Cost Of Equity Capital and Risk on USE: Equity finance; bank finance, which one is cheaper?

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Abstract

Using data from 2003-2007, we calculate the systematic risk and cost of equity for mean variance efficient portfolios on USE; Preliminary estimates show that nominal Cost of equity reduced over time from 63.24 percent (January 2005 to January 2006) to 18% (February 2006 to March 2007). The efficient frontier shifted below in the period considered to suggest a general lowering of expected returns on portfolios, re-affirming the notion that stock markets lead to reduction in the cost of funds; and thus a viable option to bank finance that at the moment is considered prohibitive with annual percentage rates of between 20-25%.

Key words: **Cost of equity capital, Beta, CAPM, Uganda Securities Exchange (USE)**

1.0 INTRODUCTION

1.1 Background

After centuries of existence in the more endowed countries, stock markets are still in fashion. For one good reason; instruments traded on these markets have returned better yields than other money market instruments, (Dimson, Marsh, and Staunton, 2002) making them popular among the investing public. A financial manager of high rank commonly known as a Chief Financial Officer (CFO) in large corporations mainly answers two questions ; what assets should the company buy that are worth more than they cost?[1] The capital budgeting decision; the other; how to finance the buying of these assets? (Brealy, Myers, and Allen, 2006). It's on the second question that capital markets come to the fore, to offer a menu of options like bonds, and equity issues to finance the acquisition of real assets. In Uganda where bank finance is the dominant option, it would be interesting to ascertain the cost of funds for companies that have listed, and compare that to the prevailing option; of bank finance ranging from 20-25 percent per annum.

However, there are no free lunches; investors expect the returns on equity to match the level of risk they take on. Treasury bills offer the least risk on nominal returns. The stock market provides a measure of cost of equity that is used in capital budgeting decisions. When analyzing cash flows to assess the viability of investments, the discount rate is usually adopted from the yields of companies listed on the stock market that are of similar risk or in the same industry. In the absence of stock markets; it is guesstimation, an inept method when huge sums could be lost. If future projects are erroneously considered viable due to guessed discount factors that have no empirical grounding, the result may be wastage of ever scarce capital.

The emergence of Uganda Securities Exchange (USE) can be considered a good thing, if among other benefits; informs capital budgeting decisions for firms considering investing in real assets similar to those of companies listed on the market, and leads to a lowering of the cost of funds. Costs of equity (required returns) for listed companies are calculated

[1] As determined by various valuation methods

on the assumption that the past will reflect the future with some degree of error statistically comfortable. The assumptions and weaknesses of this application are discussed in Fernåndez (2004).

1.2 Motivation of the Study

Capital markets provide an alternative avenue for companies to raise money for future investments. In Uganda the main sources of capital for companies are own funds and bank loans. The existence of a market for equity is believed to lower the cost of capital for a firm that is also the return investors in its equity expect (Fernåndez, 2004). It remains an empirical question whether this is the case in Uganda. Is it cheaper for companies to source funds from the USE instead of banks?

A perusal of various valuations for companies listed has revealed that risk has been assumed to be constant for all companies regardless of industry, with a beta of 1 that is applied to the Capital Asset pricing Model (CAPM). The purpose of this research is to verify whether this assumption is any good, by applying a rather simple calculation of Betas for stocks that reflect their idiosyncratic risk relative to the market.

1.3 Objectives

- To calculate the cost of equity capital for firms listed on Uganda's stock exchange
- To determine the risk of holding mean-variance efficient portfolios on USE
- To ascertain whether the valuation of firms before they list on the exchange takes into account proper beta estimates of firms.
- To generate discount factors for assessing the viability of investments in different industries, these have implications for the allocation of capital in the economy, currently they are guessed, or are determined by bankers without much reference to empirics.

1.4 Hypotheses

- All the stocks listed on USE have a beta of 1 as has been used in all previous valuations
- Capital on USE is cheaper than bank capital; equivalent to testing the notion that; stock markets reduce the cost of capital for firms.

1.5 Anticipated results/benefits of the study

The benefits of this analysis are quite numerous, first; to aid the estimation of proper discount factors for future investment projects in Uganda that have implications on the efficient allocation of resources. Second; cost of equity estimates will aid valuations of companies that float Initial Public Offers (IPOs). In addition, investors will know what risks they face based on their risk preferences. Thirdly; international investors rely on these estimates to allocate funds, thus a country that lacks estimates of risk and return is relatively disadvantaged in its efforts to attract non-green field FDI due to information barriers. Fourthly; Institutional investors like insurance companies and managed funds; need these estimates to accurately measure the risk of individual stocks in a portfolio. In Addition fund managers can use the results from the estimated efficient frontier to select portfolios that beat the return on the market portfolio assumed to be the USE All Share Index (ALSI).

1.6 Policy relevance

The current government policy to privatise through listing some public enterprises through the stock market is aimed at boosting the growth of the stock market, so as to encourage saving and investment. It is envisaged that this policy would lead to lower capital cost and provide an alterative source of financing for companies in Uganda, thus leading to a deepening of the financial sector. In this paper we find that this policy may be yielding some positive results although more has to be done to encourage more companies to list on USE**.**

Policy relevant and interesting applications refer to utility companies like Umeme that are regulated.[2] The question is how does the Electricity Regulatory Authority (ERA) know whether the price set by Umeme is a good or a bad one? There has been a public outcry whenever Umeme raises power charges; the methods not always clear, regulators have to balance low prices with a fair rate of return to Umeme. What is fair should be the rate offered by securities that have the same risk as Umeme's common stock (Brealy, Myers and Allen 2006)[3]. If precedence is any thing to go by (see footnote 2 below), then applying the same principle to Umeme and other regulated companies may be defensible to the public. Such a method would balance the interest of regulator, company and the public. This type of policy would rely heavily on estimates of return and risk for different stocks that this study provides.

