

How much does capital cost the private or publically owned company in South Africa? A review of the theory and evidence.

Brian Kantor; Feb 19th 2013

Capital is everything

Capitalism is a very good description of our economic system. The modern economy revolves about the competence with which firms use capital entrusted to them. Successful, profitable firms, consistently invest in projects that return more than the cost of the capital they employ. They are strongly encouraged to expand. That is to make more of the economy's scarce resources – people, natural resources and capital. Firms unable to cover these costs of capital are as strongly encouraged to waste less, that is to yield scarce resources to those firms that are able to put them to better use.

We should take capital and its use very seriously

Another word for capital is wealth and wealth is accumulated through savings, that is by sacrificing consumption, which is very hard to do. It is essential to our economic purpose to put these savings to good use, investing them well to create additional wealth, so that we can consume more in the future. It is very understandable why we would take our savings and wealth as seriously as we do.

Our future economic well being depends essentially on the success with which firms and their owners and managers allocate capital. And accordingly we shower rich rewards on those who prove capable of earning more than the cost of capital they employ.

True capitalism looks after itself. But the best firms do not provide the best returns

The capitalist economic system allows firms to sink or swim. They are in most cases free to price their goods or services as they see fit. They are mostly free to raise or attempt to raise capital in different ways. The providers of that capital are in turn free to evaluate the performance of the firm as best they can in the debt and equity markets.

The capital markets, when they value the equity or debt of a firm constantly grapple with the task of converting exceptional good or poor performance into normal risk adjusted returns by adding or subtracting market value to its shares or debt. This is why the best managed firms, with proven ability to find and exploit cost of capital beating projects, do not necessarily provide shareholders with superior risk adjusted returns. The superior returns, when expected, are incorporated into higher share prices. This higher entry price makes it that much harder to

achieve for shareholders to achieve exceptional market returns, even as the company continues to post cost of capital beating performance. That is when internal rates of return exceed the required returns, or cost of capital. Shareholders pay up in advance for such expected results.

This is why managers should be judged on their ability to achieve cost of capital beating internal rates of return rather than on the stock market performance of their companies. Similarly investors in less well managed firms can be compensated with lower share prices that make it that much easier to realize required returns in the share market. Nevertheless from society's concern to allocate capital to the firms that can best use capital, the firms that enjoy a favourable rating in the market, in the form of high share prices or low market discount rates applied to their expected performance, will find it very easy to raise capital on favourable financial terms from the market place. The firms less favoured by the market place are likely to find funding more difficult and expensive to acquire.

What principles should apply to the regulated firm?

But what of those firms, whether they be private or publically owned, that are not allowed to set their own prices. The regulated firms are regulated because they have monopoly powers and are thought likely to abuse such power in the absence of regulation.

How then should their prices be regulated? The answer is surely to regulate them as if the capital they employ is as valuable as all other capital employed in the economy. They too should be required to earn an appropriate risk adjusted rate of return on the capital provided for them by the private investor or the taxpayer. The government can inject equity capital and or guarantee the debt issued by the publically owned enterprise in which case the tax base becomes the security for the funds borrowed. If the enterprise can realize cost of capital beating projects that will exceed the government's cost of finance, it will be able to sustain high levels of debt and earn enough to pay interest and repay its debts.

The prices allowed by the regulator should be just high enough to provide the owner of the regulated firm, public or private, with a return that equals its risk adjusted cost of capital. If the prices are set too high and provide an excessive rate of return, consumers will be overcharged. If prices are set too low, leading to returns on capital that are below their cost consumers would be subsidized, at the expense of the taxpayers who are providing the subsidy and the finance or loan guarantees necessary to sustain subsidies.

The risks of the projects undertaken by the regulated firm can be estimated by reference to similarly risky private companies. Evidence from listed companies regulated in other economies would be valuable in this regard. Both publicly owned electricity generation and distribution

facilities, as well as pipelines with monopoly powers, are well below average risk projects as we show using evidence from the US, and for which a well below average cost of capital should be measured and reflected in their regulated charges.

What is the cost of capital? How do we measure it? Time only can tell for sure if capital has been well used and compensated for the risks of doing so

What then is this all-important cost of capital that successful firms are able to recover in their operations and unsuccessful firms are unable to do. The cost of capital may be regarded as the returns required by wealth owners, or rather more accurately, expected by them when they make capital available to the firm. If the firm proves able to generate returns in excess of these required returns, the owners of the capital will have realized a true economic profit. In this way the firm will be adding wealth for them.

