Blume (1975:787-788) offers an intuitive explanation why the β's appear to regress to the mean based on portfolio formation. He argues that estimated β's will conform to "true" β's when the positive and negative estimation errors offset each other. However at the extremes these errors may not offset each other and thus over time it would appear that these β's regress to the mean.

Having proposed this intuitive argument, Blume (1975:789-790) then formalises the argument and tests for its validity. He argues as follows:

\[ e \beta_i = \tau \beta + \epsilon_i \]  

(3.17)

where: \( e \beta_i \) = estimated β;  
\( \tau \beta \) = true β; and,  
\( \epsilon_i \) = error term, \( E(\epsilon_i) = 0 \).

He then makes the following assumptions:
- \( e \beta_i \) and \( \tau \beta \) are distributed by a bivariate normal distribution;
- \( \tau \beta \) has a mean of one and a \( \sigma^2 = \sigma^2_{\beta} \); and,
- \( \epsilon_i \) is independently distributed.

Based on these assumptions, Blume (1975:789) argues that the following regression is implied:

\[ E(\beta_{i+1}|\beta_i) - 1 = [\sigma_{\beta_{i+1},\epsilon_{i+1}}/\sigma^2_{\epsilon_{i+1}}](\epsilon_{i+1} - 1) \]

(3.18)

The expression \([\sigma_{\beta_{i+1},\epsilon_{i+1}}/\sigma^2_{\epsilon_{i+1}}]\) can be broken down into two components: one of which reflects the so-called order bias and the other reflects a "true order tendency".

From (3.18): \( \sigma_{\beta_{i+1},\epsilon_{i+1}} = \sigma_{\beta_{i+1},\beta_{i+1}} + \epsilon_i \), then:

\[ e \beta_i = \tau \beta + \epsilon_i \]  

(3.17)

\[ E(\beta_{i+1}|\beta_i) - 1 = [\sigma_{\beta_{i+1},\epsilon_{i+1}}/\sigma^2_{\epsilon_{i+1}}](\epsilon_{i+1} - 1) \]

(3.18)

\[ E(\beta_{i+1}|\beta_i) - 1 = [\sigma_{\beta_{i+1},\epsilon_{i+1}}/\sigma^2_{\epsilon_{i+1}}](\epsilon_{i+1} - 1) \]

(3.18)

For \( \tau \beta \), we drop the subscript.
\[ E(\beta_{t+1}|\beta_t) - 1 = \{(\rho_{\beta_{t+1}t})(\sigma_{\beta_t})/\sigma_{\beta_t}^2)(\beta_t - 1) \]

where: \((\rho_{\beta_{t+1}t})(\sigma_{\beta_t})/\sigma_{\beta_t}^2)\) = the true regression tendency; and, 
\((\sigma_{\beta_t})(\sigma_{\beta_t}/\sigma_{\beta_t}^2)\) = order bias.

If the \(\beta\) is stationary over time then:

\(\rho = 1\); and,

\(\sigma_{\beta_{t+1}} = \sigma_{\beta_t}\).

Therefore, \(E(\beta_{t+1}|\beta_t) - 1 = (\sigma_{\beta_t}^2/\sigma_{\beta_t}^2)(\beta_t - 1)\)

Now: \((\sigma_{\beta_t}^2/\sigma_{\beta_t}^2) < 1\)

Therefore, the \(\beta\) is closer to one than an estimate of \(\beta\).

Based on this mathematical analysis, Blume (1975:790) states that, "an estimate of beta for an individual security except for an estimate of 1.0 is biased."

Blume (1975) tests this by estimating \(\sigma_{\beta_t}^2\) and \(\sigma_{\beta_t}^2\). \(\sigma_{\beta_t}^2\) is calculated from the sample variance calculated from \(\beta\) of securities and \(\sigma_{\beta_t}^2\) is estimated as the difference between \(\sigma_{\beta_t}^2\) and \(\sigma_{\beta_t}^2\). Using these estimates, he calculated that an unbiased \(\beta\) would be eight to twenty-five per cent closer to one than would the original biased \(\beta\).

