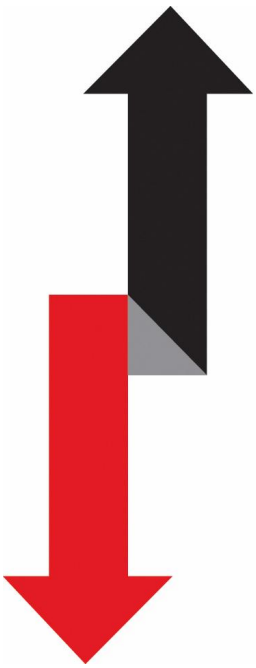

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The Equity Risk Premium Puzzle: A Resolution - The Case for Real Estate

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The Equity Risk Premium Puzzle: A Resolution – The Case for Real Estate*

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Abstract

This paper examines and estimates the equity risk premium for securitized real estate (U.S. Real Estate Investment Trusts-REITs). By introducing stochastic taxes for equity REITs shareholders, the analysis demonstrates that the current expected after-tax risk premium for REITs generate a reasonable coefficient of relative risk aversion. Employing a range of plausible stochastic tax burdens, the REITs shareholders' coefficient of relative risk aversion is likely to fall within the interval from 4.3 to 6.3, a value significantly lower than those reported in most of the prior studies for the general stock market.

Keywords: Equity premium, REITs, Risk aversion, Stochastic Tax

JEL Classification: G1; G2

I. Introduction

The equity premium puzzle was first identified by Mehra and Prescott (1985) using historical data for the stock market portfolio $\beta = 1$. Utilizing the traditional CCAPM, with an expected equity premium of 6% for the S&P 500, a commonly used value and estimated by Mehra (2003) using average historical stock returns, yields a coefficient of relative risk aversion of roughly 50. This unbelievably high value for the coefficient of relative risk aversion constitutes the so called "equity premium puzzle". Put somewhat differently, the "risk-adjusted" stock market rate of return is too high for the perceived measured risks associated with stock market investments.

There have been many attempts to resolve the stock market equity risk premium puzzle.[1] Fama and French (2002) have charted one of the most promising ways to resolve the stock equity risk premium puzzle. They observe that historical stock market trends will significantly overestimate the

[1]For a review article on the equity premium puzzle see DeLong, J.B., Magin, K., 2009. The U.S. Equity Return Premium: Past, Present, and Future, Journal of Economic Perspectives 23:1 (Winter), pp. 193-208, for example.

expected equity premium in stocks because there were significantly large unexpected capital gains during 1951-2000. They indicate that the application of the dividend growth model engenders an estimate that is superior to the traditional methods of simply using historical averages. The Fama and French estimate for stock returns generates a standard error that is less than one third the standard error derived from average stock returns. Using the average return estimation, the Sharpe ratio for the period of 1872-1950 was only half that for 1951-2000, while the Sharpe ratio estimated from the dividend growth model is similar for both periods.

The Fama and French estimate of the expected stocks returns, is, unfortunately, not sufficient to resolve the equity premium puzzle. Magin (2009) demonstrates that the coefficient of relative risk aversion as implied by the expected equity premium of 2.55% (obtained by Fama and French (2002), using the dividend growth model) is still very high: 20.40. Magin (2009), by adding a stochastic tax variable τ_t imposed on stock wealth holdings, finds that for an average investor, who realizes short-term and long-term gains in accordance with historical patterns, the coefficient of relative risk aversion is 3.76. Since earlier studies suggest that a coefficient of relative risk aversion

between 2 and 4 would seem reasonable, the Magin estimate for, $a = 3.76$ "resolves" the equity premium puzzle.

Surprisingly, the risk premium puzzle for asset classes other than stocks has been largely unexplored. An exception to this has been Shilling (2003), who examined the equity risk premium for real estate. In his study, he utilizes NCREIF[2] data and the Korpaz Real Estate Surveys[3]. The NCREIF data is based upon actual ex-post data provided by institutional investors, and is based principally on appraisals. The Korpaz data is expectational data from surveys. The risk premium calculated by these two methods differs significantly with the historical NCREIF data producing a real estate risk premium significantly lower than the survey data. This, gap, at least in part, may be explained by the unexpected capital losses that occurred in the real estate markets during 1988-2002.

