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# The Truth About Income Trusts: Lower Volatility or Simply Less Tax?

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**PRÉCIS**

Le présent article analyse le positionnement des fiducies de revenu sur le marché des valeurs mobilières du Canada. L'auteur révèle que, dans la période de deux ans prenant fin le 24 février 2006, 240 fiducies de revenu cotées au Canada affichent un risque moins élevé qu'un échantillon correspondant de sociétés de taille comparable œuvrant dans des secteurs industriels analogues. Un regroupement plus étroit révèle que la volatilité plus faible est liée aux modes de paiement en vertu desquels les paiements de redevances sont plus fiables, ainsi qu'à des secteurs industriels précis où la production de pétrole et de gaz ou l'exploitation de services publics sont moins instables. Lorsque l'ampleur des rendements est prise en compte toutefois, l'auteur a établi qu'il n'y a pas de preuve de résultats de rendement plus élevés relativement au risque pour les fiducies de revenu par comparaison avec des sociétés correspondantes. Les données sur les 13 sous-indices de la Bourse de Toronto ne présentent aucune preuve d'une amélioration significative au chapitre de l'efficacité de la sélection de portefeuilles qui serait associée aux rendements des fiducies de revenu.

**ABSTRACT**

This article investigates the placement of income trusts in the Canadian securities market. The author finds that, in the two-year period ending February 24, 2006, 240 income trusts listed in Canada exhibit lower risk than a matched sample of firms of similar size in similar industries. Further clustering toward lower volatility is related to payout structure, where royalty payments are more secure, and to specific industrial sectors, where oil and gas production or utility operation are less volatile. When the magnitude of returns is considered, however, the author finds no evidence of higher return performance with respect to risk for income trusts over the matched firms. Data for 13 Toronto Stock Exchange sub-indexes provide no evidence of significant improvement in the efficient frontier for portfolio selection associated with income trust returns.

**KEYWORDS:** INCOME TRUSTS ■ RETURNS ■ RISK ■ SECURITIES MARKETS

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## INTRODUCTION

Between 2002 and 2006, income trusts burst into the Canadian securities market, being the most frequent and largest public offerings available. These "flowthrough" structures make frequent cash distributions, free from corporate tax, and thus are valuable to income-dependent investors in lower tax brackets or those who can avail themselves of tax shelters. With steady cash distributions, income trusts might provide a niche in the investment market, but are these securities any less volatile than comparable corporate forms? This study evaluates the risk of 240 listed income trusts in Canada based on their total pre-tax and after-tax returns in the two years ending on February 24, 2006. This period ends one month prior to the inclusion of 59 income trusts in the Toronto Stock Exchange (TSX) composite index on March 26, 2006, and well before the ensuing legislative changes on October 31, 2006 that affected the future tax status of the majority of income trusts.

This article adds to the current literature on income trusts in three aspects. First, using a matched sample of companies that do not operate under the beneficial tax structure of trusts, volatilities are quantitatively compared to demonstrate that trust units are lower-risk securities. Second, the available income trust securities are separated on the basis of payout structure and broad industrial classification to assess risk in the subclasses. Volatility differences relate to both the payout structure and the industrial classification. Third, the magnitude of returns relative to risk is tested using several accepted performance measures, to demonstrate spanning of income trust pre-tax returns by the existing TSX sub-indexes during the period of study.

This study complements the work of Cleary and Mackinnon,[1] who found that income trust unit returns were closer to stock market results than bond market performance. In their study of the 59 income trusts that now comprise the TSX income trust index, for an earlier period that ended in 2004, Cleary and Mackinnon found that trusts enhanced the efficient frontier for portfolio selection, thus completing the

1 See Sean Cleary and Greg Mackinnon, "The Investment Nature of Income Trusts and Their Role in Diversified Portfolios" (2007) vol. 24, no. 4 *Canadian Journal of Administrative Science* 314-25.

securities market. In contrast, this study proves that these securities reside in the low-volatility region of the same investment space and incorporates all income trusts that are publicly traded during the chosen analysis period. Further, by separating income trusts into logical categories, this research establishes certain types of trusts as potential low-risk security investments in Canada.

## PROBLEM DESCRIPTION AND MOTIVATION

Income trusts were established to attract investment in relatively stable assets, primarily in the real estate and resource sectors. Without restriction to these areas in Canada, however, income trusts now exist across the economy, giving rise to two concerns: unsuitable candidates may choose to reorganize simply to gain a higher market valuation, and all firms might eventually convert, greatly reducing federal tax revenues. Movement by Telus Inc. and BCE in this direction is thought to have forced the government's hand toward announcing taxation changes in October 2006.[2]

Tax reduction is only one of four areas of financial advantage offered by income trusts. Corporate taxes are avoided when profit is paid out as a recognized expense, reducing net earnings toward zero; and while the result is not unique to trusts, attaining a sufficient expense obligation is difficult without this organizational form. Investment trusts combine the issue of an internal, subordinated high-yield note with common shares in an offering of trust units. Interest expenses are passed directly to unitholders, who are taxed once at marginal personal tax rates. Royalty trusts provide similar payouts allocated to royalty claims on assets. Either way, these pre-tax cash flows far outweigh available dividends. The tax burden for the investor will also be higher, however, deriving from the requirement to claim the payout as a mixture of dividends, interest, and return of capital.[3] In this study, pre-tax total returns are considered throughout. Marginal tax rates for investors vary, and the securities may be held in tax-protected registered plans and pension funds, where no tax is actually paid on distributions in the near term. For comparison of the performance between trusts and matched firms, after-tax total returns are also considered for a fully taxed Ontario resident, in the 46 percent marginal tax bracket with a combined federal and provincial dividend tax credit of 18.5 percent. Further scenarios to convert payouts to after-tax returns have been well described by previous authors in this journal.[4]

2 A year earlier, in September 2005, Gordon Nixon, the chief executive officer of RBC Royal Bank, had also mentioned the advantages that would accrue from the bank's reorganization. John Partridge, "RBC Open to Income Trust Spinoff," *Globe and Mail*, September 14, 2005.

3 See Jack M. Mintz and Stephen R. Richardson, "Income Trusts and the Integration of Business and Investor Taxes: A Policy Analysis and Proposal" (2006) vol. 54, no. 2 *Canadian Tax Journal* 359-402.

4 Ibid.; and Kenneth J. McKenzie, "Income Taxes, Integration, and Income Trusts" (2006) vol. 54, no. 3 *Canadian Tax Journal* 633-56.