Having done this, what remains to do, is to identify the origin of the bias. Using \((\sigma_{\beta_t}^2/\sigma_{\beta_t}^2)(\beta_t - 1)\) to adjust for order bias, Blume (1975) tested for a "true regression tendency". He found that there was, and states that the, "evidence strongly suggests that there is a substantial tendency for the underlying values of beta to regress towards the mean over time". He also states that the order effect is "not of overwhelming importance" (Blume 1975: 794).

Blume (1975:795) argues that there are two potential reasons for this:
- the risk of existing projects becomes less extreme over time; and,
- new projects have less extreme risk profiles over time.
There is no theoretical reason why the former may be true. While it is possible to make a theoretical argument in favour of the latter, it would fall beyond the scope of this section and indeed, this paper.

This, then became established as the conventional wisdom. Brenner and Smidt (1977:1091) support this position by arguing that, "there is no theoretical support for the proposition that beta coefficients are stable". They base this conclusion on the following formulation:

\[ \beta = \frac{B}{V} \]

where: \( B \) = risk of the real asset; and,

\( V \) = value of the underlying asset.

If we accept the CAPM then,

\[ R_t = R_f + \left[ B (R_m - R_f) / V \right] + \varepsilon \]

From this we can see that there is no reason for \( \beta \)'s to remain constant. If there are any changes to the underlying firm, that might lead to a price change, \( \beta \) will change as well\(^{33}\). Following their tests, Brenner and Smidt (1977:1091) argue that the market model is possibly not an accurate description of the return generating process and that the instability of \( \beta \)'s is thus not a result of measurement error.

Kolb and Rodriguez (1989:321) write that mean regression is widely accepted among empirical results in finance. However, they argue that two interpretations of the empirical results have developed and that "common assertions in the academic literature about the behaviour of betas go well beyond the scope of Blume's evidence and are in error" (Kolb and Rodriguez 1989:319).

\[^{33}\] The fact that \( \beta \)'s are related to "real" phenomena and not just market conditions is strengthened by Fabrozzi and Francis (1977: 1098) who find that, "[n]either the alpha nor the beta statistics...appear to be significantly affected by the alternating forces of bull and bear markets." This indicates that "real" factors are of importance in determining these statistics.
These interpretations, Kolb and Rodríguez (1989:321) refer to as versions one and two:

VERSION ONE: β's ≠ 1 are expected to be closer to one in the next period; and,

VERSION TWO: β's exhibit a long term drift towards one, with this tendency holding for all β's.

These "versions" are formalised as propositions one and two:

Proposition one: |1 - β| > |1 - E(β)|

Proposition two: P(|1 - β| < |1 - 1|) > 0.5

Version two implies that the distribution of β's is collapsing towards the mean.

In their empirical testing (1926-1985) using the market model, Kolb and Rodríguez (1989) find the following statistics for the entire period:

μ = 0.98

σ = 0.4396

skew = 0.8822

The σ's varied over the twelve periods used in the study, but these variations were found to be random. Kolb and Rodríguez (1989:324) interpret this to mean that "betas show no general tendency to get closer to 1.0". The reason for this is that there is no evidence that the distributions of β's are collapsing over time. In addition, the skewness of β's suggests that there are more firms with β's < 1 than β's > 1.

Kolb and Rodríguez (1989) report an interesting phenomenon, one that is not reported elsewhere. Those β's that are remote from one have a high probability of tending to one, however, "[a] beta close to 1.0 has a high probability of moving away from 1.0" (Kolb and Rodríguez 1989:328). This result leads Kolb and Rodríguez (1989:333) to argue that only, "[b]etas with extreme values in period t are expected to have values closer to 1.0 in the next estimation period" (emphasis mine). The proposition that, "[a]ll betas exhibit a long term drift toward 1.0" is false. Unfortunately, Kolb and Rodríguez (1989) offer no reasons for this interesting behaviour.
### 3.4.3 CAPM AND THE MARKET MODEL