1.7 Paper Layout

Section 1 is an introduction to the paper; its aims and objectives, including motivation for the research. In section 2, we examine the literature on Uganda's capital markets and CAPM, Section 3 presents the methodology, section 4 discusses the empirical results and section 5 presents the conclusions and remarks.

[2] Umeme is the major distributor of power in Uganda; it is regulated by the Electricity Regulatory Authority (ERA) that approves its price changes, because it sells such an important resource it is not logical to let it set prices without any form of approval.

[3] This is the practice in some advanced economies, (Brealy, Myers and Allen 2006) ch.4 pp.66 cite, the U.S. Supreme Court's directive in 1994 "**the returns to the equity owner (of a regulated business) should be commensurate with returns on investments in other enterprises having corresponding risks**." *Federal Power Commission v. Hope Natural Gas Company.*

2.0 LITERATURE REVIEW

2.1 Capital markets in Uganda

Previously the focus of research on USE has been; legal framework, stock markets and development as well as liquidity issues that we do not go into here.[4] The Capital Markets Authority (CMA) is at the helm of the capital markets industry as regulator with the enabling law; the CMA Act 1996 and Collective Investments Scheme Act 2003 being the enabling law for managed funds (CIS)[5]. USE is the only registered exchange so far, in form of a mutual trust held by registered brokers/dealers and financial advisers. It has platforms for trading shares and government treasury bonds, that have helped shape the yield curve (USE Annual Report 2006). Uganda has a B rating from Fitch obtained in 2005, like all emerging markets the Capital market is still dominated by bank loans, the concept of issuing stocks to raise capital in Uganda is still new (Bohnstedt, Hannig and Odendall, 2000) with just under 10 companies listed on the exchange although many have promised to float shares soon (Buringuriza and Hyltensam 2002).

The capital markets became active in 1999, with the IPO of Uganda Clays(UCL)' stock that was 100% government owned, so Government of Uganda takes credit for kick starting it and also has gone a head to offer more equity; British American Tobacco (BATU); 10% sold in 2000, Bank of Baroda (BOBU); 10 % sold in 2003, Development Finance Corporation of Uganda (DFCU) 40% sold in 2004, And New Vision Company Limited (NVL) 20% sold in 2004. Recently 10% of Stanbic bank was floated under the same scheme. It is envisaged that following the empirical evidence between stock markets and growth as in the UK, US and India among others. Uganda would experience growth as a result of privatization through capital markets; this method is also politically robust due to full disclosure although relatively expensive. Worldwide the increasing role of capital markets as compliments to commercial banks in linking savers to borrowers is recognized (Ekiring, 2005)

[4] Liquidity constraints on USE have been documented by Lutwama (2006), The legal framework is explored by Atuhairwe and Tarinyeba (2005), Katto and Tarinyeba(2004)

[5] For an exploration of what CISs are and their importance, see Watson (2006).

Ngumi (2006) discusses the complimentary nature between Capital markets and banks; Capital markets are seen as something of an alternative to commercial banks, some claim banks have failed Africa through there focus on short-term finance and stringent security requirements. However, he argues that we should think about capital markets and banks as joined to the hip, "Banks are evolving as investment banks and providers of expertise, chief contact as well as 50% capital on all bond issues" (Ngumi 2006). Capital markets foster efficient mobilization and allocation of resources for economic development. Savers; pension funds, insurance companies and individuals and borrowers; corporations and the government interact through capital market instruments such as corporate bonds, commercial paper, syndicated loans or equity: A formalization of the process whereby owners (lenders) are able to find users (borrowers) of capital at a profitable rates sufficient to justify risks taken in giving or renting capital to potential users[6].

2.2 Stock Markets and development

Singh (1993) studies the role of the stock market in the economic and industrial development of emerging market countries using the International Finance Corporation (IFC) Emerging Markets' Database, and finds it more prudent to encourage bank-based financial systems because of the speculation, excessive volatility of share prices and short termism. He documents avenues through which the market may be useful if the mitigating factors above can be controlled; a) growth of savings, b) efficient allocation of investment resources c) better utilization of existing resources. "The pricing of shares is critical in terms of how well the stock market can perform its allocative functions. An efficient pricing process will reward well managed, profitable firms by valuing their shares more highly than those of unsuccessful, unprofitable firms. This mechanism lowers the cost of capital to the former and hence ensures a greater allocation of new investment resources to such firms at the expense of the latter group of firms, which correspondingly face a higher cost of capital. Thus relative share prices of firms in an "efficient" pricing system should reflect their relative expected profitability" (Singh,

[6] The rate of return lenders expect to risk their money is also the cost of equity to the users; it is market determined when they interact. Researchers believe that the existence of formal markets where instruments can be traded; lowers the cost of capital. We shall test this assumption by looking at the cost of capital on the ALSI for different time periods.

1993) the importance of calculating the cost of capital relative to other markets or companies then it is a signal of profitability or the lack of; in companies listed and of the market in general. If the pecking order theory of finance is to be believed[7]; then the cost of capital on the market has to be low enough to encourage firms to issue equity as opposed to bank debt and retained earnings.

