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Does Limited Liability Matter? Evidence from a Quasi-Natural Experiment

Finance Working Paper N° 740/2021
March 2021

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Abstract

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Keywords: Limited Liability, Income Trusts, Financing, Investments

JEL Classifications: D22, G32, G38, K20, L21, P12

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"The limited-liability company is one of man's greatest inventions [...]. [The limited-liability company] encourages investment by limiting people's downside risk [...] and you have an institution that allocates spare money to productive purposes and [frees] investors from the threat of personal ruin [...]. As capital-hungry technologies such as the railroads arrived, [...] the privilege [of limited liability became] open to all comers".

- The Economist, September 2016 -

1 Introduction

In an article that appeared in The Wall Street Journal in 2018, Senator Elizabeth Warren made the following comment about limited liability corporations: "American corporations exist only because the American people grant them charters. Those charters confer valuable privileges - such as limited legal liability for their owners - that enable businesses to turn a profit"[1]. Is limited liability really as important for firms as implied by Senator Warren in the quote above? This seemingly obvious yet fundamental question has not garnered adequate attention in the academic literature, mainly because it is empirically challenging to test the effects of limited liability.

First, the change in legal status from unlimited to limited liability is extremely rare to observe. Since the overwhelming number of public companies are limited liability from their inception, there are virtually no recent instances of an observed switch in the liability status of firms. Consequently, there are only a few papers that empirically study different liability regimes. For example, Esty (1998), Grossman (1995), Weinstein (2003, 2005) use data from the 19th century to the early 20th century. The results from these early studies and selective samples, however, might not be relevant today. In fact, Kessler (2003)) agrees that limited liability was essential in promoting commerce in the US in the 19th century, as suggested in

[1] https://www.wsj.com/articles/companies-shouldnt-be-accountable-only-to-shareholders-1534287687

the introductory quote, but questions whether it plays a significant role today.

Second, extant empirical tests face identification problems: the choice of the liability status is endogenously determined by the firm[2]. The prospect of this endogeneity can have serious consequences on the estimates from empirical tests, leading the researcher to potentially draw the incorrect conclusions.

In this paper, we use a quasi-natural experiment to study the effects of limited liability on various firm outcomes, alleviating previous empirical challenges. Our setting, in which the switch from unlimited to limited liability is imposed by exogenous law changes, is unique, and to the best of our knowledge, does not exist anywhere else with such a large and modern 21st century sample. In particular, we exploit the enactment of limited liability legislation across Canadian provinces in the early 2000s for a group of public firms known as income trusts. Our sample consists of 70 income trusts from a wide range of businesses, such as energy (including oil & gas), restaurants, consumer products, transportation, and manufacturing[3].

Income trusts have a similar structure to Real Estate Investment Trusts (REITs) and Master Limited Partnerships (MLPs)[4] in the US. Income trusts own and manage the underlying operating companies. The operating company is structured so that it pays out the majority of its taxable income as cash distributions to the income trusts in order to minimize corporate taxes. The income trusts then distribute all the cash flows to the unitholders of the trusts, so that unitholders effectively pay taxes only at the personal level. Due to this tax efficiency, income trusts became very popular among investors in Canada during the early 2000s[5]. However, at the time, there was increasing concern over the unlimited liability

[2]For example, Grossman (1995) and Weinstein (2008) examine the impact of unlimited liability for American Express, which was chartered as an unlimited liability joint stock association, and became a limited liability corporation only in 1965. Esty (1998) compares the risk-taking behavior of US banks in the early 20th century with different liability regimes, depending on whether they were chartered federally or chartered in different states under various liability regimes. Thus, the choice of liability status of the firms in these samples is endogenously determined. Moreover, these papers do not examine the *change* in the liability regime imposed by law changes.

[3]Please refer to Appendix B for the list of income trusts and their industries.

[4]According to Jay Ritter's IPO data update in Ritter (2020), there were 227 LP IPOs in the US between 1980 and 2019 (source: https://site.warrington.ufl.edu/ritter/files/IPOs2019Statistics.pdf).

[5]In 2006, Telus Corp and Bell Canada, the two main telecommunications companies in Canada, announced

status of income trusts (King, 2003). Ultimately, the liability acts enacted across Canadian provinces between 2004 and 2006 extended limited liability protection to unitholders, similar to the liability status of regular corporations.

Our difference-in-difference strategy relies on the comparison of (i) income trusts in provinces that passed the liability acts to those in other provinces that did not pass the act, and other corporations not affected by the act; and (ii) income trusts before and after the liability acts. This methodology allows us to separate trusts' reactions to the liability acts from the industry and local macroeconomic shocks.

Our results show that the limited liability structure is important. First, we examine the change in market value around the switch from unlimited to limited liability. Specifically, we conduct an event to see how the market values limited liability. Our event study results show highly statistically significant and positive cumulative abnormal returns (CAR) around the announcement dates of limited liability legislation. We also find an increase in both the total institutional investor ownership and pension fund ownership in income trusts after the enactment of the liability acts. These results indicate that many institutional investors viewed the liability risk as a concern.

Second, we show that the enactment of the liability acts leads to an increase in external financing. In particular, we find an increase in equity issuance for the energy trusts and debt (including convertible debt) issuance for both energy and business trusts.

Third, we find that income trusts increase their investment activities. While energy trusts increase capital expenditures, business trusts increase SG&A expenses, which we use as a proxy for investment in intangible assets, such as brand equity. Furthermore, we find evidence that energy trusts' investments are productive, resulting in higher profitability and payouts among this group of trusts.

We further explore whether the change in the liability status of income trusts affects risk-taking and risk-shifting incentives. We find that while income trusts increase equity volatility

their intention to convert to the income trust structure.

after the liability acts, we do not find evidence supporting a risk-shifting explanation based on our cash holdings tests and sub-sample tests where we split trusts into above and below median leverage groups. This can be explained by the low leverage found among income trusts.

We find that the switch from unlimited to limited liability has a stronger effect on energy compared to business trusts. We propose two explanations for these findings. First, energy trusts are more capital-intensive firms that require larger investment expenditures, and the switch in the liability regime helped increase their ability to raise more capital. Second, energy trusts face potentially higher and more severe sources of liability, such as environmental accidents and disasters.

Our results are robust to examining the dynamic effects before and after the enactment of the liability acts, and to using a propensity score matching method that matches trusts to corporations with similar characteristics (including industry, size, Tobin's Q, and leverage) before the enactment of the liability acts. We also address the endogeneity concern that the enactment of the liability acts could be affected by province-level economic and political characteristics, or lobbying efforts. Specifically, we use a Cox hazard model and a linear probability model to investigate whether these various characteristics can predict the enactment of the liability acts. We confirm that the enactment of the liability acts is not correlated to or driven by province-level characteristics.

There may be a concern that our results are driven by increasing oil prices during our sample period, affecting the results for the energy trusts. However, we mitigate this concern by including energy corporations in the control group, year fixed effects, and by later using propensity score matching (PSM). We conduct each test for the whole sample and separately for the energy and business groups. Thus, in the sub-sample analysis for the energy group, we only use energy trusts in provinces that had not yet passed the liability act and energy corporations as the control group. This helps us to control for growth opportunities for all firms in the energy sector. The inclusion of year fixed effects helps control for factors

changing over time that are common to both the treatment and control groups, including oil prices.

Overall, our results support the notion that the limited liability structure provides firms with greater access to capital. This, in turn, increases firms' investment activities, profitability and payouts, resulting in higher shareholder value. Legal scholars have suggested that the likelihood of unlimited liability for income trust investors prior to the liability acts was very remote. Thus, the statistically and economically significant results we present provide a lower bound estimate of the impact of limited liability on various firm outcomes. To the best of our knowledge, ours is the first paper to establish the positive real effects of limited liability on firms and investors.

2 Contributions and related literature

Our paper contributes to the discussion on the effects of limited liability status on the firm – a fundamental topic in the theory of the firm. According to Coase (1960), Calabresi (1968) and Demsetz (1972), the initial allocation of the liability status should be irrelevant in the absence of frictions. In other words, if transaction costs are negligible, the rules regarding liability should not affect firm outcomes.

However, there are strong arguments supporting the impact of limited liability on firms precisely because of the presence of frictions. For example, for investors in income trusts, one of the main frictions was the lack of hedging opportunities. Investors could not limit their downsize risk by buying put options, as the option market for income trusts was non-existent.

Several authors argue that limited liability provides significant benefits. Livermore (1935) argues that large companies with diffuse ownership would benefit from limited liability in order to attract greater quantities of capital. Carr and Mathewson (1988) suggest that limited liability is particularly efficient for large firms, and theoretically show that unlimited liability increases a firm's cost of capital and serves as a barrier to entry. Jensen and Meckling

(1976) argue that investors in a limited liability company can diversify and reduce their transaction costs since they do not need to incur monitoring costs to keep track of the firm's liabilities or the personal wealth of the other investors in the company. Winton (1993) shows that equities become less valuable for wealthier shareholders when the liability status is more severe (i.e. when shareholders are more liable) because they assume more liability risk. Consequently, wealthy shareholders avoid investing in those companies.

In the law literature, Manne (1967) and Forbes (1986) support the idea that limited liability is necessary for publicly held corporations with a large base of shareholders and reduces transaction costs. Woodward (1985), Easterbrook and Fischel (1985), and Dari-Mattiacci, Gelderblom, Jonker and Perotti (2017) believe that one of the main reasons that firms want to limit liability is to make their shares more transferable. Halpern, Trebilcock and Turnbull (1980) argue that in the case of large, widely held companies, limited liability is the most efficient regime and that unlimited liability creates "a significant measure of uncertainty in the valuation of securities and threaten the existence of organized securities markets". Lamoreaux (1998) supports the argument that the benefits of limited liability are greater for large firms seeking public ownership than for small closely held companies.

In line with the above literature, we find that income trusts increase their external financing and investments after the enactment of the liability acts. Our results also suggest that income trusts were able to use the capital to invest in valuable projects and increase their profitability and payouts.

Jensen and Meckling (1976) also point out that the limited liability status affects the risk-taking and risk-shifting incentives of shareholders. In particular, shareholders in a limited liability firm face an option-like payoff, which has a limited downside and a potentially unlimited upside. As a result, with limited liability, shareholders tend to increase the riskiness of the firm's assets at the expense of the debt holders . In a recent paper, Akey and Appel (2020) study the effect of limited liability in the parent-subsidiary context and show that a court ruling which strengthened liability protection for parent companies led to an increase

in toxic emissions and ground pollution by subsidiaries. The results suggest that the limited liability regime is associated with a moral hazard problem. Consistent with this notion, using US bank data from 1900 to 1915, Esty (1998) finds that banks with more severe liability rules have lower equity and asset volatility, hold a lower proportion of risky assets, and are less likely to increase their investment in risky assets when their net worth declines.

In our paper, we find that the switch from unlimited to limited liability status indeed increases firm risk. However, we do not find evidence of an increase in risk-shifting incentives among income trusts after the enactment of the liability acts.

It is also worthwhile to note that the empirical law literature has a mixed view on the value of limited liability. In particular, Grossman (1995) shows that American Express stock was actively traded even when the company had unlimited liability, thus concluding that limited liability is not a necessary condition for the functioning of an active stock market. Weinstein (2008) also studies American Express and finds that the adoption of limited liability reduced the riskiness of the shares, but had no effect on shareholder value. Acheson, Hickson and Turner (2010) examine the impact of liability regimes on the tradability and liquidity of shares for a sample of nineteenth-century British banks. The authors show that shares of limited liability banks were not more liquid than those of unlimited liability banks. Similarly, Weinstein (2003, 2005) looks at the share prices of California firms that switched from unlimited to limited liability in the 1920s and 1930s. The studies do not find a significant price reaction around the change in liability status, and further documents that the unlimited liability status at the time did not adversely affect corporate or economic activity in California. However, Weinstein (2003, 2005) notes that the findings might not be relevant today since, during the period of the studies, large class action tort liability lawsuits were not a big threat to firms, as they are today. In a more recent paper using the same California liability rule, Bargeron and Lehn (2017) show that trading volume and share turnover increased significantly for these state firms relative to non-California firms after the adoption of limited liability. The results presented in Bargeron and Lehn (2017) support the hypothesis

that limited liability reduces transaction costs and promotes the transferability of shares.

There is also a relevant law literature in Canada that has debated the actual likelihood of unlimited liability risk for income trust investors. Some legal opinions on this matter (e.g. Gillen (2006), King (2003)) argue that the prospect of unlimited liability was very remote, and likely as remote as the risk of unlimited liability that a shareholder in a public corporation would face. In fact, prior to the enactment of the liability acts, there were no recorded cases of major lawsuits against listed public income trusts. However, Erlichman (2003) notes that there have been cases involving private trusts where beneficiaries were responsible for the liabilities incurred by the trusts. Therefore, the fact that beneficiaries in private trusts faced lawsuits could have been a precedent for publicly listed income trusts.

Our paper is distinct from the existing literature, and thus contributes to it in several important ways. First, we use a quasi-natural experiment to empirically measure the effect of limited liability status, which overcomes the empirical challenges in the prior research. In our setup, the switch in liability regime is exogenously imposed by law, mitigating selection concerns. Our results are robust to an extensive set of additional tests, including the parallel trends test as well as propensity score matching. Second, we measure the effect of limited liability status on a larger group of firms operating in a wide range of industries, and these firms (income trusts) are comparable to corporations in terms of business operations[6]. Third, we use a more recent sample to test the effect of limited liability as compared to previous papers that use historical data from the 19th and early 20th centuries. Consequently, the results presented in our paper are more relevant and generalizable than earlier papers.

[6]The fact that many corporations converted to or had the intention to convert to the trust structure during the 2000s supports our argument that our sample of income trusts is comparable to ordinary corporations.