The Shilling analyses may be hampered by his data sets. First, the NCREIF data is based upon appraisals, which are alleged to have significant smoothing biases. Second, survey data is also well known to have intrinsic

[2]The National Council for Real Estate Investment Fiduciaries (NCREIF) collects real estate value and return data for institutional investment grade commercial real estate.

[3]A Survey of large commercial real estate investors in the United States.

problems.

We develop an alternative method for calculating the real estate risk premium. Our tact is to utilize transactions data based upon securitized traded real estate markets, REITs. We use the Fama and French estimate for the before-tax risk premium for the S&P 500 to produce a before-tax estimate for REITs (the real estate) risk premium. Moreover, REITs holders like regular stock holders are subject to a stochastic tax imposed on the wealth from REITs holdings. This tax emanates from the short-term and long-term capital gains taxes and dividend taxes. It is, therefore, appropriate to discuss after-tax not before-tax risk premiums. However, since REITs are very special investment vehicles, it is not trivial to determine the actual tax burden on REITs shareholders vis-à-vis general stock shareholders. REITs are not subject to taxation at the corporate level, but are obligated to distribute at least 90% of net income to shareholders in the form of dividends. Since REITs dividends, a substantial part of the overall before-tax return from REITs, are taxed as ordinary income, one might expect that investors attracted to REITs may have below average ordinary income tax rates. To address this issue, we shall modify the traditional way of determining the actual tax bur-

den on stocks developed by Sialm (2008). We shall use NAREIT data and allow the actual ordinary income tax rates for REITs holders to vary from 25% to 100% of the general stock market shareholders. We obtain the after-tax estimate of the expected real estate risk premium and use it to determine the "true" coefficient of relative risk aversion for investors in REITs.

We find that the investors in REITs are likely to have below average ordinary income tax rates and have a taste for current cash flow, and are more risk averse than investors in the S&P 500 (market) portfolio. We find that for reasonable levels of tax burdens the coefficient of relative risk aversion for REITs investors varies from 4.3157 to 6.2904, thus "resolving" the real estate equity risk premium puzzle.

The remainder of the paper is organized as follows. Section II develops estimates for the tax yield for REITs. Section III derives after-tax expected risk premiums for REITs and the coefficient of relative risk aversion for REITs shareholders. Section IV concludes.

II. Calculating the Tax Yield for REITs

Sialm (2008) estimates the tax yield for S&P 500 stocks to be:

$$TY_{kt+1} = \frac{\tau^d_{t+1} d_{mt+1} + \tau^{SCG}_{t+1} SCG_{mt+1} + \tau^{LCG}_{t+1} LCG_{mt+1}}{p_{mt}} =$$

$$\tau^d_{mt+1} \cdot 0.045 + \tau^{SCG}_{t+1} \cdot 0.001 + \tau^{LCG}_{t+1} \cdot 0.018,$$

where p_{mt} is the price per share of the S&P 500 (market) portfolio,

d_{mt+1} is the dividend per share of the S&P 500 (market) portfolio,

τ^d_{mt+1} is the effective dividend tax for the S&P 500 (market) portfolio,

τ^{SCG}_{t+1} is the tax on short-term capital gains,

τ^{LCG}_{t+1} is the tax on long-term capital gains,

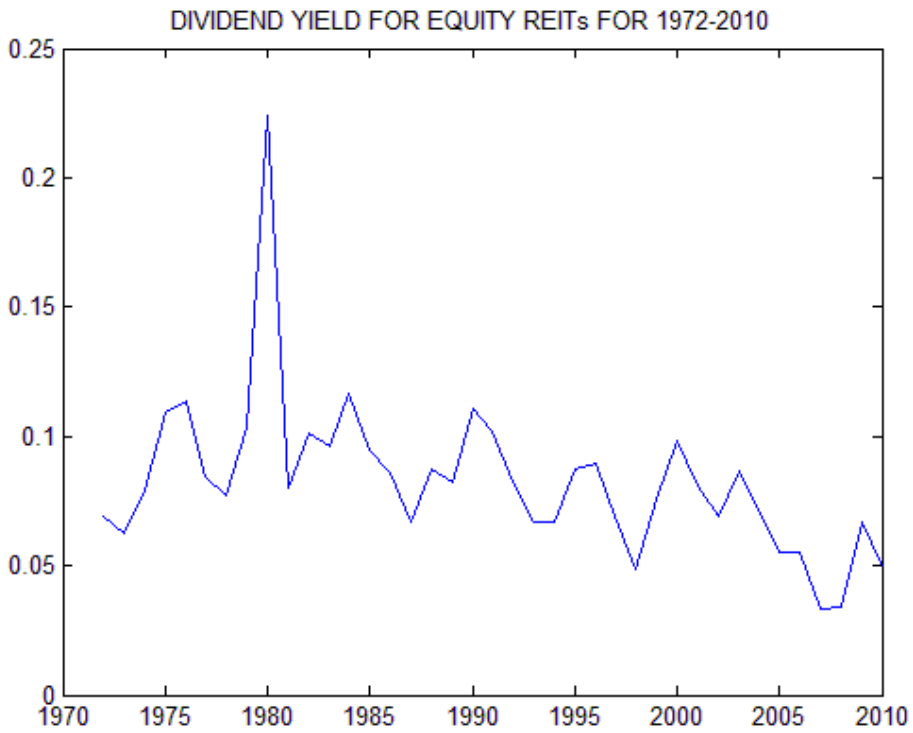
SCG_{t+1} are realized short-term capital gains,