2.3 Risk and cost of equity capital

Risk poses a big problem for financial economists who attempt to predict the cost of equity capital. In this paper we will adopt the Capital Asset Pricing Model of Sharpe (1964), Lintner (1965) and Black (1972) to estimate risk and cost of equity capital. Ross (1976) suggested the Arbitrage pricing theory that we do not pursue due to data limitations. However CAPM is still dominant paradigm for the task at hand[8].

2.4 Capital Asset Pricing Model

Path breaking papers of Markowitz (1959) and Tobin (1958) formed the basis of CAPM. CAPM was developed by Sharpe (1964) and Lintner (1965) who introduced the CAPM model. However, despite its dominance it has been criticized by Blume (1970), Blume and Friend (1973) and Jensen, Black and Scholes (1972) who disagree with Sharpe and Lintner findings when they consider portfolio rather than individual securities. Work by Levy (1983) suggests that CAPM should be reformulated. It has also been criticized by; Basu (1977), Banz (1981) and Bhandari (1988). Stattman (1980) and Rosenberg and Lanstein (1985) who find out that that stocks with high book-to-market equity ratios have high average returns that are not captured by their betas. Roll (1977) noted that the market portfolio is mean-variance efficient.

However, Fama and French (1996) disagree with the above criticisms because of the ratios they considered in their approach. Fama and French (1992) offer more incite regarding regarding ratios used in CAPM. In addition, some papers find positive results supporting the CAPM; Kothari, Shanken and Sloan (1995) and Chan, Hamao and

[7] Pecking order theory is discussed in Myers(1984), Myers and Majlug (1984), Fazzari, Hubbard and Peterson (1984)
[8] See Graham and Harvey(2003)

Lakonishok (1991) when they apply CAPM to the Japanese stocks, and Capaul, Rowley and Sharpe (1993) who apply CAPM to four European stock markets.

3.0 METHODOLOGY

3.1 Data

Data from 2003 to 2007 was collected from the research department of USE, the frequency of the data are the daily closing prices of the individual stocks on the USE. To calculate the market return we use monthly returns. The data for the Treasury bill rate was collected from BoU and de-annualised to a monthly rate. We adjusted for stock returns using indexing.

3.2 The mean and variance of returns for portfolios

We use the financial analysis tool pack in Matlab; that is based on Markowitz (1952) portfolio theory[9]. The main argument put forward my Markowitz is that " The risk of an asset has no meaning except with reference to the portfolio in which it is held" based on that idea, we present only the estimates of return and risk of different portfolios. We rely on betas to measure the risk of individual securities. To simplify the estimation it is assumed that 1)there are no taxes or transaction costs 2)financial markets are competitive 3) asset returns are normally distributed.

The expected value (return) of a portfolio is given by

$$E(R_p) = \sum_{i=1}^{n} X_i \left[E(R_i) \right] \qquad (1)$$

Where $E(R_i)$ is the expected return on security i and X_i is the proportion of money invested in security i, the expected return on a security is defined below. n is the number of securities in the portfolio.

$$E(R_i) = \sum_{j=1}^{n} p_j R_{i,j} \qquad (2)$$

[9] See McInish (2001) ch.11 and Brealy, Myers and Allen (2006) ch. 7 for an introductory exploration.

The possible returns of a security i, are defined by a distribution based on its mean and variance. $R_{i,j}$ is the possible return on security i in period j, p_j is the probability that $R_{i,j}$ will occur, n is the number of possible returns or periods. We estimate these returns based on monthly periods.

The variance for the individual securities above can be defined as

$$\sigma_i^2 = \sum_{j=1}^{n} p_j \left[R_{i,j} - E(R_{i)} \right]^2 \qquad (3)$$

Where $E(R_i)$ is the expected return on security i as defined in equation (2), $R_{i,j}$ is the possible return on security i in period j, p_j is the probability that $R_{i,j}$ will occur, n is the number of possible returns or periods.

The risk of a portfolio; measured by the variance of possible returns is given by

$$\sigma_p^2 = \sum_{a=1}^{n} \sum_{b=1}^{n} X_a X_b \sigma_{a,b} \qquad (4)$$

Where the Xs are the proportions of money invested in each security, $\sigma_{a,b}$ is the covariance of security a with asset b, n is the number of securities in the portfolio.

Matlab calculates the mean and variance of efficient portfolios using equations (1) and (4) that are used to construct the efficient frontier for securities listed on USE, it is this continuum of variance and return for different portfolios that would enable informed decisions on portfolio selections based on investor's risk preferences as well as give indicative cost of equity measures or the return on the USE All share index (ALSI). "A portfolio is efficient if it has the highest return for a given level of risk and the lowest risk for a given level of return" McInish (2001). It is assumed that investors are risk averse and therefore would require more return to take on more risk. The frontier enables investment managers to select portfolios that offer a good return with knowledge of the

associated risk. And policy makers that need to regulate prices an indicative required return by investors in regulated companies whose risk can be calculated from the standard deviations of returns whether they are listed or not.

3.3 Portfolio theory on risk and return

Further analysis is grounded on theory that was developed in the mid 1960s by Sharpe (1964), Lintner (1965) and Treynor (unpub), it is known as the Capital Asset Pricing Model (CAPM)[10]. CAPM builds on the idea introduced by Markowitz (1952) that analyzing stocks individually is meaningless. The idiosyncratic risk of a stock can be eliminated through diversification (Statman, 1987). The efficient frontier then contains all plausible combinations of portfolios that minimize systematic risk. They add the assumption of a riskless asset that can be borrowed and lent to derive an equilibrium in which all investors will hold the market portfolio that lies on the security market line (SML). It is also assumed that for the relationship to hold; investors are risk averse and have homogenous expectations.