3 Canadian income trusts and the limited liability legislature

3.1 Canadian income trust structure

An income trust is an investment vehicle that holds all the equity and a substantial amount of debt in an operating company. The trust often receives interest, royalty or lease payments as well as dividends and a return of capital from an operating company that is under the trust's control. An income trust structure is most suitable for businesses that generate a steady stream of cash flows, require minimal capital expenditure and face limited competition King (2003). While initially mainly used as a structure for real estate investment trusts (REITs) and oil and gas royalty trusts, income trusts became popular among other businesses, such as restaurants, consumer products, transportation, and industrial companies in Canada in the early 2000s[7]. Canadian income trusts have a similar structure to Real Estate Investment Trusts (REITs) in the US, but the Canadian trust structure is used in a wide range of industries.

Income trusts own the assets of a revenue generating business in a wholly owned subsidiary[8]. The capital raised through unit issuance by the trusts is invested in the operating company through an income trust. The operating company manages the income producing business on behalf of income trusts. Unitholders are the beneficiaries of the trust. Trusts hold equity and internal debt/loan of the operating company. The internal debt, which is often subordinated to other claims against the operating company and generally does not carry the covenants or protection of a public debt issue, is viewed as equity for all purposes except for tax purposes (King, 2003).

[7] In 2006, Telus Corp and Bell Canada, the two main telecommunications companies in Canada, announced their intention to convert to the income trust structure.

[8] TMX Group limited https://www.tmxmoney.com/en/research/income_trusts/business_trusts.html.

Figure 1 provides an overview of a typical income trust structure. The main difference between income trusts and a typical corporation is the presence of a legal entity[9] between equity investors (unitholders) and the operating company. Aside from internal debt, operating companies could have third party debt, mainly bank loans. A management company could also be hired, for a fee, to manage the operating company on behalf of the income trust.

[Insert Figure 1 here]

In the early 2000s, the main attraction of the income trust structure was the preferential tax treatment compared to corporations. In particular, the operating company that carried on the business was structured so that it paid out the majority of its taxable income to trusts as cash distributions in order to minimize corporate taxes. The income trusts then distributed all the cash flow they received to the unitholders, essentially making income trusts flow-through entities. Thus, unitholders effectively paid taxes only at the personal level.

Another distinct feature of income trusts is their stated goal of paying out consistent cash flows to investors, which was especially attractive when the yields on bonds were low. Consequently, the popularity of the income trust-type arrangement in the early 2000s was a result of individual investors' reactions to low interest rates and the attractiveness of tax-preferred and stable high payouts promised by the income trusts (Jog and Wang, 2004). Investors continue to enjoy the steady stream of cash distributions from holding trust units, a type of security considered by many at that time to have features of both equity (ownership of the trust) and bonds (a steady stream of cash distributions). In Canada, income trusts are also eligible for a registered retirement savings (RRSP) account, pension accounts, and other non-taxable accounts (King, 2003), so that even personal taxes could be deferred.

[9]For convenience, we refer to an income trust as a legal entity. In law, however, a trust is not technically a legal entity. Rather, a trust is a relationship (just as a contract is a relationship, not a legal entity) and, in the case of a trust, the relationship is among the trustee, the beneficiaries (i.e. unitholders in the case of a public trust) and the trust assets.

[Insert Table 1 here]

As the income trust structure became popular among investors, several corporations (with stable cash flows) converted or planned to convert to income trusts during the early 2000s. According to the Toronto Stock Exchange (TSX) documents, at the end of 2006, there were 216 Canadian income trusts listed on the TSX with a total market capitalization of over $154 billion, accounting for 7.5% of the total market capitalization of all listed firms (Table 1). There were 163 business trusts, with a total market value of over $66 billion and 53 energy and pipeline trusts with a total market value of over $88 billion. At the time, there were a total of over 1,000 listed companies excluding structured products[10]. Figure 2 shows the increase in the number of income trusts over time from 2000 to 2006.

[Insert Figure 2 here]

However, the preferential tax treatment for income trusts ended when the government enacted the Fairness Tax Plan (FTP) on October 31st, 2006. The FTP, widely known as the "Halloween Massacre", eliminated income trusts' privileged tax status and imposed a tax similar to that of other corporations in Canada. Doidge and Dyck (2015) examine the implications of the changes in the tax treatment as a result of the FTP on corporate policies and find that trusts make adjustments to leverage, payouts, cash holdings and investments, following the enactment of the FTP.

3.2 Introduction of limited liability acts across provinces

Despite the widespread popularity of income trusts, especially among retail investors, many large groups of institutional investors, including pension funds, avoided investing in income trusts due to the potential risk of unlimited liability (King, 2003). Cleary and

[10] According to the TSX Group (The Toronto Stock Exchange Group) 2006 Annual Report, at the end of 2006, there were over 1,500 issuers (including structured products) with aggregate market capitalization of almost $2.1 trillion that were listed on Toronto Stock Exchange.

MacKinnon (2007) also show that income trusts had high returns and Sharpe ratios, which might be due to investors requiring compensation for bearing some unlimited liability risk. An article appearing in *The Globe and Mail* on December 12th, 2002 states: "while retail investors have embraced trusts, institutional players like pension funds have shunned them out of concern that unitholders could be held liable in case of bankruptcy or a catastrophic lawsuit. [...] In practical terms, unlimited liability risk is widely regarded as being negligible. [...] [T]here's still a perception that this is a point of vulnerability for trusts"[11]. Until the early 2000s, Quebec was the only province to have the limited liability legislation in place (since 1994)[12]. Although perceived by many as a theoretical risk of being liable for potential losses above and beyond the investors' initial investment, the unlimited liability status of income trusts was still a key obstacle for institutional investors when making investment decisions Gillen (2006).

Indeed, in the Annual Information Form, many trusts would state "The Trust Indenture provides that all contracts signed by or on behalf of the Trust must contain a provision to the effect that such obligation will not be binding upon Unitholders personally. Notwithstanding the terms of the Trust Indenture, Unitholders may not be protected from liabilities of the Trust to the same extent a shareholder is protected from the liabilities of a corporation"[13]. Moreover, until the mid-2005, income trusts were not included in the S&P/TSX Composite

[11] "Income trusts need all the help they can get on liability issue", *The Globe and Mail*, Dec 12th, 2002. https://www.theglobeandmail.com/globe-investor/investment-ideas/income-trusts-need-all-the-help-they-can-get-on-liability-issue/article758551/

[12] Wikipedia: https://en.wikipedia.org/wiki/Income_trust

[13] Annual information form, Crescent Point Energy Trust, Apr 19th, 2004. Accessed through Sedar.com (https://www.sedar.com/GetFile.do?lang=EN&docClass=1&issuerNo=00019829&issuerType=03&projectNo=00632541&docId=1226004)
Upon the enactment of the liability acts, the income trusts explicitly stated their protection of unitholder from personal liability through the liability acts in their annual information forms. The Annual information form of Crescent Point Energy Trust dated Apr 2nd, 2007 stated: "On July 1, 2004, the Province of Alberta proclaimed the Income Trusts Liability Act (Alberta) in force. This legislation provides that beneficiaries of Alberta based income trusts are not liable, as beneficiaries, for any act, default, obligation or liability of the income trust. Unitholders of the Trust have the benefit of this legislation with respect to liabilities arising on or after July 1, 2004."
(https://www.sedar.com/GetFile.do?lang=EN&docClass=1&issuerNo=00019829&issuerType=03&projectNo=01078405&docId=1926678)

Index due to the concern around the possible unlimited liability faced by unitholders of income trusts[14].

The provincial governments, and especially the governments of Alberta and Ontario, the home provinces for the majority of income trusts, decided to draft liability acts to protect investors from personal liability. Under the proposed rule changes, trust unit investors would not be held personally liable for the activities of an income trust, just like shareholders in a corporation. The first draft was proposed by the provincial government of Ontario in 2003. However, the draft did not go through in 2003 due to the change in government after an election.

[Insert Figure 3 here]

Eventually, to the surprise of many, Alberta, became the second province after Quebec to pass the liability act legislation on May 19th, which became effective on July 1st, 2004. Following Alberta, Ontario passed their Trust Beneficiaries Liability Act on December 16th, 2004, which took effect on January 1st, 2005. Manitoba, British Columbia and Saskatchewan passed similar liability acts in 2005 and 2006. Figure 3 provides a timeline of events around the enactment of the liability acts across Canadian provinces and Table 2 shows the effective dates of the liability acts across provinces.

[Insert Table 2 here]

It should be also noted that income trusts located in Alberta were mainly energy trusts and those located in Ontario were mainly business trusts. According to the documents from the Toronto Stock Exchange (TSX), as of the end of 2006, there were 82 income trusts registered in Alberta (of which 42 were energy trusts), and 86 income trusts in Ontario. Thus, the enactment of the liability acts in the provinces of Alberta and Ontario should have the most significant impact on the income trusts.

[14]Income funds, mutual funds and pooled funds: A recap on the limited liability issue and questions about governance. (Investment Funds Bulletin) Stephen Erlichman, Fasken Martineau DuMoulin LLP, May 2003.

The nature of the enactment of limited liability legislation for income trusts across Canada allows us to conduct a difference-in-difference analysis to measure the impact of the switch in liability regime on firm policies. The small window around the enactment of the new legislation is helpful for the empirical strategy. In particular, it mitigates the potential concern that the measured response of firms to the switch in regime is biased because the trusts are responding in very different (i.e., incomparable) economic conditions.

4 Data and summary statistics

We obtain the list of income trusts from the TSX documents. We hand-collect information on the date of formation, or conversion of corporations into trusts, and trusts' provinces of jurisdiction from the System of Electronic Document Analysis and Retrieval (SEDAR), the Canadian filing system for companies, similar to EDGAR in the US. We obtain accounting data for Canadian income trusts and corporations from the Compustat North America database. Institutional ownership is obtained from Thomson Reuters EIKON.

We exclude US-based trusts and corporations, as well as REITs. We want to focus only on the types of income trusts that are similar to operating companies. Following the existing finance literature, utilities and financial firms (SIC code 6000-6999 and 4900-4999) are also excluded, as these industries are highly regulated. Data on stock returns, trading volume, and market capitalization are obtained from Datastream.

We use the income trust classification from the TSX[15], Doidge and Dyck (2015) and Jog and Wang (2004) and split the trust sample into energy trusts and business trusts, which has become a common practice in income trust research. Energy trusts are engaged in the oil and gas sector, while business trusts are income trusts that operate in many industries, such as manufacturing, food distribution, and consumer services[16].

[15]Based on the TSX documents, coal income trusts, such as Fording Canadian Coal Trust, are classified as business trusts. However, we get qualitatively similar results if we reassign coal trusts into the energy group.

[16]Appendix B Provides a list of income trusts with their industry and grouping used in our tests.

Another reason to split the sample into energy and business trusts is that energy trusts are more capital-intensive than business trusts. If limited liability benefits capital intensive firms the most, as suggested by our opening quote from The Economist, then we should expect to see a greater effect for energy trusts after the liability acts are enacted.

The sample for our main regressions consists of income trusts and corporations in the same Fama-French 48 industries as the income trusts. Trusts formed in the provinces after the liability acts were enacted are in the treatment group, and trusts in a province that did not pass the law as well as the corporations in the same industries, are in the control group. We use data from approximately 3 years before to 3 years after the liability acts (between 2001 and 2006).

We only include trusts and corporations with available accounting data at least 1 year before and 1 year after the liability acts. We also exclude observations before the formation date of the trusts [17]. As the majority of our variables are scaled by lagged assets, any major restructuring in smaller sized companies would lead to extreme ratios. Consequently, we do not include corporations with extreme values in the control group[18].

For our main results, we end our sample period at the end of 2006 to exclude the effect of the Fairness Tax Plan (FTP) that was enacted on October 31st, 2006, which eliminated income trusts' privileged tax status and imposed a tax similar to that of other corporations. Since we require available data for our main variables for both income trusts and corporations at least one year before and one year after the liability acts, our final sample for the main

[17]Some corporations converted to trusts during the sample period. We exclude all observations before the conversion.

[18]For example, FEC Resources Inc in 2003 acquired 66% of outstanding shares of FEI, a Philipine Corporation, resulting in FEC's total assets increasing from $70,794 to $9,109,013.
Source: FEC (Forum Energy corporation) 2003 audited consolidated financial statements.
https://www.sedar.com/GetFile.do?lang=EN&docClass=5&issuerNo=00005275&issuerType=03&projectNo=00651142&docId=1262453
Another example is Rock Energy Inc, which acquired outstanding share of REL, an Alberta private oil and natural gas company, resulting in Rock's total assets increasing for $5.03 million in 2004 to over $21.8 million in 2003.
Source: Rock Energy Inc 2004 audited consolidated financial statements.
https://www.sedar.com/GetFile.do?lang=EN&docClass=5&issuerNo=00003111&issuerType=03&projectNo=00679756&docId=1316456

regressions consists of around 70 income trusts and 250 corporations listed on the TSX. The number of firm-year observations across different tests varies due to the data availability of our dependent variables of interest.

[Insert Figure 4 here]

In Figure 4, we provide summary statistics of the main variables for our sample of income trusts and corporations listed on the TSX during the periods 2001-2003 and 2004-2006 (which are the periods before and after the liability acts). Compared to corporations, income trusts have lower volatility but much higher profitability and payouts during the period 2001-2003. The raw data are consistent with the notion that income trusts in general have more stable business operations.

[Insert Figure 5 here]

In Figure 5, we report the summary statistics for our main variables separately for energy and business trusts. Based on the averages of before and after the liability acts, both groups of trusts tend to increase their external financing, investments, profitability and asset beta after the liability acts, although a more significant change is seen among energy trusts.