A second, related advantage of an income trust is the "bird-in-hand" scenario,[5] where certain cash flows today are preferred to uncertain capital gains in the future. Income trusts pay larger amounts more frequently than stocks, so income is available sooner to investors. To compare the value of the distributions with average dividend streams, consider that US firms paid out dividends at 43 percent of after-tax earnings over a 25-year period of study.[6] Canadian firms might be expected to pay out in similar ratios. In this situation, distributions would be three and half times greater than dividends for a firm in a 40 percent corporate tax bracket choosing to pay out 90 percent of pre-tax profits. For an investor in a low marginal income tax bracket, these cash flows are much more valuable.

Further, the value of the trust unit is known to investors, being calculable using the discounted cash flow technique. Expected distributions are well publicized for most trusts, and some are essentially unchanging, thereby potentially stabilizing unit prices in normal and exceptional circumstances. Within minutes of the announcement of taxation reforms on the evening of October 31, 2006, the expected November 1 opening unit prices of most trusts were predicted to drop 20 percent below the previous day's close, which was the approximate observed result. Thus, valuation remains relatively straightforward, and if distributions remain above the required return for assessed risk in the underlying corporation, income trusts will remain popular. Unit prices are now lower as a result of the 2011 tax deduction, but the required rate of return should also be lower since uncertainty relating to future tax treatment has been resolved.

The third, well-referenced reason to adopt a trust structure stems from the reduction of agency costs in the corporation. These costs result from overinvestment and undue rents,[7] and are avoided by the discipline of large, regular distributions. In this way, the income trust structure with high debt financing is similar to a leveraged buyout (LBO), a corporate form that Michael Jensen argued would eventually supplant the more typical public corporation, particularly in slow-growth sectors of the economy.[8] The counterargument contends that private operations eventually

5 Cleary and Mackinnon, supra note 1, at 316. This effect is not unlike the "liquidity preference" described by Keynes with respect to investment behaviour during an economic depression.

6 See Eugene F. Fama and Kenneth R. French, "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity To Pay?" (2001) vol. 60, no. 1 *Journal of Financial Economics* 3-43.

7 See seminal studies in this area completed by Michael C. Jensen, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers" (1986) vol. 76, no. 2 *The American Economic Review* 323-29; and Michael C. Jensen and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure" (1976) vol. 3, no. 4 *Journal of Financial Economics* 305-60.

8 See the debate between Michael C. Jensen, "Eclipse of the Public Corporation" (1989) vol. 67, no. 5 *Harvard Business Review* 61-74, and Alfred Rappaport, "The Staying Power of the Public Corporation" (1990) vol. 68, no. 1 *Harvard Business Review* 96-104.

require flexibility to face economic realities, making an equity offering in a reverse LBO necessary. The income trust avoids this reversal, however, since retail investors are involved in the buyout, and subsequent offerings have met success in providing further funding. Each time, the decision is assessed by the market. The Canadian market saw an ever-increasing number of trust reorganizations, even after dividend taxation was reduced.[9] The only impediment to their adoption was proposed legislation providing that distributions would be taxed after January 1, 2011, an impact that has already lowered unit prices.

The final advantage of income trusts relates to the liquidity of the units and the ability of retail investors to afford them. The trust packages investment in high-yield debt with an equity stake in the enterprise, and the portion of debt is affordable since units generally begin trading at prices below $20. As a result, risky debt, which otherwise has a rather restricted high-yield market, has become more readily available to the average retail investor in Canada. From the investor's point of view, diversification is easily accomplished, and from an insurance standpoint, the issuance of the trust units allows default risk to be spread widely across the investment community. If the return from the debt and equity is high enough with respect to risk, income trust units may potentially complete the market of Canadian securities.

In the equity market, the demand for yield is growing, as a result of uncertainty in the market and the demographic of aging investors. Scandals have taken the shine off several bellwether growth stocks,[10] and Sarbanes-Oxley controls in the United States have been deemed expensive.[11] Baby boomers and pension funds, which serve as tax-protected agents for the retiring population, prefer the higher pre-tax payouts afforded by flowthrough securities. According to Zetzsche,[12] the combination of strong demand and aggressive marketing creates the potential for a pricing bubble. To guard against such a concern, it is important that the value of income trust units can be easily traced back to fundamentals, as reflected in the stability of the returns.

The first task in this study is to assess the risk and suitability of converting firms. Are income trusts more or less volatile than a comparable group of firms trading as stocks? Using a matched sample of firms, risk is tested directly by comparing estimated pre-tax total return volatilities.

Second, trusts are separated along two dimensions: industry classification and payout structure. As a result of an increased number of trust formations in recent years, income trusts occupy several distinct industrial sectors. Moreover, it has been argued that new entrants in the general business classification may be unsuitable

9 See McKenzie, supra note 4, at 644.

10 Enron, WorldCom, and Nortel were found, in varying degrees, to be falsely reporting on their success.

11 Aaron Lucchetti, "Moving the Market: Why Spitzer Is Backing Study That Endorses Less Regulation," *Wall Street Journal*, January 23, 2007.

12 See Dirk Zetzsche, "The Need for Regulating Income Trusts: A Bubble Theory" (2005) vol. 63, no. 1 *University of Toronto Faculty of Law Review* 45-109.

candidates for the trust structure.[13] These "business trusts" are compared with more conventional trusts in the real estate and the resource sectors, which have existed for many years. Typically, resource trusts adopted a royalty structure, where proven, producing oil and gas reserves ensured stable "top-line" distributions for investors, albeit on a slowly depleting asset. The riskier exploration side of the business was avoided. Similarly, real estate investment trusts (REITs) invested in ownership and management of existing real estate properties, forgoing the uncertainties of land development. In response to deregulation, utility trusts have become a third focused sector in the market, adopting an investment structure and often paying sizable after-tax dividends in their distributions. Thus, differing operating companies now underlie the total number of trusts in Canada, and risk may be greater with a particular trust type.

