash flows categorization method in Dickinson, 2011).
Lev (%)	Leverage, calculated as Total Debt/Total Assets
MV ($mil)	Market Value
NI ($mil)	Net Income
Net Sales ($mil)	Net Sales
NTA ($mil)	Net Tangible Assets
NTA/TA (%)	Net Tangible Assets/Total Assets
R&D (%)	R&D/Net Sales
TA ($mil)	Total Assets
D_REIT	Dummy equals 1 for REIT and 0 otherwise.
Dif CFVol (%)	Difference in Cash Flow Volatility between Trust and Matched Corporation
Dif ETR (%)	Difference in Effective Tax Rate between Trust and Matched Corporation
Dif Div Yield (%)	Difference Dividend Yield between Trust and Matched Corporation
Dif Tangibility (%)	Difference in Tangibility between Trust and Matched Corporation
Dif CapEx (%)	Difference in Capital Expenditure between Trust and Matched Corporation
Dif Depreciation (%)	Difference in Depreciation between Trust and Matched Corporation
Dif Leverage (%)	Difference in Leverage between Trust and Matched Corporation
Dif LCStage	Difference in Life Cycle Stage between Trust and Matched Corporation
Dif Size ($mil)	Difference in Net Sales
Size	Log of Net Sales ($mil)
CAR (%)	Cumulative Abnormal Returns, calculated using the CAPM model with changes in the S&P TSX Index as the market returns
Acquired Post-2006	Dummy for if an income trust was subsequently acquired after the TFP

Appendix 3-B: Life Cycle Stage Classification

	Intro	Growth	Mature	Shake-Out	Shake-Out	Shake-Out	Decline	Decline
CF Operating	-	+	+	-	+	+	-	-
CF Investing	-	-	-	-	+	+	+	+
CF Financing	+	+	-	-	+	-	+	-

Following Dickinson (2011), this table explains how the life cycle stage is defined based on the signs of the cash flows.

Appendix 3-C: Taxes and Income Trusts

To provide a better understanding of the tax situation for income trusts, below are some examples using federal and provincial taxes to compare the magnitude of the tax revenues generated by the government for income trusts relative to standard corporations and how they depend on the type of shareholder.

We will start with the tax situation for a regular corporation. If we start by assuming the corporation earns $1 of pre-tax income, we can demonstrate the amount the government receives and the investors receive very simply. Since the tax rates differ across the provinces, we would need to identify the location in which each corporation is carrying on business in Canada. The tax rate also depends on whether the corporation was a Canadian-controlled private corporation, the type of income earned, and the province in which the income was earned. The following explanation gives an idea of the tax situations for companies: a publicly traded corporation operating exclusively in Ontario faced a tax rate of approximately 36 per cent during our sample period. The rates across Canada in 2005 varied from a low of 31 per cent in Quebec to a high of 39 per cent in Saskatchewan. Everything is much simpler for income trusts as an income trust would have paid no taxes regardless of its location. This means the regular corporation would have between $0.69 and $0.61 to distribute to its investors, if it chose to, and the income trusts would have $1 to distribute to investors. (Note: the income trust must distribute the majority of this to its investors whereas the regular corporation can choose whether to distribute any of the remaining income to its investors or to re-invest it in the company.)

Using the 36 per cent corporate tax rate for Ontario, we will look at the tax implications for different types of investors. Starting with foreign investors (say someone from the United States), if it was a regular corporation and paid all of its post-tax profits to the investors, they would receive a $0.64 dividend. U.S. investors would pay a 15 per cent withholding tax of $0.10 so $1 of pre-tax earnings was worth $0.54 to a U.S. investor. An income trust would not have to pay any corporate tax so that $1 could be fully paid out to the investors. A U.S. investor would therefore have to pay the withholding tax ($0.15 in withholding tax) so $1 of pre-tax earnings was worth $0.85 after all taxes were paid in Canada. If the U.S. investor was a non-taxable entity, no

further tax was due in the United States but the withholding tax could not be recovered. Taxable U.S. investors could recover the withholding tax but owed personal taxes. Most trusts were treated as a foreign corporation for U.S. federal income tax purposes—distributions were treated as dividends and were subject to the same tax rate as dividends paid by a Canadian corporation.

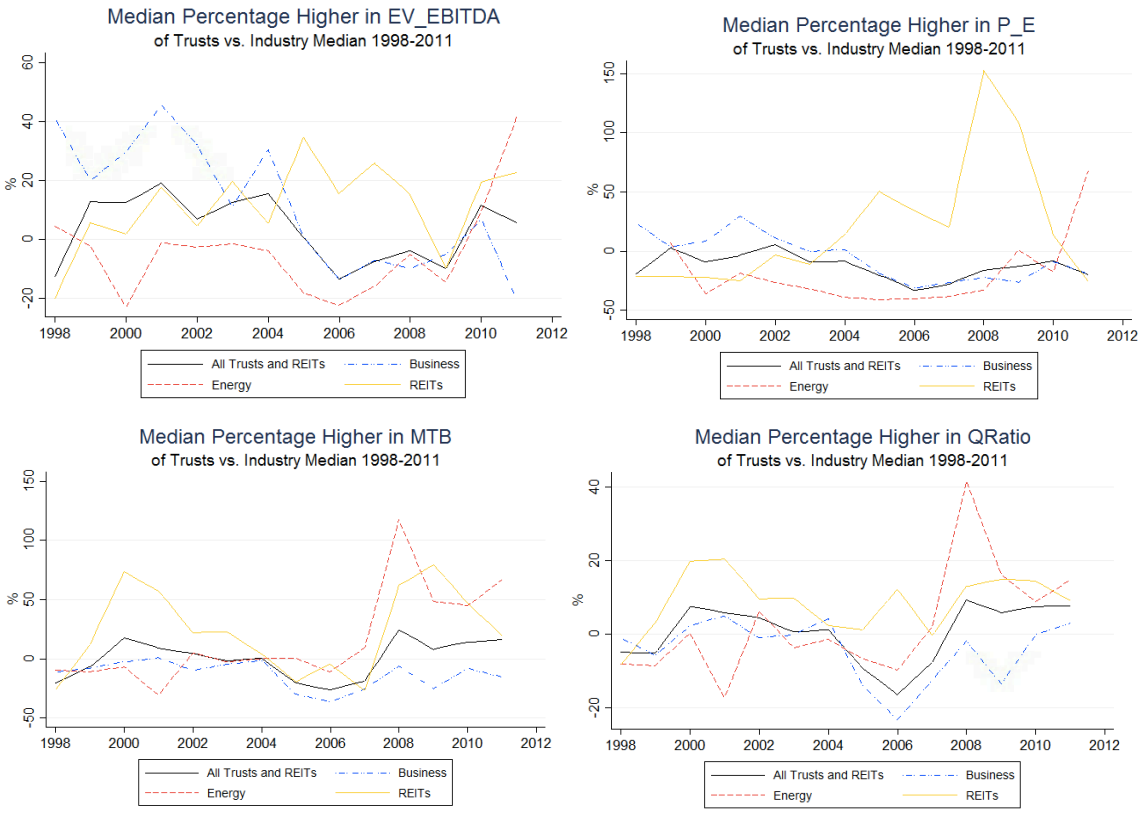
For individual Canadian investors, the distributions from the income trusts were treated as regular income, so they were taxed at individual statutory rates: top statutory rates on individuals were 46 per cent in Ontario in 2005 and ranged from 39 per cent in Alberta to almost 49 per cent in Newfoundland and Labrador. This is where corporations and income trusts have some important differences. Individual Canadian investors receiving dividends from corporations did not pay tax on the entire amount of the dividends whereas they would pay tax on the entire amount of the distributions from the trusts. The government attempted to decrease the double taxation on the dividends from corporations to acknowledge the fact that dividends are paid from the corporation's after-tax income (i.e., the corporation has already paid some tax on their profits). The tax credits provided by the government for the taxes already paid on corporate profits means that dividends were taxed at a theoretical maximum rate of 31 per cent in Ontario. For investors in other provinces, the maximum rate ranged from 24 per cent in Alberta to 37 per cent in Nova Scotia and in Newfoundland and Labrador. For public corporations that owned shares, dividends were exempt from taxation (that is, corporations received a 100 per cent dividend deduction) so the only taxes were those paid by the corporation before distributing them to their investors.

Assuming shareholders are 40 per cent regular Canadian individual investors, 40 per cent are tax exempt Canadian individual or institutional investors, and 20 per cent are foreign investors, an idea of the tax implications of the income trust structure for the government is as follows: a corporation with $100 in income would pay 36% or $36. Trusts with $100 of income would pay no corporate taxes so $100 would flow through to the investors. After corrections for double taxation for the regular corporation, the Canadian individual investors in the highest tax bracket would pay 31 per cent on their $40 of the earnings (or $15.20), the tax-exempt investors would pay no taxes on their $40, and the foreign investors would pay a 15 per cent withholding tax on their $20 (or

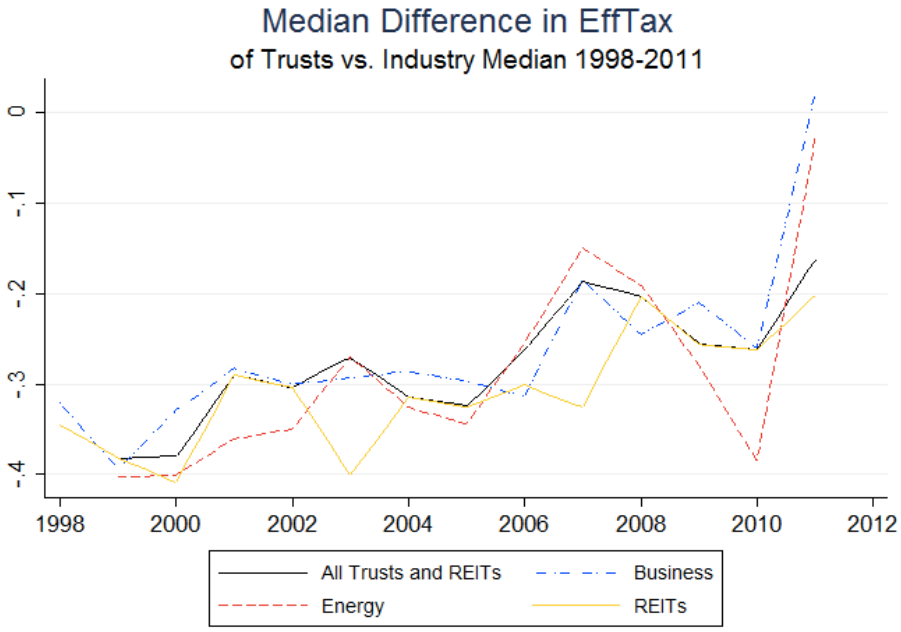
$3). This means the government would receive the $36 plus $18.20 (about $54) from a corporation. For the income trust, the $40 to the regular investor would be taxed at their marginal rate which was slightly over 50 per cent in Ontario— or $20. There would be no taxes paid by the institutional shareholders (e.g., pension funds) and only the 15 per cent withholding tax for the U.S. investors—or the $3 as above. This means the government receives only $23 versus $54 per $100 of earnings for firms using the income trust structure versus a standard corporate structure.

Appendix 3-D: A Comparison with Industry Average

To address the concern of imperfection in our matching method, we compare an income trust to the average firm in the same industry.



Median Difference by Year in Effective Tax Rate between Trusts and Industry Median



Chapter 4

4 Offshore Bonds and Maturity Diversification

4.1 Introduction

How firms manage the maturities of their debts is an important research topic in corporate financing that begins as early as Stiglitz (1974) and Myers (1977). An aspect of maturity management that has raised growing interest in the literature is maturity diversification. Scholars show that by spreading out maturities of debts across different ranges, firms can avoid rollover risk and better manage their financing (Norden, Roosenboom, and Wang, 2016, Gopalan, Song, and Yerramilli, 2015, and Choi, Hackbarth, and Zechner, forthcoming).

In an internationalized financial market, it has been hypothesized that tapping the offshore bond market is a way firms can diversify the maturity structure of their bond profiles. By issuing into a larger and more complete market offshore, firms may complement domestic bonds with offshore bonds of different maturities than at home (Black and Munro, 2010). For example, in 2001, LG-Caltex Oil Corp, Korea's second largest oil refiner at the time, issued a 300-million U.S. dollar denominated bond into the Euro/144A market. The bond was issued into the 10-year maturity, while pre-existing and new domestic bonds all had maturities of no more than 3 years.[27] In 2015, Apple Inc. issued domestic U.S. bonds into the 2-, 5-, 7-, 10-, and 30-year maturity ranges. Yet, the firm was able to expand the maturity diversification of its bond profile further to cover middle maturity ranges (12-, 14-, 15-, 27-year) by borrowing from the European markets. Another example is La Poste SA, a French postal service firm that issued new offshore bonds into maturities of 5 and 7 years in 1992. Those maturities are shorter than what the firm has in its domestic bond book (7, 8, and 9 years) and are also shorter than what the

[27] The bond issue was thought as an attempt to lengthen the firm's maturity profile: *"This is not a company that needs to raise debt," an observer concludes. "But it is one that's keen to lengthen its maturity profile."* (Finance Asia). In fact, during the period 1991-2015, South Korean firms borrow relatively short-term in the domestic market, with 61% of total dollar value of domestic bonds belonging to the 3-4 year maturity range (calculated from SDC Platinum data).

majority of French firms borrowed during 1991-2015.[28] Those examples are illustrated in Figure 4-1 and demonstrate how the maturity structures of firms become more diverse after tapping offshore bond markets compared to if the firms issue only domestic bonds. This chapter aims to answer the research questions: How do firms manage maturity structure of their bond profiles with the presence of the offshore bond market? Is there a maturity diversification effect from issuing bonds offshore?

How might accessing an offshore bond market provide firms with maturity diversification benefit? Internationally, different bond markets may have preferences for different bond maturities due to tastes of the investors as well as institutional, legal, and financial characteristics of the markets. The market segmentation theory to explain the yield curve by Culbertson (1957) and the preferred habitat theory by Modigliani and Sutch (1966) propose that there are separate markets for different maturities, with each maturity having its own supply and demand. Guibaud, Nosbusch, and Vayanos (2013) build a theory on clientele model of the yield curve and show that difference in median age of the population explains variation in average maturity of OECD (Organisation for Economic Co-operation and Development) countries' government debts. Roll (1971) views a diversified bond portfolio as one having bonds of different maturities and the separation in preferences could be caused by institutional and regulatory factors. Maturity structure has been shown by Demirgüç-Kunt and Maksimovic (1999), Giannetti (2003), Zheng et al. (2012), and Fan et al. (2012) to exhibit systematic differences across countries due to differences in countries' financial market development, legal and institutional environment, and national culture. Furthermore, the cost of hedging in each different maturity can vary across currencies depending on availability of the government bond yield curves, making maturity availability specific to each market (Siegfried, Simeonova, and Vespro, 2007, Baker and Riddick, 2013).