5 Limited liability and value implications: evidence from an event study

To measure the value of the switch from unlimited to limited liability status for income trusts, we first look at equity values and the information embedded in stock prices. We calculate the cumulative abnormal returns around the Alberta and Ontario events because these two provinces first passed the act in 2004, and because the majority of income trusts are also domiciled in the two provinces.

We estimate abnormal returns around the Alberta and Ontario liability acts for four value weighted portfolios: Alberta trusts, Alberta corporations, Ontario trusts, Ontario corporations. The portfolios of corporations are included as a control group to test whether income trusts and corporations react differently to the news on the enactment of the liability acts. In particular, if the switch from unlimited to limited liability is important, then we should only expect to find a stock price reaction for income trusts.

To compute abnormal returns, we use the regression based event study model (following Karafiath (1988) and MacKinlay (1997) over a (-75,+75) trading day window):

$$R_{pt} = \alpha_p + \beta_p * R_{bt} + \gamma * Event_j + \epsilon_{pt} \tag{1}$$

R_{pt} is the daily return of a value weighted portfolio p and R_{bt} is the daily return of the benchmark portfolio. We use the TSX composite index as our benchmark portfolio. $Event_j$ is a dummy variable that equals one on the event day corresponding to the j event (either Alberta or Ontario event date). The estimate of γ_p measures the portfolio's average abnormal return over the event period. To compute CAR, each γ_p is multiplied by the number of days in the event period.

For the Alberta event, we use March 30th, 2004, which is the first date the news on the extension of limited liability protection to trust unitholders was announced by the Alberta government[19]. The Ontario event date is December 16th, 2004, which is the news announcement and enactment date of the liability act in Ontario[20].

[Insert Table 3 here]

[19]We conduct Factiva news search for Alberta liability act enactment. The initial news on the liability acts were released together with Alberta Government budget plans. These news releases include information relevant to not only income trusts (the extension of the liability but also ordinary corporations (reduction in provincial taxes for corporations). Thus, they might not be a clean date to conduct our event study. The earliest news article mentioning only the liability act enactment for trusts in Alberta separate from other budget plans is Chalmers, R. (2004) Limited Liability for Income Trusts in the Edmonton Journal, March 30,2004. We use that date as our Alberta event date.

[20]We also conduct Factiva news search for Ontario liability act and the earliest news regarding the official enactment of the liability acts in Ontario is on the enactment date (December 16th, 2004). Thus, we use December 16th, 2004 as our Ontario event date.

The event study results are presented in Table 3 and reveal several interesting findings. First, we find a statistically significant three-day CAR of 1.11% for the portfolio of Alberta trusts around the Alberta event date. Meanwhile, the Alberta corporations, Ontario trusts and Ontario corporations do not exhibit any significant positive reaction around the announcement date of the enactment of the liability act for Alberta income trusts. These results are in line with the idea that the enactment of the Alberta act should affect only income trusts that were formed as trusts governed by Alberta law, and not Alberta corporations or Ontario income trusts and corporations.

Second, we document even stronger positive abnormal returns around the announcement and enactment date of the liability act in Ontario (December 16th, 2004) for both the Ontario and Alberta income trust portfolios. Specifically, the results show highly statistically significant and positive three-day cumulative abnormal returns of 2.23% for the portfolio of Ontario income trusts and 2.14% for the portfolio of Alberta income trusts.

We also assess the economic magnitude of market reactions. The average market capitalization at the end of November 2004 for Alberta and Ontario trusts were $895 million and $297 million, respectively. Therefore, the three-day cumulative abnormal return around the Ontario event is equivalent to an increase in market capitalization of $19.15 million and $6.6 million for an average Alberta and Ontario trust, respectively. We also find a positive market reaction over a 7-day event window for Ontario and Alberta trusts. In particular, the seven-day CAR for Ontario income trusts is 3.58%, and the seven-day CAR for Alberta income trusts is 2.63%, and both are significant at the 1% level. Again, we do not see any significant reaction for the portfolios of corporations.

The stronger market reaction for the Ontario event (significant three-day CAR of 2.14%) compared to the Alberta event (significant 3-day CAR of 1.11%) for the portfolio of Alberta trusts might seem somewhat puzzling as the income trusts are formed at the provincial level. However, we believe there is an explanation for this finding. Notably, there was a difference between the Alberta and Ontario liability acts. Alberta's act removed the possible liability

of beneficiaries only for trusts created under Alberta law. The Ontario act allowed any trust, formed in any province across the country, to obtain limited liability so long as they were a reporting issuer in Ontario (which would include all TSX-listed trusts) and provided they also amended their trust to be governed by the laws of Ontario. The most likely explanation is that the Ontario change affected the entire class of trusts, while the Alberta change only impacted trusts formed under Alberta law. It might be the case that investors, especially institutional investors, were unwilling to invest in income trusts until the liability rule applied to the class of trusts as a whole. In other words, investors were making decisions about trusts as a class, rather than on a case-by-case basis, and they would only invest if the whole class of income trusts became seen as being devoid of liability risk.

There are other complementary explanations as well. Ontario is the most important capital market in Canada. In addition, *the National Post* reported on December 29, 2004, two weeks after the Ontario liability act was passed, the following: "watch for another busy year now that the federal government has extended liability protection to fund unitholders"[21]. Thus there might have been a misperception that the Ontario act was a federal change that applied across Canada.

As an additional test (not tabulated), we also look at abnormal trading volume around the enactment of the Alberta and Ontario liability acts. If limited liability increases the market activity for the shares of limited liability firms, we should see positive abnormal trading volume around the time of the enactment of the liability acts. We calculate the trading volume for value weighted portfolios of the Alberta trusts, Ontario trusts, and both Alberta and Ontario trusts. The abnormal trading volume[22] for all three portfolios around the Ontario event is positive and higher than around the Alberta event. Moreover, the magnitude of the abnormal trading volume around the Ontario event is the highest for the

[21] "Fortune's final verdict on TSX stocks: A look at the best and the worst performers of 2004" – National post, December 29th, 2004.

[22] The abnormal trading volume is then defined as the difference between the actual percentage of shares traded for that portfolio i on day t and the median over that calendar year: $abTO_{it} = TO_{it} - med[TO_{it}]$.

value weighted portfolio of Ontario trusts[23].

6 Limited liability and firm outcomes

We next investigate how firm policies change in response to the enactment of the liability acts. Our empirical strategy relies on the comparison of income trusts in provinces that passed the liability act, relative to the income trusts in the provinces that have not passed the liability act, and a sample of corporations in the same industries as the income trusts. We note that the corporations were not affected by the liability acts. Thus, any trust formed in the province in which the law was passed is in the treatment group, and any trust in a province that did not pass the law, as well as, the corporations in the same industries, are in the control group. Income trusts whose principal regulator is Quebec are always in the treatment group, since Quebec passed the Income Trust Liability Act in 1994, while firms in the other provinces are in the control group until their province passes the liability act. We include Canadian corporations in the control group, since the limited liability acts did not affect these companies. Our data covers the period 2001-2006, or roughly 3 years before and 3 years after the enactment of the liability acts.

Our main regression (OLS) is a generalized difference-in-difference (DiD) estimation:

$$Dep.var_{it} = \alpha + \beta_1 LiabAct_{it} + \boldsymbol{\beta X_{it-1}} + FirmFE_i + YearFE_t + \epsilon_{it} \tag{2}$$

Where $Dep.var_{it}$ is our dependent variable of interest for firm i at time t; $LiabAct_{it}$ is an indicator that is equal to 1 if the observation for a trust i in year t takes place after

[23]To further document the overall market response to the liability acts in both Alberta and Ontario, we look at the press coverage of each of the events. We use Factiva to search for all the news articles that mention "income trusts" and "limited liability" 2.5 months around the announcement of the acts and effective dates of the liability acts in the provinces of Alberta and Ontario. Although it was expected that Ontario would pass the liability act first, Alberta ultimately enacted the act first, which came into effect on July 1, 2004. However, there were significantly more news articles appearing in national newspapers that covered the enactment of the liability act in Ontario than in Alberta. The total number of articles covering the Ontario act was eleven, of which nine were in national newspapers, compared to seven total number of articles and five national newspaper articles for the Alberta act.

the act is passed in firm i's province, and 0 otherwise. $LiabAct_{it}$ is 0 for all corporations. The coefficient for $LiabAct_{it}$ is the difference-in-difference estimate of the average impact of the liability acts on the dependent variable of interest for the treated group relative to the control group.

In the main specification we include firm fixed effects ($FirmFE_i$) and year fixed effects ($YearFE_t$). Firm fixed effects control for firm characteristics that do not change over our sample period. Year fixed effects control for time varying shocks affecting all firms (Gormley and Matsa (2014)). Also, the treatment dummy and post dummy, which are present in a standard difference-in-difference setup are absorbed by the firm fixed effects and year fixed effects, respectively. We also include the standard firm level variables to control for time-varying firm level characteristics (expressed by the vector $\boldsymbol{X_{it-1}}$). The firm level controls include lagged Tobin's Q, lagged leverage, lagged profitability and the lagged natural log of assets[24].

Following Bertrand and Mullainathan (2003) and Gormley and Matsa (2011), all regressions use robust standard errors clustered at the province of incorporation level to account for potential cross-firm correlation within provinces, serial correlation, and heteroscedasticity[25]. In the following set of DiD regressions, we present the results for the whole sample of income trusts and corporations in the same industry, as well as the energy group and business group subsamples separately, with firm and year fixed effects and the firm level control variables.

6.1 Limited liability and institutional ownership

Anecdotal evidence suggests that institutional investors, especially pension funds, avoided investing in income trusts due to the unlimited liability issue. In this section, we formally

[24]In the main regressions, we use lagged natural log of assets as the control for size. However, we get qualitatively similar results when we use the lagged natural log of sales as the control for size.

[25]As a further robustness check, we re-run our main tests with clustered standard errors at the firm level (untabulated), and also find qualitatively similar results.

test the effect of the liability acts on institutional ownership[26].

[Insert Table 4 here]

For each company and income trust, we obtain both total institutional and pension fund ownership from Thomson Reuters EIKON. We examine the change in both total institutional and pension fund ownership for the whole sample, and separately for the energy and business groups. We include standard firm level lagged control variables, and firm and year fixed effects in all regressions.

The results are presented in Table 4. We find an increase in both institutional ownership and pension fund ownership for energy trusts, with the point estimates being 0.0654 and 0.00853, respectively (Columns (2) and (5) of Table 4). This is equivalent to an increase of 55.66% and 270.87% given that the average institutional and pension fund ownership in energy trusts before the liability acts were 11.75% and 0.23%, respectively. We also find an increase in pension fund ownership in business trusts. The point estimate of 0.0088 (Column (6) of Table 4) is equivalent to an increase of 282.60% based on the average pension fund ownership in business trusts of 0.23% before the liability acts[27].

Overall, consistent with the anecdotal evidence, we show a statistically and economically significant increase in institutional ownership, especially pension fund ownership, after the enactment of the liability acts. Importantly, this evidence suggests that the liability risk was a real concern, and a barrier to invest, for institutional investors.

[26]See "Income trusts need all the help they can get on liability issue", *The Globe and Mail*, December 12th, 2002.
https://www.theglobeandmail.com/globe-investor/investment-ideas/income-trusts-need-all-the-help-they-can-get-on-liability-issue/article758551/

[27]Although we find a significant increase in the pension fund ownership of income trusts in terms of the percentage increase, the percentage ownership remained rather modest. One reason for this is the government's policy to curb the purchase of trust units by pension funds. The federal government was concerned that considerable participation of pension funds in the income trust market would significantly impact government revenues because of their tax-exempt status (*Toronto Star*, March 24th, 2004).

6.2 Limited liability and external financing

We next examine the effect of limited liability on firm financing activities. We expect trusts to increase their debt financing as unitholders have limited downside risk after the liability acts, lowering the risk to unitholders from additional debt. Trusts are also likely to increase equity issuance after the liability acts, since investors are shielded from personal liability. As a result, firms would be more willing to raise equity capital, and investors (especially the wealthier ones) are more willing to invest in trust units. In addition, since debt should become riskier after the liability acts, we expect convertible debt issuance to increase.

In these tests, the dependent variable in Equation 2 is replaced with measures of financing: (i) net debt issuance, measured as total debt (Compustat DLC+DLTT) minus lagged total debt scaled by lagged total assets (Compustat AT); (ii) net equity issuance, which is measured as proceeds from common and preferred stock issues (Compustat SSTK) minus purchases and retirements of common and preferred shares (Compustat PRSTKC) scaled by lagged total assets (Compustat AT); (iii) net external financing, which is equal to the sum of net equity issuance and net debt issuance; (iv) convertible debt (Compustat CVT) over total assets (Compustat AT).

[Insert Table 5 here]

The results are presented in Table 5. We separately examine the energy and business groups, since the capital-intensive nature of energy firms implies greater financing needs. We also control for firm characteristics, firm and time fixed effects. The coefficient on the *LiabAct* identifies the marginal effect of the enactment of the liability acts on the trusts in the provinces that pass a liability act.

While the results for external financing for the whole sample (Column (1)) and for the business group (Column (3)) are insignificant, the enactment of the liability acts has a

significantly positive effect on external financing for the energy group. Specifically, after the liability acts, external financing increases by 18.1% (significant at the 1% level) for energy trusts relative to energy corporations and trusts in provinces that did not yet pass the liability acts (Column (2)).

In Columns (4) - (6) of Table 5, we also find a significantly positive effect on debt financing for both the energy and business groups, with an annual increase in debt financing of 5.3% (significant at the 1% level) and 5.9% (significant at the 5% level), respectively.

