Maximising the Worth of the Young Accountant in Ghana, Treasury Bills or Shares?

Ernest Bruce-Twum[1]

[1] Central Business School, Central University College –Ghana

Correspondence: Ernest Bruce-Twum, Central Business School, Central University College –Ghana. P. O. Box AN 16900, Accra-North, Ghana. Tel: 233-0262-000-772. E-mail: ertwum@yahoo.com

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Abstract

Treasury bills have gained a high appeal among the Ghanaian population as a security with a high return and virtually no default risk. Stocks are of higher risk, and therefore according to finance theory should offer higher return than treasury bills. It is therefore expected that the young accountant, should be investing in stocks rather than treasury bills, to grow his /her worth faster. The paper looks at the average annual returns on investments in treasury bills and shares in Ghana within a period of fifteen years, i.e. 1991-2005; To determine whether investors who buy shares are given premiums for taking risk; Again to ascertain whether investors are adequately compensated in real terms, that is after considering inflation, and finally to ascertain which of the two investments will maximise the worth of the young accountant.

The researcher analyse nominal and real returns of both treasury bills and Shares, over the period and using statistical measure of standard deviation and co-efficient of variation for two investors, arrived at the conclusion that it is worth investing in shares as a young accountant, and better investing in treasury bills when you are 56 years and above and nearing your retirement. It was also confirmed that investors are rewarded for bearing risk. The paper also found out that both investments earn returns above inflation over the period.

Keywords: Ghana, Treasury bills, Shares, Returns, Risk and investment

1. Introduction

For most of your life, you will be earning and spending money. Rarely, though will your current income exactly balance with your consumption desires. Sometimes, you may have more money than you want to spend; at other times, you may want to purchase more than you benefit from your income (Reilly 2003).One would thus need to invest to meet some known or unforeseen circumstances in the future.

Treasury Bills have gained a high appeal among the Ghanaian population as securities with high returns and virtually no default risk (Aboagye, 2003). The establishment of the Ghana Stock Exchange (GSE) in 1990 represented a significant change in the securities markets in Ghana. There are currently 35 listed companies trading on the GSE. Shares on the GSE are traded regularly enabling listed equities to provide more liquidity than unlisted equities, since it is more difficult to dispose off unlisted shares than shares of listed companies. An asset is liquid if it can be quickly converted to cash at a price close to fair market value (Reilly2003) Treasury bills are highly liquid security.

According to finance theory "Those who bear systematic risk expect to be rewarded in the long run". It is therefore logical that the expected returns on equity investment which is riskier should attract more returns than the return on treasury bills which has virtually no default risk unless the state is destroyed.

Investors are rewarded for bearing risks. In the stock market, investors are rewarded for bearing risk with a risk premium. This risk-return trade off is so fundamental in financial economics that it could well be described as the "first fundamental law of finance." Ghysels(2004). Investors stand the chance to earn positive risk premiums. This induces them to make investments with potential gains to the whole economy. One issue that bothers investors is inflation.

In general, investors do not like rising prices because that introduces uncertainty into their lives and makes it difficult to plan for the future. Therefore, investors focus on the returns they will receive over and above the rate of inflation.

This is called the real return. The return that investors receive prior to considering the rate of inflation is called nominal returns. Economic theory holds that the real return is approximately given as the nominal return minus the rate of inflation.

Finance theory on the other hand, has it that the rate of return an investor earns is dependent on the level of risk involved in that investment. Risk refers to the chance that some unfavourable event will occur (Brigham 2001). Investment in stocks (shares) is taking high risk. This is because it is possible that the price of the stocks will drop to such an extent that you may lose all your monies invested. Again the return from stocks cannot be estimated precisely.

On the other hand, investment in treasury bills is risk free. The rate of return on treasury bills can be estimated quite precisely. That is, you are sure of exactly how much you will earn upon the maturity of the investment. Investments in stocks are relatively riskier because there is a significant danger of earning much less than the expected return. To illustrate the riskiness, suppose an investor buys GHS 10,000 of short term treasury bills with an expected return of 9%.In this case, the rate of return on the investment 9 percent, can be estimated quite precisely, and the investment is defined as being essentially risk free. However if the same amount has been invested in Stock of a company, then one could analyse and conclude that the rate of return is likely to be 20%, but the investor should recognise that the actual rate of return could range from +1000 percent to -100 percent. Because there is a significant danger of actually earning much less than the expected return, the stock would be relatively risky. Theory thus has it that no investment should be undertaken unless the expected return is high enough to compensate the investor for the perceived risk of investment. The high the probability of default, the riskier the investment; and the higher the risk, the higher the required rate of return.

