An investigation of "true" Talmudic investing

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ABSTRACT

This study examines an application of the Talmudic principal that a person should invest 1/3 of his wealth in real estate, 1/3 in business and hold 1/3 on hand using REITs, stock market indices, and U.S. Treasury securities. This Talmudic "1/3-1/3-/13" recommendation has been extensively sited in the naïve investing literature but had not yet been explicitly examined. Consistent with the finding of other naïve strategies, the results indicate that in some instances the Talmudic allocation can outperform its minimum variance counterpart, although this occurrence is rare.

Keywords: Naïve Investing, Talmud, Behavioral Finance

INTRODUCTION

Several investment allocation studys[1] in recent years have tangentially mentioned the Talmudic passage that "it is advisable for one that he should divide his money in three parts, one of which he shall invest in real estate, one of which in business, and the third part to remain always in his hands,[2]" when evaluating the naïve investment strategy commonly referred to as the use of the "1/N rule". Tu and Zhou (2009) and Levy and Duchin (2009) even go so far as to reference the Talmud in their study's title, "Markowitz meets Talmud: A combination of sophisticated and naive diversification strategies"- yet an extensive review of the literature did not reveal a single instance examining the effect of following this passage explicitly: forming a portfolio in thirds using real estate, business, and cash. This study will construct a variety of portfolios based on this principle to evaluate the benefit of "true" Talmudic investing.

The Talmud is the compendium of Jewish law which was complied between the 3rd and 5th centuries[3]. It is comprised of two parts the Mishna and the Gemara. Orthodox Jews believe that Mishna was passed down from God to Moses at Mount Sinai. The Maharsha, a 17th century commentator on the Talmud, explained the financial logic of the 1/3 strategy by claiming it provided an optimal mix of returns since land is "safe" and can't lose all its value, thus offering a low return but sustainable; while business offers a higher return due to its higher risk and, cash on hand provides liquidity for unexpected expenses. It is likely that the Talmud has captured the attention of researchers because it provides one of the earliest known pieces of investment advice.

The Talmud's advice may run contrary to the portfolio theory as advanced by Markowitz (1952) which states that an investor should select the portfolio allocation that maximizes the expected return for a given level of tolerable risk. The rub between the two approaches lies in the fact that portfolio theory focuses on the creation of the portfolio as a whole and thus bases its asset selection on the covariance between the assets returns rather than on the attributes of the assets themselves. Proponents of portfolio theory generally refer to the Talmud's suggestion as naïve diversification or the "1/N rule" where N is the number of assets in the portfolio. They note that this strategy may be suboptimal because it doesn't take the assets' covariances into account, and thus, may inadvertently lead an investor to increase the risk of their portfolio beyond their tolerable limit or to sacrifice potential returns.

LITERATURE REVIEW

Do people really invest this way?

The use of naïve diversification is so pervasive on American society it even influences children's Halloween candy selections! One stormy Halloween[4] night in 1993, Read and Lowenstein (1995) found that trick-or-treaters offered two candy bars at one house tended to

[1] Fisher and Statman (1997); Benartzi and Thaler (2001); Huberman and Jiang (2006); Tu and Zhou (2009)

[2] Tract Baba Metzia, Mishna VIII's Gemara

[3] "Talmud and Midrash (Judaism) :The making of the Talmuds: 3rd-6th century". Encyclopædia Britannica. 2008

[4] To the best of my knowledge, this study has not been replicated on Purim.

choose two different types, while those who were offered one candy bar at two neighboring houses tended to choose the same type both times. Their results indicate that people tend to diversify when choices are made simultaneously (as in the selection of a portfolio) but not when they are made sequentially. This phenomenon is also found in more "traditional" investing venues. Based on experimental survey data, Benartzi and Thakler (2001) find that their subject's proportionate investment in stocks or bonds was highly correlated with the number of stock and bond choices. Similarly, using on a sample of 600 401(k) plans Huberman and Jiang (2006) find that investors tended to allocate their contributions evenly across the funds used but that this effect diminished as the number of finds used increased. Also, they noted that most investors used 3 or 4 funds (plans in sample offered between 4 and 59).