Columns (7) -(9) present the results for net equity issuance for the whole sample and for the energy and business groups. We find that equity issuance for the energy group increases by 11%, which is significant at the 10% level.

Turning to Columns (10) - (12) of Table 5, we find a statistically significant increase in convertible debt after the liability acts for both groups of trusts. The coefficient for convertible debt ranges from 1.3% for energy trusts to 2.3% for business trusts, and both effects are significant at the 1% level. The results show that, in anticipation of potential risk-shifting incentives from unitholders[28], both trusts in the energy and business groups increase the issuance of convertible debt after the legislative changes. These results are consistent with Green (1984), which shows that the conversion options issued with debt help manage the risk incentives of shareholders.

To put the results into context, higher debt financing reflects the willingness of income trusts to raise additional debt (an increase in the demand for capital) after the liability acts because unitholders face less risk with limited liability. The increase in equity financing for the energy trusts reflects an increase in the supply of capital - new unitholders are more willing to contribute capital to income trusts at a lower cost. At first glance, one might not expect a large change in equity financing, since as shown in Table 3, the market prices for the income trusts adjust upward to reflect the benefits of limited liability. However, the

[28]To be more precise, trustees manage the trusts on behalf of the unitholders similar to the way managers manage a corporation on behalf of its shareholders.

market for income trust units was segmented before the liability acts, as only a subset of investors invested in income trusts. For example, prior to the liability acts, it is well known that pension funds avoided investing in income trusts due to the risk of unlimited liability (see Edgar (2004)). Thus, after the enactment of the liability acts, the cost of capital likely decreased due to better risk sharing[29]. This resulted in greater investments which were partly financed with equity.

Overall, the results are consistent with our prediction that the extension of limited liability to income trusts encourages trusts to increase outside financing since the unitholders are shielded form personal liability. Energy trusts raise both equity and debt financing, while business trusts tend to raise only debt financing.

6.3 Limited liability, firm size and investments

In this subsection, we examine the investment behavior of income trusts that switch from unlimited to limited liability. Since income trusts are committed to distributing almost all of their cash flows King (2003), additional capital investments would most likely need to be funded by outside capital. Therefore, we expect that the increased access to capital after the enactment of limited liability legislation will lead to increase in assets and investments.

[Insert Table 6 here]

We first look at the impact of the liability acts on the assets of income trusts using the natural log of assets. Columns (1) - (3) in Table 6 depict regression results for the whole sample, for the energy group, and for the business group, with $ln(Assets)$ as the dependent variable. The coefficient on the *LiabAct* dummy measures the elasticity of firm assets to the enactment of the liability acts. The point estimates of *LiabAct* range from 16.5% for business trusts to 17.9% for energy trusts (both significant at the 5% level).

[29]For the literature on the effect of market segmentation on firms' cost of capital, please see Errunza and Losq (1985) and Errunza and Miller (2000).

To get a sense of the economic magnitude of these results, the average asset size of business trusts and energy trusts before the enactment of the liability acts were $364.2 million and $796.9 million, respectively. Therefore, after the enactment of the liability acts assets of business trusts and energy trusts increased on average by $60.1 million and $142.6 million annually, respectively.

We next consider two measures of investment: capital expenditure (Compustat CAPX) over lagged assets (Compustat AT) and cash acquisitions (Compustat AQC) over lagged assets (Compustat AT). The regression results are presented in Columns (4) - (9) of Table 6. The coefficient on the *LiabAct* indicator is positive and statistically significant only for the energy group. Specifically, the point estimate indicates an increase in capital expenditure by 5.1 percentage points of lagged assets and an increase in cash acquisition by 5.9 percentage points of lagged assets. Since the mean capital expenditure for energy trusts is around 29% of lagged assets per year, the effect we document implies a 17% increase in investment for energy trusts. Similarly, since the acquisitions over lagged assets for energy trusts is around 10% per year, the coefficient implies a 50% increase in average cash acquisitions for energy trusts.

These investment results indicate that energy trusts are able to raise capital and invest the proceeds in capital expenditures and cash acquisitions. The importance of property, plant, and equipment (PPE) in the energy sector also helps explain the large magnitudes we document for the energy trusts as compared to the business trusts as PPE is the primary asset of energy firms. In particular, Net PPE accounts for approximately 80% of the assets for energy trusts, compared to only approximately 30% of the assets for business trusts.

6.4 Limited liability, operating performance and payouts

The results so far indicate that firms, particularly those that are capital-intensive, have greater access to capital after the enactment of the liability acts. Subsequently, these firms also tend to invest more. In this subsection, we examine whether firms invest in profitable

investment opportunities after the liability acts.

We use earnings before interest, taxes, depreciation, and amortization (EBITDA) over lagged assets as our dependent variable. The results for the whole sample and the split by the energy group and business group are presented in Columns (1) - (6) of Table 7. Indeed, for the energy trusts, in the regression with EBITDA as the dependent variable, the *LiabAct* dummy has a positive and significant coefficient of 0.07 and is statistically significant at the 5% level. This coefficient corresponds to an over 30% increase in the profitability measure (the mean EBITDA over lagged assets for the sample of energy trusts before the liability acts is 23%). As the stated goal of income trusts is to distribute all available earnings to investors (King, 2003), higher payouts are likely the result of higher profitability for the energy trusts.

The profitability results for the business trusts, however, are negative (although not statistically significant). Thus, business trusts do not appear to be more profitable after the switch to limited liability.

[Insert Table 7 here]

Overall, the increase in profitability for energy trusts (capital intensive firms) suggests that the greater access to capital after the switch from unlimited to limited liability increases investments in positive NPV projects for this group of trusts. However, it remains unclear as to how business trusts use the additional capital they raised through debt issuance. If the proceeds through debt issuance are not invested in capital expenditures (as business trusts do not have intense capital needs), then it could be that these business trusts increase their selling and advertisement expenses[30]. Business trusts might want to grow by advertising more to potentially increase their customer base.

We, therefore, investigate the change in sales and costs for both energy and business trusts in response to the switch in liability status. Columns (4) - (12) of Table 7 present the regression results for sales scaled by beginning of year assets as the dependent variable. We

[30] A number of business trusts operate in the consumer services sector such as restaurants (Keg Royalties) or cinemas (Cineplex Galaxy Income Fund, Movie Distribution Income Fund).

find an increase in sales for both group of trusts after the act, but the increase in sales is only statistically significant for the energy trusts. More specifically, sales for energy trusts increase over 5% of lagged assets annually after the liability acts. While the magnitude of the coefficient for business trusts is higher (over 20%), it remains statistically insignificant.

As very few companies in our sample report their advertisement expenses separately, we use selling, general and administrative costs (SG&A) as a proxy for investments in intangible assets, such as brand equity. In Columns (7) - (9) of Table 7, we present the regression results for SG&A scaled by sales as the dependent variable. A considerable number of Canadian companies in our sample combine their cost of goods sold (COGS) and selling general and administrative costs (SG&A) into one single item called operating expenses.

Consequently, our sample for the regressions on SG&A is reduced. However, even on a reduced sample, we notice a significant increase in SG&A for business trusts after the switch in liability status, while the increase in SG&A is insignificant for energy trusts. In particular, the results in Column (9) show a 7.8% increase in SG&A to sales for the business trusts. Furthermore, in Columns (10) - (12) of Table 7, we do not see any change in COGS for both groups of trusts.

Overall, the results suggest that energy trusts are more profitable after the liability acts, and the increase in costs associated with SG&A (including marketing and advertising expenses) for the business trusts leads to an insignificant change in profitability for business trusts.

We next investigate the change in payout policy of the income trusts after the liability acts. If income trusts become more profitable and less financially constrained after the liability acts, then we could expect an increase in their payouts.

We use dividends scaled by sales and dividends scaled by lagged assets as our measures of payouts. The results are presented in Table 8. For both of our measures of cash payouts, we find a significantly positive coefficient on the liability act dummy. The coefficients range between 0.023 and 0.027 and are significant at 1% level of significance for energy trusts. To

put the magnitudes into perspective, after the liability acts, energy trusts increased their payouts by 10-20% given the mean of dividends over sales and dividends over lagged assets of 26% and 13%, respectively, for energy trusts before the liability acts.

[Insert Table 8 here]

The evidence presented in Table 8, thus, provides further support for the idea that due to the greater access to external capital from the switch to limited liability, energy trusts can finance profitable investments that in turn increases their payouts.

We also find a decline in both profitability and payouts for business trusts (although the decline in profitability is not statistically significant). The reason might be that the business trusts over-invested in SG&A, which negatively impacted their profitability and payouts.

6.5 Limited liability and risk

To further examine the effects of the switch from unlimited liability to limited liability, we investigate trusts' risk taking after the liability acts. As unitholders become shielded from personal liability on claims against the trusts, we would expect unitholders to be more willing to invest in riskier projects.

We investigate the risk-taking incentives of the trusts after the liability acts using several proxies: equity volatility, asset (unlevered) beta, and idiosyncratic volatility. These proxies allow us to separately examine whether the switch in the liability regime affects risk through higher leverage or through a change in business risk, and whether the liability regime affects the systematic or the unsystematic risk. In these tests, we exclude the year 2006 in order to mitigate the effect of the Tax Fairness Plan implemented on October 31st, 2006.

The equity volatility is calculated as the annualized standard deviation of the daily returns of the trust units. In calculating the equity and asset beta, we follow Bernardo, Chowdhry and Goyal (2007) and Michel and Shaked (1984). The equity beta is obtained from the market model using annualized daily returns. The S&P/TSX Composite Index is

used as the proxy for the market portfolio and the Canadian one-year Treasury bills as a proxy for the risk-free rate. The unlevered beta $\beta_{i,t}$ for firm i at time t is then calculated using the following formula:

$$\beta^U_{i,t} = \frac{\beta^E_{i,t}}{1 + (1-\tau) * D_{i,t}/E_{i,t}} \tag{3}$$

Where $\beta^E_{i,t}$ is the equity beta of firm i at time t, τ is the tax rate (assumed to be 33% for the entire period for all corporations and 0 for trusts). $D_{i,t}/E_{i,t}$ is the ratio of total debt (short-term debt and long-term debt) to shareholder's equity for firm i at time t.

Following the standard asset pricing literature (e.g., Ang, Hodrick, Xing and Zhang (2006)), we calculate the idiosyncratic volatility (proxy for the unsystematic risk) for firm i at time t based on the Fama-French four factor model (including the market risk, SML, HML, UMD)[31]:

$$r_{i,t} = \alpha_i + \beta_{i,MKT} * MKT_t + \beta_{i,SMB} * SMB_t + \beta_{i,HML} * HML_t + \beta_{i,UMD} * UMD_t + \epsilon_{i,t} \tag{4}$$

As in Ang et al. (2006), we define the idiosyncratic risk (ivol) as $\sqrt{var(\epsilon_{i,t})}$ in equation (4).

[Insert Table 9 here]

Columns (1)-(3) of Table 9 present the regression results for our risk measures for the whole sample, and again for the energy and business groups separately. We find that the equity volatility for both energy and business trusts increases after the liability acts, indicating an increase of 6.53% and 11.80%, respectively (both statistically significant at the 1% level of significance). This is consistent with the idea that with limited liability, trusts are willing to increase equity volatility by issuing more debt, as can be seen in Table 5, or through investing in riskier projects. Our results are also in line with Brander and Lewis (1986), who show that limited liability serves as a commitment mechanism for leveraged firms to

[31]Data for the Canadian Fama-French factors are obtained from Frazzini and Pedersen (2014): https://www.aqr.com/Insights/Datasets/Betting-Against-Beta-Equity-Factors-Daily.

pursue aggressive business strategies. As equity volatility is affected by corporate leverage, we also examine the effect on the unlevered beta for both groups of trusts. We document a significant increase in the unlevered beta only for business trusts. The coefficient of 13.40% for the unlevered beta is statistically significance at the 1% level (Columns (4)-(6) of Table 9).

In Columns (7)-(9) of Table 9, we test the impact of limited liability on firms' idiosyncratic volatility (ivol) and find an increase in ivol for both the energy and business trusts. The results show that both groups of trusts increased their unsystematic risk after the enactment of the liability acts.

Overall, we find that while both groups of income trusts increase their total risk as well as idiosyncratic risk, only business trusts increase their systematic risk. The reason for this finding might be that business trusts exhibit a higher correlation with the market, whereas energy trusts exhibit a higher correlation with oil prices. This is also consistent with the findings in Cleary and MacKinnon (2007).

We also examine the risk-shifting prediction of Jensen and Meckling (1976). We indirectly test the risk-shifting incentives by analyzing the trusts' cash holdings. If the trusts are engaging more in actions detrimental to the debtholders, we would see a decrease in cash holdings for income trusts after the liability acts.

In Columns (10) - (12) of Table 9, we look at the change in cash holdings for income trusts and find an increase in cash holdings for the energy trusts. The coefficient estimate on the *LiabAct* dummy suggests a 6.99% increase (significant at the 10% level) in cash for energy trusts following the enactment of the liability acts.

The increase in cash holdings for energy trusts provides evidence that there is no risk-shifting among more profitable trusts after the switch from unlimited to limited liability. That is, profitable trusts do not seem to drain their cash at the expense of debtholders. It is also worth noting that income trusts in our sample have very low leverage ratios, with a mean value of 19% of total debt to assets, and risk-shifting is often only present in highly

leveraged limited liability firms[32].

Overall, the regression results on risk suggest that after the enactment of the liability acts, income trusts tend to increase equity volatility, but we do not find evidence of risk-shifting.

7 Endogeneity and robustness

7.1 Endogeneity of the enactment of the liability acts

In this section, we address a potential concern that the enactment of the liability acts are anticipated and thus endogenous. In particular, our identification strategy would be weaker if the enactment of the liability acts are driven by or coincide with the underlying economic and political conditions at the provincial level, or if there were lobbying efforts to pressure the enactment of the liability acts.