CAPM enables us to estimate one of the best known measures of risk in a diversified portfolio. Many investors are diversified, thus their expected return on a security should be positively related to its *beta*. Dhankar and Rohisigh (2005) assert that CAPM provides a methodology that quantifies risk translating it into estimates of expected return on equity. The SML that is the underlying economic relationship can be represented by the formulation below

$$Y_i = X_f + \beta_i \times (Y_M - X_f) \qquad (5)$$

Where, Y_i is the expected return on a security i, X_f is the risk free rate, β_i is the beta of the security that measures its systematic risk, $(Y_M - X_f)$ is the market risk premium. Y_M is the market return estimated using the return on the ALSI. We provide beta estimates using a regressive plot of (5).

[10] An alternative to CAPM we do not pursue is the Arbitrage Pricing theory, we take the market consensus that CAPM is still the main model applied without necessarily implying that APT is false

Beta can also be calculated using the formula below that we shall call the covariance approach

$$\beta_i = \frac{Cov(Y_i, Y_M)}{Var(X_i)} \qquad (6)$$

3.4 Econometric model

To obtain empirical estimates of beta, one has to assume that CAPM an *ex ante* model also holds *ex post***.** That enables us to use historical data to estimate the systematic risk of securities and subsequent estimate of cost of equity capital. The market portfolio is assumed to be the USE ALSI, a weakness of the model considering that there are other risky assets that investors hold.

Rearranging (1) and introducing a stochastic error term yields the estimating equation below

$$Y_i = \alpha + \beta_i Y_M + \varepsilon_i \qquad (7)$$

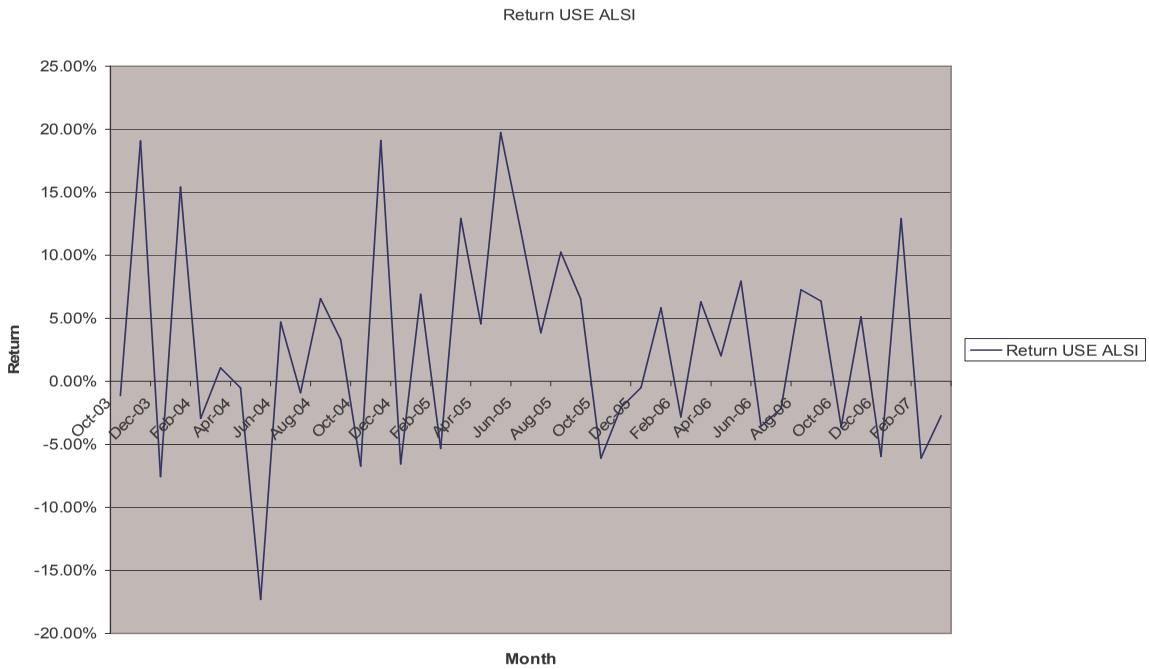
Where $\alpha = X_i(1 - \beta_i)$ is constant by definition the rest are as defined in equation (5). We use the holding period return on a monthly basis; the return on the market was calculated using the value of the ALSI. To aid comparisons the differencing intervals were kept constant for all securities. To estimate cost of equity capital we use the beta estimates over the period February 2006, to march 2007. The estimates are plugged into equation (5) to calculate the required return (cost of equity capital).

4.0 EMPIRICAL RESULTS

4.1 Data exploration

Graph 4.1: USE ALSI level; day to day change

Graph 4.2: USE ALSI holding period return monthly



4.2 Risk and Return estimates of efficient portfolios

From tables B1-B3 in appendix B; minimum variance efficient portfolios can be seen; the shaded part shows combinations that beat the market. The risk return estimates are shown for the 3 different periods; the periods were selected based on new listings that change the ALSI index, to assess how cost of capital and the risk of individual stocks have varied of time. Betas of stocks are reported in the last row of each table calculated using equation 6.To calculate the cost of capital for an average business we multiply the monthly ALSI return by 12, for the period January 2005 to January 2006 it was 63.28 percent the equity premium for the period a whooping 55.03 percent, for the period October 2006 to march 2007 it reduced to 18% and the equity premium to a somewhat more believable 9.67%.