Once we have derived the CAPM (3.8) and the market model, what remains to do is to tie them together. Jacob and Pettit (1984:374) argue that the linking criteria is $\alpha$. They argue, in order for the market model to be consistent with the CAPM, that all characteristic lines (i.e. regressions of equation 3.13) for all securities must pass through the coordinates $R_f R_f$. They further argue that the only value of $\alpha$ that could fulfil this requirement is:

$$ \alpha_i = (1 - \beta_i)R_f $$  \hspace{1cm} (3.19)

Fitting this into the CAPM framework is a matter of simple algebra\(^\text{34}\):

- $E(R_p) = \alpha + \beta_i E(R_m)$

- $E(R_i) = (1 - \beta_i)R_f + \beta_i E(R_m)$

- $E(R_i) = R_f - \beta_i R_f + \beta_i E(R_m)$

- $E(R_i) = R_f + \beta_i (E(R_m) - R_f)$

This shows the expected return for an individual security. In order to demonstrate this equation in portfolio format, we need to demonstrate the relationship between individual betas and portfolio betas. Modigliani and Pogue (1974:78) state that the following relationship exists between the two:

$$ \beta_p = \sum_i \beta_i $$

The same holds true for $\alpha$: Jacob and Pettit (1984: 378) make the following generalisation: "[t]he characteristic line for a portfolio of securities is just a weighted average of the characteristic lines of the component securities, where the weights are the proportionate holdings in each security."

**THUS:** $E(R_p) = R_f + \beta_p (E(R_m) - R_f)$  \hspace{1cm} (3.20)

---

\(^{34}\) It is possible to derive this expression from the opposite angle:

- $R_i = R_f + \beta_i (R_m - R_f)$
- $R_i = R_f + \beta_i R_m - \beta_i R_f$
- $R_i = R_f (1 - \beta_i) + \beta_i R_m$

**BUT:**

- $R_i = \alpha_i + \beta_i R_m$
- $\alpha_i = R_f (1 - \beta_i)$

---

79
What we now need to demonstrate is the conditions under which the $\beta$ of the market model is equal to that of the CAPM. This can be rephrased as follows: "Is the empirical $\beta$ = the theoretical $\beta$?" (Jacob and Pettit 1984:368). If we compare 3.5 and 3.17, we see that $R_t$ appears in both, $R_A$ and $R_m$ also appear. If $R_A = R_m$, then the two $\beta$'s are equal.

3.5 TESTS OF THE CAPM

Up to this point, the chapter has largely been about developing a theory of capital asset pricing, viz. the CAPM. In this section, we will review some of the empirical evidence that supports the CAPM. The evidence that suggests that the CAPM misspecifies the relationship between risk and return is presented in the next chapter.

3.5.1 CONSTRUCTING TESTS OF THE CAPM

The CAPM hypothesizes a relationship between ex ante expected returns and the market portfolio. The major difficulty that arises in testing the CAPM arises in that "large-scale systematic data on expectations do not exist" (Elton and Gruber 1991:338). Thus tests on the CAPM have made use of ex-post data. There are two rationales for doing so:
- in the long run, most expectations are realised; and,
- the relationship between the market model and the CAPM allows researchers to formulate tests on the basis of ex-post observations (Jensen 1979:29).

The second rationale has more theoretical basis than the former. The derivation, following from Elton and Gruber (1991:338) follows.

Begin by making the following assumptions:
- the market model holds in every period;
- the CAPM holds in every period; and,
- $\beta$'s are stable over time.

Recall (3.13): $R_t = \alpha_t + \beta_t R_m + \epsilon_t$
and (3.14): \( E(R_i) = \alpha_i + \beta_i E(R_m) \)

Thus: \( E(R_i) - \alpha_i - \beta_i E(R_m) = 0 \)

If we add this latter equation to (3.14) then:

\[
R_i = E(R_i) + \beta_i [R_m - E(R_m)] + \varepsilon_i
\]

all the CAPM equation:

\[
E(R_i) = R_f + \beta_i (R_m - R_f) + \varepsilon_i
\]

Substitution for \( E[R_i] \) and simplifying leads to:

\[
R_i = R_f + \beta_i (R_m - R_f) + \varepsilon_i
\]

As can be seen, all the expected variables have been transformed into variables that can be proxied by historical data.