Various studies have been undertaken to determine the relationship between risk and return. Merton's (1973) ICAPM suggests that the conditional expected excess return on the stock

Market should vary positively with the market's conditional variance:

$$Et\,[Rt+1] = \mu + bVart\,[Rt+1],$$

Where **b** is the coefficient of relative risk aversion of the representative agent and, according to the model, μ should be equal to zero. The expectation and the variance of the market excess return are conditional on the information available at the beginning of the return period, time **t**.

DeGennaro (1990), Stambaugh (1987), and Hentschel (1992) do find a positive albeit mostly insignificant relation between the conditional variance and the conditional expected return. In contrast, Campbell (1987) and Nelson (1991) find a significantly negative relation. The main difficulty in testing the ICAPM relation is that the conditional variance of the market is not observable and must be filtered from past returns. The conflicting findings of the above studies are mostly due to differences in the approach to modelling the conditional variance (Ghysels, 2004).

Various reasons have been given by scholars, as accounting for the demand for large return. According to Guoa(2005) although stock market volatility is positively priced, in most cases it only explains a small fraction of return variation. Expected returns are driven primarily by changes in the ability of the stock market to hedge shifts in investment opportunities. Campbell and Cochrane (1999) address changing investment opportunities in a habit formation model. In their model, when consumption approaches the habit level, the agent becomes extremely risk averse and demands a large expected return.

Literature seems to suggest that stocks provide higher returns than other investments. Common stock has provided the highest rate of return to investors in the United States (Brown, 2003). A study by R. G. Ibbotson & Associates found that, over the period 1926-96, large company common stock provided an arithmetic average annual return of 12.7 percent in USA. This compares with an average annual return of 6 percent for long-term corporate bonds, and 3.8 percent for U.S. Treasury bills (T-bills). Aboagye (2003) in studying the performance of stocks in Ghana, found out that investors in stock exchange traded shares earned on average 54% per annum, whereas treasury bill investors earned 36.3%.According to Aboagye it is worth more investing in shares than in treasury bills.

In spite of these higher returns, it appears more and more Ghanaians are so impressed with an observable high rate of returns on treasury bills, that many believe that treasury bills offer the opportunity to earn higher rewards (returns) than can be earned on other securities. Should the accountant in Ghana be obsessed with the seemingly attractive interest rate on Treasury Bills and therefore not willing to take risk, which might earn him/her a higher return in the long run?

This paper therefore takes a look at the average annual returns on investments in treasury bills and shares in Ghana within a period of fifteen years, i.e. 1991-2005; To determine whether investors who buy shares are given premiums for taking risk; Again to ascertain whether investors are adequately compensated in real terms, that is after considering inflation, and finally to ascertain which of the two investments will maximise the worth of the young accountant in Ghana.

To achieve the above *aims* the researcher generated the following hypothesis for the study;

HO = investments in equities have higher returns in the long run than investments in treasury bills

H1 = investments in equities do not have higher returns in the long run than investments in treasury bills

These two investment instruments have been chosen for study because of their growing popularity among the investing public. The choice of period has been influenced largely by availability of data.

The rest of the paper is structured as follows: Section 2 looks at the methodology for the study. In Section 3 the researcher discusses the results of the study. Section 4 concludes.

2. Methodology

The investment variables used in the comparative study are the 91 – Day Treasury bill and the Capital Market Instruments, represented by the GSE - All Share Index. We considered two investors, **investor A**, and **investor B**. Investor B started the year 1991 by purchasing one share each of the listed companies on the GSE. By buying a share each of the companies listed on the GSE, the investor has created an investment portfolio with the value of GHS1, 000.

Investor A started the same year by investing the same amount into 91-day treasury bills. After 91 days, investor A reinvests all proceeds from her Treasury bill investment in yet another 91-day Treasury bill investment again. She does this till the year ends. Her returns are then rolled over. This means that her returns were calculated as the compound return earned for the year. This roll over was done after every 91 days for every year to the end of 2005. Please refer to equation below.

For investor B, at the end of 2005, his portfolio had a value equivalent to the dividends he received on each company share in addition to the market value of each share in the portfolio. Most often, dividends paid by a company are used to buy more shares of the same company. The gains or return realized for the year is equivalent to the end-of-year value of the portfolio minus the value of the portfolio at the start of the year. The rate of return equalled the gain divided by the value of the portfolio at the start of the year. This process is repeated yearly in computing the annual rates of return on the portfolio of shares.