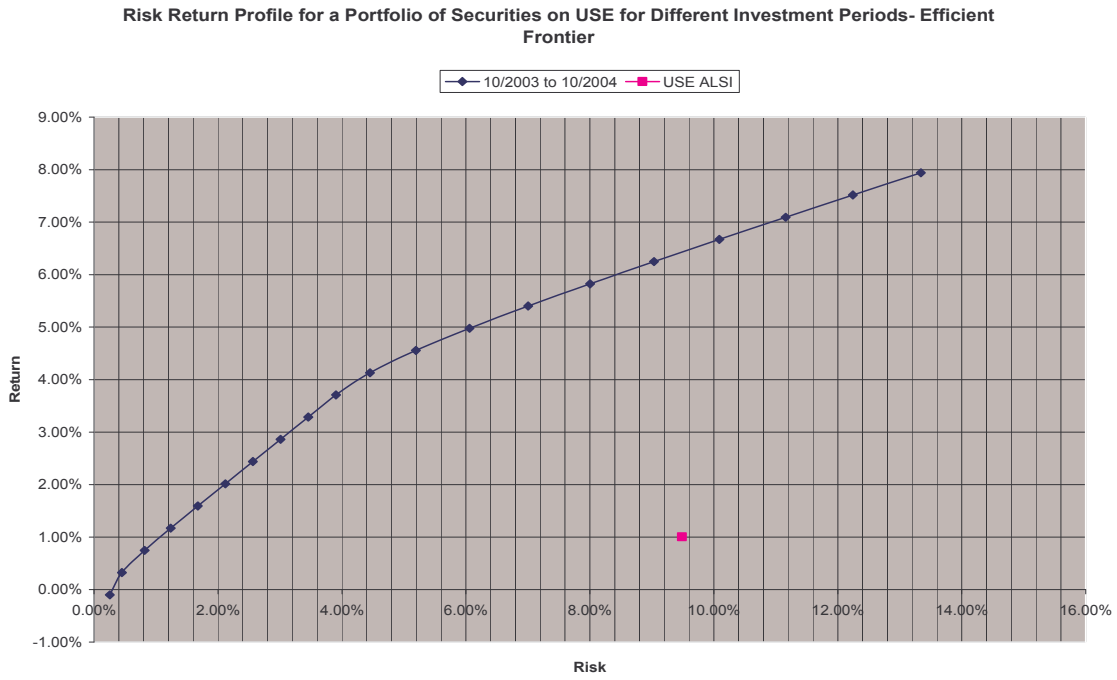
From Graph 4.1 to 4.3 below the efficient frontiers are graphed for different time periods, The graphs reflect a reduction in the portfolios that dominate the market to suggest that the expected return (cost of capital) for a given amount of risk is reducing over time and in the last period that we use for the preferred estimates of betas and the cost of capital for individual stocks the graph takes a shape similar to that predicted by the Markowitz (1959) theory for the efficient frontier. Although further analysis has to be done as we wait for more data points, it is clear in graph 4.4 where all frontiers are super imposed that there has been a lowering of expected returns for the same risk. This could be an indication that the market is becoming efficient, although this has to be confirmed by further empirical analysis that is outside the scope of this paper. Table 4.1 shows that only EABL has a beta close to one, which means that current valuations of companies that assume a beta of 1 may be flawed.

Table: 4.1 Betas of stocks using the covariance method.

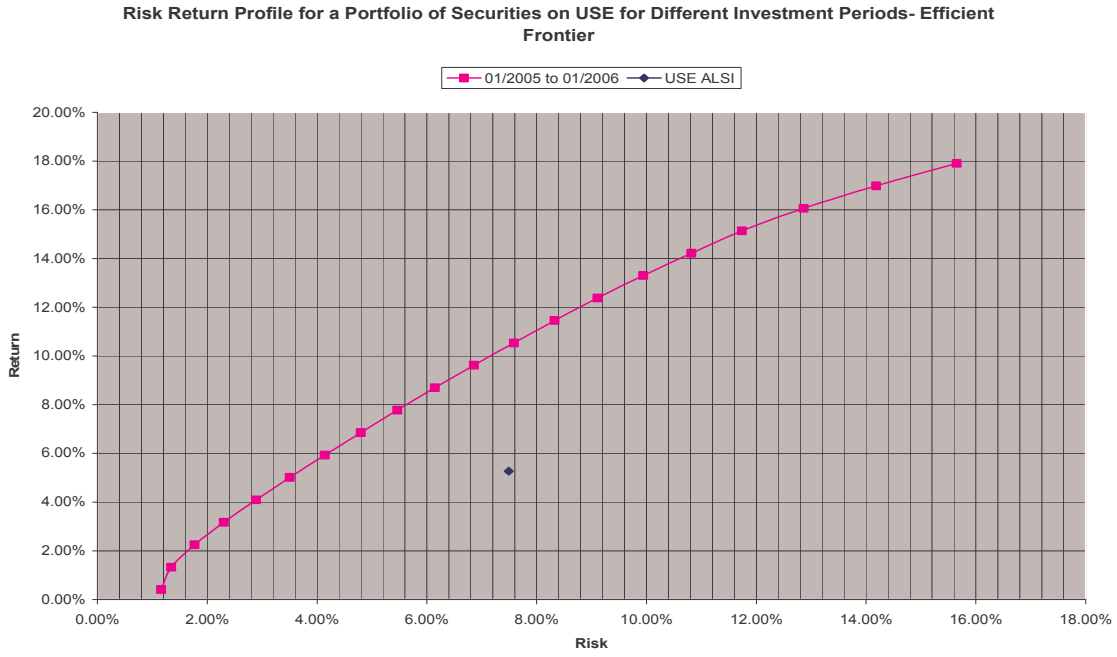
Period	ALSI	UCL	BATU	EABL	KA	BOBU	DFCU	NVL	JHL
Oct/2003-oct/ 2004	1.00	-0.05	0.00	0.96	0.04	-0.01			
Jan/2005-jan/2006	1.00	0.02	-0.24	1.03	1.78	-0.06	0.14	-0.63	
feb/2006- mar/2007	1.00	-0.03	-0.47	0.60	0.59	-0.34	-0.05	0.05	1.56