Finally, the performance of income trusts is positioned in the risk-return space to determine whether trusts provide greater value to investors. Because of the non-normal distributions of returns, the income trusts are evaluated using the Sharpe ratio and two other adapted risk measures from the hedge fund literature.[14] Graphically, the four industry types—business trusts, oil and gas trusts, REITs, and utility trusts—seem to occupy distinct regions of the portfolio investment space, and royalty trusts seem to outperform investment trusts. But does the clustering lead to improved investment opportunities related to higher returns? The study concludes by establishing whether these securities complete the Canadian market: multivariate spanning tests compare the trusts against the TSX sub-indexes, which did not include income trusts during the period of study.[15]

## THE INCOME TRUST SAMPLE AND MATCHING

The data for income trusts are collected solely from the Canadian market, the only developed jurisdiction to allow this flowthrough structure across all industries (industrial sectors). A complete listing of Canadian income trusts is found at http://www.investcom.com/, and trusts with inception dates prior to January 1, 2006 are included in the study. Thomson's Datastream database is the source of market value, daily price, and daily distribution information for this list of 240 income trust securities. The Advance 4.0 interface for Datastream is used to manually compile a list of

13 Mintz and Richardson, supra note 3, at 371; Paul Halpern and Oyvind Norli, *Income Trusts: Old Wine in New Bottles?* MFC Global Investment Management paper (Toronto: Manulife Financial, MFC Global Investment Management, 2004), 6; and Michael R. King, *Income Trusts—Understanding the Issues*, Bank of Canada Working Paper 2003-25 (Ottawa: Bank of Canada, September 2003), 23-24.

14 See Lew D. Johnson and Wulin Suo, 2006, *An Analysis of Hedge Fund Returns*, Queen's University, School of Business Working Paper (Kingston, ON: Queen's University, School of Business, 2006).

15 This analysis is carried out via the multivariate mean-variance spanning test introduced by Gur Huberman and Shmuel Kandel, "Mean-Variance Spanning" (1987) vol. 42, no. 4 *The Journal of Finance* 873-88. Using a similar method, Cleary and Mackinnon, supra note 1, find evidence that the inclusion of 59 trusts improves the frontier.

matching firms for the sample of income trusts, and data for these firms are taken from the same source. The primary selection criteria are that firms be in the same sector of industry (preferably in the same business), traded on the TSX, and of comparable size by market capitalization. In other words, the study compares returns on an investment in an ice distribution firm that has adopted an income trust structure with returns from an ice distribution firm that has not reorganized. This matching strategy is chosen to respond to criticisms that unsuitable firms might choose the trust structure simply for tax reasons, and in these cases reduced risk would not be expected. Pressure to pay out the majority of cash flow would lead to or illuminate poor business decisions that would be reflected in increased market risk. This study aims to prove that income trust units are less risky than other stocks, rather than assume the result.

Herein, size of the matched firm is controlled as a secondary criterion by restricting selection to the larger stock exchanges, and where possible, the matching firm is at least as large as the corresponding income trust. When a matched firm could not be found on the TSX, firms on the New York Stock Exchange (NYSE) and American Stock Exchange (Amex) were included. It is understood that the Canadian and US markets performed differently in this period, but restricting selection to the larger US exchanges should not unduly bias the matched sample toward higher volatility. Sixty-seven US-based firms were included in the final matched sample.[16] Matching of firms becomes most difficult for the oil and gas and REIT sectors, where the income trust structure is a well-established organizational form in Canada and the United States allows flowthrough organizations in the form of master limited partnerships (MLPs) and REITs, respectively. Many larger players have already adopted the trust or partnership structure.

This matching strategy is chosen to find similar pairs of firms in order to reduce industry effects related to macroeconomic conditions that might unduly affect the risk comparison. One potential shortcoming relates to the naïve choice provided to the income trust investor. The investment decision might otherwise be based, for example, on a comparison of Fording Canadian Coal Trust to a dividend-paying firm in the wider mining industry, or the stock market in general. In this case, a similar player providing low or no growth and a comparable payout might be chosen as a more appropriate match. However, many income trust players are not as well known as Fording, nor do they pay distributions that can be imitated by typical "value stocks." As an example, Pizza Pizza was not extreme in its annual 8 percent yield during the period of study, but this cash return surpassed the dividends of all banks and utilities in the same time frame. Thus, it is difficult to match the pre-tax cash yield in this case, and where an investor chooses a relatively small pizza retailer, it may be less likely that the alternative investment being considered is much larger.

16 In fact, the US firms were generally much larger than the matched Canadian income trusts. To test for robustness, data for the US firms and their corresponding paired trusts were removed, It was found that volatility estimates for both samples were slightly increased, but the results of the study were materially unchanged.

It might also be argued that the unit distribution derives from the weighted combination of debt and equity, and thus unit returns should be compared with the suitably weighted debt and equity returns of the matched firms. This matching will fall short on three aspects, however, relating to availability, affordability, and investor perspective. For the investor to receive the interest from owning debt, the matched firm would have to offer a public corporate bond, which few potential matches do in the restricted Canadian bond market. In addition, since income trust units often sell for less than $20, whereas bonds are purchased in thousands of dollars, the analysis would be restricted to a more affluent retail investor in the case of the matched firms. Finally, shareholders and unitholders hold only residual claims on assets. In the case of bankruptcy, both the shareholder and the unitholder will receive little, after the creditors are paid. Thus, the investment comparison between units of an income trust and shares in a comparable firm is consistent with the purpose of this study, and also the proposed tax legislation.

Matching strategies do have limitations, but the main requirement is a fair interpretation of results. The sample of income trusts contains the population of actively traded trusts during the analysis period and does not suffer from survivorship bias. Several trusts reduced or suspended distributions and others failed or were taken private subsequent to the period of analysis. Firms in the matched sample are often much larger than the paired trust, particularly in a focused industrial sector or where a US firm must be chosen, balancing the lower-risk findings for the matched firms against the findings for income trusts. Finally, income trusts are intermediate players in their sectors, and larger energy and utility companies that do pay dividends have entered the comparison here. One hundred and eleven firms in the matched group pay dividends. In light of these considerations, the research is considered conclusive and robust with respect to matching and the tests performed.

## VOLATILITY TESTS

The first test compared the relative risk of income trusts and matched firms, where the proxy for risk is estimated volatility from February 25, 2004 to February 24, 2006. Estimates were calculated from historical pre-tax and after-tax total return data as described in appendix 1. Confidence interval calculations were carried out using daily variances before these results were converted to volatility, defined herein as the annualized standard deviation. For statistical comparison, confidence intervals were constructed using three parametric techniques based on independent and normally distributed returns.[17] To overcome the non-normal profile of

17 See F.E. Satterthwaite, "An Approximate Distribution of Estimates of Variance Components" (1946) vol. 2, no. 6 *Biometrica Bulletin* 110-14; B.L. Welch, "On Linear Combinations of Several Variances" (1956) vol. 51 *Journal of the American Statistical Association* 132-48; and the modified large-sample procedure proposed by F.A. Graybill and C.M. Wang, "Confidence Intervals on Nonnegative Linear Combinations of Variances" (1980) vol. 75 *Journal of the American Statistical Association* 869-73.

the volatility data, a robust, non-parametric bootstrap percentile interval was also constructed.[18]

Estimated volatilities for income trusts are lower than those calculated for the matched firms, as presented in figure 1. The average pre-tax volatility estimate for the sample of trusts is 31.83 percent, which is significantly lower than the estimate for the matched sample of traded firms, at 46.83 percent. After-tax estimates are essentially unchanged.