If within the course of any particular year, any company listed on the GSE issued additional shares to shareholders probably in lieu of cash dividends, stock dividends and /or stock splits, the increased number of shares is used in computing the value of the portfolio thereafter.

Comparing the annual returns on the treasury bills and equities, the following are calculated for the two instruments;

- The average annual rate of return (nominal and real)
- The standard deviations and
- Co-efficient of variations

The average annual rates of returns are obtained by using the Arithmetic Mean formula and the Geometric Average formula

$$\text{Arithmetic Mean (AM)} = \Sigma \text{ ARR}/ \text{ n} \quad \text{..... ... (1)}$$

Where Σ ARR is the total of annual rates of returns and n is the number of years.

$$\text{The Geometric Average} = \{(HPR_1+1.0)\,(HPR_2 + 1.0)\,(HPR_3 + 1.0)\,....\}\ 1/n - 1.0 \quad \text{..... (2)}$$

Where HPRi is a holding period for exactly one year.

The "real" average annual rates of return have been computed using the formula

$$\{\frac{(1+\text{norminal interest}}{(1+\text{inflation rate}}\}\text{-}1 \quad \text{.....(3)}$$

The standard deviations are computed using the formula.

$$\theta = \frac{\sqrt{\{(Ri-(R)^2}}{n} \quad \text{.....(4)}$$

Where: $\frac{\Sigma}{n}\left(Ri \quad R^2\right) = \delta^2(\text{var}iance)$

R_i = Annual Rate of Return during period (i)

$\overline{R}$ = the expected value of the holding period yield i.e. the Geometric mean or the Arithmetic mean of the series.

And n = the number of observations

The co-efficient of variation have been calculated by dividing the standard deviation of the returns by the expected rate of the returns i.e. the geometric or arithmetic average of the series. This can be expressed as follows:

$$\text{Co}-\text{efficient of Variation (CV)} = \frac{\text{Standard Deviation of Returns}}{\text{Expected Rate of Return}} \quad \text{.....(5)}$$

3. Results and Discussions

A) NOMINAL RETURNS

Table 1, shows the nominal return an investor gets from investing in treasury bills and shares for the period 1991-2005.The table indicates that the return from treasury bills increased from 18.85% in 1991 to as high as 41.99% in 2000.This means that investor (A) who invested GH¢1,000 in 1991 would have his money increased to the value of GH¢20,676 by the end of 2000.That is realizing a monetary return of GH¢19,676 over the 10 years period.

Table 1. Nominal Returns for shares and Treasury Bills in Ghana. Inflation and Real Returns for Shares- 1991 – 2005.

Year	GSE – All-Share	91-Day Treasury Bill	Rate of inflation %	Real Rate of return on Shares %
1991	(7.95)	18.85	18.0	(25.95)
1992	(3.63)	30.10	10.02	(13.65)
1993	113.74	34.78	27.7	86.04
1994	124.34	29.50	24.9	99.44
1995	6.33	45.10	74.4	(68.07)
1996	13.82	47.80	46.6	(32.78)
1997	41.65	45.68	27.6	14.05
1998	69.69	28.78	19.2	50.49
1999	(15.22)	34.19	12.6	(27.82)
2000	16.55	41.99	40.5	(23.95)
2001	11.42	28.94	21.3	(9.88)
2002	45.96	24.61	15.2	30.76
2003	154.60	18.70	23.6	131.07
2004	91.32	17.08	11.8	79.52
2005	(28.05)	11.53	14.8	(42.85)
Arithmetic Average	42.31	30.50		
Geometric Average	32.70	28.37		

Sources: Ghana Stock Exchange, Ghana Statistical Service, Bank of Ghana

Table 1 further shows that, there was a persistent drop in the rate of return from the year 2000 to 2005.The rate dropped to as low as 11.53% as at the end of year 2005. This means that our investor (A) would have a monetary value of GH¢51,492 at the end of 2005.

This means that on the average the investor in treasury bills obtains a 30.5% rate of return per annum on his investment.

Nominal annual returns on the stock market for the period gave interesting results. The returns ranged from (28.05) % to 154.67 %, with an average annual return of 42.31%.

Return on the market for 2003 in particular was splendid. The position of Investor B, who invested the same amount of money as investor **A** (that is GH¢1,000) in 1991 is analysed as follows: the return rates achieved means that, the nominal value of her investment will be GH¢12,227 by the end of 2000. This is rather low, compared to same period return earned from Treasury bill investments.

However, Investor B's values increases to GH¢69,707 at the end of 2005. This gives an indication that investor B, maximises her wealth, far higher than if she had invested in treasury bills over the entire period under study.