The outcomes of some projects are much less certain than others given the nature of the enterprise and the activities it undertakes. The economic performance and the returns realized by the capital employed for example in an electric utility are typically much more easily predicted than those of a steel mill. Or in other words producing electricity is much less risky than producing steel.

The expected returns that direct capital expenditure are therefore adjusted for risk, that is the danger that the best laid plans may not be realized. The greater the risk of failure to meet the costs of capital, the higher will be the expected return, the higher the cost of capital.

How then is the cost of capital to be measured? The market in capital, the debt and equity markets, will provide them with much of this vital information though not always obviously or unambiguously. The owners of unlisted companies with similar operations can take their cue from the share market performance of their listed peers

The terms at which debt finance will be made available to the firm is usually highly explicit in the interest rate and repayment terms agreed. These terms will depend on the borrower's credit rating, that is its expected ability to meet the conditions of the contract. This credit rating will be revealed in a interest rate spread over the interest paid by the sovereign government, the most credit worthy borrower, for debt of a similar duration and repayment terms.

Much of the extra capital employed by a firm in its projects will be generated in the form of cash flow from its operations that is its own savings or more correctly the savings it has made on behalf of its owners. The firm has to decide whether to employ such cash in its operations or to give it back to the shareholders in the form of dividends or buying back shares.

The economic logic is clear enough. The firm should ideally utilize the cash in expanding or maintaining the scale of its operations only if it can expect a return in excess of its cost of the capital, that is the returns required of the firm by its shareholders. It is therefore essential that the managers or owners making such choices, be able, measure the cost of the capital they employ.

The share market does not make clear announcements about the cost of capital facing the firm. Such costs have to be inferred, from the market value of the shares in a listed company that can change from day to day and week to week as economic and company events are interpreted that change the outlook for the future.

Accounting data supplied by the company is not always well suited to this purpose. Turning such inferences into explicit measures of the cost of capital or even of past returns on capital is an art form rather than a science. But art or science has to be practiced well by both the firm and investors buying or contemplating buying its debt or shares.

Measuring risks; calculating the betas

Risk is a relative measure. The stock market performance of a company, or sector of the stock market, must be compared to others. The exercise usually undertaken in this regard is to measure the *beta* of the company or sector. The *beta* is the second co-efficient of a simple linear regression ($y=a+bx$) equation where y is the weekly or monthly share price move and x is the market move over the same period. The overall market will be represented by an Index representative of all shares listed on the stock exchange, weighted by their market value. The average risky counter or sector will have a beta of one. The above (below) average risky counters or sectors will realize betas greater (less) than one.

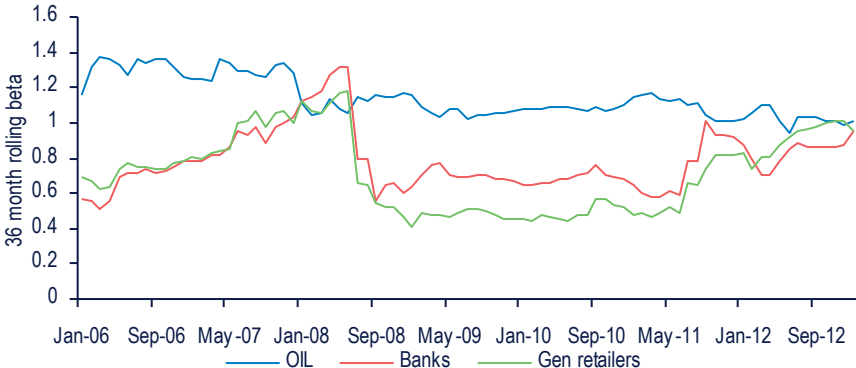
How reliable and consistent are the betas?

A few caveats need to be recognized. Firstly the market moves may only help explain a small proportion of the observed behavior of the share price changes. The model may produce a very low R^2 or goodness of fit. In which case firm specific, rather than market risks are driving the share price and the market beta cannot be regarded as a consistent measure of the risks facing the firm or the investor in it. For this reason combinations of firms with similar economic characteristics that leads them to be included in some sub-sector of a stock exchange, will produce a stronger relationship with the market and a more reliable beta than an individual company.