We use two alternative approaches to explore whether province-level characteristics might be correlated with the enactment of the liability acts. First, we estimate a Cox hazard model following Acharya, Baghai and Subramanian (2014), Serfling (2016) and Cremers, Guernsey and Sepe (2019), where the failure event is defined as the enactment of the liability acts in a given province. Second, we estimate a linear probability model (LPM), where the dependent variable *LiabAct* is an indicator for whether or not a province passes the liability acts. The LPM regressions allow for the inclusion of year and province-level fixed effects to account for time-varying shocks affecting all provinces and time-invariant factors within the province, respectively. For both models, we estimate robust standard errors, adjusted for clustering at the province level. We also exclude the province from the sample after it passes the liability act[33].

[Insert Table 10 here]

[32] In untabulated results, when we split our sample into above median and below median leverage trusts, we do not find any significant results of risk-shifting among above median leverage trusts.

[33] Thus, all the observations for the province of Quebec, which passed the liability act in 1994, are excluded from the regressions.

The results are presented in Table 10. Columns (1) and (2) show the hazard rates from the Cox model, while Columns (3) and (4) present the marginal effects from the linear probability models. The analysis uses province-level variables from 1996 to 2006 as we want to have ten years of province-level characteristics before the liability acts are passed. Predictor variables are lagged one-year (thus they are pre-determined). We standardize all continuous economic predictor variables to have a mean of zero and a standard deviation of one.

In Table 10 the province-level economic and political variables include: the natural logarithm of the province's real gross domestic product per capita ($ln(GDPPC)$); the province's real GDP growth rate ($GDP\ Growth$); the natural logarithm of the province's population ($ln(Population)$); the province's unemployment rate ($Unemployment\ Rate$); and the political party dummy ($Political\ Party$), which is a dummy indicator for whether the province's premier belongs to a more left wing political party and zero otherwise[34]. In Columns (2) and (4), we also include the percentage growth in the number of trusts in a given province ($Trust\ Growth$) to control for the possibility that lobbying efforts could drive the enactment of the liability acts.

The results in Table 10 indicate that province-level economic and political factors did not affect the enactment of the liability acts. The only marginally significant (at the 10% level) variable is $Political\ Party$ in Columns (3) and (4). The positive coefficient indicates that provinces with premiers belonging to more left wing parties (NDP and Liberal) are more likely to pass the liability acts. However, this result is the opposite of what we might expect, since right wing parties are in general considered to be more pro-business.

A more obvious endogeneity concern, particularly for the energy-focused province of Alberta, is that the rise in oil prices might be driving the effects we document for the energy trusts (which are mainly domiciled in Alberta) after the liability acts. These economic conditions could also put pressure on the regulators to pass the liability act in Alberta. However,

[34]The Progressive Conservative party is considered more right wing, while the Parti Quebecois, NDP and Liberal parties are considered more left wing. As a robustness, we also use an indicator variable for each political party. The untabulated results remain qualitatively the same.

the Table 10 results show that none of the province-level economic variables (which would also reflect the impact of oil prices on the province's economic conditions) are significant. In addition, we do not find the growth in the number of trusts to be a significant determinant of the enactment of the the liability acts, suggesting that the enactment of these acts is not due to lobbying efforts.

Overall, Table 10 confirms that the timing of the enactment of the liability acts was not a function of economic, political and other prior observable factors. Thus, the evidence is consistent with our assumption that the enactment of the liability acts was unanticipated, allowing us to identify their causal effect on firm outcomes.

7.2 Dynamic analysis

The main regression results presented in the previous sections include the sample of Canadian income trusts and corporations in the same industries listed on the Toronto Stock Exchange with available data during the period 2003-2006. In this section we address an important identification concern associated with the DiD method. An important assumption of the DiD method is the parallel trends, which maintains that, in the absence of any treatment effect, the treated and control groups should have a common trend in the outcome variable.

To satisfy the parallel trends assumption for the DiD setup, we need to show that, conditional on covariates in the regression, the treatment and control firms exhibit parallel trends in the absence of the treatment shock (i.e. the liability acts). While there is no perfect test for this assumption, several studies (e.g., Angrist and Pischke (2008); Lechner (2011), Roberts et al. (2013)) recommend testing the parallel trends by using pre-treatment time period indicator variables to examine whether treatment and control firms exhibit any differential changes in the outcome variables prior to the treatment year.

Consequently, like Bertrand and Mullainathan (2003), we test the parallel trends assumption by replacing the *LiabAct* dummy with the indicator variables for pre-treatment and post

treatment periods. Due to the nature of our data (we only have fully available data from 2001-2006) we replace $LiabAct$ dummy with the indicator variables $LiabAct\_Before(-1)$, $LiabAct\_After(0)$, $LiabAct\_After(+1)$ and $LiabAct\_After(+2)$ for our main regressions.The following equation is the estimation model:

$$\begin{aligned} Dep.var_{it} = \quad & \alpha + \beta_1 LiabAct\_Before(-1) + \beta_2 LiabAct\_After(0) + \beta_3 LiabAct\_After(+1) \\ & + \beta_4 LiabAct\_After(+2) + \boldsymbol{\beta X_{it-1}} + FirmFE_i + YearFE_t + \epsilon_{it} \end{aligned} \tag{5}$$

$LiabAct\_Before(-1)$ is an indicator variable that equals one for firm-year observation one year before the liability acts and if the firm is a trust, and zero otherwise. $LiabAct\_After(0)$ is an indicator variable that equals one if the firm-year observation is in the year the liability act is enacted and if the firm is a trust, and zero otherwise. $LiabAct\_After(+1)$ and $LiabAct\_After(+2)$ are independent variables that equal one if the firm-year observations is in 1 year and 2 years after the liability acts and if the firm is a trust, and zero otherwise. We regress our main outcome variables on the four dummy variables using our baseline regressions from our earlier tests. The test allows us to detect if the documented effect on the outcome variables occurred prior to the enactment of the liability acts. If this is the case, then the parallel trends assumption is likely violated.

[Insert Table 11 here]

We present the regression results of the dynamic effects of the liability acts on our main variables in Table 11. The fact that the coefficient estimates on the $LiabAct\_Before(-1)$ indicator dummy is statistically indistinguishable from zero suggests that the changes in financing, size, profitability, and payouts for treatment and control groups are not statistically different one year prior to the enactment of the liability acts. Meanwhile, the coefficients for the $LiabAct\_After$ dummies are mainly positive and statistically significant. The fact that

there is a difference in the significance of the lead and lag dummies also helps to alleviate the concern of reverse causality.

Interestingly, while we see an immediate increase in external financing, firm size, and profitability in the year the liability acts were enacted, the increase in payouts is more significant in the first and second years after the liability acts. The results are consistent with the idea that trusts first raise capital, then invest and become more profitable, and then start to increase their payouts.

Overall, our dynamic effects results suggest that treatment and control firms follow parallel trends for the year prior to the liability acts, and these trends diverge only after the enactment of the liability acts.

7.3 Propensity score matching

As an additional robustness check, we conduct a propensity score matching to obtain corporations in the control groups that are comparable to our treatment group. Specifically, for each trust, we obtain the closest matched corporation as its control. Corporations are matched one-to-one with treated trusts, based on the propensity score calculated on the firm observable characteristics in 2003, which is the year preceding the enactment of the liability acts. The matching criteria are 2003 Tobin's Q, leverage, log sales, and industry classification.[35] This matching procedure ensures that the corporations in the control groups are as similar as possible, in observable characteristics to the treated trusts ex-ante.

[Insert Table 12 here]

To illustrate the similarity between treated trusts and corporations in the control group, Table 12 presents the covariate balancing output. For each variable, the table reports the univariate comparison between the treatment and control group before the liability acts

[35]Size, Tobin's Q, leverage and industry are commonly used in the economics and finance literatures to construct a set of comparable firms (e.g., Almeida et al. (2012) and Frésard and Valta (2016)).

enactment (Columns (1) and (2)) and the t-test and p-values of the differences-in-means between the treated and matched control group after conducting the propensity score matching procedure (Columns (3) and (4)). In particular, the null hypothesis of equal means cannot be rejected (with p-values ranging from 0.224 to 0.984). Overall, the table shows that there are no significant differences between the two groups before the treatment in terms of observable characteristics, and thus provide a reliable control group.

[Insert Table 13 here]

We repeat our DiD regressions for financing, size, profitability, and payouts based on propensity score matching in Table 13. Although the matched sample leads to a considerable reduction in the number of observations, we still find that the results are qualitatively consistent with our base regression results.

We continue to see more significant results for energy trusts. In particular, Column (2) shows that energy trusts increase external financing by over 8 percentage points after the liability acts. Moreover, Columns (5) and (8) of Table 13 show an increase in assets and profitability by 23% and 9 percentage points, respectively (both coefficients are statistically significant). In Column (11) of Table 13 that presents our results for payouts, the coefficient estimate of *LiabAct* is 0.0241 and is statistically significant at the 5% level. This coefficient estimate translates into a 18% increase in payouts for energy trusts after the liability acts.

7.4 Inclusion in the S&P-TSX Composite Index

In this section we address a potential concern that our results are driven by the inclusion of income trusts in the S&P-TSX Composite Index, rather than by the enactment of the liability acts, as many previous studies show that index inclusion can affect the demand for a company's shares (see, e.g. Chang, Hong and Liskovich (2015)).

According to the S&P announcement[36], income trusts were first introduced into the TSX

[36]"S&P publishes plan for adding income trusts to S&P/TSX composite", Investment Executive

Composite Index (which is the benchmark index of the Toronto Stock Exchange) in December 2005 at only 50% full float adjusted weight. In the March 2006 Quarterly Rebalance, the S&P/TSX Composite would include income trusts at full float.

We obtain the list of S&P/TSX Composite Index constituents directly from TMX Datalinx. We create TSX_Dummy, which equals one in years the company/income trust is included in the S&P/TSX Composite Index, and zero otherwise. We rerun the main tests, keeping the same specifications and including the TSX_Dummy. The tables, presented in the Online Appendix[37], show that our results remain qualitatively the same even after adding the TSX_Dummy. We thus confirm that the significant results presented in the main section of the paper are driven by the enactment of the liability acts, and not by the inclusion of income trusts into the S&P/TSX Composite Index.

8 Conclusion

The enactment of limited liability legislation in various Canadian provinces sheltered income trust investors from being personally liable for the obligations of the income trust. Since the liability acts did not affect income trusts in provinces that did not yet pass the legislation and did not affect regular corporations, the enactment of the liability acts provides a natural experiment for examining the effects of limited liability on firm outcomes. Our findings show that limited liability matters for firms and investors.

First, our event study results show significantly positive cumulative abnormal returns around the introduction of limited liability legislation. There is also an increase in institutional and pension fund ownership after the liability acts, indicating that the investors were more willing to invest in income trusts once they were protected from personal liability. Moreover, we find that the switch from unlimited to limited liability increases the trusts' net

https://www.investmentexecutive.com/news/research-and-markets/sp-publishes-plan-for-adding-income-trusts-to-sp-tsx-composite/

[37]Online Appendix can be accessed through: http://www.aripandes.com/wp-content/uploads/2021/03/Online-appendix_Limited-Liability.pdf

external financing, investments, profitability, payouts, equity and idiosyncratic volatility.

We find stronger results among the energy trusts, which is consistent with the notion that these are more capital-intensive firms that require larger investment expenditures. In addition, energy trusts face potentially higher and more severe sources of liability, such as environmental liabilities.

Legal scholars have suggested that the likelihood of unlimited liability for income trust investors prior to the liability acts was very remote. Contrary to this, our results show that liability risk was perceived to be a major issue. In fact, after the change in liability regime, income trusts became so popular that the Canadian federal government was forced to cancel their favorable tax treatment for them for fear of losing tax revenues (Doidge and Dyck (2015)). To conclude, limited liability indeed makes a big difference.