But isn't naïve diversification bad?

Despite its name, we have known for years that naïve diversification is not necessarily a "bad" thing. In fact, as early as 1980 Jobson and Korkiwe noted that, "naïve diversification rules such as the equal weight rule can outperform the Markowitz rule." The reason for this arises from the fact that while portfolio theory works great on paper, it is not so perfect in the real world! In order to measure the potential loss of the "1/N rule" relative to the mean-variance efficient portfolio Levy and Duchin (2009) consider three scenarios: full, zero and partial information. With full information the investors know the return distribution of each asset currently and in the future. Under this scenario, the mean-variance allocations will outperform the 1/N allocations because the former will always maximize return relative to risk by its construction. With zero information the 1/N allocation is presumably optimal because neither the current or future distributions of returns are known; thus mean-variance theory has no way of suggesting an allocation! With partial information, the most realistic case, mean-variance allocations formed based on the current return distribution will not necessarily outperform 1/N allocations because the return distribution in the future is subject to change. If the distribution remains relatively constant mean-variance allocations will likely fair well; however, as the variability of future returns increases so does the validity of the use of the "1/N rule".

Using monthly value weighted returns on Fama and French industry portfolios between 1/96 and 5/07, Levy and Duchin (2009) measure the vertical distance between mean-variance optimal portfolios and 1/N portfolios for varying Ns holding the standard deviation of returns constant. This allows them to compare the performance of each portfolio holding risk constant. They find that use of the "1/N rule" induced a gain out-of-sample vs. the mean-variance portfolios with small Ns when short sales are not allowed.

The use of the "1/N rule" by individual investors is further supported by DeMiguel, Garlappi and Uppal (2007). They compare the 1/N rule ex-ante with a variety of alternate portfolio selection techniques and find that, "the estimation window needed for the sample-based mean-variance strategy and its extensions to outperform the 1/N benchmark is around 3,000 months for a portfolio with 25 assets and about 6,000 months for a portfolio with 50 assets."

DATA

In order to examine the benefits of "true" Talmudic investing one must form portfolios which allocate 1/3 to "real estate", 1/3 to "business" and 1/3 "on hand." Four real estate investment trust (REIT) indices were selected for the real estate segment. REITs are corporations which invest in real estate[5] either through purchasing properties outright or though mortgage financing. The properties they hold or finance can be residential, commercial or a mix there of.

[5] By law 75% of their gross income must come from real estate related activities

Shares of REITs are publicly traded on every major stock exchange. The advantage of using REITs is that they allow investors to diversify their real estate investment across geographic locations thus illuminating any geographic bias in the asset selection, and focusing on indices one captures the performance of the market as a whole. The data was downloaded from Yahoo finance on a monthly non-seasonally adjusted basis. The REIT indices chosen and their descriptions are as follows:

i. Dow Jones Equity All REIT Index (REI)
   - This index includes publicly traded companies in the Dow Jones Indexes U.S. stock universe that have elected to be taxed as REITs and are classified as equity REITs which indicates that they primarily own and operate income producing properties.

ii. MSCI US REIT Index (RMZ)
   - The MSCI US REIT Index consists of equity REITs that are included in the MSCI US Investable Market 2500 Index, except for specialty equity REITs that do not generate a majority of their revenue and income from real estate rental and leasing operations.

iii. TAREX
   - This fund in equity securities, including common stocks and convertible securities, of real estate and real estate-related companies, or in companies which own significant real estate assets at the time of investment.

iv. ARIIX
   - This fund invests in the equity securities of US and international REITS and as real estate operating companies.

The business portion of the portfolio is examined based on 3 common market stock indices. The data was downloaded from Yahoo finance on a monthly non-price adjusted basis. Their names and descriptions appear below:

i. Dow Jones Industrial Average (DJIA)
   - The "Dow" a price-weighted average of 30 stocks traded on the New York Stock Exchange and the NASDAQ. It tracks the performance of the "blue chip" segment of the market.

ii. Russell 2000 Index
   - The Russell 2000 includes approximately 2,000 of the smallest securities based on a combination of their market cap and current index membership. It tracks the performance of the small cap market.

iii. S&P 500
   - The S&P 500 index consists of stocks of 500 companies in the U.S. economy; it captures 75% of all U.S. equities. It tracks the performance of the market as a whole.