The returns are depicted on figure 1.

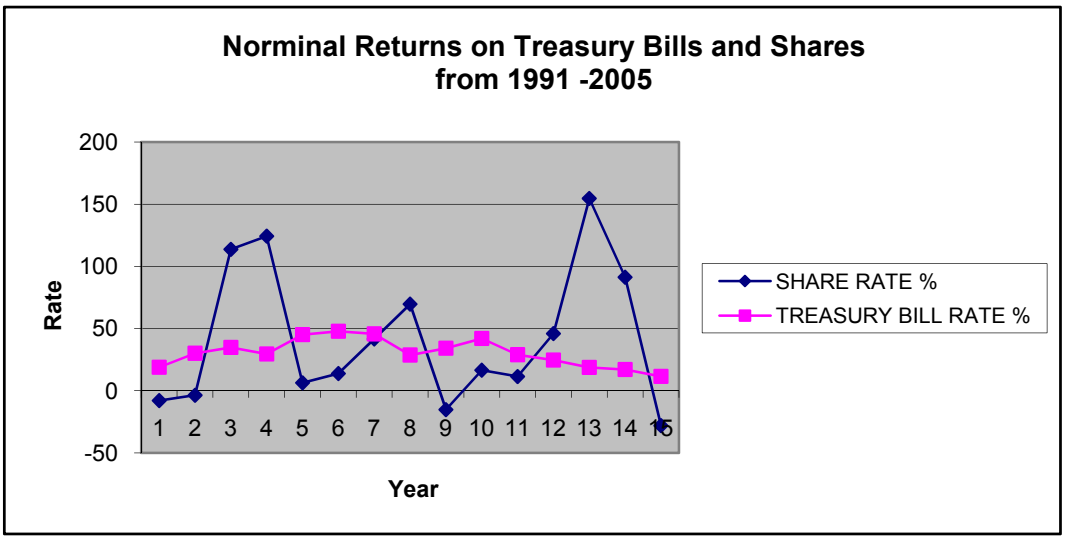

Figure 1. Nominal Returns on Treasury Bills and Shares from 1991-2005

Source: Bank of Ghana and Ghana Stock Exchange

The graph shows the wide variation in returns provided by shares over the period. Returns from treasury bills was however fairly stable.

These returns earned, have not factored the time value of money. This means that, we need to factor the concept that the GH¢1,000 invested in 1991, is not the same as GH¢1,000 obtained in 2005.This is mainly because of inflation. Thus to be able to obtain the true return the investors earned over the period we need to factor in the respective annual inflation rates. In order words we need to calculate the real rate of return.

The inflation, Real rate of returns for both investments is also shown on Table 1.

B) REAL RETURNS

It will be seen further from Table 1, that the real rate of returns was negative in certain years for both investments. This means that for those years it was not worth investing in both securities, as the returns earned from such investments in those years' falls short of increases in general price levels.

The negative returns recorded, further means investible funds, committed to both investments for those years lost value.

For our investor A (treasury bill), given the real rate of return, it means that the investor's real value of his funds at the end of 2000 was GH¢1,452. This further means that in real terms the investor had made a monetary return of GH¢452.

The table also indicates a persistent drop in the real rate of returns from 1999 onwards; with the rate dropping from 22% in 1999 to negative 3% by the end of 2005. This means that the return from T-bills has performed poorly compared to inflation in those years. Investor A's real monetary value at the end of 2005 was thus GH¢1,656. Indicating a growth of GH¢656 in real money terms from the investment made in 1991. This gives an average annual growth of 4.14% over the period. This average real rate of return for the period means that investment in Treasury bill over the period especially when rolled over with interest resulted in a real gain.

In terms of investments in shares, (investor B), the average real rate of return over the period was 16.56%.This returns means in absolute terms that, her investment dropped to GH¢510 at the end of 2000. It however increased to the value of GH¢1,424 at end of the period.

It is interesting to note that even though in terms of average real rate of return over the period, shares posted a higher rate, in absolute terms; treasury bills posted the highest absolute value.

So far we have just been looking at returns. However, expressing our goal only in terms of returns can lead to inappropriate investment practices or decisions. In order to make a sound decision we need to factor in the risk associated with the investment. Safe treasury bills will sometimes outperform shares, and because of their higher risk, shares sometimes lose significant value.

For the purpose of this article the researchers measure risk as the standard deviation of annual rates of return for the asset using equation (4).

In terms of the risk, shares over the period of study had a Standard Deviation of 54.30 %. This indicates that shares are by far a higher risk instrument compared to Treasury bills.