While enhancing maturity diversification of the bond profiles is a potential benefit that has been hypothesized in previous studies and there is early evidence that lends support to this hypothesis, a more thorough study employing different methods to

[28] Seventy-five per cent of bond value has been issued into the 9- to 20-year maturity range in France during 1991-2015 (author's calculation from SDC Platinum data).

investigate the diversification effect may be worthwhile. Prior works have tested the maturity diversification hypothesis by comparing average maturities of offshore versus domestic bonds. Black and Munro (2010) find that offshore bonds tend to have longer maturity than bonds issued onshore. Henderson, Jegadeesh, and Weisbach (2003) also document that the proportion of debts with longer maturity is higher for international bonds than domestic debts. This evidence supports the diversification benefit by showing that firms borrowing in the offshore market get access to longer debt maturity range. However, looking only at the average maturity is a limited approach to tell whether there is a maturity diversification effect in issuing offshore bonds. For example, such results do not account for the case when firms diversify debt maturity structure by issuing offshore into the middle maturity ranges while issuing into the short and long ends of the maturity spectrum at home. In that case, diversification takes place; however, a comparison of average maturity between offshore and domestic bonds may not pick up the case. For the Apple Inc. example discussed earlier where offshore bonds diversify the maturity structure of domestic bonds in the middle maturity ranges, simply comparing average maturity of offshore bonds with that of domestic bonds will not convey enough information about possible maturity diversification effect.

This study differs from the previous literature in at least two dimensions. While I also test the maturity diversification benefit hypothesis, I use more detailed data and employ methods that more specifically address potential maturity diversification effect compared with previous works on maturity of offshore bonds. My data with transaction details merged with firm characteristics control for other factors that could impact the maturity choice. I also use different measures of maturity diversification that may more accurately address the maturity diversification benefit. I look at the maturity structure of offshore bond issues at firm level in addition to average maturities of offshore bond issues at aggregate level compared to previous studies. This will allow the examination of potential maturity diversification effect in different maturity ranges. I also employ an identification strategy which includes the propensity matching method and difference-in-difference to further the knowledge on potential maturity diversification effect.

At the firm level, my study shows that throughout their lifetime, firms issue new offshore bonds with maturity structure similar to that of new domestic bonds. A higher

proportion of new domestic bonds issued into a maturity bin by a firm throughout the sample period is associated with a higher proportion of new offshore bonds issued by that firm into the same maturity bin. I also find that having new offshore bonds issued in a year is associated with a lower degree of maturity diversification (lower inverse of the Herfindahl index), whereas the opposite is true for having new domestic bonds issued in a year. Looking at all firm-year pairs in the sample (both those that use only the domestic bond markets and those that also use the offshore bond markets), I find that in the year a firm has offshore bonds outstanding, it has lower inverse of the Herfindahl index, which means a lower measure of maturity diversification. To control for selection bias where firms that choose to use the offshore bond markets are different from firms that never borrow offshore, I use a propensity score matching method to create a matched group of domestic-only U.S. firms to compare with U.S. firms that used the offshore bond market during the 2008 financial crisis. The crisis is used as a shock in a difference-in-difference analysis to examine whether firms that use the offshore bond market have higher maturity diversification than firms that never borrow offshore in case there is constraint in the domestic credit market. The difference-in-difference analysis does not reveal an impact of using the offshore bond market on the degree of maturity diversification post-crisis for U.S. firms. The above findings challenge the maturity diversification effect of offshore bonds.

Nevertheless, I do find that for the subsample of firms that use the offshore bond markets, a firm has a higher inverse of the Herfindahl index in the years it has offshore bonds outstanding, meaning higher maturity diversification in those years. In order to find the sources of potential maturity diversification effect in the years a firm has offshore bonds outstanding and how firms choose maturity of new offshore bond issues, I look closely at how the maturity structures of new offshore, pre-existing offshore, pre-existing domestic, and new domestic bonds of a firm in a year are related. I find that the proportions of outstanding offshore bonds (new and pre-existing) are negatively related to the proportions of outstanding domestic bonds (new and pre-existing) for the middle maturity ranges and not for the short or long ends of the maturity spectrum. In terms of how a firm chooses maturities of new offshore bonds, I also find that a firm is more likely to have high proportions of new offshore bonds issued into very short (very long)

maturity if it has high proportions of pre-existing domestic, pre-existing offshore, and new domestic bonds in the very short (very long) maturity ranges. In other words, maturity diversification does not happen in the short and long ends of the maturity spectrum. A firm is more likely to diversify its maturity profile if it issues offshore bonds into the middle ranges of the maturity spectrum as the proportion of new offshore bonds are negatively related to the proportion of pre-existing domestic bonds in the middle maturity ranges. A plausible explanation is that large firms tend to borrow in the very short or very long maturity ranges at home (Guedes and Opler, 1996) and will continue to do so in the offshore market. Meanwhile, small firms may have higher proportions of bonds in the middle maturity ranges at home, while they borrow more in either the short or long maturity ranges in the offshore market. Therefore, it is possible that only smaller firms will enjoy maturity diversification benefit when borrowing in the offshore bond markets.

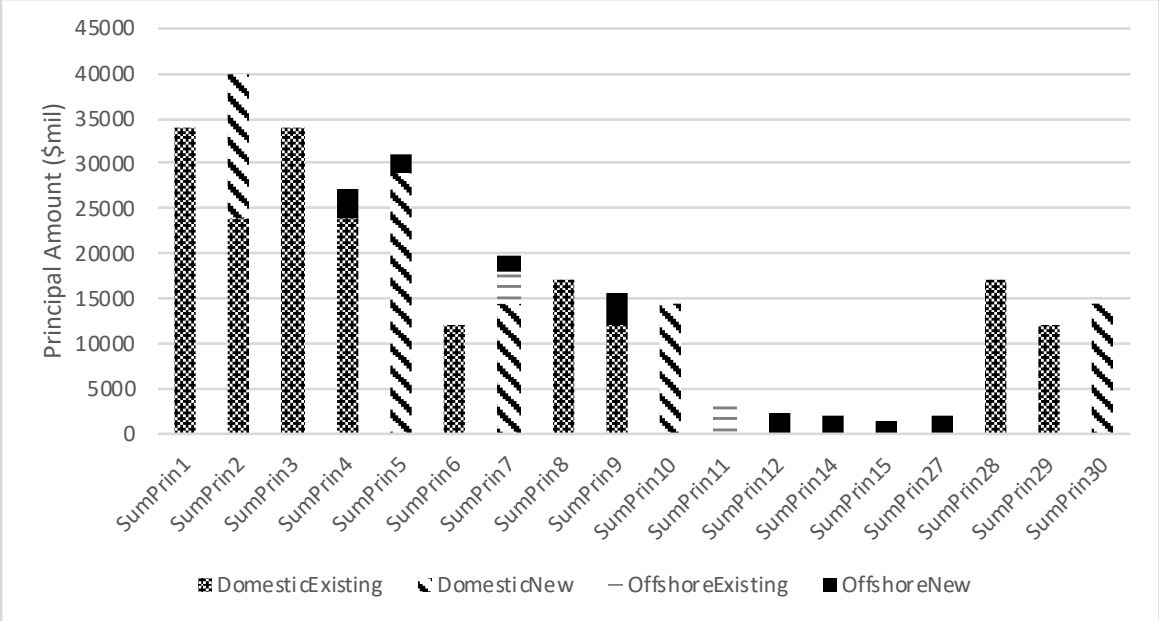
This chapter therefore contributes to the literature in motivations to use the offshore bond market. Scholars have investigated various reasons why firms use the offshore bond market, which include the hedging motivation (Géczy, Minton, and Schrand, 1997, Allayannis and Ofek, 2001, Graham and Harvey, 2001, Bancel and Mittoo, 2002, Allayannis, Brown, and Klapper, 2003, Kedia and Mozumdar, 2003, Elliott, Huffman, Makar, 2003, and Aabo, Hansen and Muradoglu, 2013), tax (Graham and Harvey, 2001, Bancel and Mittoo, 2002, Desai, 1998, Panteghini, 2009), institutional constraint (Allayannis, Brown, and Klapper, 2004), market timing (Keloharju and Niskanen, 2001, Henderson et al., 2006, and McBrady and Schill, 2007), and maturity diversification (Black and Munro, 2010). Among them, the hedging and the maturity diversification motivations suggest different outcomes on how maturities of offshore bonds and domestic bonds are related. If the maturity diversification motivation is dominant in the choice of offshore bond maturity, one would expect firms to choose different maturity for offshore bonds compared to maturity of domestic bonds. In the survey of financial managers by Bancel and Mittoo (2002), firms tap the offshore bond market mostly to provide a natural hedge for their business and to keep the source close to the use of funds. Such motivations suggest that offshore bond maturity should not differ from what is issued domestically if the business offshore is the same as the

business at home. The empirical evidence suggests that there could be maturity diversification benefit from issuing offshore bonds; however, this is not a systemic phenomenon. Therefore, both the hedging and the maturity diversification motivations may play a role in bond maturity management in the offshore market.

This chapter also contributes to the growing literature on bond maturity management and more specifically on the debt maturity profiles of firms. Choi, Hackbarth, and Zechner (forthcoming) show that firms actively manage their debt maturity profiles by issuing into maturity bins that have low proportions of pre-existing bonds remaining. My work adds to this literature by examining how firms manage their bond maturity profiles with the presence of the offshore bond market. The results suggest that firms that borrow offshore in general do not have a higher degree of maturity diversification compared to firms that borrow only domestically.

The remainder of the chapter is organized as follows: Section 4.2 provides a literature review for relevant papers to my study, specifically in the fields of offshore bond market and maturity structure management. Section 4.3 describes the data and variables used in the empirical analysis. Section 4.4 develops the hypotheses for testing, which include the hypothesis about choice of maturity at issuance and the hypothesis about the degree of maturity diversification. Section 4.5 reports the results for the tests, where I examine how maturity at issuance differs between offshore versus domestic bonds, and how offshore bonds add to the degree of maturity diversification each year. Section 4.6 performs robustness checks. Section 4.7 concludes.

Figure 4-1: Examples on Maturity Structure of Offshore versus Domestic Bonds
a. Maturity Structure of Bonds for Apple Inc. 2015

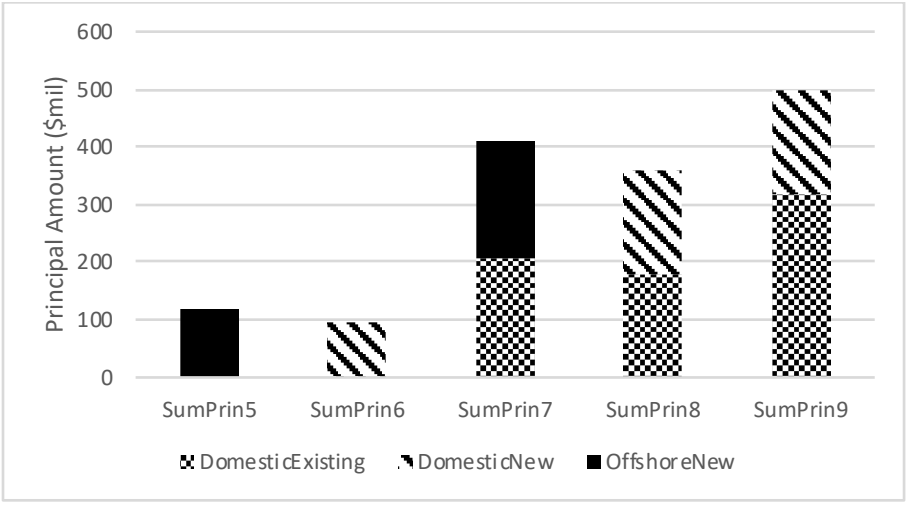


In 2015, Apple Inc. issued new offshore bonds into maturities of 4,5,7,9, 12, 14, 15, and 27 years. Of those maturities, the 12-, 14-, 15-, and 27-year bonds diversify maturity structure of existing domestic bonds as well as new domestic bonds. Data source: SDC Platinum.

Data: Apple Inc.'s New Bond Issuance in 2015

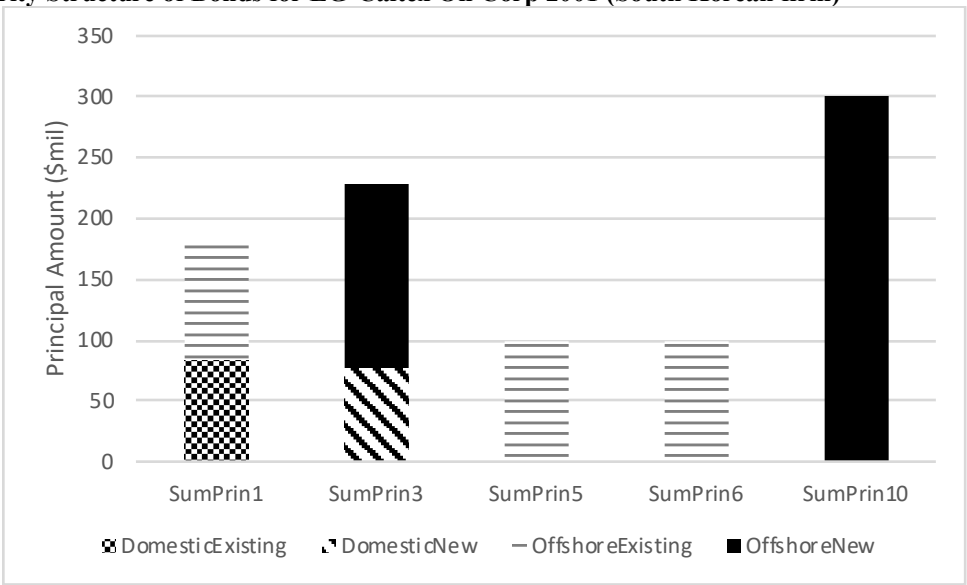
Issuer	Principal Amount ($mil)	Currency	Target Market	Maturity
Apple Inc	1938.875	STG	Euro Public	14
Apple Inc	6500	US	United States	10
Apple Inc	6500	US	United States	5
Apple Inc	1348.29	SFR	Foreign Public	15
Apple Inc	2009.5	Y	Euro Private	5
Apple Inc	6500	US	United States	5
Apple Inc	2256.318	EUR	Euro Public	12
Apple Inc	1646.775	AU	Foreign Private	4
Apple Inc	1646.775	AU	Foreign Private	4
Apple Inc	6500	US	United States	7
Apple Inc	8000	US	United States	10
Apple Inc	6500	US	United States	30
Apple Inc	8000	US	United States	7
Apple Inc	1348.29	SFR	Foreign Public	9
Apple Inc	8000	US	United States	2
Apple Inc	8000	US	United States	2
Apple Inc	8000	US	United States	5
Apple Inc	8000	US	United States	5
Apple Inc	1938.875	STG	Euro Public	27
Apple Inc	8000	US	United States	30
Apple Inc	2256.318	EUR	Euro Public	9
Apple Inc	1646.775	AU	Foreign Private	7

b. Maturity Structure of Bonds for La Poste SA 1992 (French Firm)



French firms used to borrow longer term in the domestic market compared to other countries. Most bonds (75% of total dollar amount) are issued into the 9-10-year and 11-20-year ranges. In 1992, La Poste SA had domestic bonds of 7-, 8-, and 9-year maturities. It issued new offshore bonds in shorter maturities (5- and 7-year) compared to pre-existing and new domestic bonds, therefore diversifying the range of maturities in its bond maturity structure.

c. Maturity Structure of Bonds for LG-Caltex Oil Corp 2001 (South Korean firm)



As opposed to French firms, South Korean firms borrow short-term in the domestic market. Sixty-one per cent of total dollar value of domestic bonds belongs to the 3-4-year maturity range. When LG-Caltex Oil Corp, Korea's second largest oil refiner at the time, issued new offshore bonds in 2001, it issued into the 10-year maturity, while its pre-existing and new domestic bonds all had maturities of no more than 3 years. Therefore, offshore bonds helped diversify the maturity structure of LG-Caltex Oil Corp. In fact, for LG-Caltex, all bonds of 10-year maturity at issuance are issued abroad, and all domestic bonds are issued into the 3-year maturity tranche.