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Appendix A: Variables definition

Variables	***Definition***	***Source***
LiabAct dummy	Equals one for trusts after the liability act was passed in their province of formation, and zero otherwise Equals 0 for all corporations	
Net equity issuance	(proceeds from common and preferred stock issues SSTK)- purchases and retirements of common and preferred shares (PRSTKC)) scaled by lagged total assets (AT)	COMPUSTAT
Net debt issuance	change total debt (DLC+DLTT) Scaled by lagged total assets (At)	COMPUSTAT
Net external finance	The sum of net debt and equity issues as defined above	COMPUSTAT
Convertible debt/Assets	Convertible debt (CVT) scaled by total assets (AT)	COMPUSTAT
ln(Assets)	Natural log of total assets (AT)	COMPUSTAT
Capex/lagged Assets	Capital expenditure (CAPX) scaled by lagged assets (AT)	COMPUSTAT
Acquisitions/lagged Assets	Acquisitions (AQC) scaled by lagged assets (AT)	COMPUTSAT
EBITDA/lagged Assets	Earnings before interest, tax, depreciation and amortization (EBITDA) scaled by lagged assets (AT)	COMPUSTAT
Sales/lagged Assets	Sales (SALE) scaled by lagged assets (AT)	COMPUSTAT
COGS/Sales	Cost of goods sold (COGS) scaled by sales (SALE)	COMPUSTAT
SG&A/Sales	Selling general and administrative costs (XSGA) scaled by sales (SALE)	COMPUSTAT
Dividends/Sales	Dividends (DVT) divided by sales (SALE)	COMPUSTAT
Dividends/lagged Assets	Dividends (DVT) scaled by lagged assets (AT)	COMPUSTAT
Cash/lagged Assets	Cash (CHE) scaled by lagged assets (AT)	COMPUSTAT
Equity volatility	Annualized standard deviation of daily returns	Datastream
Leverage	Total debt (short term Debt plus long term debt (DLC+DLTT)) over assets (AT)	COMPUTSAT
Tobin's Q	(end of fiscal year price (PRCC_F) multiplied by number of shares outstanding (CSHO) minus shareholder equity (CEQ) plus total assets (AT)) divided by total assets (AT)	COMPUSTAT

Variables	***Definition***	***Source***
Asset (Unlevered) Beta ($\beta_{i,t}$)	Unlevered beta $\beta_{i,t}$ of firm i at time t is then calculated using the following formula: $\beta_{i,t} = \frac{\beta^E_{i,t}}{1+(1-\tau)*D_{i,t}/E_{i,t}}$ where is the tax rate (0 for trusts and set at 33% for corporations), $D_{i,t}/E_{i,t}$ is the debt to equity ratio	Datastream, COMPUSTAT
GDP growth	(Province-level real GDP growth rate=real GDP this year divided by real GDP previous year -1	CANSIM
ln(GDPPC)	The natural logarithm of a province's real GDP divided by its total population	CANSIM
ln(population)	The natural logarithm of a province's total population	CANSIM
Unemployment Rate	The unemployment rate of the province in a given year	CANSIM
Trust Growth	Percentage growth of the total number of trusts formed in a given province.	SEDAR
Political party	Dummy variable equal to 1 if the province's premier party is left wing, and zero otherwise	thecanadaguide.com

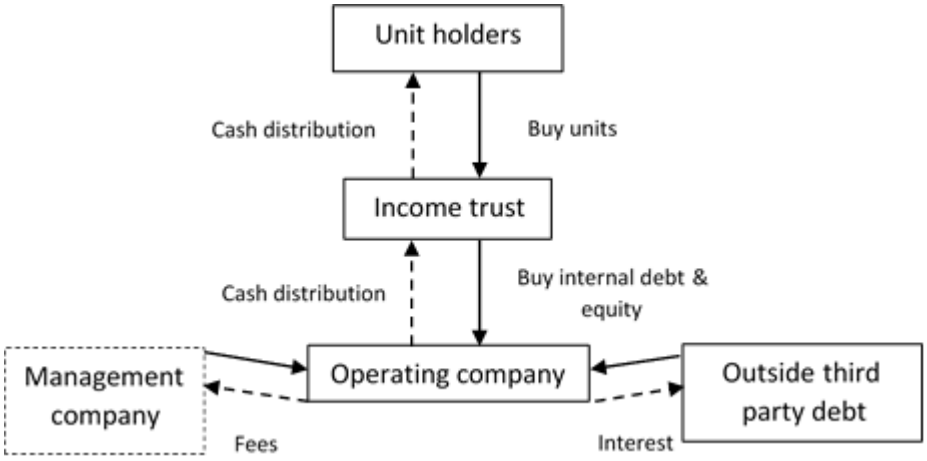
Appendix B: List of income trusts included in the main regressions

Name	*Province*	*Industry description*	*Grouping*
Acclaim Energy Trust	AB	Petroleum and Natural Gas	energy
ACS Media Income Fund	ON	Printing and Publishing	business
Advantage Energy Income Fund	AB	Petroleum and Natural Gas	energy
AG Growth Income Fund	MB	Machinery	business
Amtelecom Income Fund	ON	Communication	business
ARC Energy Trust	AB	Petroleum and Natural Gas	energy
Arctic Glacier Income Fund	MB	Food Products	business
Art in Motion Income Fund	BC	Retail	business
Associated Brands Income Fund	ON	Food Products	business
Atlas Cold Storage Income Trust	ON	Business Services	business
Baytex Energy Trust	AB	Petroleum and Natural Gas	energy
Big Rock Brewery Income Trust	AB	Beer & Liquor	business
Bonavista Energy Trust	AB	Petroleum and Natural Gas	energy
Bonterra Energy Income Trust	AB	Petroleum and Natural Gas	energy
Boyd Group Income Fund	MB	Personal Services	business
Canadian Oil Sands Trust	AB	Petroleum and Natural Gas	energy
CanWel Building Materials Income Fund	BC	Wholesale	business
Cathedral Energy Services Income Trust	AB	Petroleum and Natural Gas	energy
Chemtrade Logistics Income Fund	ON	Chemicals	business
Cineplex Galaxy Income Fund	ON	Entertainment	business
Coast Wholesale Appliances Income Fund	BC	Wholesale	business
Connors Bros. Income Fund	NB	Food Products	business
Contrans Income Fund	ON	Transportation	business
Crescent Point Energy Trust	AB	Petroleum and Natural Gas	energy
Custom Direct Income Fund	ON	Printing and Publishing	business
Davis + Henderson Income Fund	ON	Business Services	business
Enerplus Resources Fund	AB	Petroleum and Natural Gas	energy

Name	***Province***	***Industry description***	***Grouping***
Entertainment One Income Fund	ON	Wholesale	business
Focus Energy Trust	AB	Petroleum and Natural Gas	energy
Fording Canadian Coal Trust	AB	Coal	business
Foremost Industries Income Fund	AB	Machinery	business
FP Newspapers Income Fund	BC	Printing and Publishing	business
Gateway Casinos Income Fund	BC	Entertainment	business
General Donlee Income Fund	ON	Aircraft	business
Great Lakes Carbon Income Fund	ON	Petroleum and Natural Gas	energy
Hardwoods Distribution Income Fund	BC	Wholesale	business
Harvest Energy Trust	AB	Petroleum and Natural Gas	energy
Inter Pipeline Fund	AB	Transportation	business
KCP Income Fund	ON	Consumer Goods	business
Keg Royalties Income Fund (The)	BC	Restaurants, Hotels, Motels	business
Livingston International Income Fund	ON	Transportation	business
Menu Food Products Income Fund	ON	Food Products	business
Movie Distribution Income Fund	ON	Entertainment	business
NAL Oil & Gas Trust	AB	Petroleum and Natural Gas	energy
Newalta Income Fund	AB	Petroleum and Natural Gas	energy
Noranda Income Fund	ON	Steel Works	business
North West Company Fund	MB	Retail	business
Parkland Income Fund	AB	Wholesale	business
PBB Global Logistics Income Fund	ON	Transportation	business
Pembina Pipeline Income Fund	AB	Transportation	business
Pengrowth Energy Trust	AB	Petroleum and Natural Gas	energy
Peyto Energy Trust	AB	Petroleum and Natural Gas	energy
PrimeWest Energy Trust	AB	Petroleum and Natural Gas	energy
Priszm Canadian Income Fund	ON	Restaurants, Hotels, Motels	business
Provident Energy Trust	AB	Petroleum and Natural Gas	energy
PRT Forest Regeneration Income Fund	BC	Construction Materials	business
Rainmaker Income Fund	ON	Entertainment	business
Rogers Sugar Income Fund	BC	Food Products	business
SCI Income Trust	ON	Consumer Goods	business
Shiningbank Energy Income Fund	AB	Petroleum and Natural Gas	energy
Sound Energy Trust	AB	Petroleum and Natural Gas	energy

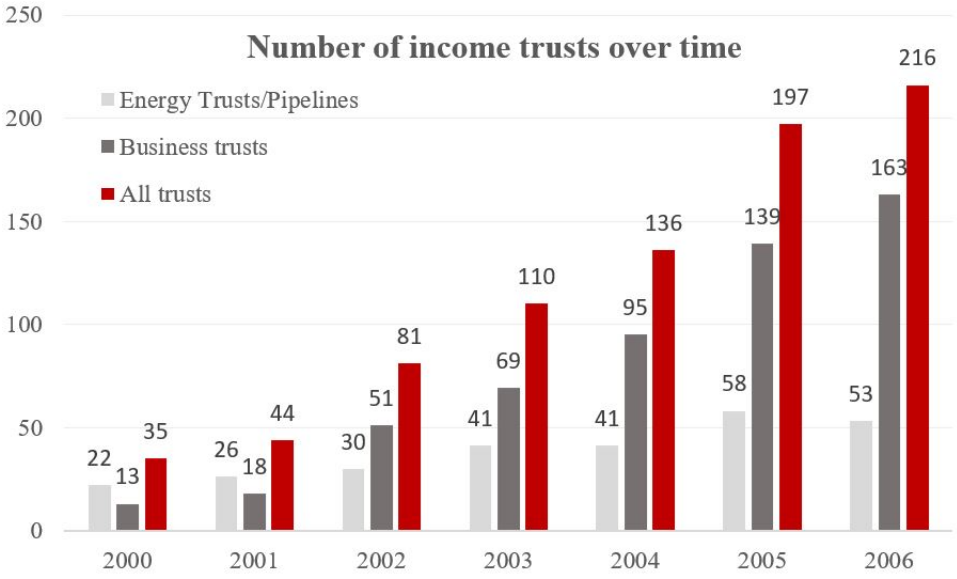
Name	***Province***	***Industry description***	***Grouping***
Superior Plus Income Fund	ON	Retail	business
Taiga Building Products Ltd.	BC	Wholesale	business
Taylor NGL Limited Partnership	AB	Petroleum and Natural Gas	energy
TimberWest Forest Corp.	BC	Construction Materials	business
Tree Island Wire Income Fund	BC	Steel Works	business
Trinidad Energy Services Income Trust	AB	Petroleum and Natural Gas	energy
Versacold Income Fund	BC	Business Services	business
Viking Energy Royalty Trust	AB	Petroleum and Natural Gas	energy
Village Farms Income Fund	BC	Agriculture	business
Wellco Energy Services Trust	AB	Petroleum and Natural Gas	energy
Westshore Terminals Income Fund	BC	Transportation	business

Figure 1: Trust business structure



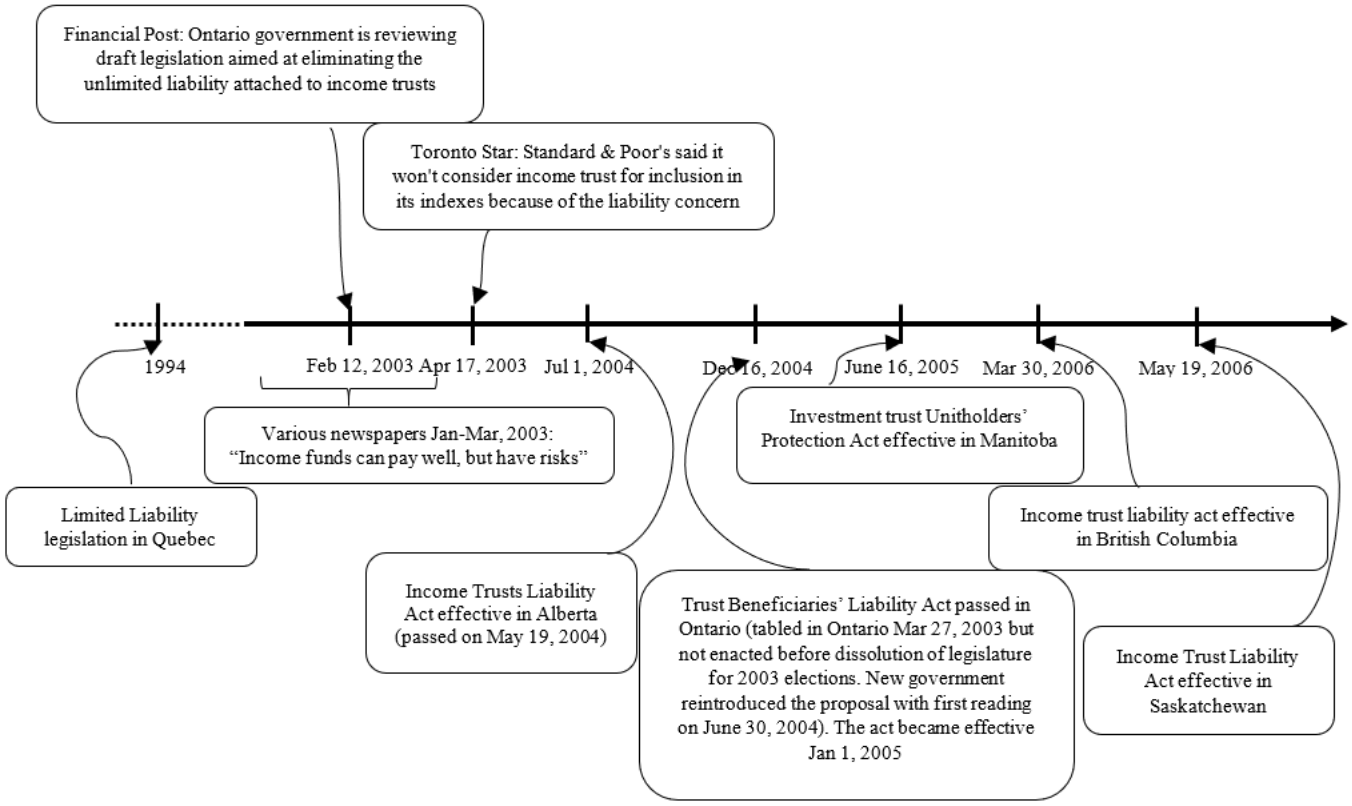
This figure shows a simple structure of a typical business trust that sells units to the public investors. The capital raised through unit issuance are invested in the operating company through an income trust. Unitholders are the beneficiaries of the trust. Trustees hold equity and internal debt/loan of the operating company. The term of the internal debts/loans are structures so that most of the before interest expense income of the operating entity is distributed to the trustees as interest, thus reducing taxable income at the operating company level. The income trusts serve as a flow-through entity so that the before interest income is passed through to the united holders to be taxed at the personal tax rate. (Figure adopted from Jog and Wang (2004))