The histograms indicate strongly right-skewed distributions, leading to bias-corrected bootstrap intervals that are noticeably wider than the three intervals derived from distribution theory. All intervals separate income trusts and matched firms, however, showing income trusts to be lower-risk securities.

Bootstrap 95 percent confidence interval tests indicate a significant risk difference between the two recognized payout structures: royalty trusts and investment trusts. The mean volatility of royalty trusts at 22.9 percent is found to be much lower than the mean volatility of investment trusts at 40.1 percent. However, no similar result arises in the interval test between the four recognized industrial classifications of income trusts (REITs, oil and gas, utility, and business trusts). The mean volatilities indicate that utility trusts are lowest risk at 22.6 percent, followed by oil and gas at 27.1 percent, REITs at 31.8 percent, and business trusts at 34.6 percent; however, the REIT interval overlaps the adjacent intervals to such an extent that volatility estimates cannot be statistically separated. Though the increase in the number of business trusts in recent years seems to lead to higher average volatility, the variance associated with REITs does not allow this conclusion statistically.

To resolve the effects of structure and industrial classification together, multiple linear regression is appropriate. Equation 1 models the relation between the return volatility ($\sigma$) and trust types, using four indicator variables along two dimensions. The structural dimension is picked up by the variable *ROYALTY*, which is unity where a royalty structure is adopted and zero if the organization is an investment trust. Similarly, *REIT*, *UTILITY*, and *O&G* indicate the classifications of the income trusts by specified industry sector relative to the business classification. In this study, *O&G* is specific to firms involved in the production side of the oil and gas sector, corresponding closely to conventional resource trusts.[19]

$$\sigma = \beta_0 + \beta_1 ROYALTY + \beta_2 REIT + \beta_3 UTILITY + \beta_4 O\&G + \varepsilon, \quad (1)$$

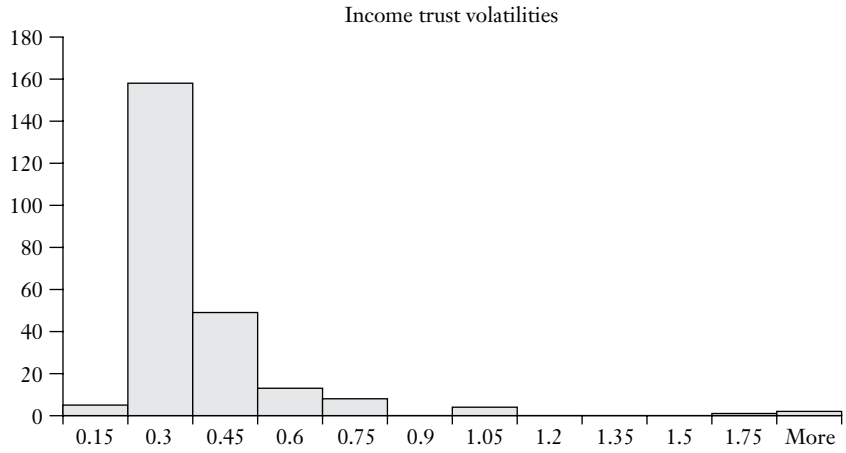
where

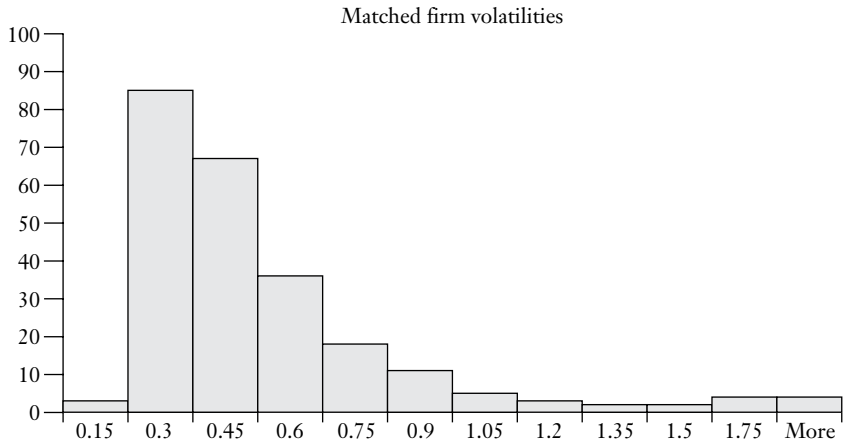
$\sigma$ is the empirical estimate of historical volatility from February 2004 to February 2006,

18 See Bradley Efron and Robert J. Tibshirani, *An Introduction to the Bootstrap* (New York: Chapman & Hall, 1993).

19 The Web site http://www.investcom.com/ includes services firms in the classification of resource trusts, and other authors have included raw materials such as coal or iron ore in the resource classification.

**FIGURE 1 Comparison of Distributions of Investment Volatilities**




Note:

| *99 percent confidence intervals* | *Income trusts* | *Matched firms* |
|---|---|---|
| Satterthwaite | {0.3823, 0.3965} | {0.5864, 0.6015} |
| Welch, with adjustment | {0.3826, 0.3969} | {0.5865, 0.6016} |
| Graybill and Wang | {0.3830, 0.3976} | {0.5871, 0.6029} |
| Bootstrap interval | {0.3145, 0.4813} | {0.5042, 0.7094} |

*ROYALTY* indicates a royalty structure rather than an investment structure,
*REIT* indicates a real estate investment trust rather than a business trust,
*UTILITY* indicates a utility trust rather than a business trust,
*O&G* indicates an oil and gas production trust rather than a business trust, and
$\varepsilon$ is the error term.