LCG_{t+1} are realized long-term capital gains.

So, $\frac{d_{mt+1}}{p_{mt}} = 0.045$, $\frac{SCG_{t+1}}{p_t} = 0.001$ and $\frac{LCG_{t+1}}{p_t} = 0.018$.

Since REITs are publicly traded on the same exchanges and in exactly the same fashion as publicly traded stocks (some REITs are even included

in the S&P 500), it is reasonable to assume that τ_{t+1}^{SCG}, τ_{t+1}^{LCG}, $\frac{SCG_{t+1}}{p_t}$ and $\frac{LCG_{t+1}}{p_t}$ are likely to be similar for S&P 500 stocks and REITs. However, this is unlikely to be true about the dividend yields, since unlike the rest of the publicly traded companies, REITs are obligated to distribute at least 90% of net income to their shareholders in the form of dividends. Indeed, using FTSE NAREIT US Equity REITs Index for 1972-2010 as a benchmark for US REITs performance, the average dividend yield for REITs is almost twice that of the average dividend yield for S&P 500 stocks: 0.08 vs. 0.045. See Figure 1 below.


DIVIDEND YIELD FOR EQUITY REITs FOR 1972-2010
0.25
0.2
0.15
0.1
0.05
0
1970
1975
1980
1985
1990
1995
2000
2005
2010

Since REITs distribute at least 90% of net income to shareholders in the form of dividends, REITs dividends constitute a significant part of the overall before-tax return from REITs. Therefore, since REITs dividends are taxed as ordinary income, it is natural to expect that the typical investor in REITs may have below average ordinary income tax rates. Many institutional investors, such as insurance companies or pension funds, are, in fact, tax exempt, and may be attracted to REITs. Hence, the average tax rate that has been suggested for the S&P, in general, may not be appropriate for REITs investors. To address this issue, we shall follow the methodology proposed in the Poterba (2002) review article in order to estimate the average effective dividend tax rate $\tau^{d}_{re\ t+1}$ for REITs holders:

$$\tau^{d}_{re\ t+1} = \tau^{LCG}_{t+1} + \frac{r_{re\ t+1}[1-\tau^{LCG}_{t+1}]-\rho}{\frac{d_{re\ t+1}}{p_{re\ t}}}, \bigstar$$

where ρ is the required after-tax rate of return for an equity REITs portfolio,

$r_{re\ t+1}$ is before-tax rate of return for an equity REITs portfolio,

$p_{re\ t}$ is the price per share of an equity REITs portfolio,

$d_{re\ t+1}$ is the dividend per share of an equity REITs portfolio.

The before-tax rate of return, the dividend yield and the long-term capital gains tax for FTSE NAREIT US Equity REITs Index appear to be stable around 0.110, 0.080 and 0.196, respectively, for the period of 1972-2010.[4] We set $r_{re\ t+1} = 0.110$, $\frac{d_{re\ t+1}}{p_{re\ t}} = 0.080$ and $\tau^{LCG}_{t+1} = 0.196$. We then perform the computations for ρ between 0.01 and 0.05. This range for ρ is not arbitrary. Indeed, the average risk-free rate is 0.01. At the same time, Magin (2009) calculates the average after-tax rate of return for the S&P 500 ($\beta = 1$) portfolio to be roughly 0.05. Therefore, it is realistic to expect the average required after-tax rate of return for REITs ($\beta = 0.5$) portfolio to be somewhere between 0.01 and 0.05. Thus, we obtain using ★ that

$$E[\tau^{d}_{re\ t+1}] = E[\tau^{LCG}_{t+1} + \frac{r_{re\ t+1}[1-\tau^{LCG}_{t+1}]-\rho}{\frac{d_{re\ t+1}}{p_{re\ t}}}] = E[0.196 + \frac{0.110 \cdot [1-0.196]-\rho}{0.08}] = 0.0178.$$