Figure 2: Income trusts 2000-2006



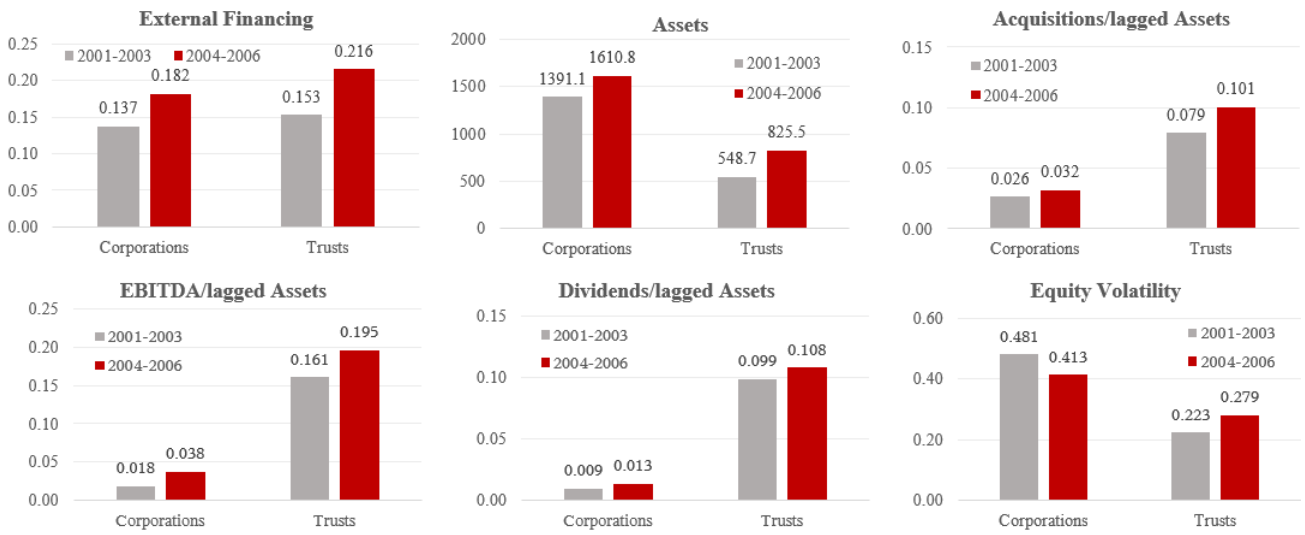
This figure shows the number of Canadian income trusts by type from 2000-2006. REITs and US trusts are excluded.

Figure 3: Timeline of events around the Liability Act



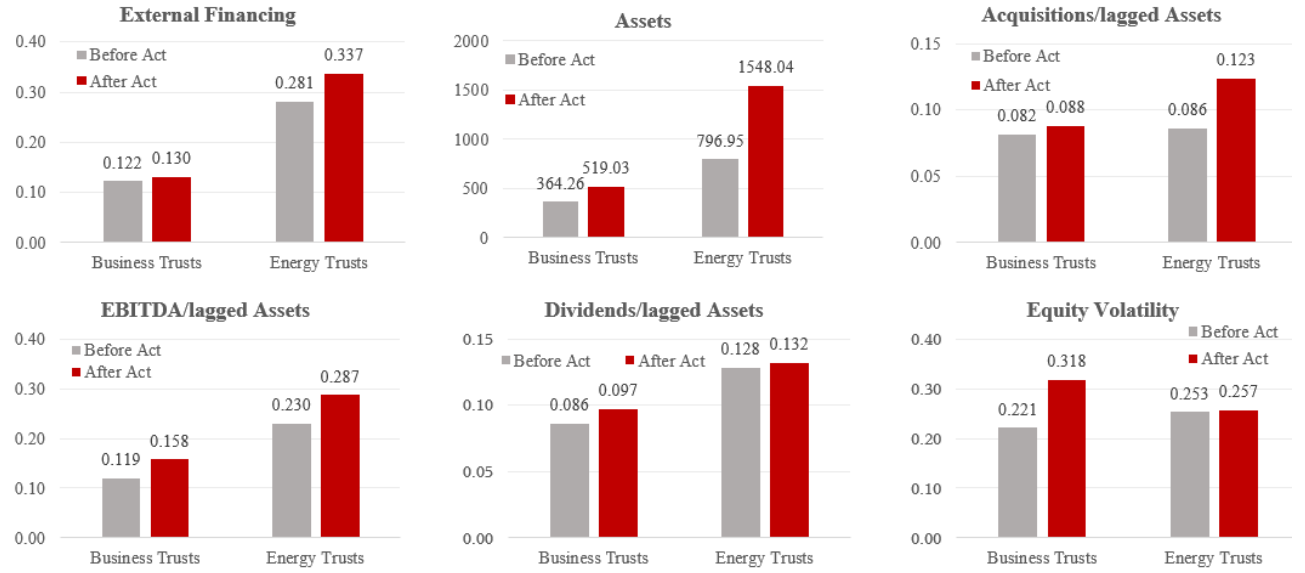
This figure shows the timeline of enactment of the liability act across provinces in Canada. It also shows the main concerns over the liability risk when income trusts had become more popular among investors.

Figure 4: Main variables for trusts and corporations during 2001-2003 and 2004-2006



This figure shows the main variables for trusts and corporations in our sample in the years before and after the act change.

Figure 5: Main variables for energy and business trusts before and after the act change



This figure shows the main variables for energy trusts and business trusts in our sample in the years before and after the act change

Table 1: Income trusts as of end of 2006

Groupings	Number of trusts	Total market value (CAD mil)
All trusts	216	154,789
Business Trusts	163	66,015
Energy/Pipeline trusts	53	88,774

The table shows the number of trusts and total market value by groupings as of Dec 31, 2006 that was provided by the Toronto Stock Exchange. We exclude US-based trusts that are listed on the Toronto Stock Exchange as IDS/IPS (Income Depositary Securities/Income Participating Securities) and REITs.

Table 2: Liability acts by province

Province	Date	Act
Quebec	1994	
Alberta	1-July-04	Income Trusts Liability Act
Ontario	1-Jan-05	Trust Beneficiaries' Liability Act
Manitoba	16-Jun-05	Investment trust Unitholders' Protection Act
British Columbia	30-Mar-06	Income Trust Liability Act
Saskatchewan	19-May-06	Income Trust Liability Act

This table shows the effective date of the Liability Act across Canadian provinces.

Table 3: CAR around AB and ON event

	AB Event (Mar 30, 2004)		ON Event (Dec 16, 2004)	
	(1) (-1,+1) CAR	(2) (-3,+3) CAR	(3) (-1,+1) CAR	(4) (-3,+3) CAR
AB trusts	1.11%***	-0.94%	2.14%***	2.63%***
	(2.27)	(-0.51)	(5.89)	(2.32)
AB corporations	0.58%	-1.10%	-0.06%	0.81%
	(0.95)	(-0.82)	(-0.06)	(0.42)
ON trusts	-0.26%	-1.41%	2.23%***	3.58%***
	(-0.66)	(-1.14)	(3.07)	(3.57)
ON corporations	-0.51%***	-3.00%***	0.63%	1.78%
	(-2.82)	(-4.33)	(0.93)	(1.81)

Event windows are 1 day before and 1 day after the event date (columns (1) and (3)) and 3 days before and 3 days after the event date (columns (2) and (4)). The regression window is 75 trading days before, and 75 trading days after the event date.

Table 4: Institutional ownership

	Institutional onwership			Pension Fund Ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Energy	Business	All	Energy	Business
$LiabAct_t$	0.00705	0.0654***	-0.0150	0.00821**	0.00853***	0.00886*
	(0.32)	(12.34)	(-0.51)	(2.53)	(4.80)	(1.89)
$Profitability_{t-1}$	0.00242	0.00114	-0.00165	0.00121	-0.0000156	0.00416
	(1.26)	(0.39)	(-0.36)	(1.04)	(-0.15)	(1.73)
$Tobin's\ Q_{t-1}$	0.00229**	0.00259*	0.000969	0.000180	-0.0000273	0.000651
	(3.13)	(2.30)	(0.42)	(0.85)	(-0.39)	(1.19)
$Leverage_{t-1}$	-0.0134*	0.0150**	-0.0237***	0.000162	-0.00182	0.00245
	(-2.06)	(3.38)	(-4.40)	(0.09)	(-1.24)	(1.43)
$ln(Assets)_{t-1}$	0.0211***	0.0295***	0.0118	0.000573	0.00111*	-0.00181
	(3.95)	(10.62)	(1.51)	(0.58)	(2.16)	(-1.57)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	1447	416	1031	1447	416	1031
R^2	0.826	0.818	0.831	0.757	0.774	0.755

This table presents DiD regressions of institutional percentage ownership around liability act change. Sample includes both corporations and trusts with available data at least 1 year before and 1 year after the act change. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 5: External financing: Difference-in-difference results around liability act change

	Net External Financing			Net Debt Issuance		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Energy	Business	All	Energy	Business
$LiabAct_t$	0.0755	0.181***	0.0240	0.0502**	0.0527***	0.0590**
	(1.46)	(5.59)	(0.47)	(2.43)	(5.61)	(2.63)
$Profitability_{t-1}$	-0.556	0.0275	-1.121	0.0556**	0.0828***	0.0362
	(-1.23)	(0.32)	(-1.67)	(2.44)	(15.25)	(0.97)
$Tobin's\ Q_{t-1}$	-0.0204	-0.0884*	-0.0334	-0.00828	-0.00804**	-0.0145
	(-0.57)	(-2.31)	(-1.13)	(-1.54)	(-4.09)	(-1.37)
$Leverage_{t-1}$	-0.402**	-0.739**	-0.328**	-0.480***	-0.820***	-0.466***
	(-3.01)	(-2.99)	(-3.19)	(-3.65)	(-5.33)	(-3.39)
$ln(Assets)_{t-1}$	-0.326**	-0.746**	-0.269**	-0.105***	-0.0981***	-0.130***
	(-3.06)	(-2.89)	(-3.33)	(-3.72)	(-12.72)	(-3.62)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	1360	345	1015	1450	374	1076
R^2	0.495	0.588	0.541	0.402	0.540	0.380
	Net equity Issuance			Convertible Debt/Assets		
	(7)	(8)	(9)	(10)	(11)	(12)
	All	Energy	Business	All	Energy	Business
$LiabAct_t$	0.0115	0.110*	-0.0271	0.0212***	0.0128***	0.0229***
	(0.27)	(2.61)	(-0.76)	(5.89)	(5.60)	(4.37)
$Profitability_{t-1}$	-0.173**	-0.0574	-0.0504	-0.000323	-0.00438*	-0.00125
	(-3.03)	(-0.62)	(-0.43)	(-0.12)	(-2.30)	(-0.23)
$Tobin's\ Q_{t-1}$	-0.00310	-0.0796	0.0467***	-0.00118	0.00134	-0.00318
	(-0.17)	(-2.12)	(5.24)	(-1.45)	(0.79)	(-1.30)
$Leverage_{t-1}$	0.197***	0.124	0.197***	0.00475	0.0551**	0.00324
	(5.53)	(0.32)	(5.74)	(0.49)	(3.02)	(0.32)
$ln(Assets)_{t-1}$	-0.237**	-0.636*	-0.135**	-0.00101	-0.000219	-0.00168
	(-2.75)	(-2.45)	(-2.98)	(-0.29)	(-0.07)	(-0.30)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	1360	345	1015	1450	374	1076
R^2	0.536	0.574	0.580	0.584	0.638	0.572

This table presents DiD regressions of external issuance around liability act change. Sample includes both corporations and trusts with available data at least 1 year before and 1 year after the act change. Net debt issuance measured as the change in book value of total debt over lagged assets. Net equity issuance measured as sales of equity minus purchases of equity from the cash flow statement, divided by lagged assets. Net external financing, measured as the sum of net debt issuance and net equity issuance. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 6: Investments: Difference-in-difference results around liability act change

	$\ln(\text{Assets})_t$			$\text{CAPEX}_t/\text{Assets}_{t-1}$			$\text{Acquisitions}_t/\text{Assets}_{t-1}$		
	(1) All	(2) Energy	(3) Business	(4) All	(5) Energy	(6) Business	(7) All	(8) Energy	(9) Business
$LiabAct_t$	0.218**	0.179**	0.165**	0.0448**	0.0507*	0.00714	0.0250	0.0595***	0.00510
	(3.16)	(2.98)	(3.22)	(2.89)	(2.66)	(0.82)	(1.39)	(11.16)	(0.21)
$Profitability_{t-1}$	-0.004	0.408	0.0357	0.0684	0.338	0.0201*	0.0164	0.0871	0.00986
	(-0.05)	(0.80)	(0.53)	(1.19)	(1.44)	(1.87)	(1.73)	(1.51)	(1.17)
$Tobin's\ Q_{t-1}$	-0.0249	-0.0444	-0.00819	0.0170	0.0149	0.00802***	-0.00201	0.00291	-0.00499
	(-0.91)	(-1.79)	(-0.43)	(1.10)	(0.29)	(4.27)	(-0.67)	(1.07)	(-1.28)
$Leverage_{t-1}$	-0.0352	-0.451	0.0110	-0.186	-1.230**	-0.0334	-0.0456**	-0.104**	-0.0410**
	(-0.19)	(-1.00)	(0.06)	(-1.38)	(-4.40)	(-1.55)	(-2.66)	(-4.59)	(-2.50)
$ln(Assets)_{t-1}$				-0.200**	-0.522**	-0.0195	-0.0385***	-0.0408***	-0.0422*
				(-2.61)	(-3.57)	(-1.08)	(-3.64)	(-10.63)	(-2.29)
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1445	369	1076	1502	426	1076	1380	352	1028
R^2	0.973	0.977	0.975	0.503	0.507	0.683	0.380	0.421	0.376