The results of the regression are included in table 1 as model I. The sample includes 240 income trusts traded on the TSX over the period February 25, 2004-February 24, 2006. The results are from an ordinary least squares (OLS) regression where the dependent variable is the historical volatility of returns and the independent variables are all indicator variables of income trust type. The first three classify the trust in its broad industry sector as follows: *UTILITY* is unity for a utility trust, *REIT* is unity for a real estate investment trust, and *O&G* is unity for an oil and gas production trust. Where these indicators all take the value zero, the trust is in the more general business trust classification. The final variable, *ROYALTY*, takes the value unity if distributions are royalty payments and it takes the value zero when distributions are returns on equity and debt investments. Return data are collected from Datastream.

The coefficients shown in table 1 are accurate, but poor residual variance makes the estimated significance unreliable. Residual plots (not included here) indicate changing variance over the prediction region with increased uncertainty in predicted results for REITs and business trusts. To overcome the problem, bootstrap intervals of the coefficient estimates are presented in the second column of table 1, replacing the *t*-statistics from the first column. These interval estimates are based on 500 repetitions of the regression equation and indicate that the *UTILITY*, *O&G*, and *ROYALTY* coefficients are all significantly non-zero at the 95 percent confidence level using the robust bootstrap technique. Only the REIT coefficient estimate lacks significance.

Royalty trusts are represented in both the oil and gas and business sectors, and the significant negative coefficient indicates that distributions from "top-line" royalty payments lead to lower volatility. For royalty trusts in the business sector, in the restaurant subsector, this reduction may result from the noted annual rebalancing of the operations underlying the royalty pool of investments. Distributions are paid from profits at chosen locations, providing flexibility for the trust to stabilize cash flow. Each year, less successful franchises are removed and new locations are added, providing distributions that are sheltered by asset selection and geographic diversification.

By including the payout structure with the industrial classification, and using the bootstrap technique to overcome distributional problems, utility trusts and oil and gas trusts can be separated as less risky alternatives to the general business trusts. Thus, investors interested in reducing the volatility of their portfolios might select from the utility or oil and gas production trusts.

## RISK VERSUS RETURN

Reduced risk is beneficial to investors only if it is accompanied by a reasonable return relative to other market securities. Here, the comparisons of pre-tax and after-tax total returns assess income trusts against the matched firms on the basis of three performance measures:

1. The Sharpe ratio in equation 2 is the standard mean-variance measure of return above the risk-free rate divided by volatility.

$$\text{Sharpe ratio} = \frac{E(R_i) - r_f}{\sigma_i}, \tag{2}$$

**TABLE 1 Regression Results for Response = Volatility**

| Variable | (I) Trust classes and structure | 95% Bootstrap intervals[a] |
|---|---|---|
| *UTILITY* | –0.127** (–2.56) | [–0.1722, –0.0850]** |
| *REIT* | –0.032 (–0.72) | [–0.1267, 0.1556] |
| *O&G* | –0.061 (–1.52) | [–0.1000, –0.0164]** |
| *ROYALTY* | –0.102* (–1.92) | [–0.1425, –0.0692]** |
| Constant | 0.353*** (18.91) | |
| *F*-statistic | 2.91 | |
| (*p*-value) | (0.0224) | |
| $R^2$ | 0.0472 | |
| Adjusted $R^2$ | 0.0309 | |

Notes

[a] Bias-corrected percentile intervals, based on 500 repeated measures of the regression equation.

The values presented in the table are coefficient estimates and *t*-scores (in round brackets). Significance is indicated as follows:

* 10 percent
** 5 percent
*** 1 percent

where

$E(R_i)$ is the expected annual return of security *i*,

$r_f$ is the risk-free rate of return, and

$\sigma^i$ is the estimated volatility of security *i*.

2. The Sortino measure in equation 3 reconciles the interpretation of risk as a downside variation from a target expected return, which is generally above the risk-free rate and often as high as the return on an equity index.[20]

$$\text{Sortino} = \frac{E(R_i) - r}{\sqrt{\sum_{it} ((R_{it} - r)^-)^2}}, \qquad (3)$$

20 See Frank Sortino and L. Price, "Performance Measurement in a Downside Risk Framework" (1994) vol. 3, no. 3 *Journal of Investing* 59-65.

where

$E(R_i)$ is the expected annual return of security $i$,

$r$ is the expected/acceptable rate of return, and

$(R_{it} - r)^-$ are negative returns, those below the target rate $r$.

3. The Omega ratio in equation 4 relates the upside potential of an investment to the downside, relative to a target expected return, similar to the Sortino measure.[21] For comparison purposes, the absolute value of the ratio is presented.

$$\Omega(r) = \left| \frac{\sum_{it} (R_{it} - r)^+}{\sum_{it} (R_{it} - r)^-} \right|, \tag{4}$$

where

$R_{it}$ is the daily return of security $i$ in time period $t = (1, \ldots, T)$,

$r$ is the expected/acceptable rate of return,

$(R_{it} - r)^+$ are positive returns, those above the target rate $r$, and

$(R_{it} - r)^-$ are negative returns, those below the target rate $r$.

Since income trusts are primarily yield-bearing investments, the target return chosen for Sortino and Omega measures was 4 percent, a competitive rate for a long-term fixed-income investment during the study period.[22] All three measures for income trusts and the matched firms clearly align on top of one another, with slight differences in skew and extreme observations dictating the central location of the results. The summary information is included in table 2.

As with table 1, the sample includes 240 income trusts traded on the TSX over the period February 25, 2004-February 24, 2006. The matched sample of 240 firms contains industry-specific pairings traded on the TSX, NYSE, or Amex over the same period. The results represent summary information related to the performance data for the Sharpe ratio and two hedge fund measures that reflect risk as downside variation, rather than volatility. Return data are collected from Datastream.

Although the income trusts demonstrate outperformance on average for each measure, in no case is the improvement significant statistically, on the basis of confidence interval estimation. The differing shapes of the distributions indicate that income trusts are unique and more secure investments. However, the returns are no

21 See Con Keating and William F. Shadwick, *An Introduction to Omega* (London: Finance Development Centre, 2002) (online: http://faculty.fuqua.duke.edu/~charvey/Teaching/BA453_2006/Keating_An_introduction_to.pdf).

22 Use of the three-month treasury bill rate of 2.55 percent or the average return of the TSX composite index produces a similar result.