4.2 Literature Review

4.2.1 Bond Maturity Determinants

The maturity structure of corporate debts has been an established research topic at least since Modigliani and Miller (1958) and Stiglitz (1974). Early works such as Modigliani and Miller's (1958) irrelevance proposition show that the choice among various financing options does not affect the value of a firm. Stiglitz (1974) extends Modigliani and Miller's (1958) theory to show that the maturity structure of debt also does not matter for firm valuation. However, underlying the results in Modigliani and Miller (1958) and Stiglitz (1974) are assumptions that can be violated such as market completeness and imperfection. The theories include asset matching, agency conflict, signaling, information asymmetry, taxes, market timing, and recently the supply from the government bond market.

Asset Matching

The matching principle refers to the practice that firms tend to match the maturities of their assets and liabilities. Myers (1977) suggests that matching maturities could be explained by his theory of underinvestment by timing the maturity of debt to be the time when the assets start to decline in value. Therefore, agency theory can serve as the theoretical ground for the matching principle. Hart and Moore (1994) emphasize that the choice of debt maturity depends on the use of the debt; for example, long-term debt is associated with real-estate properties, whereas short-term debt is used for working capital purposes. Stohs and Mauer (1996) find that firms with longer-term asset maturity use more long-term debt. Emery (2001) models the choice of maturity of debts for a firm so as to match the demand for its products. The choice of short-term debt is to match production and sales to the demand of final goods. For example, if the demand for a firm's product is cyclical, the debt and assets also follow the cyclical pattern. However, Mitchell (1991) finds no evidence that firms match debt to asset maturity. Guedes and Opler (1996) find that the matching theory is partly correct that firms issuing debts of longer than 30 years have longer asset lives than those issuing in maturities shorter than 30 years, while asset lives among those issuing bonds shorter than 30 years do not exhibit a major difference.

Asymmetric Information and Signaling

The asymmetric information theory assumes that the type of firms is known to the borrowers but not the lenders. The choice of maturity serves as a way to signal the type of firm. Myers and Majluf (1984) propose that the type of a firm is known only to the firm and not the investors; therefore, the firm will prefer the type of securities that the investors value most and the investors will rationally interpret the firm's choice as a signal about its type. Fama (1980) suggests that maturity structure of a debt contract serves as a mechanism to lower monitoring costs since it reflects the determination to provide information, monitoring, and bonding. Therefore, it could be used as a signal about the type of borrower in the debt contract. Theoretical papers such as Flannery (1986), Robbins and Schatzberg (1986), Kale and Noe (1990), and Diamond (1991) concentrate on the role of information asymmetry between the borrowers and the lenders and debt maturity. When there is less information about the borrowers, short-term loans are used more because this is a way for good firms to signal their quality (Diamond, 1991), or it can be that long-term debt is underpriced (Flannery, 1986).

In Flannery's model, good firms would prefer to borrow short-term debt. They think long-term debt is underpriced by investors since only bad firms who want to avoid transaction cost in issuing short-term debts will borrow long-term debts. Bad firms will borrow long-term debt since they save the refinancing cost and gain. That would lead to a separating equilibrium. However, if transaction cost is too high, even good firms will borrow long-term debts because the cost offsets the benefits of borrowing short-term. Therefore, a pooling equilibrium occurs when all firms borrow long-term. The implications from Flannery (1989) are that (1) debt is correlated with asset risk: the higher the risk of the debt, the higher the maturity and (2) the higher the information asymmetry, the more short-term debts firm issue since long-term debt would be more underpriced. However, without knowing the cost of issuing short term debts, the model is difficult to test. Diamond (1991) also models the choice of debt maturity using the asymmetric information explanation. There can be good firms or bad firms in the market, where good firms are more likely to be upgraded and bad firms are more likely to be downgraded at the end of one short-term debt contract. This is different from Flannery's assumption that firms are concerned about long-term debt underpricing and transaction

cost. Good firms may prefer to issue short-term debt because they have higher credit rating improvement probability and thus can signal their quality through the short-term debt. However, they face the risk that they cannot refinance the debt for the next period (liquidity risk). Bad firms will always mimic the action of good firms since they don't want to be uncovered about their type. The result is a pooling equilibrium where bad firms mimic good firms, and the choice of debt maturity of good firms depends on the probability that a random firm is a good firm. The implication from Diamond (1991) is that the relationship between maturity and firm performance is non-monotonic where the highly rated and the very low-rated firms borrow short-term debts. Only the middle-rated firms borrow long-term debt.

Empirical evidence by Berger, Espinosa-Vega, Frame, and Miller (2005), Barclay and Smith (1995), Guedes and Opler (1996), Stohs and Mauer (1996), Benmelech (2008), and Benmelech, Garmaise, and Moskowitz (2004) support the role of asymmetry information on debt maturity. Berger et al. (2005) test Flannery's and Diamond's models by relating the choice of maturity to firm risk. They employ data on debt maturity at the issuance of the debts and therefore could more accurately test the implications from Flannery's and Diamond's models. They confirm the prediction of Flannery (1986) and Diamond (1991) for low-risk firms that they have shorter debt maturities and the maturity lengthens as the degree of asymmetric information increases. They also test Diamond's implication that high-risk firms have shorter debt maturities compared to middle-rated firms. However, they find no significant difference between maturities of the two types. Therefore, the evidence is not consistent with Diamond's model for high-risk firms. Stohs and Mauer (1996) empirically show that firms with very high or very low bond ratings use short-term debt, supporting the non-monotonic relation predicted by Diamond (1991). Mitchell (1991) also finds evidence supporting the role of information asymmetry that firms not traded on the NYSE have more short-term debts. Benmelech (2009) conducts a test on asset salability and debt maturity. They hypothesize that creditors are willing to lend for a longer term if the asset is liquid. The paper looks at American railroads with the track gauge as proxy for their asset salability. The size of the track is exogenous to the ability to refinance; however, it determines whether the railroad's assets are liquid if the firm needs to liquidate them to pay back its debts. The author finds that higher asset

salability leads to longer debt maturity, linking asset risk and debt maturity. The higher liquidity- longer-term debts relation is also found in Benmelech, Garmaise, and Moskowitz (2005). They show that debts on properties that have more potential uses (higher liquidity) have more favorable terms and longer maturity. Barclay and Smith (1995) show that lower information asymmetry (larger, more regulated firms) leads to the use of more long-term debt. Guedes and Opler (1996) empirically test the determinants for new corporate bond issues (incremental approach) instead of maturity structure of corporate debt (balance sheet approach). They also test the role of information asymmetry via performance and rating subsequent to the issuance, firm size, and dispersion of earning forecasts. They find that large firms issue at the short or long ends of the spectrum, supporting the role of information asymmetry. However, they do not find evidence with earning forecast dispersion and subsequent performance.

Agency Conflict

Myers (1977) implies that short-term debt could be used to mitigate the agency problem of underinvestment therefore resolving the imperfection of the debt contract. If a firm faces debt overhang or debt distress, it may forego positive NPV projects (underinvestment problem). If there are more positive NPV projects, the conflict between debtholders and shareholders is more intense. Using short-term debt reduces this agency conflict because it increases the chance that the debt matures before the firm decides on which projects to take. Furthermore, instead of using long-term debt, the rolling short-term debts could also be negotiated and alleviate debt overhang pressure therefore mitigating an underinvestment problem. This theory also explains why firms tend to match the maturity of assets with maturity of liabilities. However, using rolling short-term debt has its cost (Barnea, Haugen, and Senbet, 1980); for example, the firm may suffer from periods of undervaluation of the market.

Barnea et al. (1980) consider the effect of agency cost on maturity structure of debt. The choice of debt maturity serves to solve the asset substitution problem (managerial/stockholder risk incentives) as well as the underinvestment problem (foregone growth opportunities). Call provision of debt could also solve the agency problem since, if the firm takes on risky investment opportunities for growth, it can do so and call the debt back (Bodie and Taggart, 1978). In some senses, call feature is

comparable to short-term debt since it also shortens the maturity of debt. However, callable feature is more costly than short-term debt because bondholders require a premium for this flexibility of the firm.

Taxes

Boyce and Kalotay (1979) and Brick and David (1985) argue that long-term debt may be optimal in the presence of an upward-sloping interest rate structure since long-term debt maximizes the tax benefits of debts. The tax deductibles if firms use long-term debts will be higher if the long-term interest rate is higher than the short-term interest rate. However, Lewis (1990) argues that even considering tax implication, debt maturity is irrelevant to a firm's value since there is no tax distinction between short and long-term debts. Stohs and Mauers (1996) show empirically that debt maturity varies inversely with a firm's effective tax rate, indicating a relation between tax and debt maturities.

Market Condition

Recent literature focuses on how managers react to market conditions in making debt maturity choice. The theory concerns market timing behavior of managers, i.e., how managers respond to potential mispricing of debts of different maturities. Guedes and Opler (1996) relate the term premium to debt maturity and find that managers issue short-term when the yield curve is steep. Baker, Greenwood, and Wurgler (2003) find that more long-term debt issued indicates higher excess bond return in the future. In the international bond market, Henderson et al., (2006) find weak evidence on interest rate timing of foreign corporate bond issues. Also, see Barclay and Smith (1995) and Stohs and Mauer (1996).

Related to timing of the interest rates, another strand of the literature links debt maturity choice to supply and demand of bonds. The theory is based on the market segmentation theory in explaining the yield curve by Culbertson (1957) and the preferred habitat theory of Modigliani and Stuch (1966) and Vayanos and Vila (2009). Greenwood and Vayanos (2010, 2014) argue that the maturity structure of government bonds impacts the yield curve, leading to arbitrageurs issuing bonds into the maturity that is mispriced. Greenwood, Hanson, and Stein (2010) build a gap-filling theory of corporate maturity where firms have more flexibility than other arbitrageurs (e.g., hedge funds) in issuing bonds in response to supply shock from the government bond market. Firms then act as

liquidity providers by issuing longer-term debt when the government issues more short-term debts and vice versa. Greenwood, Hanson, and Liao (2015) share this view by suggesting that pricing in the corporate bond market can move in response to shocks from the Treasury bond market although slowly since the two markets are partially segmented. Graham, Leary, and Roberts (2014) document a negative relationship between the U.S. treasury and corporate issuance of debt, suggesting a competing relationship between the two sources of supply for debts. Greenwood et al. (2010) show in their empirical tests for the case of the U.S. market during 1963-2005 that when the government increases the share of long-term debt, corporations do the opposite. Their model has implications in explaining time-varying corporate debt maturity. In an international context, scholars have also linked maturity of corporate bond issues to maturity structure of the government bond market. Siegfried et al. (2007) find that a firm is more likely to issue a long-term bond in the United Kingdom as opposed to the United States, Japan, or Europe. They conjecture that this is because the sovereign yield curve for British pounds is the longest. In other words, firms tend to issue bonds into the maturity spectrum where government bonds span.

4.2.2 Motivations to Use the Offshore Bond Markets

The literature has discussed the motivations for firms to use the international debt market. The most popular motivation has been to hedge foreign revenues. Foreign sales exposure leads to higher use of foreign debt for exchange rate hedging (Géczy et al., 1997, Allayannis and Ofek, 2001, Allayannis et al., 2003, Kedia and Mozumdar, 2003, Elliott et al., 2003, Graham and Harvey, 2001, Bancel and Mittoo, 2002, Aabo, Hansen, and Muradoglu, 2013). Withholding tax of the domestic market is another reason why firms may want to issue bonds overseas (Graham and Harvey, 2001, Bancel and Mittoo, 2002, Desai, 1998, Panteghini, 2009). The international bond market can also be used to overcome institutional constraints in the home market (Allayannis et al., 2004). Market timing of the international bond market has also been studied by Keloharju and Niskanen (2001), Henderson et al. (2006), and McBrady and Schill (2007). Maturity diversification is another possible motivation that has been proposed. Black and Munro (2010) specifically propose that the offshore bond market can be used to complement the

domestic market in case of maturity mismatch. They find that Asia-Pacific firms issue longer-term bonds overseas and view this as a diversification benefit for firms. Schmuckler and Vesperoni (2006) study how globalization impacts debt structure of firms in emerging economies. They show that the maturity structure (long-term debt over total debts) is longer after accessing the international capital markets.

Although not specifically pointing to maturity diversification as a motivation to use the offshore bond markets, several other studies have also addressed how the maturity of domestic bonds differs from maturity of offshore bonds. Henderson et al. (2006) document that firms borrow more from the international markets for long-term debts as opposed to short-term debts and propose that this could be due to high fixed cost of issuing international securities. Gozzi et al. (2015) show that international debts have shorter maturity than domestic debts after controlling for country-year dummies, size, and firm fixed effect.

4.2.3 Maturity Diversification

This study is also related to the literature on how firms manage maturity structure of their debts and the level of maturity diversification. Researchers have recently examined how bonds are spread across different maturities. For risk management reasons, managers want to issue bonds in diversified maturities so that the amount to refinance is not too large in any given year to avoid rollover risk. Choi et al. (forthcoming) find that new bonds are issued to complement pre-existing bond maturities. Norden et al. (2016) find that firms with higher debt maturity diversification can better manage their financing with lower cost of financing, lower financial constraints, and lower stock return volatility. Gopalan et al. (2015) also find that firms with higher rollover risk, measured as a higher proportion of long-term bonds maturing in a year, have lower credit rating and higher borrowing cost.

4.3 Data

The data for testing is taken from the SDC Platinum database, where information on new domestic and foreign bond issues is collected. The SDC database has been used in previous studies related to the international bond market such as Henderson, Jegadeesh,

and Weisbach (2006), McBrady and Schill (2007), and Gozzi et al. (2015). It provides transaction-level information on new bond issuances worldwide and records transactions with maturity longer than one year. SDC Platinum's data dates back to the 1970s. However, the dataset becomes more comprehensive only since the 1990s. Therefore, the sample covers the period from 1991 to 2015. I first get transaction data for new issuances of non-convertible bonds, excluding those from municipal, financial, and unknown sectors. I also exclude transactions with maturity of less than one year since those transactions either are included for completeness of the data, are tranches of a larger bond issue with higher maturity or are subject to data errors. That leaves 96,166 bond issues worldwide as the starting sample. I define domestic bonds as those issued into a target market that is the same as the country of domicile of the firm, while offshore bonds are defined as those issued into a target market that is not the same as the country of domicile of the firm.