Furthermore the beta itself, even when statistically significant in what may be regarded as a satisfactory model with a high R- squared may prove highly variable over time. To cope with this potential instability of the beta, the calculation of a rolling beta may be helpful to indicate the reliability of the beta itself. By a rolling beta one means the coefficient measured as result of regression equation that rolls forward adding and dropping a month as the equation is re-measured over different time periods.

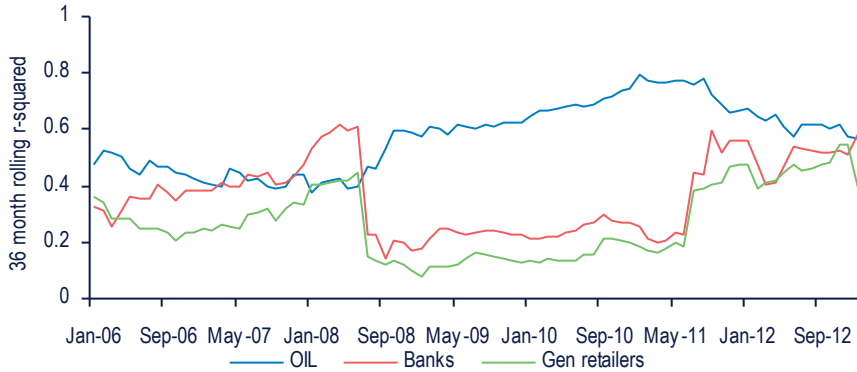
In the figures below we show the 36 month rolling Betas and Rolling R-squares ending February 2012 for three sub sectors of the JSE, Oil Producers, of whom there is only one company represented, Sasol, Banks and General Retailers. As may be seen all three sectors now have a Beta close to one. Though, as may also be seen, the relationship of the Banks and the Retailers to the market was much weaker after September 2008 in the aftermath of the Global Financial Crisis. It should also be noticed that the predictive capability of the model between 2008 and 2011 was rather limited, as measured by the low rolling R-squares. The more recent results for the model with R-quares of 0.5 and more may be regarded as satisfactory

JSE 36 month rolling Betas



Source; Investec Securities

JSE 36 month rolling R-squares for the market models

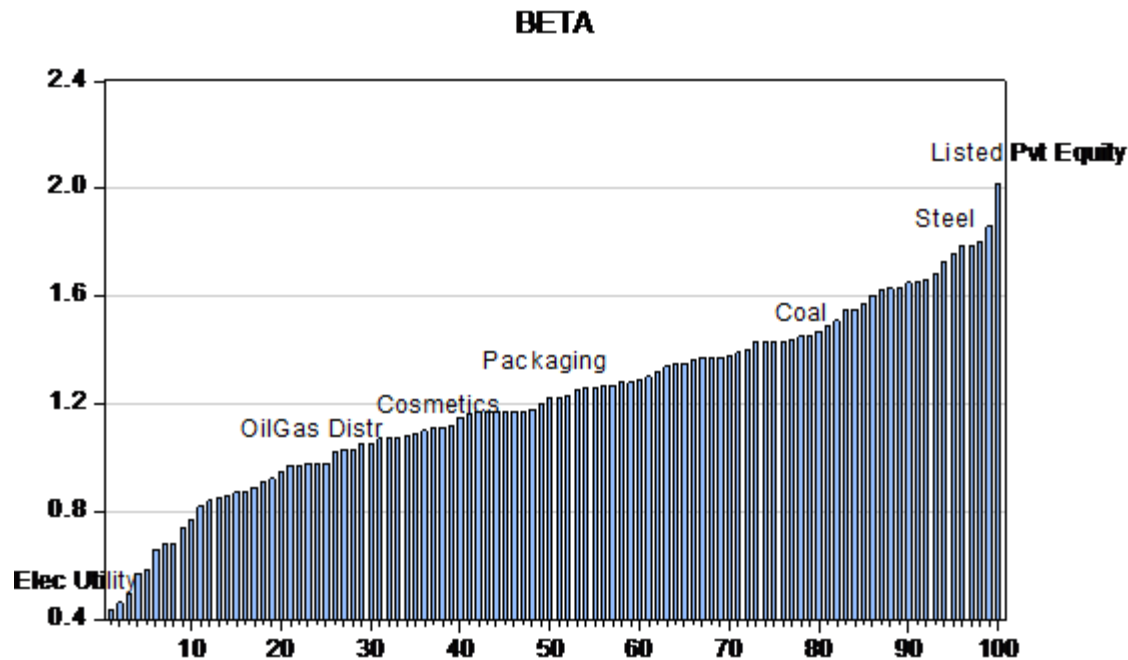


Source; Investec Securities

In the figure below we rank the betas calculated by the Stern School of New York University for 100 sectors of the New York Stock Exchanges. The results can be regarded as according well with prior beliefs. As may be seen Electrical Utilities are clearly much less risky than steel companies in the US, distributors of Gas and Oil, that is pipeline companies have well below average betas while the most risky of all sectors are the Publically Listed Private Equity Funds.