Computations by authors

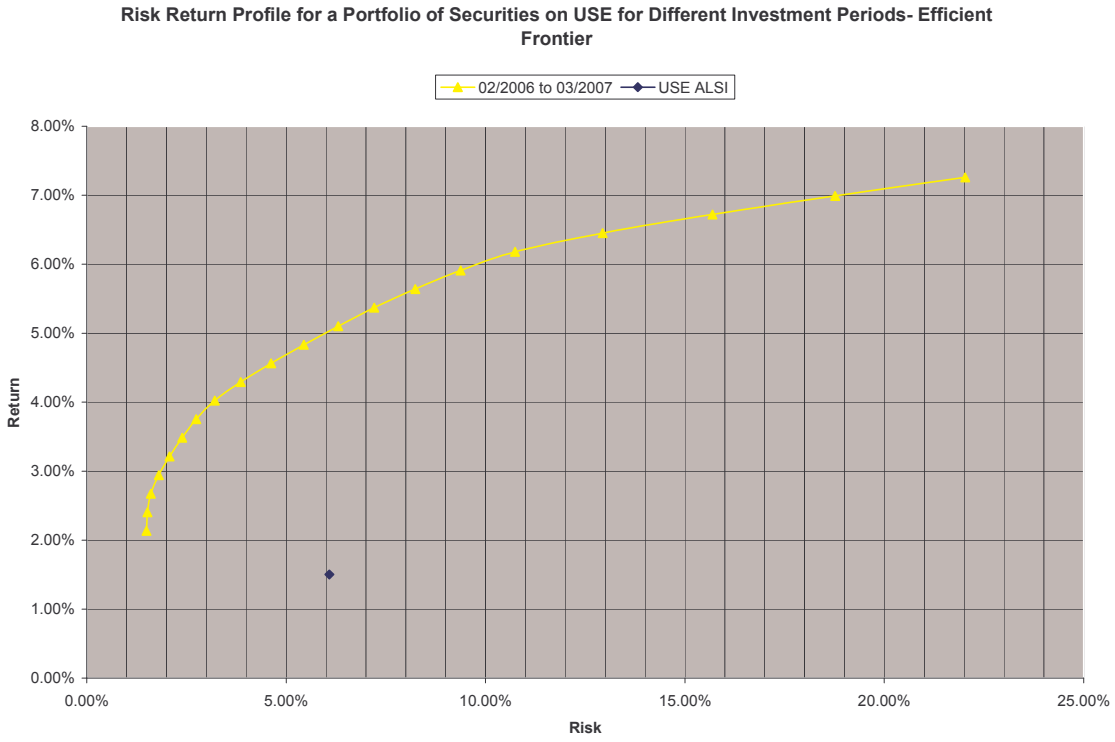
Graph 4.1: Efficient frontier for portfolios on USE for different time periods



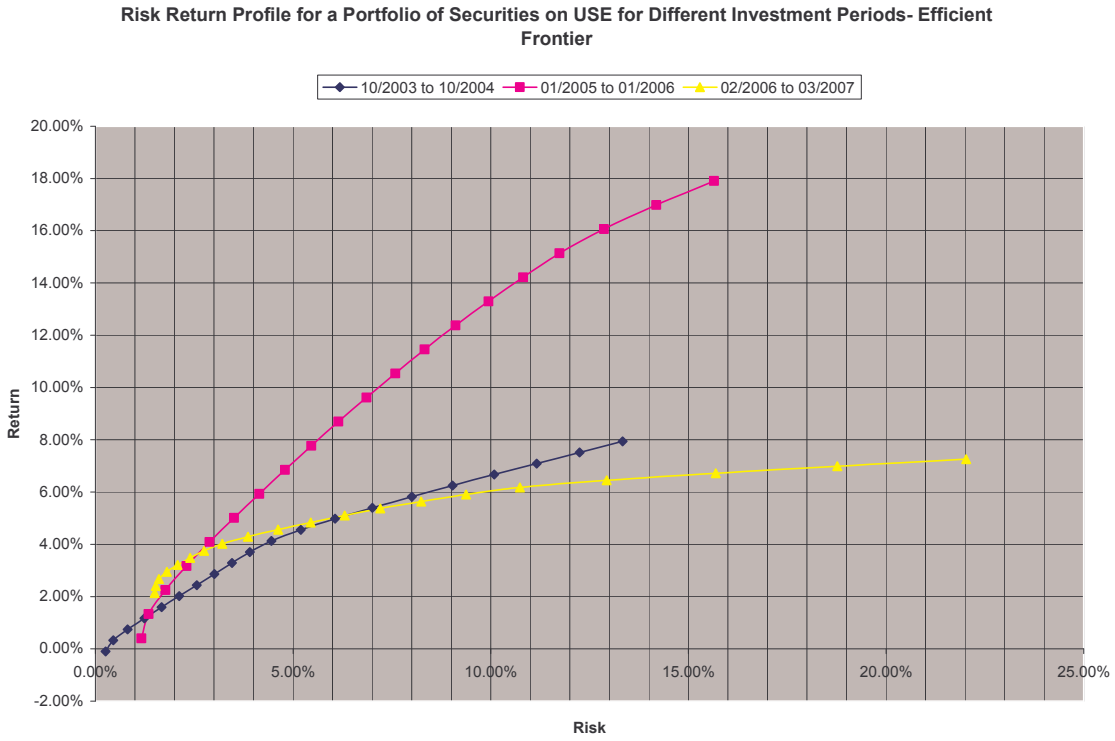
Graph 4.2: Efficient frontier for portfolios on USE for different time period