**TABLE 2 Risk-Return Performance Measures**

| Measure | Income trust mean (median) | 95% bootstrap intervals[a] | Matched mean (median) | 95% bootstrap intervals[a] |
|---|---|---|---|---|
| Sharpe ratio . . . . . | 0.470 (0.555) | [0.152, 0.718] | 0.323 (0.341) | [0.199, 0.417] |
| After-tax . . . . . | 0.438 (0.507) | [0.169, 0.604] | 0.314 (0.414) | [0.206, 0.421] |
| Sortino measure . . . . | 0.648 (0.672) | [0.504, 0.786] | 0.510 (0.455) | [0.334, 0.662] |
| After-tax . . . . . | 0.778 0.651 | [0.542, 1.012] | 0.496 (0.539) | [0.342, 0.684] |
| Omega ratio . . . . . | 1.128 (1.110) | [1.097, 1.162] | 1.089 (1.090) | [1.063, 1.122] |
| After-tax . . . . . | 1.110 (1.096) | [1.080, 1.143] | 1.087 (1.090) | [1.058, 1.121] |

[a] Bias-corrected percentile intervals, based on 500 repeated measures of the mean.

greater relative to the risk of the investment. These results combined with the lower volatility findings demonstrate that trusts occupy a space of lower returns combined with less risk, matching the needs of a certain target clientele.

Although we expect to find the after-tax returns greatly reduced for income trusts, the Sharpe ratios indicate a relatively small effect, given that the volatility estimates were not materially changed. This effect arises because income trusts in some sectors pay substantial amounts as return of capital and dividends that carry a reduced tax burden. On the basis of this measure, on average, income trusts mildly outperform the matched firms. Change in the downside risk estimate has affected the average Sortino measure, though the statistical separation of results is still not possible. On an after-tax basis, return performance for a fully taxed Canadian investor living in Ontario is still slightly higher for income trusts than for matched firms, but it is not significantly higher on the basis of these accepted measures.

Cleary and Mackinnon find greater Sharpe ratios for income trusts,[23] in contrast to this study's finding of similar ratios and lower volatility. The difference may result from the higher weighting of energy trusts in their sample, the effect of high energy prices, and the different time period covered in their study (which ended in 2004). In this study, Sharpe ratios for the oil and gas sector are almost three times greater than the average level (oil and gas mean = 1.250), and performance drops off for REITs (mean = 0.687), utility trusts (mean = 0.382), and business trusts (mean = 0.231). Oil and gas returns are higher than average, utility returns are lower than average, and REITs demonstrate improved performance over the general business trusts.

23 Cleary and Mackinnon, supra note 1, at 317.

## SPANNING IN THE RISK-RETURN PORTFOLIO SELECTION SPACE

Graphically, the data in figure 2 demonstrate that trusts cluster in the low volatility region of the risk-return space, and when the trusts are separated into their industrial sector subsamples, further clustering occurs. The utility sector offers low positive returns at low risk, and the oil and gas sector provides greater returns at slightly higher risk levels, attributable to the world pricing of energy commodities at historically high price levels. The performance of REITs is much more variable and the risk levels are not inconsequential. Finally, business trusts offer greater uncertainty than the focused types. Several have negative expected returns over the period of study, but others in this group seem to extend the frontier beyond that defined by the matched set of firms. Do these clusters of income trusts lead to a series of returns that are not otherwise available in the Canadian securities marketplace?

Portfolio performance of income trusts relative to the Canadian market is tested via an empirical portfolio spanning technique, as outlined in appendix 2. The current study differs from previous work on income trusts by expanding the dimension of the response portfolios in the spanning tests to a multivariate setting that separates the income trusts by payout structure or industrial classification. Equally weighted portfolios of income trust securities are tested against the efficient frontier for portfolio selection defined by the 13 TSX sector sub-indexes, including gold. Data for the 13 TSX sub-indexes are collected from Datastream to cover the same period of study, and monthly results are presented here. The unconstrained regression estimates are shown in table 3.

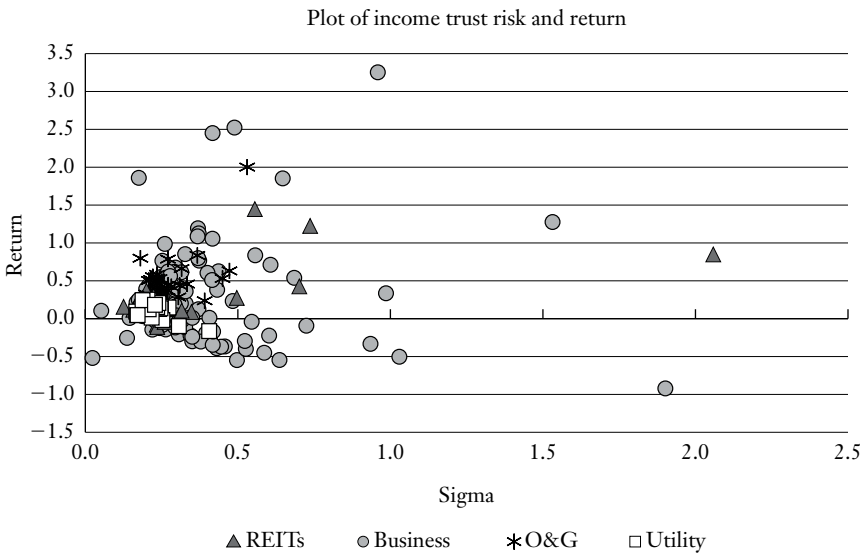
The sample includes 240 income trusts traded on the TSX over the period February 25, 2004-February 24, 2006, grouped into equal weighted portfolios and tested for spanning using the method of Huberman and Kandel.[24] The results of an OLS regression fit the returns of the trust portfolios against the returns of the 13 TSX sub-indexes including gold. Spanning is indicated in these results if the coefficient estimates sum to unity and the intercept/constant is insignificant. Otherwise, there is some evidence in improvement in the efficient frontier.

In panel A, few significant results are indicated. The business classification of income trusts is easily fit by a combination of the sub-indexes ($R^2$ = 91%); the intercept coefficient is insignificant. From a policy perspective, tax shielding using the income trust structure provides no positive effect toward returns in this class. Volatility is reduced, but this group remains the most volatile among the trust classes.[25] Returns related to cash distributions bolstered by risk-free corporate tax avoidance

24 See supra note 15.

25 See Kenneth Klassen and Christy MacDonald, *What Factors Influence the Decision To Use an Income Trust?* University of Waterloo, School of Accountancy Working Paper (Waterloo: University of Waterloo, School of Accountancy, July 2005). These authors include business trusts in their analysis, and also find that the firms that choose to convert into income trusts are no less volatile than comparable firms prior to conversion.