Betas for 100 sectors of the New York Stock Exchanges ¹

¹ Note the average beta is 1.17- because the sectors are not market weighted - as is the market Index. If the sectors were market weighted then the average beta would be one. Note that electric utilities are the very lowest risk (according to beta) and gas and oil distribution are well below average - ranked 27/100 on this scale. These betas can be found at he following site http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html



Measuring the equity risk premium..

The cost of capital calculation has as its first component the interest rate on a short dated bill issued by the relevant sovereign government in its own currency. This is called the risk free, that is default risk free, rate of interest. An alternative default free interest rate is a longer dated government bond, This long term rate of interest may be regarded as the compound average of the short term rates expected over the next ten years and will have the advantage of being much more stable than more variable short rates.

The equity risk premium (ERP) to compensate for investors assuming business and operational risk of a company, has to be added to the risk free rate of interest. This average equity risk premium is then increased or decreased by the sector or firm beta that may be above or below the market average beta of one.

The problem in measuring the ERP is that actual average returns on the equity market can vary widely, not only from month to month, but also from decade to decade. For example over the 12 years between 2000 and 2012 an investor in the S&P 500 Index would have received a well below long term, average annual return, calculated each month, of only 1.56% p.a. This was a

very poor reward for holding an average US equity over the twelve years given an average inflation rate of 2.54% p.a. Such returns as realized over the past twelve years are clearly unacceptably low for investors assuming equity risk. They would have to be regarded as a very poor guide to the equity risk premium required to justify holding equities in a balanced portfolio of securities currently. These returns are very likely to increase significantly in the future. They would have to do if the taste for assuming the risk of holding equities equity and supplying equity finance is to be maintained.

The equivalent investor in the JSE All Share Index over the same twelve year, by contrast, enjoyed very much higher average annual returns. These were of the order of 15.52% p.a. Inflation averaged 5.84% p.a. over the period. When converted to USD, these returns average a handsome 11.62% p.a. - far in excess of the returns provided by the S&P 500.

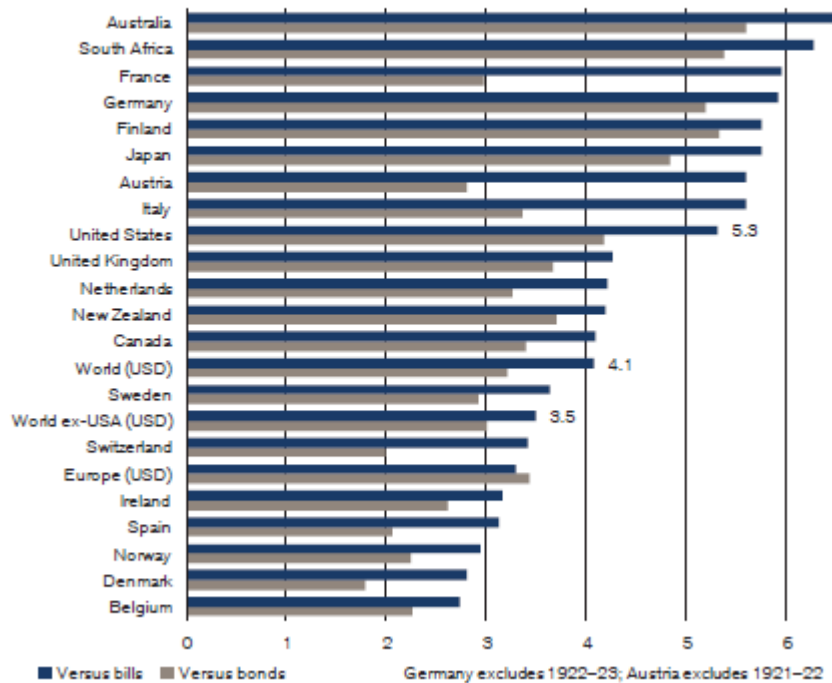
These JSE returns must be regarded as exceptionally and unsustainably good. That is too good to serve as representative of the equity risk premium and the returns required of investors in equities in the future. The exceptional returns provided by the JSE in recent years are in line with the equally good returns provided by the average emerging equity market. They are the result presumably of too much SA or Emerging Market risk being attached to the values of JSE listed counters earlier in the early 2000's. As these risks failed to materialize the prices of the shares rose in sympathy and realized the exceptional returns, mostly in the form of capital gains, referred to above.