I obtain firm characteristics from Datastream. I used CUSIP and ISIN as the identifiers to match firms in the SDC Platinum database to Datastream. Control variables that have been used in previous studies on bond maturity are included in the empirical tests. LogTA *(*log of total assets) controls for size. There can be more information available on large firms; therefore, large firms may be able to issue shorter-term loans (Flannery, 1989 and Diamond, 1991). DebttoEquity (the ratio of total debt over total common equity) and profitability (EBITDA/Total Assets) are proxies for a firm's riskiness. Less risky firms are more likely to issue short term bonds (Diamond, 1991); therefore, lower DebttoEquity and higher EBITDA/TA are expected to be associated with issuance of short-term debts. MKTB (market-to-book ratio) is a proxy for growth. Firms with higher growth opportunities are less likely to issue long-term debt since long-term debts exacerbate the underinvestment problem, especially in firms with high growth opportunities (Myers, 1977). DEP_TA is the proxy for asset life. According to the matching principle, firms with longer asset life are more likely to borrow longer term (Myers, 1977), thus DEP_TA is expected to be negatively related to debt maturity. TANG is the ratio of a net fixed asset over total assets for firm i. Tangibility matters, for example, in Benmelech et al. (2005) and Benmelech (2008); asset risk and salability impact debt maturity. Higher tangibility means less risk and higher salability of asset

risks and thus longer debt maturity. D_Util is also included to control for industry effect. Utility firms are more regulated and will be able to issue short-term debts because they are not concerned by the liquidity risk as risky firms (Guedes and Opler, 1996). On the other hand, utility firms may borrow long-term debts since they do not have to signal their low risk business. Table 4-1 summarizes data on debt issues and firm characteristics used in the study.

Table 4-1: Maturity at Issuance—Comparison between Domestic Bonds and Offshore Bonds

a. All Firms	Domestic Mean	Obs	Offshore Mean	Obs	Difference	(p-value)
Maturity	7.43	67,223	8.00	23,856	-0.57	0.000
PrincipalAmt	156.67	67,223	368.73	23,856	-212.06	0.000
SpreadtoBench	167.83	23,229	292.34	12,304	-124.51	0.000

b. Firms w. Acct	Domestic Mean	Obs	Offshore Mean	Obs	Difference	(p-value)
Maturity	9.91	19,818	8.89	6,625	1.03	0.000
PrincipalAmt	284.25	19,818	467.33	6,625	-183.08	0.000
SpreadtoBench	158.53	12,852	271.62	4,286	-113.09	0.000
TA	27,900,476	19,818	39,191,191	6,625	-11,290,715	0.000
TANG	0.32	19,605	0.32	6,382	0.00	0.874
DEP_TA	0.05	19,373	0.05	6,506	-0.00	0.000
EBITDA_TA	0.13	19,400	0.13	6,499	0.00	0.699

c. Firms w/o Acct	Domestic Mean	Obs	Offshore Mean	Obs	Difference	(p-value)
Maturity	6.39	47,405	7.66	17,231	-1.27	0.000
PrincipalAmt	103.34	47,405	330.82	17,231	-227.48	0.000
SpreadtoBench	179.35	10,377	303.42	8,018	-124.06	0.000

This table reports and compares characteristics of the bonds issued in the domestic markets versus those issued in the offshore markets, as well as comparing characteristics of the firms issuing the bonds. Maturity (years) is the maturity at issuance of the issues. PrincipalAmt ($mil) is the principal amount of the issue. SpreadtoBench (bps) is the number of basis points over the comparable maturity treasury. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets.

Panel a reports the average maturity, principal amount, and spread to benchmark of all domestic and offshore bond issues. Panel b reports the statistics for bonds issued by firms that have accounting data (total assets), and the characteristics of the firms underlying the issues. Panel c reports the statistics for bonds issued by firms that do not have accounting data.

4.4 Hypothesis Development

How can the offshore bond market provide higher maturity diversification? As discussed earlier in the Introduction, each bond market can have availability and preferences for different ranges of maturities due to the level of market development and investor tastes. If a firm can access a more diversified market than at home, I expect it can issue bonds into a difference maturity range from what it can borrow at home. Therefore, the first hypothesis regards the comparison between maturity at issuance of offshore versus domestic bonds. First, as previous studies have shown, there is a systematic difference between average maturity at issuance of offshore bonds versus that of domestic bonds (Black and Munro, 2010, Henderson et al., 2006, Gozzi et al., 2015). Researchers consider such results to be indicative of a diversification impact. To confirm previous studies, my study will also look at the average maturity at issuance to determine if there is difference in the maturities at issuance of offshore versus domestic bonds, as in H1a.

However, average maturity is only one aspect of maturity diversification and information can be missing from analyzing only average maturity. For example, average maturity does not account for the case of diversification caused by firms issuing into the middle maturity in the offshore markets while issuing into the short/long maturities in the domestic market. In such a case, average maturities at issuance of offshore and domestic bonds are similar. I then form another hypothesis regarding the maturity structure at issuance of offshore bonds versus that of domestic bonds. If a firm diversifies the range of maturities it can issue into, I expect that firms issue offshore bonds into maturity ranges that are different from what it used to issue at home. In that case, I expect a negative relationship between the proportion of offshore bonds issued into a maturity range and the proportion of domestic bonds issued into that same maturity range. I therefore form hypothesis H1b.

H1: For firms that use the offshore bond market, maturity at issuance of offshore bonds is different from maturity at issuance of domestic bonds:

-H1a: Average maturity at issuance of offshore bonds is different from average maturity at issuance of domestic bonds.

-H1b: The maturity at issuance of all the bonds ever issued by a firm is such that a higher proportion of offshore bonds in a maturity range is associated with a lower proportion of domestic bonds in the same maturity range.

Secondly, I look at yearly management of the bond structure by a firm. I examine how the degree of maturity diversification of a firm's bond profile changes as offshore bonds are issued. If a firm issues offshore bonds to diversify its maturity structure, I expect that the degree of maturity diversification is higher. I use two methods to analyze the degree maturity diversification. Hypothesis H2a regards the Herfindahl index for maturity structure, which has been used in previous studies on maturity diversification such as Choi, Hackbarth, and Zechner (2015) and Norden et al. (2016). The Herfindahl index is the sum of squares of the proportions of bonds issued into seven maturity ranges and can range from close to zero (very diverse bond maturity profile) to one (the firm issues into only one maturity range). The inverse of the Herfindahl index is therefore higher if the maturity structure is more diverse.

However, the Herfindahl index does not reveal in detail how maturity diversification happens. By looking at how maturity of new offshore bonds differs from maturity of pre-existing and newly issued domestic bonds, one can gain more insights into how new offshore bonds are related to the domestic counterpart so that the degree of maturity diversification can change in the year with a new offshore bond issuance. Therefore, I form hypothesis H2b that relates maturity structure of new offshore bond issues to maturity structure of pre-existing and new domestic bonds.

H2: If a firm uses the offshore bond market for maturity diversification, the degree of maturity diversification is higher as the firm issues offshore bonds.

H2a (Herfindahl Index Method): A firm has higher bond maturity diversification in the year with offshore bonds in the bond profile, where the higher degree of diversification is measured by the higher inverse of the Herfindahl index.

H2b (Maturity Structure Method): A firm chooses a yearly bond maturity structure such that the higher proportion of offshore bonds in a maturity bin is associated with lower proportion of domestic bonds in the same maturity bin.

4.5 Results

4.5.1 Maturity at Issuance of Offshore Bonds versus Domestic Bonds

In this section, I examine hypothesis 1 of how the choice of maturity at issuance when firms issue new bonds offshore differs from the choice of maturity when firms issue new bonds domestically. Two aspects of maturity at issuance are looked at: the average maturity at issuance and the composition of maturity at issuance.

4.5.1.a. Average Maturity at Issuance of New Offshore Bonds versus New Domestic Bonds

First, I look at the average bond maturity at issuance. This method has been used in previous studies such as Black and Munro (2010) and Gozzi et al. (2015). Table 4-1 reports results of the univariate analysis that compares average maturities at issuance of new offshore bonds versus that of new domestic bonds and characteristics of the underlying firms. For the full sample, new offshore bonds have longer average maturities of about half a year (0.57), are issued in larger amounts (higher principal amount), and are costlier to issue (higher spread to benchmark) compared to new domestic bonds. The differences are significant, as confirmed by the t-test results. The firm's underlying offshore bonds are larger and have shorter asset life (higher DEP_TA) while having similar tangibility (TANG) and profitability (EBITDA_TA) compared to the firm's underlying domestic bonds. Those results are in line with previous studies on the international bond market (Black and Munro, 2010).

The subsample of firms without accounting data also has longer average offshore bond maturity at issuance. However, for the subsample of firms with accounting data, average maturity at issuance of offshore bonds is shorter. Table 4-2 runs an OLS regression that aims to explain bond maturity at issuance controlling for firm characteristics:

$$MatYr_{i,k} = \alpha + \beta\ D\_Offshore_{i,k} + \Phi\ Controls_i + \varepsilon_{i,k}\ (1),$$

where $MatYr_{i,k,t}$ is the maturity at issuance in terms of years for a bond k issued by firm i, $D\_Offshore_{i,k}$ is a dummy for whether the bond is issued offshore or domestically. $Controls_i$ is the matrix of characteristics of the underlying firm i that issues the bond k and is taken in the year prior to the issue year. To control for the role of issuance cost on the choice of maturity, I include the cost of issuance (SpreadtoBench) of the issue k into Model 1 which studies the determinants for maturity of all bonds. The expectation is that the higher the cost of issuance, the longer the maturity chosen.

Table 4-2 shows that for the group of firms with accounting data, even when conditioned on firm characteristics, bonds issued offshore are associated with a shorter bond maturity. Gozzi et al. (2015) also find that for the group firms from developed countries, offshore bonds have shorter maturity both unconditionally and when conditioned on country and firm fixed effects, while firms from developing countries issue longer term bonds into the offshore market than at home. My results are in line with Gozzi et al. (2015) if firms from developed countries are those that are more likely to have accounting data.

My results on average bond maturity at issuance and firm characteristics are in line with previous studies in the field and suggest a significant difference between average maturities at issuance of new offshore versus new domestic bonds, supporting hypothesis 1a. However, it is inconclusive as to whether offshore bonds have longer or shorter maturities on average compared to domestic bonds, as the sign of the differences depend on the subsample of firms. Therefore, it is not straightforward to tell whether borrowing offshore will lengthen or shorten the average maturity of the bond profile for an assessment of the maturity diversification effect.

Table 4-2: Maturity at Issuance Conditioned on Firm Characteristics

	(1)	(2)
D_Offshore	-1.520***	-1.453***
	(-11.64)	(-8.14)
PrincipalAmount	0.00209***	0.00105***
	(14.95)	(5.85)
logTA	0.127***	0.0641
	(3.46)	(1.09)
TANG	0.648**	2.980***
	(2.18)	(7.40)
DEP_TA	-12.30***	-4.108*
	(-7.22)	(-1.65)
EBITDA_TA	2.399***	1.825***
	(6.05)	(3.96)
SpreadtoBench		-0.00100**
		(-2.15)
_cons	7.386***	9.152***
	(12.30)	(9.14)
N	25366	16496
adj. R^2	0.019	0.013

In this table I use the OLS regression to explain maturity of bond issues as in Model 1:

$$MatYr_{i,k} = \alpha + \beta\ D\_Offshore_{i,k} + \Phi\ Controls_i + \varepsilon_{i,k} \quad (1),$$

where $MatYr_{i,k,t}$ is the maturity at issuance in terms of years for a bond k issued by firm i, $D\_Offshore_{i,k}$ is a dummy for whether the bond is issued offshore or domestically, $Controls_i$ is the matrix of characteristics of the underlying firm i that issues the bond k and is taken in the year prior to the issue year. Principal Amt ($mil) is the principal amount of the issue. SpreadtoBench (bps) is the number of basis points over the comparable maturity treasury. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. Column (2) includes the spread to benchmark to control for the cost of issuance. t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

4.5.1.b. Structure of Maturity at Issuance of Offshore Bonds versus Domestic Bonds

The previous analysis looks at average maturity of offshore and domestic bonds and suggests that there can be difference in term of maturity between offshore bonds and domestic bonds. This part of the analysis compares maturity structure at issuance of offshore bonds with maturity structure at issuance of domestic bonds for the bonds issued by a firm over its lifetime as recorded in the SDC database. This helps address in more detail the diversification effect of using the offshore bond markets compared to previous studies and test hypothesis H1b.

The maturity structure is formed by dividing the maturity spectrum into seven ranges called seven bins and then calculating the proportion of bonds issued into each bin. The seven bins are 1-2 Yr, 3-4 Yr, 5-6 Yr, 7-8 Yr, 9-10 Yr, 11-20 Yr, and >21Yr following Choi et al. (forthcoming). For each firm, I look at the maturity structure of all offshore bonds ever issued by the firm and compare that to the maturity structure of all domestic bonds ever issued by that firm. Model 2a, 2b, and 2c then compare the compositions of domestic bonds versus offshore bonds in terms of maturities at issuance. If a firm uses offshore bond markets to diversify the ranges of maturities of bonds issued at home, it is expected that firms issue new offshore bonds into maturity ranges that fewer domestic bonds are issued into. Following are the specifications for Models 2a, 2b, and 2c. Model 2a does not control for firm characteristics and allows one to examine the relationship for the groups of firms with and without accounting data, while model 2b controls for firm characteristics averaged across the years a firm issues offshore bonds. Model 2c takes into account proportions of domestic bonds in other maturity bins and not just the same maturity bin as the offshore bonds examined. For each bin j, I estimate:

$$OProp\_All_i = \alpha + \beta\ DProp\_All_i + \varepsilon_i \quad (2a)$$

$$OProp\_All_i = \alpha + \beta\ DProp\_All_i + \Phi\ Controls_i + \varepsilon_i \quad (2b)$$

$OProp\_All_i$ is the proportion of all new offshore bonds issued by firm i into maturity bin j throughout the sample period. $DProp\_All_i$ is the proportion of all new domestic bonds issued by firm i into maturity bin j throughout the sample period. Control

variables are firm i's characteristics averaged across the years before the years the bonds are issued.

$$OProp\_All_i = \alpha + \Delta\ DPROP\_ALL_i + \Phi\ Controls_i + \varepsilon_i \quad (2c)$$

The dependent variable $OProp\_All_i$ is proportion of new offshore bonds issued by firm i into maturity bin j throughout the sample period. $DPROP\_ALL_i$ is the matrix of the proportions of new domestic bonds issued by firm i into maturity bins 2 to 7 throughout the sample period. Here, the proportion of new domestic bonds issued into bin 1 is taken as the base case.