**FIGURE 2 Income Trust Clusters in the Portfolio Space**




are no greater than those expected for corporations operating without the requirement of paying out all operating profits. Such poor performance supports the view that less suitable corporations may migrate toward this organizational form simply to reduce their taxes, making poor investment decisions.[26]

Income trust structures provide divergent results in panel B of table 3. Royalty trusts, which demonstrate significantly lower volatility than investment trusts, provide a poorer fit with the spanning regression. The percent of variation explained is lowest for this grouping of income trusts, suggesting that royalty payments offer an alternative investment. Investment trusts have a significant intercept at the 5 percent level, but evidence against spanning by the sub-indexes is weak. Results differ from one structure to the other, but no extension of the efficient frontier is indicated overall.

When the total results are tested, no marked improvement is found as a result of the inclusion of income trusts, which is a lesser finding than that of Cleary and Mackinnon. One must conclude that the equally weighted portfolios of all four industry types, the three focused industry classes, and the two structural types are all effectively spanned by the 13 TSX sub-indexes. From several angles, the performance of income trusts demonstrates lower volatility, but the return is commensurate with the level of risk as established in the Canadian stock market.

Before closing, it is important to note that the empirical result relates solely to the pattern of returns and does miss a practical aspect, relating to the aforementioned

26 Mintz and Richardson, supra note 3, at 371.

**TABLE 3 Results of Variance Spanning Tests for Income Trusts by Industrial Classification and Organizational Structure**

| | Panel A Industrial classification | | | | Panel B Organizational structure | |
|---|---|---|---|---|---|---|
| TSX sub-index | (II) Business trusts | (III) Oil and gas trusts | (IV) REITs | (V) Utility trusts | (VI) Investment trusts | (VII) Royalty trusts |
| Energy | 0.0518 | **0.4154*** | –0.0556 | –0.0596 | 0.0439 | 0.1661 |
| Financial | 0.2837 | 0.1793 | 0.0944 | 0.3745 | 0.1593 | 0.2329 |
| Gold | 0.0310 | –0.4269 | –0.2978 | –0.2516 | –0.2938 | –0.5285 |
| Info. technology | –0.1069 | –0.0199 | 0.2513 | 0.1567 | 0.0975 | 0.0289 |
| Construction | 0.1836 | –0.9877 | –1.1700 | –1.0836 | **–0.9419*** | –1.0509 |
| Discretionary consumer staples | **0.8943***** | –0.0621 | –0.2922 | 0.2137 | 0.1115 | 0.0448 |
| Healthcare | **–0.3317**** | 0.2435 | 0.0848 | –0.0572 | 0.0048 | 0.0745 |
| Industrials | **0.4719**** | –0.0863 | 0.3314 | 0.3959 | 0.3440 | 0.2107 |
| Materials | **0.6852*** | 0.7282 | 0.8965 | **1.1708*** | **0.9661**** | 1.2694 |
| Metal/mining | **–0.4340**** | –0.0309 | –0.3084 | **–0.5610*** | –0.3773 | –0.3387 |
| Real estate | –0.1704 | 0.1658 | **0.9117**** | **0.6142*** | 0.5083 | 0.2418 |
| Telecom | –0.0388 | –0.0963 | –0.0808 | –0.0573 | –0.0208 | –0.2435 |
| Utilities | 0.1552 | 0.4516 | 0.3429 | 0.1905 | 0.2179 | 0.4282 |
| Sum of coefficients | 1.675 | 0.474 | 0.708 | 1.046 | 0.824 | 0.536 |
| Constant $\alpha$ | –0.00015 | **0.0246*** | **0.0188*** | 0.0112 | **0.0172**** | **0.0229*** |
| $F$-statistic | **8.009** | 2.029 | 1.616 | 1.801 | **2.353** | 0.999 |
| Prob > $F$ | **0.0012** | 0.1336 | 0.2260 | 0.1779 | **0.0906** | 0.5110 |
| $R^2$ | 91.24% | 72.51% | 67.76% | 70.08% | 75.36% | 56.50% |

Note: The values presented in the table are coefficient estimates. Significance is indicated as follows:

* 10 percent
** 5 percent
*** 1 percent

Potential enhancement to the frontier is indicated in two ways:

1. Significant intercept estimates correspond to a positive expected return for the "zero-beta" portfolio in the tests.
2. Sub-index coefficients totalling values other than 1 indicate difficulty in spanning.

"bird-in-hand" and liquidity benefits of income trusts. The mathematical method reports the result of an absence of arbitrage argument that investors should be indifferent to all securities of a given risk providing similar returns over time, those spanned by the existing market. This result captures neither the practical aspects of investing with limited capital in the presence of transaction costs nor the difference between paper returns and cash payouts. In order for an average retail investor to mimic the frequent, small, cash distributions offered by the affordable income trust units,[27] significant charges would be levied when buying and selling the securities that follow the TSX sub-indexes. This dimension of the problem cannot be satisfactorily covered by risk-return analysis. Thus, the results of this study simply demonstrate that the tax savings and related cost of capital benefits provide no greater return at a specified level of risk.

## CONCLUSION

Income trusts have been found to be less volatile than comparable firms trading as stocks. Within the income trust market, those structured as royalty trusts are less volatile than investment trusts. Although some order arises in the risk profiles of the major industry classes of trusts, separation of volatility by sector classification alone is not possible, owing to dispersion of data from the REIT sector. Multivariate regression results do indicate, however, that investors may reduce risk by investing primarily in the utility or oil and gas sectors. Thus, a conventional oil and gas royalty trust may provide a secure investment. We find that the total return for income trust investments is not extraordinary; it is expected to be above that received from low-risk, fixed-income securities, as indicated by the positive non-normal portfolio performance measures, and below that returned by a riskier stock portfolio.

The study demonstrates that income trusts do exhibit lower volatilities than equities on the major stock exchanges in similar businesses. This aspect of unit returns is seldom reported with respect to the security class, though it does hold value in a risk-averse investment community. The study did not find substantially greater risk associated with unsuitable candidates in the sector, and as illustrated by the performance measures and spanning tests, the valuation of income trusts in the market corresponds well to a similar set of securities and to the composite sub-indexes. In this respect, a pricing bubble related solely to the trust sector is unlikely. Specific to the income trust market segment, the industry type, trust structure, and size of the distribution are found to influence the risk of the investment.