This value seems sensible because only about 20% of equity REITs shares are held in taxable accounts. Moreover, when stock dividends are taxed, they are on average taxed at the ordinary income tax rate of about 20%.[5]

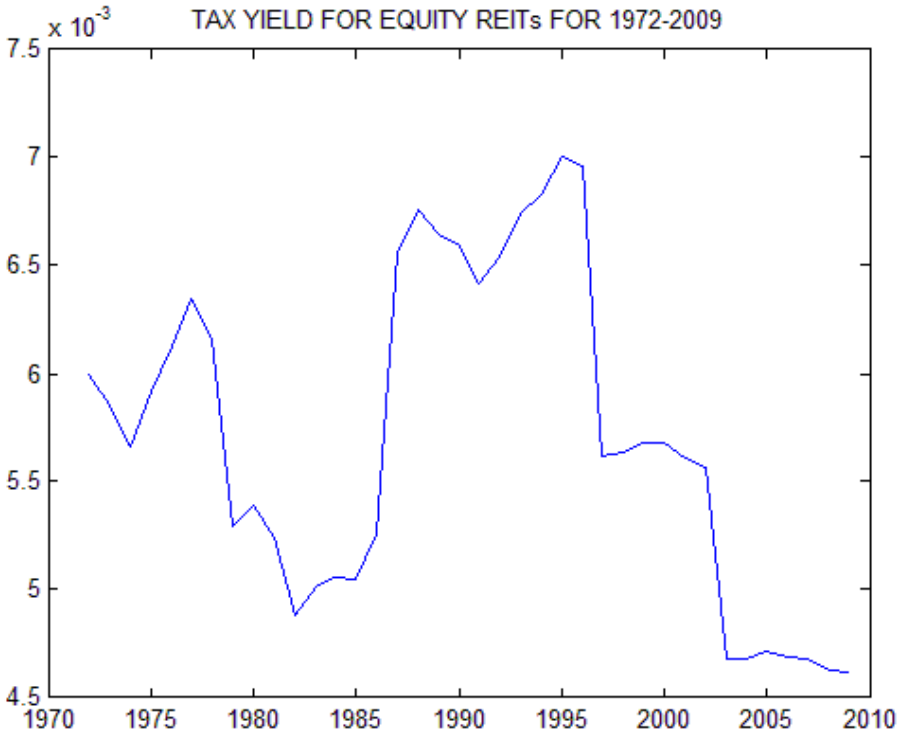
[4] We use the long-term capital gains tax rate τ^{LCG}_{t+1} in our calculations not the short-term capital gains tax rate τ^{SCG}_{t+1}, since according to Sialm (2008) the realized short-term capital gains are very close to 0.

[5] See Samwick (2000)

Therefore, if investors in REITs were subject to average ordinary income tax rates, the effective dividend tax rate would be about 4%. It is reasonable to expect that the typical investor in REITs, who has below average ordinary income tax rates, pays an effective dividend tax of less than half of what an investor in general stocks would pay. We will therefore estimate the tax yield for equity REITs for 1971-2009 as

$$TY_{re\ t+1} = 0.0178 \cdot 0.08 + \tau_{t+1}^{SCG} \cdot 0.001 + \tau_{t+1}^{LCG} \cdot 0.018.$$

We obtain the mean tax yield for equity REITs, $E\left[TY_{re\ t+1}\right] = 0.0057$. See Figure 2 below.