The overall result reported in Tables 4-3, 4-4, and 4-5 is that when comparing maturity at issuance of all new offshore versus that of all new domestic bonds ever issued by a firm, the proportion of new offshore bonds issued into each maturity bin is positively related to the proportion of new domestic bonds issued by the same firm into the same maturity bin. In Table 4-3a, the coefficients for $DProp\_All_i$ are all positive, and they are significant for all bins except for Bin 3. It is notable that the high proportion of offshore bonds issued into Bin 2 and 3 (the short maturity ranges) are associated with high proportions of domestic bonds issued into those ranges for both groups of firms. The coefficients are above 0.5 for all cases and R-squared measures are high. For firms without accounting data, there is a high tendency that they issue a high proportion of bonds into the 9-10 year maturity range both offshore and domestically. The coefficient is significant at 0.724 and R-squared is at 62.8 per cent. A very low R-squared in several bins could maybe be explained by there being few bonds issued into those maturity ranges both domestically and offshore. The results suggest that throughout their lifetime, firms use the offshore bond market and domestic bond market in quite a similar manner. The maturities at issuance of offshore and domestic bonds issued by a firm exhibit positively related structures. This does not lend support to hypothesis 1b.

The results are the same controlling for firm characteristics (Table 4-4) and proportions of domestic bonds in other maturity bins (Table 4-5). In Table 4-5, the results for Model (2c) are reported, with the proportion of offshore bonds issued into each maturity bin explained by the set of firm characteristics, the proportion of domestic bonds issued into the same maturity bin, and also the proportions of domestic bonds issued into

other bins. Again, it is confirmed that the proportion of new offshore bonds issued by a firm is positively related to the proportions of new offshore bonds the firm ever issues throughout its lifetime into the same maturity bin. It can be observed that the proportions of new domestic bonds issued into other maturity bins throughout the sample period are not related to or are negatively related to the proportion of new offshore bonds issued into a specific maturity bin (Table 4-5). The results for proportions of bonds in other maturity bins, although insignificant, suggest that a firm is less likely to issue offshore bonds into maturity ranges that it does not issue into in the domestic market.

Table 4-3: Composition of Maturity at Issuance of Offshore Bonds versus Domestic Bonds at Firm Level

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
				a) All firms			
DProp_All	0.531***	0.431***	0.0473	0.158***	0.500***	0.0595**	0.215***
	(17.82)	(14.60)	(1.60)	(7.03)	(28.07)	(2.06)	(7.43)
_cons	0.185***	0.221***	0.0235***	0.00210*	0.000589	0.00119***	0.00672***
	(14.38)	(15.74)	(6.90)	(1.71)	(0.58)	(3.17)	(3.17)
N	1255	1255	1255	1255	1255	1255	1255
adj. R^2	0.202	0.145	0.001	0.037	0.386	0.003	0.041
				b) Firms with accounting data			
DProp_All	0.512***	0.348***	0.0641	0.796**	0.0208	0.0691**	-0.00460
	(10.70)	(7.69)	(1.58)	(1.97)	(1.00)	(2.18)	(-0.08)
_cons	0.123***	0.295***	0.0236***	0.00248	0.00157	0.00141**	0.00769***
	(8.23)	(13.84)	(5.03)	(1.33)	(1.62)	(2.51)	(3.30)
N	587	587	587	587	587	587	587
adj. R^2	0.162	0.090	0.003	0.005	0.000	0.006	-0.002
				c) Firms without accounting data			
DProp_All	0.479***	0.485***	0.0325	0.157***	0.724***	-0.00773	0.255***
	(11.99)	(12.60)	(0.76)	(7.14)	(33.57)	(-0.10)	(6.90)
_cons	0.259***	0.163***	0.0233***	0.00154	-0.0000995	0.00101**	0.00668*
	(12.63)	(8.89)	(4.76)	(0.93)	(-0.07)	(1.99)	(1.96)
N	668	668	668	668	668	668	668
adj. R^2	0.176	0.191	-0.001	0.070	0.628	-0.001	0.065

Taking all offshore bonds and all domestic bonds a firm ever issues throughout the sample period into consideration, the following OLS regression is run for each maturity bin j (j from 1 to 7). There are seven regressions to explain proportion of bonds issued into seven bins.

$$OProp\_All_i = \alpha + \beta\ DProp\_All_i + \varepsilon_i \quad (2a)$$

$OProp\_All_i$ is the proportion of offshore bonds issued into maturity bin j by firm i throughout the sample period. $DProp\_All_i$ is the proportion of domestic bonds issued into maturity bin j by firm i throughout the sample period. The proportion of offshore bonds in each maturity j is then related to the proportion of domestic bonds in the same maturity bin. Panel a reports the results for all firms, while Panel b reports the results for firms with accounting data (Total Assets), and Panel c reports the results for firms without accounting data (missing Total Assets). t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Table 4-4: Composition of Maturity at Issuance of Offshore Bonds versus Domestic Bonds at Firm Level—With Controls

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProp_All	0.521***	0.259***	0.0460	0.766*	0.114**	0.0656**	-0.0252
	(10.50)	(5.45)	(1.10)	(1.82)	(2.52)	(2.07)	(-0.43)
logMeanTA	0.0114	-0.0731***	0.0112***	0.00312**	0.00150**	0.000534	0.00329**
	(1.29)	(-7.16)	(3.48)	(2.34)	(2.17)	(1.37)	(1.99)
MeanTANG	0.0411	-0.158*	-0.0337	0.0159	0.0118*	0.00541	0.0136
	(0.53)	(-1.84)	(-1.19)	(1.36)	(1.95)	(1.59)	(0.95)
MeanDEP_TA	-0.0662	0.0519	-0.210	-0.0202	-0.0162	-0.0101	-0.0452
	(-0.17)	(0.12)	(-1.51)	(-0.35)	(-0.54)	(-0.60)	(-0.64)
D_Util	-0.106***	-0.0173	0.0168	0.000418	-0.00310	0.00258*	0.0170***
	(-3.31)	(-0.49)	(1.45)	(0.09)	(-1.23)	(1.83)	(2.88)
MeanDebttoEquity	-0.0000700	-0.000140	-0.0000075	0.00000804	0.00000416	0.00000111	0.0000117
	(-0.27)	(-0.49)	(-0.08)	(0.21)	(0.21)	(0.10)	(0.25)
MeanEBITDA_TA	-0.320*	-0.0809	0.132**	0.0157	0.00401	0.00819	0.00398
	(-1.90)	(-0.43)	(2.16)	(0.62)	(0.30)	(1.10)	(0.13)
MeanMKTB	0.000149	0.0000993	0.0000313	-0.0000144	-0.0000081	-0.0000015	-0.0000169
	(0.31)	(0.19)	(0.18)	(-0.20)	(-0.22)	(-0.07)	(-0.19)
_cons	0.00183	1.531***	-0.150***	-0.0523**	-0.0247**	-0.00988	-0.0501*
	(0.01)	(9.11)	(-2.91)	(-2.45)	(-2.23)	(-1.58)	(-1.90)
N	556	556	556	556	556	556	556
adj. R^2	0.184	0.182	0.039	0.008	0.015	0.012	0.013

Taking all offshore bonds and all domestic bonds a firm ever issues throughout the sample period into consideration, the following OLS regression is run for each maturity bin j. There are seven regressions to explain proportion of bonds issued into each of the seven bins.

$$OProp\_All_i = \alpha + \beta\ DProp\_All_i + \Phi\ Controls_i + \varepsilon_i \quad (2b)$$

$OProp\_All_i$ is the proportion of offshore bonds issued into maturity bin j by firm i throughout the sample period. $DProp\_All_i$ is the proportion of domestic bonds issued into maturity bin j by firm i throughout the sample period. The proportion of offshore bonds in each maturity j is then related to the proportion of domestic bonds in the same maturity bin. Control variables are firm i's characteristics averaged across the years prior to when the bonds are issued, where TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Table 4-5: Composition of Maturity at Issuance of Offshore Bonds versus Domestic Bonds at Firm Level - With Controls and Proportions of Domestic Bonds in other Bins

	Bin 1 (1-2 Yr)	Bin 2 (3-4 Yr)	Bin 3 (5-6 Yr)	Bin 4 (7-8 Yr)	Bin 5 (9-10 Yr)	Bin 6 (11-20 Yr)	Bin 7 (>21 Yr)
DProp_All2	-0.264***	0.241***	-0.0141	-0.00292	-0.00197	0.00112	-0.00871
	(-5.66)	(4.95)	(-0.91)	(-0.44)	(-0.57)	(0.58)	(-1.07)
DProp_All3	-0.324**	-0.167	0.0422	0.00304	0.0000181	0.00311	-0.0187
	(-2.57)	(-1.27)	(1.00)	(0.17)	(0.00)	(0.59)	(-0.85)
DProp_All4	-0.817	-3.139	0.824	0.777*	-0.0403	-0.0299	-0.257
	(-0.27)	(-1.00)	(0.82)	(1.82)	(-0.18)	(-0.24)	(-0.49)
DProp_All5	-0.486	-0.634	-0.00540	-0.0140	0.113**	0.000490	0.187*
	(-0.78)	(-0.98)	(-0.03)	(-0.16)	(2.47)	(0.02)	(1.73)
DProp_All6	-1.025	-1.634**	1.314***	-0.0494	-0.00992	0.0686**	0.0618
	(-1.33)	(-2.03)	(5.10)	(-0.45)	(-0.17)	(2.13)	(0.46)
DProp_All7	-0.398	0.378	0.0516	0.00120	-0.0166	0.00103	-0.0316
	(-1.17)	(1.07)	(0.45)	(0.02)	(-0.66)	(0.07)	(-0.53)
logMeanTA	-0.000678	-0.0742***	0.0102***	0.00293**	0.00145**	0.000583	0.00303*
	(-0.07)	(-7.26)	(3.12)	(2.10)	(2.00)	(1.43)	(1.78)
MeanTANG	0.0753	-0.185**	-0.0336	0.0158	0.0117*	0.00570*	0.0131
	(0.90)	(-2.13)	(-1.21)	(1.33)	(1.91)	(1.65)	(0.90)
MeanDEP_TA	0.0556	0.0550	-0.148	-0.0191	-0.0156	-0.0119	-0.0313
	(0.14)	(0.13)	(-1.08)	(-0.33)	(-0.51)	(-0.70)	(-0.44)
D_Util	-0.100***	-0.0113	0.0130	0.000533	-0.00310	0.00267*	0.0151**
	(-2.91)	(-0.32)	(1.13)	(0.11)	(-1.22)	(1.86)	(2.52)
MeanDebttoEquity	0.00000094	-0.000148	-0.0000028	0.00000992	0.00000525	0.00000085	0.0000145
	(0.00)	(-0.52)	(-0.03)	(0.25)	(0.26)	(0.08)	(0.30)
MeanEBITDA_TA	-0.463**	-0.0444	0.116*	0.0157	0.00383	0.00803	0.00133
	(-2.57)	(-0.24)	(1.93)	(0.62)	(0.29)	(1.07)	(0.04)
MeanMKTB	0.0000291	0.000108	0.0000212	-0.0000176	-0.0000100	-0.0000009	-0.0000233
	(0.06)	(0.20)	(0.13)	(-0.24)	(-0.27)	(-0.05)	(-0.26)
_cons	0.383**	1.566***	-0.133**	-0.0483**	-0.0230*	-0.0111*	-0.0428
	(2.37)	(9.31)	(-2.47)	(-2.11)	(-1.93)	(-1.65)	(-1.52)
N	556	556	556	556	556	556	556
adj. R^2	0.072	0.188	0.081	-0.000	0.007	0.004	0.013

Taking all offshore bonds and all domestic bonds for each firm into consideration, the following OLS regression is run for each maturity bin j.

$$OProp\_All_i = \alpha + \Delta\ DPROP\_ALL_i + \Phi\ Controls_i + \varepsilon_i \quad (2c)$$

The dependent variable $OProp\_All_i$ is proportion of new offshore bonds issued by firm i into maturity bin j throughout the sample period. $DPROP\_ALL_i$ is the proportions of new domestic bonds issued by firm i into maturity bins 2 to 7 throughout the sample period. Here, the proportion of new domestic bonds issued into bin 1 is taken as the base case. Control variables are firm i's characteristics averaged across the years prior to when the bonds are issued. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

4.5.2 Maturity Diversification and Maturity Structure Management

4.5.2.a. The Inverse of the Herfindahl Index Measure

In this part, I carry out the tests for hypothesis 2. While the previous section has examined maturity at issuance of new offshore bonds versus new domestic bonds, the current section will look at the impact of having offshore bonds on the degree of maturity diversification as well as the maturity structure of a firm's bond profile. Maturities at issuance of new bonds and remaining maturities of pre-existing bonds will be looked at, which extend previous studies that only look at maturity at issuance. First, I examine the Herfindahl index for analyzing the maturity diversification degree of the overall bond profile. The diversification measure inverse of the Herfindahl index is calculated as:

$$\text{InvHERF}_{\text{i,t}} = 1 \,/\, \text{HERF}_{\text{i,t}} = \; 1 \,/\, \sum_{B=1}^{7} w_{B,i,t}^{2} \quad (3a),$$

which is the sum of the square of the proportion of bonds (new and pre-existing) from maturity bins 1 through 7 for firm i in year t. The proportion of bonds in each bin is denoted $w_{B,i,t}$ as in the equation. In this case, a firm has bonds issued into only one maturity bin, which means low diversification, the HERF measure takes the value one, and InvHERF is one. In the case of higher diversification, HERF takes the value of less than one and InvHERF becomes larger. Therefore, the higher InvHERF is, the more diversified the maturity structure is.

$$\text{InvHERF}_{i,t} = \alpha + \beta\ \text{D\_HasOffshore}_{i,t} / \text{D\_NewOffshore}_{i,t} / \text{D\_ NewDomestic}_{i,t} + \Phi\ \text{Controls}_{i,t-1} + \varepsilon_{i,t} \quad (3b),$$

where $\text{InvHERF}_{i,t}$ is inverse of the Herfindahl index, $\text{D\_HasOffshore}_{i,t}$ is whether the firm i has offshore bonds (either new or pre-existing) in year t. $\text{D\_NewOffshore}_{i,t}$ is an indication for whether the firm i has new offshore bonds issued in year t. $\text{D\_NewDomestic}_{i,t}$ is an indication for whether the firm i has new domestic bonds issued in year t. Control variables are taken in the year before the inversed Herfindahl index is calculated.

The results in Table 4-6 reveal that having outstanding offshore bonds (either new or pre-existing) is associated with lower InvHERF for the full sample (column 1, Table 4-6), while it does increase InvHERF for the sample of firms that ever use the offshore bond markets (column 4, Table 4-6). Having new offshore bonds issued in a year is associated with having lower InvHERF (i.e., lower maturity diversification degree) as evidenced by significantly negative coefficients to $D\_NewOffshore_{i,t}$ in column 2 and 5, Table 4-6. Meanwhile, having new domestic bonds issued in a year is associated with having higher InvHERF in that year as evidenced by significantly positive coefficients to $D\_NewDomestic_{i,t}$ in column 3 and 6, Table 4-6. The results are consistent across groups of firms that larger firms, firms with lower tangibility and depreciation, lower leverage, and higher profitability, and utility firms have a higher degree of maturity diversification. Overall, this suggests a diversification effect of having offshore bonds outstanding for firms that use the offshore bond market and lends some support to hypothesis 2a within this group of firms. However, the results do not support that issuing new offshore bonds helps increase maturity diversification.