The risk-return performance ratios of income trusts are no different from those of the matched set of firms, as expected in an efficient market. From a practical standpoint, however, a more risk-averse clientele in the market may consider the potential for immediate, moderate returns at lower volatilities as an attractive investment

27 Although the annual returns on investment may surpass 10 percent in some sectors, most income trusts pay monthly distributions at less than 1 percent of their unit prices, which generally debut at less than $20.

alternative. Although empirical spanning tests indicate that the return provided by such an investment strategy is replicated at similar risk by a suitable combination of the TSX sub-indexes, the analysis cannot capture the fact that income trust returns are heavily weighted toward cash distributions, which would otherwise be expensive to replicate. Thus, trust units may fulfill an investment need without completing the market.

## APPENDIX 1 HISTORICAL RETURN VOLATILITY ESTIMATION[28]

The volatility estimates in the study are associated with the total return of income trusts and, where applicable, the matched sample. Price and dividend/distribution data are collected directly from Datastream, with distributions recorded on the ex-distribution date. Pre-tax returns are defined as the logarithmic change in daily values and are calculated on most days as the change in daily prices as indicated in equation 5.

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right), \tag{5}$$

where

$r_t$ is the calculated return for time period $t$, and

$P_t$ is the price of the unit or share at time period $t$.

On each ex-distribution date, the calculation will include the value of the distribution in addition to the price, as indicated in equation 5D.

$$r_t = \ln\left(\frac{P_t + D_t}{P_{t-1}}\right), \tag{5D}$$

where

$r_t$ is the calculated return for time period $t$,

$P_t$ is the price of the unit or share at time period $t$, and

$D_t$ is the distribution for the unit or share dividend at time period $t$.

Historical volatility is defined as annualized standard deviation, which arises from the annual number of trading days and daily standard deviation, calculated on the daily return data, as expressed in equation 6.

$$\sigma = \sqrt{252} \cdot s_t = \sqrt{252} \cdot \sqrt{\sum_{t=1}^{T} \frac{\left(r_t - \overline{r}\right)^2}{T-1}}, \tag{6}$$

28 See John C. Hull, *Options, Futures, and Other Derivatives*, 5th ed. (Upper Saddle River, NJ: Prentice Hall, 2002), 239-41.

where

$\sigma$ is the defined volatility for a year comprising 252 trading days,

$s_t$ is the daily standard deviation,

$r_t$ is the calculated return for time period $t$,

$\bar{r}$ is the average return over the period $T$, and

$T$ is the total number of days over which returns and volatilities are calculated.

Where after-tax returns are considered at the fully taxed personal level, the breakdown of the distributions must be determined for each income trust, and corresponding portions are reduced accordingly. Data for the tax treatment of the distributions are gathered from the Canada Revenue Agency T3, R16 tax filings for 2005. "Other income" is fully taxed, dividend income is taxed with a tax credit applied to the grossed-up amount, and return of capital is added to capital gains and taxed at half the marginal tax rate. A small amount of foreign income is also returned by some trusts, with the tax owing on this amount included in the distribution.

To provide comparable information on the after-tax total returns as that provided above, the daily price data should be unaffected, since the capital gains portion is not recognized until sale of the unit occurs. Equation 5 still accounts for days when distributions are not received. On ex-distribution dates, the after-tax amounts are calculated and then corrected upward by the capital gains adjustment as indicated in equation 5T.

$$r_t = \ln\left(\frac{P_t + D_t\left[\dfrac{i\tau + d(1-(1+g)(\tau-\delta)) + c(1-0.5\tau) + f}{1-0.5\tau}\right]}{P_{t-1}}\right), \qquad (5T)$$

where

$r_t$ is the calculated return for time period $t$,

$P_t$ is the price of the unit or share at time period $t$,

$D_t$ is the distribution for the unit at time period $t$,

$\tau$ is the marginal tax rate of a fully taxed Canadian investor, set at 46 percent,

$i$ is the other income portion of the distribution,

$d$ is the dividend portion of the distribution,

$g$ is the dividend gross-up amount, set at 35 percent (an average amount in this period),

$\delta$ is the dividend tax credit, set at 18.47 percent (the combined Ontario prevailing rate),

$c$ is the return of capital/capital gain portion of the distribution, and

$f$ is the after-tax foreign income portion of the distribution.

For the matched set of firms, 111 pay regular dividends and these are adjusted into after-tax amounts in a similar fashion, as indicated in equation 5M.

$$r_t = \ln\left(\frac{P_t + D_t\left[\frac{1-(1+g)(\tau-\delta)}{1-0.5\tau}\right]}{P_{t-1}}\right), \tag{5M}$$

where

$r_t$ is the calculated return for time period $t$,

$P_t$ is the price of the unit or share at time period $t$,

$D_t$ is the share dividend at time period $t$,

$\tau$ is the marginal tax rate of a fully taxed Canadian investor, set at 46 percent,

$g$ is the dividend gross-up amount, set at 35 percent, and

$\delta$ is the dividend tax credit, set at 18.47 percent.

Historical volatility is defined for both samples as before in equation 6.

## APPENDIX 2 MEAN-VARIANCE SPANNING TEST[29]

The method assumes that the multivariate linear model in equation 7 below can be used to relate the matrix of returns of $N$ portfolios, $r_N$, to the returns of $k$ spanning portfolios, $R_k$. If complete spanning is the case, then the vector of intercepts will be a zero vector, $\alpha = \underline{0}$, and the vector of the sums of the coefficients from each equation should be the identity vector, $\Sigma B = \underline{1}$, where each vector has $N$ elements. The constrained system of equations can be solved for these two criteria in an iterative fashion or through use of Zellner's seemingly unrelated regression model.[30] Significance of the overall result is then tested using an $F$-test constructed to compare the residual variation of the model where the spanning hypothesis does not hold with the case where the market in $k$ securities is complete, the constrained model. The test results reported here are based on construction of equally weighted portfolios of the income trust securities, and no risk-free asset is considered in adjustment of the unit returns or to adjust the degrees of freedom in the spanning test.

$$r_N = \alpha + BR_k + \varepsilon, \tag{7}$$

29 See supra note 15.

30 See Michael R. Gibbons, "Multivariate Tests of Financial Models: A New Approach" (1982) vol. 10, no. 1 *Journal of Financial Economics* 3-27.

where

$r_N$ is the matrix of time series returns across the four industrial classifications or two trust structures,

$\alpha$ is the $k$-vector of intercepts,

$B$ is the $k \times N$ matrix of regression coefficients,

$R_k$ is the matrix of time series returns for the 13 TSX sub-indexes, and

$\varepsilon$ is the N-vector of error terms.