Table 2. The summary of the returns and risk is given on table 2 below

	Averageannual nominal returns %	Average annual real returns %	Standard Deviation %	Co-efficient of Variation
91 – Day Treasury Bill	30.50	4.13	10.75	0.35
GSE Index	42.31	16.56	54.30	1.28

Source: Researchers own elaboration

The high risk means that, an investor could loss all his funds invested in shares. This is confirmed by the high variation in returns as depicted on the graph above. Thus to compensate the investor who will want to take up this risk, the investor should expect a higher rate of return from this investment.

The table also confirms the researcher's hypothesis as well as finance theory that the higher the risk, the higher the returns. Shares have higher risk and thus offer the higher returns in the long run, compared to treasury bills that has a lower risk and offers a lower rate of return.

This compensation comes in the form of risk premium. In order to find out whether investments in shares in Ghana do pay compensation for bearing risk, the researcher computed the risk premium for the various years, this is shown as part of Table 3 The table indicate that investors are being compensated for bearing risk over the period. The average premium paid over the period was 12%. That is on average investors who own shares would demand a premium of 12 % over the Treasury Bills rate to induce them to hold the share.

Table 3. Computation of Risk Premium

Year	GSE – All-Share	91-Day Treasury Bill	Risk Premium
1991	(7.95)	18.85	(26.80)
1992	(3.63)	30.10	(33.73)
1993	113.74	34.78	78.96
1994	124.34	29.50	94.84
1995	6.33	45.10	(38.77)
1996	13.82	47.80	(33.98)
1997	41.65	45.68	(4.03)
1998	69.69	28.78	40.99
1999	(15.22)	34.19	(49.41)
2000	16.55	41.99	(25.44)
2001	11.42	28.94	(17.52)
2002	45.96	24.61	21.35
2003	154.60	18.70	135.97
2004	91.32	17.08	74.24
2005	(28.05)	11.53	(39.58)

Sources: Researchers' own elaboration

Table 3 further gives an interesting revelation that nine out of the fifteen years studied, indicated negative risk premium, meaning that investors rather lost out, as result of taking risk and investing in shares.

The coefficient of variation (CV), measures the relative variability of the asset. The lowest CV was experienced by the low –risk treasury bills.

Thus investment in shares appears to be the best way to maximise the wealth of the accountant in the long run. If the accountant is however looking for a short term increase in returns then treasury bills will be the best option.

However, the accountant's choice of Investments in either stock or treasury bills should be preceded by the person's risk tolerance level. For example, a person whose goal is stated as to double his investment in five years' must be aware of the investment risk associated with such a goal, including the possibility of loss. Risk tolerance is a function of an individual's psychological makeup; it is affected by other factors, including a person's cash reserves, family situation (e.g. marital status and the number and ages of children) by his or her age. Risk tolerance is also influenced by one's current net worth and income expectation. All things being equal, individuals with higher incomes have a greater propensity to undertake risk, because their incomes can help cover any shortfall. Likewise, individuals with larger net worth can afford to place some funds in risky investment whiles the remaining assets provide a cushion against losses.

I guess, you might be thinking of what to do as a young accountant of up to 30 years. I will assume that you have a stable job, you have enough money in the bank to provide a cash reserve. Let me also assume that your priority investment goal is to build up a retirement fund, then depending on your risk preference, you can select an investment strategy of carrying moderate to high amounts of investments in risky assets (shares).Again given your young age and income growth potential, a low-risk strategy, is not appropriate for your retirement fund goal.

On the other hand assume you are between 56 above, assume you have adequate cash reserve, and you are likely to retire in some few years time, then what you need is a less risky asset, compared to the young accountant. This is because your earning power from employment will soon be ending. You will not be able to recover any investment losses by saving more out of your paycheque. Given that you are expected to live for the next 20years, you will need some protection against inflation. This does not mean you should not invest in shares, but rather, the proportion of investments in shares should be lesser compared to investments in treasury bills.

4. Conclusion

The study based on the above analysis has proved the hypothesis that average annual returns on both treasury bills and shares are normally over and above the average rate of inflation. It also confirms the hypothesis that investments in shares have higher rates of returns in the long run than investments in treasury bills. Additionally investors have been adequately rewarded for bearing risk as stock exchange traded shares for the period under study returned a positive average annual risk (market risk) premium of 12% over treasury bills.

Investments in shares, thus appears to be a better instrument than treasury bills for maximising the worth of the young accountant. A disclaimer however, needs to be made that future performance may differ from past performance.

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