TAX YIELD FOR EQUITY REITs FOR 1972-2009
x 10^-3
7.5
7
6.5
6
5.5
5
4.5
1970
1975
1980
1985
1990
1995
2000
2005
2010

III. Estimating After-tax Expected Risk Premiums and the Coefficient of Relative Risk Aversion for REITs Holders

The traditional CCAPM without insecure property rights, and assuming a current expected rate of return for REITs of 13.7464% calculated using average stock return, yields a coefficient of risk aversion for REITs holders

$$a = \frac{\ln(E[R_{ret+1}]) - \ln(R_f)}{COV\left[\ln(R_{ret+1}),\ \ln\left(\frac{C_{t+1}}{C_t}\right)\right]} =$$

$$= \frac{0.137464 - 0.04}{0.00125} = 77.97.$$

Let us first estimate a using the dividend growth model and no taxes. The Fama and French (2002) dividend growth model estimate for the expected before-tax risk premium for the S&P 500 is 2.55%. Since $\beta_{RERTS} = 0.5$ we can conclude that

$$\overbrace{E\left[R_{ret+1}\right] - R_f}^{0.5 \cdot 0.0255} = \overbrace{\beta_{RERTS}}^{0.5} \left(\overbrace{E\left[R_{mt+1}\right] - R_f}^{0.0255} \right) = 0.0127.$$

We obtain that for an average investor the coefficient of risk aversion is

$$a = \frac{\overbrace{\ln\left(E\left[R_{mt+1}\right]\right) - \ln\left(R_f\right)}^{0.5 \cdot 0.0255}}{\underbrace{COV\left[\ln(R_{mt+1}),\ \ln\left(\frac{C_{t+1}}{C_t}\right)\right]}_{0.00125}} =$$

$$= \frac{0.0127}{0.00125} = 10.16.$$

Let us now also add taxes. The introduction of a stochastic tax $\tau_{re\ t+1}$ imposed on the wealth from equity REITs holdings creates a new term $E\left[\tau_{re\ t+1}\right] \approx -\ln\left(E\left[1-\tau_{re\ t+1}\right]\right)$, reducing a further:

$$a = \frac{\ln(E[R_{ret+1}]) - \ln(R_f) + \ln(E[1-\tau_{re\ t+1}]) + COV\left[\ln(R_{ret+1}),\ \ln(1-\tau_{re\ t+1})\right]}{COV\left[\ln(R_{ret+1}),\ \ln\left(\frac{C_{t+1}}{C_t}\right)\right] + COV\left[\ln(1-\tau_{re\ t+1}),\ \ln\left(\frac{C_{t+1}}{C_t}\right)\right]} =$$

$$= \frac{0.5 \cdot 0.0255 - 0.0057 + 0.0002}{0.00125 + 0.0000} = 5.8000.$$

Let us conduct a new experiment. As we previously established, if investor in REITs were subject to average ordinary income tax rates, the effective dividend tax rate for REITs holders would be about 0.04. However, since the investors in REITs are likely to have lower than average ordinary income tax rates, we allow the actual ordinary income tax rates for REITs shareholders to vary from 25% to 100% of regular stock holders. See Table 1 below.

Table 1

Numerical Simulations

Effective Dividend Tax	Expected Tax Yield	After-tax Risk Premium	After-tax Volatility	Coefficient of Relative Risk Aversion
0.04	0.0076	0.0051	0.2518	4.3157
0.03	0.0067	0.0060	0.2963	4.9206
0.02	0.0059	0.0068	0.3358	5.6055
0.01	0.0050	0.0077	0.3826	6.2904

Our findings suggest that the investors in REITs, an investment vehicle considered to be less volatile than most equity stock alternatives, who may have lower than average ordinary income tax rates and have a taste for current cash flow, appear to be, not surprisingly, more risk averse than investor in S&P 500 (market) portfolio.

IV. Conclusion

The equity risk premium puzzle was first stated by Mehra and Prescott (1985) in the context of the stock market portfolio. Surprisingly, the issue of the puzzle with respect to other asset classes went largely unexplored. This paper addresses and resolves the real estate equity risk premium puzzle by introducing a stochastic tax on the wealth of equity REITs holders. We then estimate the expected after-tax commercial real estate risk premium to obtain the "true" coefficient of relative risk aversion for investors in REITs.

REITs are special investment vehicles, not subject to taxation at the corporate level, but obligated to distribute at least 90% of net income to shareholders in the form of dividends. Our major findings indicate that the

investors in REITs, an investment vehicle considered to be less volatile than most stock equity alternatives, are likely to have lower than average ordinary income tax rates, have a taste for current cash flow, and are more risk averse than investor in the S&P 500 (market) portfolio. We find that for reasonable levels of tax burdens on REITs shareholders the coefficient of relative risk aversion for REITs investors varies from 4.3157 to 6.2904, thus resolving the real estate equity risk premium puzzle.

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