The "on hand" portion of the portfolio is proxied using 1, 3 and 6 month U.S. Treasury bills. U.S. treasury bills are often used to proxy for the "risk free" asset because they are backed by the full faith and credit of the United States government. The data was downloaded from Fred as the secondary market rate for each asset on a non-seasonally adjusted basis.

Thirty-six portfolios were formed utilizing 1/3 combinations of these four REITs, three market indices and three treasuries. The sample data size is restricted based on the availability of

data. While a long history of data is available on the "business" side the "on hand" and "real estate" sections posed an issue. The US treasury did not begin using 1 month (4 week) T-bills until 7/01 and very few REITs existed before 2000. For these reasons the data is utilized in this study is from July 2010 to October 2013. The data set is then split evenly between "in sample" (July 2001 to August 2007) and "out of sample" (September 2007 to October 2013) portions.

ANALYSIS AND RESULTS

Following Levy and Duchin (2009) the vertical distance between mean-variance portfolios formed using monthly returns and 1/3 portfolios holding the standard deviation of returns constant was measured. All analysis is performed using Microsoft Excel 2007. First, the "in sample" portion was constructed by determining the mean and standard deviation for the Talmudic portfolios by allocating 1/3 into each of the representative "on hand", "real estate" and "business" assets. Next, the minimum variance allocation was created with the constraints that it have the same standard deviation as the Talmudic portfolio and that no low short sales were allowed. In the "out of sample" portion the Talmudic portfolios formed according to the 1/3 rules were compared these to the minimum variance portfolios based on the allocations calculated in the in the "in sample" portion[6]. This facilitates the comparison of the performance of the minimum variance and Talmudic allocation strategies while holding the risk of each portfolio constant. The minimum variance portfolios outperformed the Talmudic portfolios both in and out of sample (although to a slightly lesser degree). The results are shown in Table 1. The differences in both samples were statistically significant. For the out of sample portion the t-test was run assuming equal variances since this is a constraint of the model. The results are shown in Table 2.

CONCLUSIONS

This study investigates "true" Talmudic investing following a literal interpretation of the passage "it is advisable for one that he should divide his money in three parts, one of which he shall invest in real estate, one of which in business, and the third part to remain always in his hands," where the real estate, business and "on hand" portions are proxied by a selection of REITS, market indices and short term US Treasury securities respectively. The analysis shows that these portfolios were statistically significantly outperformed by mean variance portfolios in both the in and out of sample portions. These finding suggest that while naïve diversification may have its merits, a literal application of the Talmud is not an optimal strategy. While this result is not surprising given that the advice was offered millennia ago, it is was none the less an interesting investigation given that the strategy is so often referenced yet so little investigated.

[6] The "out of sample" optimal minimum variance allocations would not be known to the investors at the time of their investment allocation selections, thus they would need to reply on the allocations recommended based only on the older data. On the other hand, the Talmudic portfolios can be updated because their allocations are based on a rule rather than an optimizing calculation.