The latest estimate by Dimson et. al.² of the long run real return on global equities realized since 1980 is just over 6% p.a while global bonds realized about the same real rate of return. Or in other words global equity investors received nothing extra for bearing equity risk. The equivalent returns since 1950 were a real 7% real for equities and nearly 4% p.a. for global bond investors, that is a realized ERP of about 3% p.a.

² Credit Suisse Global investment Returns yearbook 2013, Elroy Dimson, Paul Marsh, Mike Staunton and Andrew Garthwaite,

Annualized historical equity risk premia (%), 1900–2012

Source: Elroy Dimson, Paul Marsh, and Mike Staunton, *Triumph of the Optimists*; authors' updates



Source; Credit Suisse, Research Intsitute, *Global Investment Returns Yearbook*, 2013, Figure 6.

Separating the Investment and the Financial decision making process

Ideally the investment decision should be separated in mind and practice from how the project is funded. Projects should only be undertaken when they return more than the cost of the capital employed. The cost of capital is not equivalent to the cost of finance. The cost of finance is highly firm specific and depends on its credit rating. This may have more to do with the strength of its balance sheet and its presumed ability to repay loans, than the quality of its current capital expenditure programme.

Society has every interest in seeing that its scarce valuable capital is well spent, independently on how it is contracted for, that is for interest payments or a share of profits. From this societal perspective and its concern for the efficiency with which its capital is employed, tax considerations or subsidies of investment activity, or debt management criteria should not be allowed to complicate the investment decision, though in practice they often will do so.

Debt adds to risks and share price volatility.

The risks that the project will not yield returns that exceed the costs of debt finance adds to the risk of the project. The risk is that the firm encumbered with debt will not be able to avoid default on its debts which would be very bad news for its shareholders who stand last in line for a payout. Such risks of leverage will show up in a more volatile share price from which shareholders will suffer in the form of a larger equity risk premium and so a higher cost of capital, rather than benefit from lower costs of finance.

There may well be some optimum combination of debt and equity that a firm should seek. But more or less debt, while possibly helpful to shareholders, does not alter the cost of capital from the perspective of the wider economy or society. Society has very good reasons to encourage the allocation of capital be it in the form of debt or equity, to the firms that can best employ capital.

The cost of capital for SA business – a rule of thumb

We would suggest, that as a working rule of thumb, the average equity risk premium for the average JSE listed company should be of the order of 4- 5 per cent per annum. Given current RSA long dated government bond yields of about 7- 8% p.a. this average real equity risk premium of 5% p.a. would translate currently into a nominal cost of capital for the average project or firm today of about 13% in nominal terms or 7% in real terms given an expected rate of inflation of 6% p.a. The RSA long dated inflation linked government bonds currently yield about a real 2% p.a. With vanilla bonds yielding, as indicated, 7 --8 per cent per annum, this implies a long term expected rate of inflation of about 6% p.a in South Africa. And so 2% real plus an equity risk premium of 4- 5 per cent gives a real cost of capital of about 7% p.a. for the average listed company.

For a well below average project, say a listed electric utility with an assumed beta of .50 (half the average beta) the equity risk premium becomes $0.5 \times 5\% = 2.5\%$ Assuming a government bond yield of 7% p.a this means a nominal cost of capital for an electric utility of 9.5% p.a. or a real cost of capital of about 3.5% p.a.

Publicly owned electricity generation and distribution facilities, as well as pipelines with monopoly powers, are well below average risk projects, for which a well below average cost of capital should be measured and reflected in their regulated charges. A pipeline with a highly predictable throughput and very low operating costs and inflation linked prices might be regarded as as even less risky than generating electricity in South Africa deserving of an even lower cost of capital than that applied to an electric utility. We would suggest a real cost of capital of about 3% p.a or about 9% p.a. regulated prices that provided returns higher than this would represent a tax on current consumers of pipelines or electricity in SA.