Graph 4.3: Efficient frontier for portfolios on USE for different time periods



Graph 4.4: Efficient frontier for portfolios on USE for different time periods



4.3 Cost of equity and betas

Using equation 7 we calculate betas of stocks using a regressive plot, and then apply the risk free rate of March 2007 and a risk premium of 9.67 percent obtained from the return on the ALSI for the period February 2006 to March 2007, to calculate the cost of capital for firms listed on USE.

Table 4.2 betas and cost of equity capital for stocks on USE

USE STOCK	Beta	Cost of Equity capital % $Y_i = X_f + \beta_i (Y_i - X_f)$ [11]
UCL	-0.03	9.56
BATU	-0.47	5.31
EABL	0.60	15.65
KA	0.59	15.56
BOBU	-0.34	6.56
DFCU	-0.05	9.37
NVL	0.05	10.33
JHL	1.57	25.03

Computations by authors

The firm with the highest cost of equity capital is Jubilee Holdings Limited (JHL) at 25.03 percent followed by East African Breweries Limited (EABL) at 15.65 percent the second highest that is far below the current interest rates, this implies that the stock market may be a cheaper option that bank loans for long term financing. This may be construed as evidence that growth of the stock market would lead to a lowering of cost of capital for firms in Uganda**.**

[11] The risk free rate is 9.85 percent the Treasury bill rate in March 2007 and the risk premium is 9.67 percent estimated.

5 CONCLUSION

5.1 Deductions from our Findings

It is clear that the assumption often made by brokers by assuming that all stocks have the same risk is erroneous, that implies that the valuations of companies that have been listed so far have assumed the wrong risk for the listed films, it is also evident from the estimates of cost of equity capital that equity finance is much cheaper than commercial bank finance, thus the development of the stock market has slowly led to a reduction in the cost of funds in line with what other researchers have found. It can be said that it would be a good idea for companies seeking long term funds to get listed as this turns out cheaper than relying on short term oriented commercial banks loans.

5.2 Policy Recommendation

It is a good policy to encourage growth of stock markets as they lead to lower cost of capital and offer an alternative to bank finance. As such subsidies and tax incentives that would boost the listing of shares as well as the participation of the public may lead to more investment and growth. This also is early evidence that the government choice to privatize some companies through the stock market may be yielding some positive results.

5.3 Limitations and areas for further study

The study would have been more conclusive with the application of the Arbitrage Pricing Theory (APT) the alternative to CAPM if more data was available.

IT may be interesting to empirically investigate the efficiency paradigm by establishing whether the ALSI follows a random walk, it may also be interesting to investigate the likely effect of a merger of East African stock exchanges on the attitudes of investors in Uganda. It is also imperative to ascertain why there are so few companies listed on the USE.

APPENDICES

Appendix A: References

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Appendix B: Matlab Financial Analysis tool Output

Table B1: Risk and return for minimum variance portfolios for the period October 2003 to October 2004

Riskless Asset (91 days Tbills)		USE ALSI		Portfolio of Securities									
Risk	Return	Risk	Return	Risk	Return	UCL	BATU	EABL	KA	BOBU	DFCU	NVL	JHL
0.48%	0.89%	9.48%	1.00%	0.26%	-0.10%	0.74%	92.10%	0.16%	0.71%	6.29%			
				0.45%	0.32%	7.77%	85.83%	1.41%	4.32%	0.67%			
				0.82%	0.75%	13.94%	75.72%	2.72%	7.63%	0.00%			
				1.24%	1.17%	19.98%	65.08%	4.04%	10.90%	0.00%			
				1.67%	1.59%	26.03%	54.44%	5.36%	14.17%	0.00%			
				2.12%	2.02%	32.07%	43.81%	6.68%	17.45%	0.00%			
				2.56%	2.44%	38.12%	33.17%	8.00%	20.72%	0.00%			
				3.01%	2.86%	44.16%	22.53%	9.32%	23.99%	0.00%			
				3.46%	3.29%	50.21%	11.90%	10.64%	27.26%	0.00%			
				3.90%	3.71%	56.25%	1.26%	11.96%	30.53%	0.00%			
				4.45%	4.13%	51.75%	0.00%	11.16%	37.09%	0.00%			
				5.19%	4.55%	45.83%	0.00%	10.07%	44.09%	0.00%			
				6.06%	4.98%	39.92%	0.00%	8.99%	51.09%	0.00%			
				7.00%	5.40%	34.00%	0.00%	7.90%	58.10%	0.00%			
				8.00%	5.82%	28.08%	0.00%	6.82%	65.10%	0.00%			
				9.03%	6.25%	22.17%	0.00%	5.74%	72.10%	0.00%			
				10.09%	6.67%	16.25%	0.00%	4.65%	79.10%	0.00%			
				11.16%	7.09%	10.33%	0.00%	3.57%	86.10%	0.00%			
				12.24%	7.52%	4.42%	0.00%	2.48%	93.10%	0.00%			
				13.34%	7.94%	0.00%	0.00%	0.00%	100.00%	0.00%			
			Stock Beta		**1.00000**	**-0.04525**	**0.00169**	**0.96459**	**0.04066**	**-0.00993**			