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Table 1

In Sample Summary					Out of Sample Summary			
Portfolio	M-V return	Talmud return	Difference		Portfolio	M-V return	Talmud return	Difference
DI6	2.3985%	1.3857%	1.0128%		DI6	0.3489%	0.4024%	-0.05%
DZ6	2.4232%	1.4732%	0.9500%		DZ6	0.3339%	0.4148%	-0.08%
D13	2.3118%	1.3505%	0.9613%		D13	0.3408%	0.3771%	-0.04%
DZ3	2.3374%	1.4379%	0.8995%		DZ3	0.4262%	0.3895%	0.04%
DI1	2.2580%	1.3284%	0.9296%		DI1	0.3986%	0.3726%	0.03%
DZ1	2.2839%	1.4158%	0.8681%		DZ1	0.4190%	0.3850%	0.03%
RI6	2.5015%	1.4950%	1.0065%		RI6	0.5619%	0.4814%	0.08%
RZ6	2.5239%	1.5824%	0.9415%		RZ6	0.5619%	0.4937%	0.07%
R13	2.4084%	1.4597%	0.9487%		R13	0.5420%	0.4561%	0.09%
RZ3	2.4316%	1.5472%	0.8844%		RZ3	0.5424%	0.4684%	0.07%
RI1	2.3512%	1.4376%	0.9136%		RI1	0.5385%	0.4516%	0.09%
RZ1	2.3748%	1.5251%	0.8498%		RZ1	0.5455%	0.4639%	0.08%
SI6	2.3783%	1.3580%	1.0203%		SI6	0.4400%	0.4122%	0.03%
SZ6	2.4040%	1.4454%	0.9586%		SZ6	0.4599%	0.4245%	0.04%
S13	2.2910%	1.3227%	0.9683%		S13	0.4025%	0.3869%	0.02%
SZ3	2.3175%	1.4101%	0.9074%		SZ3	0.4218%	0.3992%	0.02%
SI1	2.2359%	1.3006%	0.9353%		SI1	0.3756%	0.3824%	-0.01%
SZ1	2.2625%	1.3880%	0.8745%		SZ1	0.4151%	0.3947%	0.02%
DT6	2.2776%	1.3323%	0.9453%		DT6	0.3277%	0.3323%	0.00%
DT3	2.1980%	1.2970%	0.9010%		DT3	0.3556%	0.3070%	0.05%
DT1	2.1493%	1.2749%	0.8745%		DT1	0.3529%	0.3025%	0.05%
DA6	2.3672%	1.2853%	1.0819%		DA6	0.3579%	0.2096%	0.15%
DA3	2.1928%	1.2500%	0.9428%		DA3	0.3470%	0.1843%	0.16%
DA1	2.2275%	1.2279%	0.9996%		DA1	0.3450%	0.1798%	0.17%
RT6	2.3279%	1.4415%	0.8865%		RT6	0.5621%	0.4113%	0.15%
RT3	2.2442%	1.4062%	0.8380%		RT3	0.5372%	0.3860%	0.15%
RT1	2.1961%	1.3841%	0.8120%		RT1	0.5328%	0.3815%	0.15%
RA6	2.4230%	1.3945%	1.0285%		RA6	0.5622%	0.2886%	0.27%
RA3	2.3785%	1.3592%	1.0193%		RA3	0.5392%	0.2633%	0.28%
RA1	2.3230%	1.3371%	0.9859%		RA1	0.5352%	0.2588%	0.28%
ST6	2.2749%	1.3045%	0.9704%		ST6	0.4013%	0.3421%	0.06%
ST3	2.1942%	1.2692%	0.9250%		ST3	0.3839%	0.3168%	0.07%
ST1	2.1439%	1.2471%	0.8968%		ST1	0.3808%	0.3122%	0.07%
SA6	2.3452%	1.2575%	1.0878%		SA6	0.3922%	0.2194%	0.17%
SA3	2.2579%	1.2222%	1.0357%		SA3	0.3781%	0.1941%	0.18%
SA1	2.2037%	1.2001%	1.0036%		SA1	0.3756%	0.1896%	0.19%

Table 2

In Sample		
t-Test: Two-Sample Assuming Unequal Variances		
	M-V return	*Talmud return*
Mean	0.023116224	0.013653788
Variance	9.0045E-07	9.18645E-07
Observations	36	36
Hypothesized Mean Difference	0	
df	70	
t Stat	42.09461007	
P(T<=t) one-tail	9.52009E-52	
t Critical one-tail	1.66691448	
P(T<=t) two-tail	1.90402E-51	
t Critical two-tail	1.994437086	
Out of Sample		
t-Test: Two-Sample Assuming Equal Variances		
	M-V return	*Talmud return*
Mean	0.004372507	0.00350981
Variance	7.04927E-07	8.27255E-07
Observations	36	36
Pooled Variance	7.66091E-07	
Hypothesized Mean Difference	0	
df	70	
t Stat	4.18171374	
P(T<=t) one-tail	4.12437E-05	
t Critical one-tail	1.66691448	
P(T<=t) two-tail	8.24875E-05	
t Critical two-tail	1.994437086	