This table presents DiD regressions of size and investments around liability act change. The dependent variables are ln(Assets) and various measures of investments - CAPEX over lagged assets, and acquisitions over lagged assets. Sample includes both corporations and trusts with available data at least 1 year before and 1 year after the act change. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 7: Profitablity: Difference-in-difference regression results around liability act change

	$EBITDA_t/Assets_{t-1}$			$Sales_t/Assets_{t-1}$			$SG\&A_t/Sales_t$			$COGS_t/Sales_t$		
	(1) All	(2) Energy	(3) Business	(4) All	(5) Energy	(6) Business	(7) All	(8) Energy	(9) Business	(10) All	(11) Energy	(12) Business
$LiabAct_t$	-0.00336	0.0773**	-0.0114	0.141*	0.0511*	0.217	0.0292***	0.101	0.0785**	-0.648	0.00136	-0.418
	(-0.14)	(3.42)	(-0.41)	(2.28)	(2.25)	(1.83)	(3.38)	(1.23)	(2.50)	(-1.01)	(0.00)	(-1.41)
$Tobin's\ Q_{t-1}$	-0.0701*	0.00554	-0.101**	-0.144*	-0.210*	0.00817	-0.0359*	0.0487*	-0.0596	0.0520	0.449	-0.525
	(-1.96)	(0.80)	(-3.00)	(-1.89)	(-2.20)	(0.32)	(-2.01)	(2.48)	(-1.54)	(0.12)	(0.56)	(-0.77)
$ln(Assets)_{t-1}$	0.0402	-0.0590**	0.0803***	-0.401***	-0.418***	-0.377***	-0.0347	-0.247***	0.0890***	1.079	3.130	-0.355
	(1.31)	(-2.79)	(4.74)	(-10.33)	(-4.99)	(-6.17)	(-0.66)	(-5.75)	(4.50)	(0.75)	(0.67)	(-0.34)
$Profitability_{t-1}$				-0.904	-1.485***	0.132	-0.0866***	0.0505	0.219	-1.422	-0.501	-3.682**
				(-1.64)	(-5.37)	(1.66)	(-7.62)	(1.44)	(0.57)	(-1.27)	(-0.71)	(-2.77)
$Leverage_{t-1}$	-0.600	-0.0664**	-0.585									
	(-1.67)	(-3.08)	(-1.74)									
$ln(Sales)_{t-1}$	-0.00500	0.00453	-0.0104									
	(-0.46)	(0.29)	(-0.86)									
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1438	352	1086	1507	439	1068	1021	345	676	1434	387	1047
R^2	0.611	0.813	0.615	0.768	0.669	0.892	0.714	0.515	0.745	0.820	0.769	0.914

This table presents DiD regressions of profitability and costs measures 3 years before and 3 years after the liability act. Sample includes both corporations and trusts with available data at least 1 year before and 1 year after the act change. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 8: Payouts: Difference-in-difference results around liability act change

	$\text{Dividends}_t/\text{Sales}_t$			$\text{Dividends}_t/\text{Assets}_{t-1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Energy	Business	All	Energy	Business
$LiabAct_t$	-0.0127	0.0272***	-0.0309**	0.00453	0.0231***	-0.00280
	(-1.55)	(10.30)	(-2.34)	(0.47)	(31.75)	(-0.33)
$Tobin's\ Q_{t-1}$	0.000365	-0.00230	0.0000168	0.000767	-0.000137	0.00103
	(0.29)	(-0.97)	(0.01)	(1.19)	(-0.32)	(1.01)
$Leverage_{t-1}$	-0.00169	0.0385	-0.00388	-0.00484	0.0215	-0.00636
	(-0.22)	(1.00)	(-0.43)	(-1.65)	(1.48)	(-1.60)
$ln(Assets)_{t-1}$	0.00685**	0.00258	0.00351	-0.00110	-0.00640	-0.000692
	(2.97)	(0.51)	(0.91)	(-0.47)	(-1.41)	(-0.24)
$ln(Sales)_{t-1}$	0.00519	0.00312	0.00673	0.00158	0.00274**	0.00151
	(1.11)	(1.50)	(1.11)	(0.79)	(4.13)	(0.56)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	1417	340	1077	1430	349	1081
R^2	0.859	0.910	0.768	0.793	0.889	0.712

This table presents DiD regressions of payouts around liability act change. Sample includes both corporations and trusts with available data at least 1 year before and 1 year after the act change. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 9: Risk taking: Difference-in-difference results around liability act change

	Equity Volatility			Asset Beta		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Energy	Business	All	Energy	Business
$LiabAct_t$	0.104***	0.0653***	0.118***	0.174***	0.0261	0.134***
	(6.10)	(7.90)	(6.51)	(5.14)	(0.43)	(7.13)
$Tobin's\ Q_{t-1}$	-0.0123**	-0.0172***	-0.0101	0.0521*	0.0671***	0.00493
	(-2.96)	(-9.43)	(-0.92)	(2.12)	(13.30)	(0.15)
$Leverage_{t-1}$	-0.0446	-0.131***	0.0866	-0.172	-0.349***	0.216
	(-0.68)	(-11.12)	(1.86)	(-1.18)	(-14.19)	(1.41)
$ln(Assets)_{t-1}$	-0.0228**	-0.0546***	-0.0190	0.135***	-0.00965	0.0252
	(-2.79)	(-5.08)	(-1.51)	(4.24)	(-0.36)	(0.54)
$ln(Sales)_{t-1}$	-0.00249	-0.00397	0.00105	-0.0129	0.0345*	-0.00899
	(-0.48)	(-0.71)	(0.13)	(-0.32)	(2.32)	(-0.28)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	880	223	657	875	220	655
R^2	0.903	0.915	0.905	0.529	0.731	0.504
	Idiosyncratic Volatility			$Cash_t/Assets_{t-1}$		
	(7)	(8)	(9)	(10)	(11)	(12)
	All	Energy	Business	est4	est5	est6
$LiabAct_t$	0.0993***	0.0630***	0.117***	0.0211	0.0699*	-0.00204
	(5.03)	(7.71)	(5.81)	(1.64)	(2.29)	(-0.22)
$Tobin's\ Q_{t-1}$	-0.0123**	-0.0167***	-0.00882	0.0173*	0.00869	0.0176*
	(-3.20)	(-8.51)	(-0.89)	(2.08)	(0.59)	(2.11)
$Leverage_{t-1}$	-0.0438	-0.110***	0.0687	-0.0578*	-0.201	-0.0489*
	(-0.78)	(-9.46)	(1.41)	(-2.02)	(-1.20)	(-1.87)
$ln(Assets)_{t-1}$	-0.0258***	-0.0380**	-0.0273*	-0.136***	-0.224**	-0.121***
	(-3.52)	(-2.99)	(-2.24)	(-5.65)	(-3.29)	(-5.79)
$ln(Sales)_{t-1}$	-0.00651	-0.0151*	0.000363	-0.00183	-0.0166	0.00295
	(-1.11)	(-2.24)	(0.05)	(-0.11)	(-0.49)	(0.48)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	875	220	655	1442	356	1086
R^2	0.911	0.937	0.906	0.667	0.670	0.679

This table presents DiD regressions of risk taking. Year 2006 is excluded to mitigate the effect of the Tax Fairness Plan imposing tax on trusts implemented on October 31st, 2006. *LiabAct* is a dummy variable that equals 1 for trusts in years after the liability act took effect in the province and 0 for trusts before liability act. *LiabAct* is 0 for all corporations. Controls include lagged profitability, lagged Tobin's Q, lagged leverage, and lagged log assets. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 10: Determinants of the enactment of the liability acts

	Cox Hazard Model	Cox Hazard Model	LPM	LPM
	(1)	(2)	(3)	(4)
$GDP\ Growth_{t-1}$	1.054	1.085	0.0435	0.0436
	(0.92)	(0.99)	(1.18)	(1.16)
$Ln(GDP\ per\ Capita)_{t-1}$	-1.010	-1.403	-0.106	-0.106
	(-0.20)	(-0.29)	(-0.44)	(-0.43)
$Ln(Population)_{t-1}$	1.094	1.100	0.0433	0.0433
	(1.59)	(1.52)	(1.12)	(1.12)
$Unemployment\ Rate_{t-1}$	2.021	1.994	0.0276	0.0277
	(0.99)	(0.92)	(0.67)	(0.67)
$Political\ Party_{t-1}$	0.608	0.725	0.112*	0.112*
	(0.36)	(0.45)	(1.91)	(1.90)
$Trust\ Growth_{t-1}$		0.627		0.000321
		(1.21)		(0.03)
Province FE	N	N	Y	Y
Year FE	N	N	Y	Y
Observations	95	95	95	95
Pseudo R^2/ R^2	0.186	0.193	0.371	0.371

This table reports results for Cox hazard model (Columns (1)-(2)) or a linear probability model (Columns (3)-(4)) analyzing either the hazard or marginal propensity of a province enacting the liability act. The sample period is 1996 to 2006. The dependent variable/failure event is the liability act enactment of a given province. The explanatory variables (all lagged by one year) include real GDP growth ($GDP\ Growth$), the natural logarithm of the real GDP per capita ($ln(GDP\ per\ Capita)$), the natural logarithm of the province's population ($ln(Population)$, the unemployment rate ($Unemployment\ Rate$), $Political\ Party$ dummy and the growth in the number of trusts in a given province. We standardize continuous predictor variables to have zero mean and unit variance following Serfling (2016) and Cremers et al. (2019). Robust standard errors are clustered at the province level. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 11: Dynamics of the treatment effect

	External Financing		$\ln(\text{Assets})_t$		$\text{EBITDA}_t/\text{Assets}_{t-1}$		$\text{Dividends}_t/\text{Sales}_t$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Energy	Business	Energy	Business	Energy	Business	Energy	Business
$LiabAct\_Before(-1)$	0.0788	0.230	0.146	0.132	-0.0284	-0.0578	0.00384	-0.0217*
	(1.45)	(1.84)	(1.83)	(1.45)	(-0.89)	(-1.25)	(0.90)	(-2.01)
$LiabAct\_After(0)$	0.222**	0.137	0.178**	0.151*	0.0493**	-0.0640	-0.00994	-0.0392
	(3.30)	(1.72)	(2.85)	(2.16)	(3.20)	(-1.14)	(-2.10)	(-1.81)
$LiabAct\_After(+1)$	0.124	0.180***	0.205***	0.200*	0.0190	-0.00486	0.0415***	-0.0610**
	(1.82)	(4.70)	(5.56)	(2.14)	(0.68)	(-0.09)	(4.71)	(-3.20)
$LiabAct\_After(+2)$	0.216*	0.138	0.299***	0.0897	0.0330**	0.0525	0.0681***	-0.0162
	(2.48)	(1.32)	(4.79)	(0.89)	(3.56)	(0.79)	(27.03)	(-1.08)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	325	993	347	1054	384	1131	340	1077
R^2	0.670	0.564	0.979	0.982	0.792	0.614	0.915	0.771

This table reports the regression results for the dynamic effect of the liability acts on our main variables. We replace the *LiabAct_dummy* with the indicator variables for pre treatment and post treatment periods. Due to the characteristics of our data (we have fully available data from 2001-2006 only) for our main regressions we replace *liabAct_dummy* with indicator variables $LiabAct\_Before(-1)$, $LiabAct\_After(0)$, $LiabAct\_After(+1)$ and $LiabAct\_After(+2)$. $LiabAct\_Before(-1)$ is an indicator variable that equals one for firm-year observation one year before the liability act and if the firm is a trust and zero otherwise. $LiabAct\_After(0)$ is an indicator variable that equals 1 if firm-year observation is in the year liability act is enacted and if the firm is a trust and zero otherwise. $LiabAct\_After(+1)$ ($LiabAct\_After(+2)$) is equal 1 if firm year observation is in 1 year (2 years) after the act and if the firm is a trust and zero otherwise. For brevity, coefficient estimates for other control variables are not reported. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

Table 12: Covariate Balancing for propensity score matching

Variable	Treated (1)	Control (2)	t (3)	$p > \|t\|$ (4)
Tobin's Q	1.5341	1.385	1.22	0.224
Leverage	0.23849	0.24347	-0.12	0.904
ln(Sales)	5.0564	5.0483	0.02	0.984

We conduct propensity score matching based on industry, and a set of observable characteristics in year 2003 (before the liability acts) including Tobin's Q, leverage, Ln(Sales).

Table 13: Regressions with propensity score matching

	External Financing			$\ln(\text{Assets})_t$		
	(1) All	(2) Energy	(3) Business	(4) All	(5) Energy	(6) Business
$LiabAct_t$	0.0212	0.0883*	-0.0126	0.0579	0.232*	-0.0230
	(0.38)	(8.66)	(-0.21)	(1.26)	(9.12)	(-0.64)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	362	130	232	380	138	242
R^2	0.565	0.702	0.441	0.985	0.990	0.982
	$\text{EBITDA}_t/\text{Assets}_{t-1}$			$\text{Dividends}_t/\text{Assets}_{t-1}$		
	(7) All	(8) Energy	(9) Business	(10) All	(11) Energy	(12) Business
$LiabAct$	0.0464**	0.0999**	0.0258***	0.00207	0.0241**	-0.00921*
	(3.22)	(58.42)	(4.07)	(0.30)	(14.93)	(-2.14)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	376	133	243	369	126	243
R^2	0.801	0.808	0.750	0.867	0.911	0.826

We repeat the main regressions using propensity matched control group. The control variables are the same as the main regressions, but omitted in this table for brevity. t- statistics are reported in parentheses. Significant levels at 10%, 5%, 1% levels are denoted by *, ** and ***, respectively.

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