Table 4-6: Offshore Bond and The Inverse of the Herfindahl Index

	All firms			Only firms that ever use the offshore bond markets		
	(1)	(2)	(3)	(4)	(5)	(6)
D_HasOffshore	-0.331***			0.128*		
	(-6.49)			(1.72)		
D_NewOffshore		-0.819***			-0.359***	
		(-15.39)			(-4.87)	
D_NewDomestic			1.219***			0.883***
			(22.05)			(10.94)
logTA	0.994***	0.997***	0.978***	1.134***	1.142***	1.104***
	(58.22)	(59.88)	(59.73)	(43.17)	(44.15)	(42.75)
TANG	-0.694***	-0.632***	-0.609***	-0.816***	-0.834***	-0.866***
	(-4.14)	(-3.80)	(-3.71)	(-3.15)	(-3.23)	(-3.38)
DEP_TA	-2.220***	-1.484*	-1.196	-2.639**	-2.239*	-2.170*
	(-2.60)	(-1.75)	(-1.43)	(-2.07)	(-1.76)	(-1.72)
DebttoEquity	-0.00395	-0.00326	-0.00282	-0.0156***	-0.0147***	-0.0132***
	(-1.29)	(-1.07)	(-0.94)	(-3.26)	(-3.09)	(-2.81)
EBITDA_TA	1.091***	0.984***	0.821***	2.749***	2.744***	2.544***
	(3.97)	(3.62)	(3.05)	(5.94)	(5.95)	(5.56)
MKTB	-0.0000102	-0.0000498	-0.000122	0.0181***	0.0177***	0.0165***
	(-0.01)	(-0.07)	(-0.18)	(4.29)	(4.23)	(3.97)
D_Util	1.114***	1.093***	1.072***	1.008***	1.024***	1.010***
	(19.93)	(19.73)	(19.58)	(11.91)	(12.15)	(12.11)
_cons	-11.61***	-11.57***	-12.43***	-13.96***	-13.90***	-14.04***
	(-40.76)	(-41.28)	(-44.27)	(-31.72)	(-31.66)	(-32.34)
Year FEs	Y	Y	Y	Y	Y	Y
N	10439	10439	10439	4724	4724	4724
adj. R^2	0.308	0.321	0.336	0.343	0.346	0.359

This table examines inverse of the Herfindahl index as a measure of the degree of maturity diversification if a firm has outstanding offshore bonds (either new or pre-existing), if it has new offshore bonds issued, or if it has new domestic bonds issued, separately, as recorded in the SDC database. This table reports the results for Model 3b:

$$InvHERF_{i,t} = \alpha + \beta\ D\_HasOffshore_{i,t} / D\_NewOffshore_{i,t} / D\_\ NewDomestic_{i,t} + \Phi\ Controls_{i,t-1} + \varepsilon_{i,t} \quad (3b),$$

where $InvHERF_{i,t}$ is the inverse of the Herfindahl index of firm i in year t, higher InvHERF means higher maturity diversification. $D\_HasOffshore_{i,t}$ is an indication for whether the firm i has offshore bonds (either new or pre-existing) in year t. $D\_NewOffshore_{i,t}$ is an indication for whether the firm i has new offshore bonds issued in year t. $D\_NewDomestic_{i,t}$ is an indication for whether the firm i has new domestic bonds issued in year t. $Controls_i$ is the matrix of characteristics of the underlying firm i in the previous year. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. Year FEs are included in all specifications. t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

4.5.2.b. Maturity Structure Approach on Diversification Effect

The analysis on the inverse of the Herfindahl measure gives information on the overall diversification of the bond profile annually. However, it does not give further details on how the maturity of offshore bonds is related to maturity of domestic bonds. For example, it does not specify in which ranges of the maturity spectrum that offshore bonds help, or do not help, to diversify the maturity structure. Every year, I consider four parts that comprise the bond profile of a firm in a specific year: new offshore bonds, pre-existing offshore bonds, new domestic bonds, and pre-existing domestic bonds. A comparison between composition of offshore bonds (new and pre-existing) and composition of domestic bonds (new and pre-existing) can shed more light into how firms manage the maturity structure of offshore bonds given that they have domestic bonds on their books. If offshore bonds diversify the composition of domestic bonds, I expect that offshore bonds are issued more into the maturity bin with a low amount of domestic bonds (new and pre-existing) as in hypothesis H2b. There will be several specifications for testing H2b. Firstly, I compare the maturity structure of both new and pre-existing offshore bonds and the maturity structure of both new and pre-existing domestic bonds to understand the role of offshore bonds and domestic bonds in diversifying a firm's maturity profile. Secondly, I look specifically at the maturity structure of new offshore bonds and how it is related to the maturity structures of pre-existing offshore bonds, new domestic bonds, and pre-existing domestic bonds. This will shed light into how a firm chooses the maturity of new offshore bonds taking into consideration the composition of other types of bonds in the book.

Maturity Structures of Offshore Bonds versus Domestic Bonds at Firm-Year Level (both New and Pre-existing)

In what follows, I test how firms allocate the amount of offshore versus domestic bonds into each maturity bin as they manage their yearly maturity structure. Model 4a and 4b run the OLS regressions of proportion of offshore bonds (both new and pre-existing) in each bin in each year on proportion of domestic bonds (both new and pre-existing) in the same bin each year. Model 4a is run for the groups of firms with and without accounting data, while Model 4b will also control for firm characteristics for the group of firms with

accounting data. The goal is to understand whether there is a relationship between the proportion of offshore bonds in a maturity bin and proportion of domestic bonds in the same maturity bin when a firm manages the maturity structure of its bond profile each year. For each bin j, I run the models:

$$\text{OProportion}_{i,t} = \alpha + \beta\ \text{DProportion}_{i,t} + \varepsilon_{i,t} \quad (4a)$$

$$\text{OProportion}_{i,t} = \alpha + \beta\ \text{DProportion}_{i,t} + \Phi\ \text{Controls}_{i,t-1} + \varepsilon_{i,t} \quad (4b)$$

Here, $\text{OProportion}_{i,t}$ is the proportion of all offshore bonds (both new and pre-existing) for firm i, year t. $\text{DProportion}_{i,t}$ is the proportion of all domestic bonds (both new and pre-existing) for firm i, year t.

Table 4-7 has similarities between the structure of offshore bonds (both new and pre-existing) and that of domestic bonds (both new and pre-existing) indicated by positive and significant coefficients for $\text{DProportion}_{i,t}$ in Panel a) (all firms) and Panel c) (firms without accounting data). However, the R-squared for those models is low in general, except for Bin 7. Interestingly for the group of firms with accounting data, a negative relationship between proportion of offshore and domestic bonds is found for the middle maturity bins, while a significant positive relationship is found for the longer ends of the maturity spectrum (Tables 4-7c and 4-8). There are significantly negative coefficients for $\text{DProportion}_{i,t}$ especially in Bin 4. This suggests that a higher degree of maturity diversification for firms that use the offshore bond market could have been achieved through the middle ranges of the maturity spectrum. That is, a higher proportion of domestic bonds outstanding and due in 7-8 years comes with a lower proportion of offshore bonds outstanding in this maturity range.

Table 4-7: Maturity Structure of Offshore Bonds versus Domestic Bonds at Firm-Year Level

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
				a) All firms			
DProportion	0.0425**	0.0341**	0.0234	0.0432**	0.101***	0.0938***	0.431***
	(2.57)	(2.28)	(1.51)	(2.27)	(5.36)	(6.80)	(29.86)
_cons	0.210***	0.191***	0.172***	0.150***	0.132***	0.0408***	0.0311***
	(34.89)	(34.04)	(33.11)	(31.51)	(28.99)	(16.76)	(11.83)
N	5094	5094	5094	5094	5094	5094	5094
adj. R^2	0.001	0.001	0.000	0.001	0.005	0.009	0.149
				b) Firms with accounting data			
DProportion	-0.00375	-0.00789	-0.0351	-0.0580**	0.0145	0.0596***	0.326***
	(-0.16)	(-0.36)	(-1.52)	(-2.05)	(0.53)	(2.71)	(16.62)
_cons	0.205***	0.197***	0.189***	0.174***	0.142***	0.0472***	0.0325***
	(25.78)	(25.99)	(26.01)	(25.25)	(21.78)	(13.08)	(9.27)
N	2638	2638	2638	2638	2638	2638	2638
adj. R^2	-0.000	-0.000	0.000	0.001	-0.000	0.002	0.095
				c) Firms without accounting data			
DProportion	0.0741***	0.0660***	0.0689***	0.127***	0.179***	0.120***	0.531***
	(3.18)	(3.18)	(3.30)	(5.00)	(6.85)	(6.95)	(25.20)
_cons	0.219***	0.186***	0.156***	0.129***	0.125***	0.0346***	0.0323***
	(23.96)	(22.38)	(21.02)	(19.62)	(19.61)	(10.63)	(8.23)
N	2456	2456	2456	2456	2456	2456	2456
adj. R^2	0.004	0.004	0.004	0.010	0.018	0.019	0.205

This table aims to find the sources of possible maturity diversification in the year a firm has offshore bonds (either new or pre-existing) on record. I examine the relationship between the maturity structure of offshore bonds (both new and pre-existing) and that of domestic bonds (both new and existing) for a firm in the years that it has both offshore and domestic bonds on record. The table reports results for the OLS regression of proportion of new and existing offshore bonds in a bin on proportion of new and existing domestic bonds in the same bin for each firm-year. For each bin there is one regression. For each bin j (1 to 7), estimate:

$$\text{OProportion}_{i,t} = \alpha + \beta\ \text{DProportion}_{i,t} + \varepsilon_{i,t} \quad (4a)$$ (7 bins means 7 regressions)

$\text{OProportion}_{i,j,t}$ is the proportion of offshore bonds (both new and pre-existing) for firm i in year t and $\text{DProportion}_{i,j,t}$ is the proportion of domestic bonds (both new and pre-existing) for firm i in year t. Panel a reports the results for all firms, while Panel b reports the results for firms with accounting data (Total Assets), and Panel c reports the results for firms without accounting data (missing Total Assets). t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Table 4-8: Maturity Structure of Offshore Bonds versus Domestic Bonds at Firm-Year Level with Controls

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProportion	0.00211	-0.00101	-0.0678***	-0.0677**	-0.0510*	0.0502**	0.297***
	(0.08)	(-0.04)	(-2.75)	(-2.33)	(-1.80)	(2.10)	(13.57)
logTA	0.0404***	0.0337***	-0.00315	-0.0535***	-0.0457***	0.0156***	0.00508*
	(7.71)	(6.97)	(-0.66)	(-11.52)	(-10.28)	(5.57)	(1.86)
TANG	-0.250***	-0.121***	0.0120	0.0599	0.153***	0.0454*	0.0615**
	(-5.01)	(-2.63)	(0.26)	(1.35)	(3.60)	(1.70)	(2.38)
DEP_TA	0.306	0.140	0.527**	0.388*	-0.526**	-0.186	-0.299**
	(1.26)	(0.63)	(2.39)	(1.81)	(-2.56)	(-1.44)	(-2.36)
D_Util	-0.0784***	-0.0390***	-0.00538	0.00583	0.0360***	0.0200**	0.0476***
	(-5.03)	(-2.71)	(-0.38)	(0.42)	(2.71)	(2.39)	(5.91)
DebttoEquity	-0.000404	-0.000992	-0.000574	0.000285	0.000839	0.00109***	-0.000014
	(-0.57)	(-1.51)	(-0.88)	(0.45)	(1.38)	(2.87)	(-0.04)
EBITDA_TA	-0.120	0.00361	-0.110	-0.185**	0.101	0.0917**	0.113**
	(-1.38)	(0.05)	(-1.40)	(-2.42)	(1.38)	(1.99)	(2.52)
MKTB	-0.000479	0.000430	0.0000283	0.000474	-0.000106	-0.000431	-0.000204
	(-0.72)	(0.70)	(0.05)	(0.80)	(-0.19)	(-1.21)	(-0.59)
_cons	-0.350***	-0.313***	0.233***	1.027***	0.849***	-0.229***	-0.0800*
	(-3.92)	(-3.80)	(2.88)	(13.04)	(11.27)	(-4.83)	(-1.73)
N	2358	2358	2358	2358	2358	2358	2358
adj. R^2	0.039	0.022	0.003	0.060	0.049	0.022	0.113

This table re-runs the models in Table 7 for firms with accounting data and therefore examines also firm characteristics' impacts on the proportion of offshore bond (both new and existing) held by a firm in the year it has both offshore and domestic bonds outstanding. For each bin j (1 to 7), estimate:

$$OProportion_{i,t} = \alpha + \beta\ DProportion_{i,t} + \Phi\ Controls_{i,t-1} + \varepsilon_{i,t} \quad (4b)$$ (7 bins means 7 regressions)

$OProportion_{i,j,t}$ is the proportion of offshore bonds (both new and pre-existing) for firm i in year t. $DProportion_{i,t}$ is the proportion of domestic bonds (both new and pre-existing) for firm i in year t. $Controls_{i,t-1}$ is the matrix of characteristics of the underlying firm i in year t-1. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. t-statistics are in parenthesis, *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Maturity Structure of New Offshore Bonds

I also look at how firms choose the structure for maturity of new offshore bonds relative to maturities of pre-existing bonds, new domestic bonds, and pre-existing offshore bonds. Model 5a and 5b aim to explain the factors that could drive the proportion of new offshore bonds in each maturity bin including proportion of pre-existing domestic bonds and proportion of new domestic bonds in the same bin, controlling for proportion of pre-existing offshore bonds in the same bin and firm characteristics. For each bin j (1 to 7), estimate:

$$NOProportion_{i,t} = \alpha + \beta_1 PEDProportion_{i,t} + \beta_2 NDProportion_{i,t} + \beta_3 PEOProportion_{i,t} + \varepsilon_{i,t} \quad (5a)$$

$$NOProportion_{i,t} = \alpha + \beta_1 PEDProportion_{i,t} + \beta_2 NDProportion_{i,t} + \beta_3 PEOProportion_{i,t} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (5b)$$

Here, $NOProportion_{i,t}$ is the proportion of new offshore bonds in bin j, firm i, year t. $PEDProportion_{i,t}$ is the proportion of pre-existing domestic bonds in bin j, firm i, year t. $NDProportion_{i,t}$ is the proportion of new domestic bonds in bin j, firm i, year t. $PEOProportion_{i,t}$ is the proportion of pre-existing offshore bonds in bin j, firm i, year t.