Table B2: Risk and return for minimum variance portfolios for the period January, 2005 to January, 2006

Riskless Asset (91 days Tbills)		USE ALSI		Portfolio of Securities									
Risk	Return	Risk	Return	Risk	Return	UCL	BATU	EABL	KA	BOBU	DFCU	NVL	JHL
0.05%	0.69%	7.49%	5.27%	1.16%	0.41%	0.00%	26.47%	11.01%	0.82%	42.17%	13.43%	6.12%	
				1.35%	1.33%	1.86%	24.22%	7.89%	5.77%	40.15%	12.12%	7.99%	
				1.77%	2.25%	4.72%	22.76%	4.79%	10.73%	38.27%	9.04%	9.69%	
				2.30%	3.17%	7.59%	21.30%	1.68%	15.69%	36.39%	5.96%	11.38%	
				2.89%	4.09%	10.45%	18.94%	0.00%	20.26%	34.22%	2.23%	13.89%	
				3.50%	5.01%	12.38%	14.74%	0.00%	24.27%	31.36%	0.00%	17.26%	
				4.14%	5.93%	13.35%	9.79%	0.00%	28.20%	28.14%	0.00%	20.51%	
				4.80%	6.85%	14.32%	4.84%	0.00%	32.14%	24.93%	0.00%	23.77%	
				5.46%	7.77%	15.32%	0.00%	0.00%	36.09%	21.66%	0.00%	26.93%	
				6.15%	8.69%	17.24%	0.00%	0.00%	40.73%	16.19%	0.00%	25.85%	
				6.86%	9.62%	19.15%	0.00%	0.00%	45.36%	10.72%	0.00%	24.77%	
				7.59%	10.54%	21.07%	0.00%	0.00%	50.00%	5.24%	0.00%	23.68%	
				8.33%	11.46%	22.97%	0.00%	0.00%	54.65%	0.00%	0.00%	22.39%	
				9.11%	12.38%	24.31%	0.00%	0.00%	59.46%	0.00%	0.00%	16.23%	
				9.94%	13.30%	25.65%	0.00%	0.00%	64.28%	0.00%	0.00%	10.08%	
				10.82%	14.22%	26.99%	0.00%	0.00%	69.09%	0.00%	0.00%	3.92%	
				11.74%	15.14%	24.84%	0.00%	0.00%	75.16%	0.00%	0.00%	0.00%	
				12.86%	16.06%	16.56%	0.00%	0.00%	83.44%	0.00%	0.00%	0.00%	
				14.18%	16.98%	8.28%	0.00%	0.00%	91.72%	0.00%	0.00%	0.00%	
				15.65%	17.90%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
			Stock Beta		**1.00000**	**0.02476**	**-0.23574**	**1.02832**	**1.78378**	**-0.05823**	**0.13755**	**-0.62807**	

Table B3: Risk and return for minimum variance portfolios for the period; February 2006 to march 2007

Riskless Asset (91 days Tbills)		USE ALSI		Portfolio of Securities									
Risk	Return	Risk	Return	Risk	Return	UCL	BATU	EABL	KA	BOBU	DFCU	NVL	JHL
0.09%	0.69%	6.08%	1.50%	1.50%	2.13%	0.00%	4.58%	25.08%	0.00%	33.02%	21.64%	10.45%	5.23%
				1.52%	2.40%	0.00%	1.57%	22.23%	0.00%	36.16%	22.19%	12.05%	5.79%
				1.61%	2.67%	0.00%	0.00%	17.72%	0.00%	39.75%	21.63%	14.21%	6.69%
				1.81%	2.94%	2.65%	0.00%	12.74%	0.00%	43.24%	17.46%	16.11%	7.79%
				2.08%	3.21%	5.80%	0.00%	8.02%	0.00%	46.63%	12.85%	17.86%	8.85%
				2.39%	3.48%	8.95%	0.00%	3.30%	0.00%	50.02%	8.23%	19.60%	9.91%
				2.75%	3.75%	12.56%	0.00%	0.00%	0.00%	53.71%	1.75%	21.00%	10.97%
				3.21%	4.02%	15.34%	0.00%	0.00%	0.00%	45.99%	0.00%	25.46%	13.20%
				3.86%	4.29%	17.75%	0.00%	0.00%	0.00%	35.92%	0.00%	30.67%	15.66%
				4.62%	4.56%	20.16%	0.00%	0.00%	0.00%	25.84%	0.00%	35.87%	18.12%
				5.44%	4.83%	22.57%	0.00%	0.00%	0.00%	15.77%	0.00%	41.08%	20.58%
				6.31%	5.10%	24.98%	0.00%	0.00%	0.00%	5.69%	0.00%	46.28%	23.04%
				7.21%	5.37%	22.39%	0.00%	0.00%	0.00%	0.00%	0.00%	51.48%	26.13%
				8.24%	5.64%	13.29%	0.00%	0.00%	0.00%	0.00%	0.00%	56.67%	30.03%
				9.37%	5.91%	4.20%	0.00%	0.00%	0.00%	0.00%	0.00%	61.86%	33.94%
				10.74%	6.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	56.63%	43.37%
				12.93%	6.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	42.47%	57.53%
				15.69%	6.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	28.32%	71.68%
				18.77%	6.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.16%	85.84%
				22.03%	7.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
			Stock Beta		**1.00000**	**-0.03409**	**-0.46907**	**0.60040**	**0.59360**	**-0.34062**	**-0.04569**	**0.05152**	**1.56474**