In Model 5a, I could examine the structure of new offshore bonds for the groups of firms with and without accounting data, while Model 5b allows control for the impacts of firm characteristics for the group of firms that have accounting data available. Results for models 5a and 5b are reported in Table 4-9 and 4-10. I hypothesized that new offshore bonds are issued to diversify pre-existing maturity structure of domestic bonds. Table 4-9 shows a negative relationship between new offshore bond composition and pre-existing domestic bond composition in the middle maturity bins, suggesting that new offshore bonds might have a diversification impact on pre-existing domestic bonds. For firms with accounting data, I also find non-significant relationship between proportion of new offshore bonds in Bin 4 and proportion of new domestic bonds in Bin 4. Table 4-9b and Table 4-10 therefore indicate that diversification happens at the middle maturities and not at the shorter and longer ends of the maturity spectrum for firms with accounting

data. However, for those without accounting data, I find a significant positive relationship between new offshore bond composition and new domestic bond composition especially for firms without accounting data. This suggests that both new offshore and domestic bonds may help to diversify pre-existing domestic bonds for this group of firms.

A possible explanation for why maturity diversification may happen when firms issue into the middle maturity ranges is that firms that borrow in the short and long ranges have certain characteristics that make them more likely to keep borrowing in the short and long ranges in the offshore market. For example, Guedes and Opler (1996) find that large firms with better credit rating borrow at the short and long ends of the maturity spectrum, while those with worse ratings borrow in the middle ranges. We also find in Table 4-10 that larger firms have higher proportions of offshore bonds in the short and long maturity ranges while having lower proportions of offshore bonds in the middle ranges. Smaller firms might have borrowed more into the middle ranges at home, however, and will move to other maturity ranges (short or long) when they issue overseas, which will contribute to a higher degree of maturity diversification.

Table 4-9: Maturity Structures of New Offshore Bonds versus New Domestic, Pre-existing Domestic and Pre-existing Offshore Bonds

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
			a) All firms				
PEDProportion	0.0329***	-0.0197	-0.0440*	-0.0579*	0.155***	0.0470*	0.176***
	(3.17)	(-1.14)	(-1.67)	(-1.74)	(3.55)	(1.87)	(7.15)
NDProportion	0.381***	0.284***	0.192***	0.0880**	0.0409	0.0460*	0.123***
	(15.26)	(11.95)	(6.80)	(2.37)	(1.27)	(1.68)	(4.44)
PEOProportion	0.0652***	0.0360*	0.00211	0.0523	0.189***	0.399***	0.404***
	(4.75)	(1.76)	(0.07)	(1.56)	(4.52)	(9.25)	(14.43)
_cons	0.0247***	0.101***	0.211***	0.202***	0.244***	0.0588***	0.0307***
	(5.01)	(13.31)	(23.09)	(24.12)	(28.00)	(12.85)	(8.12)
N	2853	2853	2853	2853	2853	2853	2853
adj. R^2	0.090	0.049	0.017	0.003	0.012	0.032	0.122
			b) Firms with accounting data				
PEDProportion	0.0370***	-0.0511**	-0.0203	-0.145***	0.0890	0.0113	0.0677**
	(2.85)	(-2.34)	(-0.53)	(-2.87)	(1.34)	(0.32)	(1.99)
NDProportion	0.101***	0.148***	0.112**	0.0119	-0.0486	0.0480	0.104***
	(3.21)	(4.02)	(2.53)	(0.22)	(-1.11)	(1.17)	(2.96)
PEOProportion	0.0380**	0.0439*	-0.0229	0.0519	0.199***	0.203***	0.332***
	(2.34)	(1.72)	(-0.56)	(1.07)	(3.36)	(3.37)	(8.36)
_cons	0.0162***	0.0891***	0.219***	0.250***	0.274***	0.0649***	0.0339***
	(2.82)	(9.27)	(16.29)	(19.30)	(21.15)	(9.93)	(6.20)
N	1398	1398	1398	1398	1398	1398	1398
adj. R^2	0.016	0.016	0.003	0.005	0.008	0.007	0.078
			c) Firms without accounting data				
PEDProportion	0.0236	0.0180	-0.0687*	0.00627	0.202***	0.0979***	0.319***
	(1.54)	(0.68)	(-1.90)	(0.14)	(3.48)	(2.76)	(9.00)
NDProportion	0.572***	0.339***	0.246***	0.155***	0.142***	0.0326	0.207***
	(15.63)	(10.63)	(6.74)	(3.14)	(2.98)	(0.89)	(4.66)
PEOProportion	0.0868***	0.0428	0.0358	0.0382	0.179***	0.612***	0.510***
	(4.11)	(1.35)	(0.79)	(0.83)	(3.04)	(9.95)	(13.02)
_cons	0.0353***	0.111***	0.203***	0.161***	0.218***	0.0525***	0.0276***
	(4.59)	(9.73)	(16.31)	(15.03)	(18.62)	(8.26)	(5.36)
N	1455	1455	1455	1455	1455	1455	1455
adj. R^2	0.162	0.071	0.032	0.005	0.021	0.070	0.193

This table aims to understand how firms choose maturities of new offshore bond issues through exploring the relationship between the maturity structure of new offshore bonds and those of new domestic, pre-existing domestic, and pre-existing offshore bonds. The comparison is for a firm in the years that it has new offshore bonds issued and has domestic bonds on record. An OLS regression of proportion of new offshore bonds in a bin on proportions of pre-existing domestic bond, pre-existing offshore bond, and new domestic bond in the same bin is run. For each bin there is one regression. For each bin j (1 to 7), I estimate:

$$NOProportion_{i,t} = \alpha + \beta_1 PEDProportion_{i,t} + \beta_2 NDProportion_{i,t} + \beta_3 PEOProportion_{i,t} + \varepsilon_{i,t} \quad (5a)$$

$NOProportion_{i,t}$ is the proportion of new offshore bonds in bin j, firm i, year t. $PEDProportion_{i,t}$ is the proportion of pre-existing domestic bonds in bin j, firm i, year t. $NDProportion_{i,t}$ is the proportion of new domestic bonds in bin j, firm i, year t. $PEOProportion_{i,t}$ is the proportion of pre-existing offshore bonds in bin j, firm i, year t. Panel a reports the results for all firms, while Panel b reports the results for firms with accounting data (Total Assets), and Panel c reports the results for firms without accounting data (missing Total Assets). t-statistics are in parenthesis, *, **, *** denote significance at 10%, 5%, and 1%, respectively.

Table 4-10: Maturity Structures of New Offshore Bonds versus New Domestic, Pre-existing Domestic, and Pre-existing Offshore Bonds—With Controls

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
PEDProportion	0.0493***	-0.0341	-0.0633	-0.102*	0.0118	0.00845	0.0607
	(3.43)	(-1.43)	(-1.53)	(-1.93)	(0.16)	(0.22)	(1.64)
NDProportion	0.109***	0.107***	0.0659	0.0484	-0.0683	0.0285	0.0851**
	(3.20)	(2.69)	(1.41)	(0.82)	(-1.42)	(0.60)	(2.26)
PEOProportion	0.0140	0.0203	-0.0976**	0.0388	0.216***	0.162**	0.307***
	(0.76)	(0.72)	(-2.23)	(0.76)	(3.49)	(2.51)	(7.22)
logTA	0.00913**	0.0200***	0.0405***	-0.0425***	-0.0582***	0.0167***	0.00290
	(2.54)	(3.62)	(5.17)	(-5.29)	(-6.84)	(3.44)	(0.71)
TANG	-0.0886***	-0.00708	-0.0619	-0.0230	0.128	-0.0220	0.0581
	(-2.59)	(-0.13)	(-0.81)	(-0.29)	(1.55)	(-0.46)	(1.46)
DEP_TA	0.231	-0.147	0.0549	0.817**	-0.564	-0.0973	-0.140
	(1.47)	(-0.59)	(0.16)	(2.22)	(-1.47)	(-0.44)	(-0.76)
D_Util	-0.00716	-0.0333*	-0.0274	-0.0592**	0.0953***	-0.00413	0.0251*
	(-0.63)	(-1.89)	(-1.08)	(-2.25)	(3.47)	(-0.26)	(1.91)
DebttoEquity	-0.000171	-0.000340	-0.000638	0.000575	0.0000850	0.000822	-0.000018
	(-0.46)	(-0.59)	(-0.77)	(0.66)	(0.09)	(1.59)	(-0.04)
EBITDA_TA	-0.0771	0.0353	-0.101	-0.350***	0.286**	0.0436	0.0990
	(-1.44)	(0.42)	(-0.84)	(-2.80)	(2.19)	(0.59)	(1.59)
MKTB	-0.000063	0.0000318	-0.000361	0.00109	-0.000414	-0.000189	-0.000184
	(-0.18)	(0.06)	(-0.45)	(1.30)	(-0.48)	(-0.38)	(-0.44)
_cons	-0.101*	-0.217**	-0.382***	0.952***	1.149***	-0.193**	-0.0415
	(-1.71)	(-2.38)	(-2.95)	(7.11)	(8.15)	(-2.41)	(-0.62)
N	1213	1213	1213	1213	1213	1213	1213
adj. R^2	0.026	0.018	0.026	0.041	0.051	0.014	0.079

This table re-runs Table 4-9 for the group of firms that have accounting data and controls for firm characteristics. For each bin j (1 to 7), I estimate:

$$NOProportion_{i,t} = \alpha + \beta_1 PEDProportion_{i,t} + \beta_2 NDProportion_{i,t} + \beta_3 PEOProportion_{i,t} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (5b)$$

$NOProportion_{i,t}$ is the proportion of new offshore bonds in bin j, firm i, year t. $PEDProportion_{i,t}$ is the proportion of pre-existing domestic bonds in bin j, firm i, year t. $NDProportion_{i,t}$ is the proportion of new domestic bonds in bin j, firm i, year t. $PEOProportion_{i,t}$ is the proportion of pre-existing offshore bonds in bin j, firm i, year t. $Controls_{i,t-1}$ is the matrix of characteristics of the underlying firm i that issue the bond k in the previous year. TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. t-statistics are in parenthesis, *, **, *** denote significance at 10%, 5%, and 1%, respectively.

4.5.3 Robustness Checks

Using Proportions as Dependent Variables

I use GLM method besides OLS regression for dependent variables as proportions, which take value from 0 to 1. The results are largely the same.

Market Saturation

Market saturation is another possible motivation for why firms use the offshore bond markets, i.e., when the market for a certain maturity has exhausted domestically and a firm will tap the offshore market to borrow in that maturity. To examine this possibility, an initial test for market saturation is performed using a logit regression where the probability of being an offshore transaction (D_Offshore = 1) is explained by the accumulated amount of new domestic bonds that has been issued in the year in gross amount (AccND_Yr) or as a fraction of total assets in that year (AccND_Yr_TA) for a firm:

$$\text{Prob (D\_Offshore = 1)} = f(\text{AccND\_Yr, Controls}) \quad (6)$$

I find that offshore bonds are more likely to be issued if there are fewer new domestic bonds issued previously in the year, contradicting to the domestic market saturation hypothesis (a significant negative coefficient for AccND_Yr). The result can be found in Table 4-11.

Table 4-11: Market Saturation- Accumulated New Domestic Bond Issue and Probability of Being an Offshore Bond

	(1)	(2)
AccND_Yr	-0.00114***	
	(-21.77)	
AccND_Yr_TA		-0.0793***
		(-36.52)
logTA	0.246***	-0.207***
	(13.45)	(-10.44)
TANG	0.865***	1.610***
	(5.06)	(8.28)
DEP_TA	1.055	-0.567
	(1.36)	(-0.62)
D_Util	0.0675	0.186***
	(1.33)	(3.25)
DebttoEquity	0.0121**	-0.00187
	(2.30)	(-0.39)
EBITDA_TA	0.0312	0.488
	(0.10)	(1.38)
MKTB	0.00211	0.0121***
	(1.03)	(4.76)
_cons	-4.974***	3.032***
	(-15.87)	(8.77)
N	11702	11702
LR chi2	899.99	3292.27
Prob > chi2	0.0000	0.0000

This table runs the logit regression where the probability of being an offshore transaction (D_Offshore = 1) is explained by the accumulated amount of new domestic bonds that have been issued in the year by the firm (as raw amount, AccND_Yr, in Column 1 and as fraction of Total Assets of the previous year, AccND_Yr_TA, in Column 2). TA is Total Assets in thousands of dollars. TANG is calculated as NTA/TA or Net Tangible Assets/Total Assets. DEP_TA is calculated as Depreciation/Total Assets. EBITDA_TA is calculated as EBITDA/Total Assets. DebttoEquity is Total Debt/Common Equity. MKTB is the market-to-book value sourced from Datastream. If offshore bonds are issued because the domestic market has been exhausted, the higher the accumulated amount of new domestic bonds that have been issued by the firm, the more likely that the next issue will be an offshore bond. The result indicates that a bond is more likely to be issued if there are fewer new domestic bonds issued previously in the year, contradicting the domestic market saturation hypothesis. *, **, *** denote significance at 10%, 5%, and 1%, respectively.

Selection Bias

There could be selection bias issue if the type of firms that use the offshore bond market is also the type of firms that maintain a diversified bond maturity structure regardless of whether the firms tap the offshore bond market or not. To address this issue, I test whether firms issuing bonds overseas enjoy higher debt maturity diversification compared to similar firms that might have used the offshore market but stay in the domestic market during a shock that limits borrowing conditions at home. Using the 2008 financial crisis in the United States, I employ the propensity matching and a difference-in-difference method to address the selection bias issue. I match the firms based on the characteristics that may impact the likelihood to use the offshore bond market. The characteristics I employ to match firms that use the offshore bond market in 2008 with those that never use the offshore bond market are based on Gozzi et al. (2015). They find that larger firms with more leverage are those that issue debt abroad. Within firms from developing countries, firms that are older and less profitable are more likely to use the offshore market. I therefore use the propensity matching method with firm size (as the natural log of total assets), leverage, and profitability as the characteristics to match. Model (3) on the Herfindahl index will be run for the groups of firms that issued bonds offshore and the matched sample, with the hypothesis that firms that use the offshore bond market during financial crisis enjoy higher maturity diversification compared to similar firms that stay in the domestic market. The model estimated is as follows:

$$InvHERF_{i,t} = \alpha + \beta_1 Post_t * D\_Treat_i + \beta_2 Post_t + \beta_3 D\_Treat_i + \varepsilon_{i,t} \quad (7)$$

where $Post_t$ is 1 if the value is in the year during (2008) or after (2009) the 2008 financial crisis, depending on the test, and is 0 for year 2007. D_Treat_i is 1 if a firm is treated (i.e., issues offshore bonds in 2008) and 0 if not.

Table 4-12: Selection Bias with Propensity Matching and Difference-in-difference Analysis

Logit Regression

	D_Treat
logTA	-0.124
	(-0.59)
DebttoEquity	-0.118
	(-0.87)
EBITDA_TA	-13.21***
	(-2.62)
_cons	2.853
	(0.87)
N	91
LR chi2	15.09
Prob > chi2	0.0017

Comparison of Characteristics between the Matched and the Control Samples

Variable	Unmatched/Matched	Mean		t	p>|t|
		Treated	Control		
logTA	U	15.767	16.172	-1.28	0.204
	M	15.767	16.007	-0.66	0.51
DebttoEquity	U	-0.29677	1.2332	-1.51	0.133
	M	-0.29677	1.1024	-1.06	0.296
EBITDA_TA	U	0.09781	0.1627	-3.13	0.002
	M	0.09781	0.12048	-1.18	0.244

Difference-in-difference Results

	2007 vs. 2008	2007 vs. 2009
PostxTreatment	-0.341	-0.373
	(-0.23)	(-0.25)
Post	0.945	1.338
	(0.90)	(1.24)
D_Treat	-1.803*	-1.803*
	(-1.72)	(-1.67)
_cons	5.721***	5.721***
	(7.71)	(7.51)
N	100	100
adj. R^2	0.050	0.059

This table reports the results for the difference-in-difference analysis where I match U.S. firms that issue offshore bonds in 2008 (the U.S. financial crisis event) with U.S. firms that do not use the offshore bond market, then examine if borrowing offshore during the U.S. financial crisis leads to higher maturity diversification. $Post_t$ is 1 if the value is in the year during (2008) or after (2009) the 2008 financial crisis, depending on the test, and is 0 for year 2007. D_Treat_i is 1 if a firm is treated (i.e., issues offshore bonds in 2008) and 0 if not. Panel a reports the logit regression of being a firm that used the offshore market in 2008 versus one that borrows only domestically, from which the propensity score used for matching is calculated. Panel b reports the matching results where characteristics between the treated firms (U.S. firms that issue offshore bonds in 2008) and the control firms (U.S. firms that borrow only domestically). Panel c reports the results of the difference-in-difference analysis to assess the impact of being a firm that uses the offshore bond market in 2008 on the inverse of the Herfindahl index measure. *, **, *** denote significance at 10%, 5%, and 1%, respectively.

In table 4-12, I report the results for the logistic regression for whether a firm is treated or not, the comparison in characteristics between the treated and the matched groups before and after the matching, and finally the difference-in-difference analysis. Due to requirements that accounting data are available for 2008 and InvHERF measure is available for all three years of 2007, 2008, and 2009, the final sample has 25 firms to match and 91 firms in the control sample. One can tell that EBITDA_TA is the factor that is most significant in distinguishing a treated firm versus one that is not. Also, the matched group and the control group are not significantly different in terms of size, leverage, and profitability. I find that U.S. firms that stay in the domestic market have higher InvHERF, which means a higher degree of maturity diversification, and there is no indication that borrowing offshore makes a firm have a higher degree of maturity diversification during or after the financial crisis.

Utility Firms

I also test the subgroup of firms from the utility sector to rule out the foreign currency hedging motive since those firms do not usually have operations overseas. If firms have to hedge income from foreign business, for example, they may tend to borrow in the same manner as they borrow at home because the business at home and offshore should not be different. Table 4-13 reports the results for the group of utility firms. Table 13a reveals that utility firms tend to issue bonds into the 1-2 year, 3-4 year, 7-8 year, and over 11 years both offshore and domestically. The remaining maturities for offshore bonds (new and existing) have similar structure to the remaining maturities for domestic bonds (new and existing) in Table 13b. New offshore bonds seem to diversify maturity structure for Bin 3 and 4 (Table 13c). However, proportions of new offshore bonds in Bin 3 and 4 are significantly positively related to proportions of new domestic bonds in those bins. The results suggest that there is little impact of borrowing bonds offshore versus borrowing domestically on maturity diversification for utility firms, even when they have little incentive to hedge foreign currency.

Table 4-13: Management of Maturity Structure for Utility Firms

All Bond Issues Throughout the Sample Period (Table 4-3)

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProp_All	0.336***	0.279***	-0.00493	0.366***	-0.00861	0.170**	0.169**
	(5.38)	(4.47)	(-0.06)	(7.48)	(-0.22)	(2.19)	(2.32)
_cons	0.158***	0.236***	0.0530***	0.00413	0.00248	0.00270**	0.0165**
	(6.96)	(8.66)	(4.98)	(1.21)	(1.53)	(2.32)	(2.56)
N	330	330	330	330	330	330	330
adj. R^2	0.078	0.055	-0.003	0.143	-0.003	0.011	0.013

Offshore Bonds Outstanding versus Domestic Bonds Outstanding (Table 4-7)

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProportion	0.0432	0.0529**	0.0176	0.0521*	0.0998***	0.0839***	0.540***
	(1.59)	(2.01)	(0.67)	(1.65)	(2.97)	(3.46)	(21.80)
_cons	0.160***	0.166***	0.165***	0.138***	0.158***	0.0624***	0.0517***
	(18.76)	(19.69)	(20.04)	(17.99)	(18.95)	(12.33)	(9.14)
N	1827	1827	1827	1827	1827	1827	1827
adj. R^2	0.001	0.002	-0.000	0.001	0.004	0.006	0.206

New Offshore Bonds versus Pre-existing Domestic, New Domestic, and Pre-existing Offshore Bonds (Table 4-9)

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
PEDProportion	0.000242	0.0221	-0.0900*	-0.0318	0.146**	0.113**	0.257***
	(0.01)	(0.81)	(-1.88)	(-0.64)	(2.05)	(2.27)	(5.93)
NDProportion	0.302***	0.239***	0.147***	0.137***	-0.00838	-0.0111	0.126**
	(6.29)	(5.41)	(3.12)	(2.58)	(-0.16)	(-0.26)	(2.44)
PEOProportion	0.0469**	0.0379	-0.0125	0.0275	0.0160	0.294***	0.281***
	(2.17)	(1.27)	(-0.24)	(0.56)	(0.25)	(4.48)	(5.52)
_cons	0.0272***	0.0673***	0.215***	0.138***	0.310***	0.0867***	0.0497***
	(3.89)	(5.99)	(13.78)	(10.82)	(18.73)	(8.95)	(6.23)
N	982	982	982	982	982	982	982
adj. R^2	0.041	0.028	0.012	0.005	0.001	0.023	0.109

This table examines how utility firms manage the maturity structures for the offshore bonds issued throughout its lifetime (Table 4-3), for the offshore bonds outstanding each year (Table 4-7), and for the new offshore bonds issued each year (Table 4-9). *, **, *** denote significance at 10%, 5%, and 1%, respectively.

Subsamples of Firms by Countries of Domicile

I check whether firms having different countries of domicile have different motives to use the offshore bond market. The hypothesis is that firms coming from smaller markets may have a stronger need of diversifying the maturity structure of their bonds as they have limited options in the domestic market. Table 4-14 groups firms by groups of those coming from high-income nations (Panel a) and those coming from middle- and low-income nations (Panel b). The results do not indicate a diversification effect of new offshore bond issues, with all positive coefficients representing a positive relationship between the proportion of new offshore bonds in each maturity bin and the proportion of new domestic bonds a firm ever issues in the same maturity bin.

Table 4-14: Robustness Check by Nation Subsamples

a) High-income Nations

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProp_All	0.0507***	0.0313*	0.0112	0.0249	0.0937***	0.0948***	0.436***
	(2.78)	(1.94)	(0.68)	(1.23)	(4.75)	(6.49)	(29.17)
_cons	0.212***	0.192***	0.170***	0.155***	0.129***	0.0406***	0.0293***
	(33.16)	(32.54)	(31.57)	(30.25)	(26.79)	(15.56)	(10.12)
N	4492	4492	4492	4492	4492	4492	4492
adj. R^2	0.001	0.001	-0.000	0.000	0.005	0.009	0.159

b) Middle-income and Low-income Nations

	Bin 1 1-2 Yr	Bin 2 3-4 Yr	Bin 3 5-6 Yr	Bin 4 7-8 Yr	Bin 5 9-10 Yr	Bin 6 11-20 Yr	Bin 7 >21 Yr
DProp_All	0.000580	0.0494	0.0798	0.207***	0.177***	0.0793	0.431***
	(0.01)	(1.12)	(1.56)	(3.57)	(2.62)	(1.55)	(2.76)
_cons	0.207***	0.183***	0.188***	0.105***	0.158***	0.0458***	0.0427***
	(9.96)	(9.28)	(9.78)	(7.80)	(10.12)	(5.69)	(6.53)
N	492	492	492	492	492	492	492
adj. R^2	-0.002	0.001	0.003	0.023	0.012	0.003	0.013

This table examines how the maturity structure of the offshore bonds and that of the domestic bonds a firm ever issues throughout its lifetime differs from each other for firms coming from different countries of domicile. I revisit the model in Table 4-3 for subgroups of firms from nations with high income (Panel a) and those from nations with middle or low income (Panel b). *, **, *** denote significance at 10%, 5%, and 1%, respectively.

4.6 Conclusion

This chapter examines the motivation to use the offshore bond market as a way to diversify the bond profile. If there are segmentations across bond markets around the world such that each market has its own preferred ranges of maturity firms can borrow in, it is likely that issuing bonds in an offshore market may broaden the ranges of maturities a firm can issue bonds into. On the other hand, if a firm issues bonds to hedge currency exposure or to keep the source of funds close to the use, one may expect a firm to issue bonds with similar maturity in the offshore markets. To examine whether maturity diversification happens, I look at maturity at issuance of new offshore bonds and extend previous works to focus on comparing the composition of maturity for offshore bonds with that of domestic bonds. I also employ the inverse of the Herfindahl index as a measure of maturity diversification for a firm's bond profile.

I find that average maturity at issuance of offshore bonds is significantly different from that of domestic bonds. However, the difference changes sign depending on the sub-sample. A closer investigation into the composition of maturity ranges at issuance for all the bonds that a firm has issued throughout its life finds a generally positive relationship between the proportions of new offshore versus new domestic bonds for each maturity range. Also, having new offshore bonds issued in a year lowers the inverse of the Herfindahl index, i.e., lower degree of maturity diversification, while having new domestic bonds issued in a year increases the degree of maturity diversification.

There could be some evidence that indicates a potential maturity diversification effect of having offshore bonds. For the group of firms that use the offshore bond markets, I find that the inverse of the Herfindahl index is higher in the year with offshore bonds outstanding (either new or existing), suggesting a higher bond maturity diversification when a firm holds offshore bonds. However, for the full sample of firms, a firm in the year with offshore bonds in its book has a lower inverse of the Herfindahl index. It is possible that firms that stay at home have higher maturity diversification than firms that tap the offshore bond market. I also find that firms manage their yearly bond profile (new and pre-existing bonds) so that proportions of offshore bonds in the short and the long ends of the maturity ranges are positively related to the proportions of domestic bonds in the same maturity bins. However, in the middle maturity ranges, there

is a negative relationship between proportions of offshore bonds (new plus pre-existing) and domestic bonds (new plus pre-existing), at least for the group of firms with accounting data. There is also a negative relationship between the proportion of new offshore bonds in a maturity range and the proportion of pre-existing domestic bonds in the same maturity range.

In summary, the paper challenges the view that new offshore bonds lead to higher maturity diversification for a firm's bond profile. Nevertheless, new offshore bonds may help to diversify maturities of pre-existing domestic bonds in the middle maturity ranges, but my analysis cannot preclude that new domestic bonds can have the same effect. In this paper, we have not made a distinction for whether the lack of maturity diversification effect of new offshore bonds can be attributed to the absence of market segmentation or because firms do not seek to use the offshore bond market to diversify its bond maturity structure. The results do suggest that other considerations such as asset matching, hedging motivation, market timing motivation, and location of use of funds to use the offshore bond market are important as they explain why maturity structures of new offshore bonds and new domestic bonds a firm ever issues are similar.

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Chapter 5

5 Conclusion

The thesis consists of three studies that shed light on the interaction between firms' financing decisions and the financial capital market condition.

Chapter 2 examines the risk profiles of Canadian income trusts, a corporate structure that creates tax incentives for a firm to payout cash distribution while allowing investors to gain exposure to movements from the firm's equity. The risk aspect we look at is the stock-like/bond-like behavior of the income trust returns, which will have implications on the pricing of hybrid assets as well as portfolio management. We employ a shock to the tax policy (the TFP announcement) that would presumably change the stock-like/bond-like behavior of income trusts. Firstly, we examine how income trusts behave compared to ordinary corporations matched by industry and size. We find that income trusts are priced more like bonds compared to the matched group of corporations before the TFP announcement, while behaving more like stocks and having similar risk profiles compared to matched corporations after the TFP announcement. Secondly, we find that by having been formed from the selective spin-off of less than 100 per cent assets of a previous firm, having low market-to-book ratios, high tangibility, high dividend payout, low ROA, and high prospective tax shield, an income trust has less pronounced change towards being more stock-like after the TFP announcement. The chapter therefore sheds light on the practical question of how Canadian income trusts have been priced and the factors that impact the stock-like/bond-like behavior of hybrid assets.

While the majority of studies on the pricing of Canadian income trusts have focused on valuation around tax policy events in the 2005-2006 period to find a role for tax-related factors, we take a different approach in Chapter 3 by examining the valuation of income trusts throughout the life cycle of the structure. The hypothesis is that there has been a higher premium valuation given to Canadian income trusts earlier in time when the structure is new and less well-understood. We document a higher median earnings multiples of income trusts (EV/EBITDA, Market-to-Book, P/E, Q Ratio) in early 2000s that can be partly but not completely explained by tax and accounting traits. This leaves a

role for other factors including behavioral factors in the pricing of this corporate structure.

Chapter 4 examines how firms make bond maturity decisions when issuing offshore bonds. As maturity diversification is an important aspect of a firm's debt structure, it is interesting to know if a firm achieves a higher degree of maturity diversification if it goes beyond the national border to issue bonds assuming bond markets around the world are segmented. Firstly, I confirm a different average maturity of offshore bonds versus domestic bonds on aggregate, which suggests that offshore bonds and domestic bonds have different maturities as have been documented in the literature. The chapter extends previous studies by looking at the structure of maturities (i.e., the proportion of bonds issued into different maturity bins) and the inverse of the Herfindahl index to more adequately measure the diversification effect. I find secondly that at the firm level, when one looks at all the bonds a firm ever issues in the sample period, the maturity structures of offshore bonds and domestic bonds issued by the same firm do not differ. Thirdly, at the firm-year level, a firm has a lower maturity diversification degree as measured by the lower inverse of the Herfindahl index in the years with new offshore bonds issued, while the opposite is true in the years with new domestic bonds issued. Finally, I find that if a firm issues new offshore bonds in a year, a high proportion of offshore bonds issued into the short and long maturity bins can be explained by a high proportion of pre-existing domestic bonds in those same bins. However, there is a negative relationship between proportions of new offshore bonds versus pre-existing domestic bonds in the middle maturity bins. This suggests that the maturity diversification effect of having offshore bonds may take place, but only in the middle maturity ranges. However, I cannot preclude the case that domestic bonds also have the same effect. This chapter therefore challenges the view that offshore bonds diversify domestic bond markets in terms of maturity. It indicates that other considerations such as asset matching or currency hedging can be at play when firms tap the offshore bond market.

The evidence on the financial capital market's regularities would assist market participants in their decision making. From the two chapters on Canadian income trusts, firms know about the factors that are priced if they consider issuing hybrid assets. Firms

and investors understand that behavioral factors can be at play in the valuation of a new type of assets. The fourth chapter on maturity of offshore bonds lets us understand the motivations that lead firms to use the offshore bond markets. In summary, this thesis contributes to our understanding of the financial capital market and corporate financing.

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