Once we have transformed the CAPM into testable format, we can describe how the CAPM has been tested. Most of the tests consist of a two pass regression (Levy and Sarnat 1984:489-490). It is useful to relate Jensen's (1972:7-8) description of how tests of the CAPM are usually conducted in full:

"The procedure is then to estimate the cross-sectional regression

\[
R_i = \gamma_0 + \gamma_i \beta_i + \varepsilon_i
\] (3.21)

where \( \beta_i \) is obtained from the regression of a time series of individual security returns on an index used as a proxy for the market portfolio. The estimated coefficients \( \gamma_0 \) and \( \gamma_i \) obtained from the second-stage regression given by [3.21] are then compared to \( R_f \) and \( R_m - R_f \) respectively, for the time period under consideration".

Black, Jensen and Scholes (1972:84) argue that this approach is simple but inefficient. They formulate a test of the CAPM that makes use of a portfolio approach. This allows the researcher to overcome two potential problems, firstly a large number of stocks (and information) can be tested simultaneously and secondly, selection bias is avoided. The latter problem arises as high-\( \beta \) stocks would tend to have a positive bias in their estimation and as a result the intercept in the SML would be downwardly biased.

Black, Jensen and Scholes (1972) overcome the selection bias by ranking stocks in order of \( \beta \) and assigning them to portfolios. The portfolio-\( \beta \)'s are
reestimated in a later period to determine whether the relevant theoretical criteria are met.

From these formulations, several hypotheses may be tested (see next section) as this regression is an empirical estimate of the security market line.

3.5.2 TESTABLE HYPOTHESES OF THE CAPM

In order for the validity of any economic model to established it is necessary to formulate testable hypotheses that may be falsified. If we are unable to falsify these hypotheses, then there may be a case to be made for the validity of the model.

According to Modigliani and Pogue (1974:78) the CAPM yields the following testable hypotheses:
- on average in the long run, high $\beta$ securities should have high rates of return;
- on average, there should be a linear relationship between $\beta$ and return;
- the slope ($\gamma_1$) should be equal to $(R_m - R_f)$ for the period under consideration;
- the intercept ($\gamma_0$) should be equal to $R_f$; and,
- unsystematic risk ($\epsilon$) should play no role in explaining security returns.

In the survey that follows, we shall see that the CAPM performs quite well in the empirical stakes.

3.5.3 TESTS OF THE CAPM

In this section, we will review some of the studies that support the CAPM's hypotheses. The survey is not intended to be exhaustive. In order to answer the charge that the reported results may be spurious, use has been made of the so-called classic studies (those studies that are quoted most often in the literature and in the textbooks). As will be seen, many of the studies do not confine themselves to a single hypothesis, we have differentiated between hypotheses in order to identify the issues, not in order to classify the literature.
3.5.3.1 HYPOTHESIS ONE: HIGH BETA HIGH RATE OF RETURN

The long term\textsuperscript{35}, average relationship between high-\(\beta\) securities and their returns was investigated by Sharpe and Cooper (1972). Sharpe and Cooper (1972:49) hypothesised that, "[s]tocks with high beta values should have high returns on average [and] stocks with low beta values should have low returns on average." The purpose of this study was to make use of this relationship as a basis for an investment strategy.

Sharpe and Cooper (1972:50-51) ranked securities into deciles on the basis of their (sixty month) \(\beta\)’s. This was done for every year from 1931 until 1967. Investors who do this and who want to maximise the return they receive could invest in the decile portfolio that has the highest \(\beta\). Sharpe and Cooper (1972) calculate what would have happened, had anyone followed such an investment strategy.

They found, in the long run, that on average there is a positive relationship between \(\beta\)’s and return. The equation of the relationship is as follows:

\[
R_i = 5.54 + 12.75\beta_i
\]

Sharpe and Cooper (1972:52) interpret this result as follows: "[a]s expected, the relationship is positive and quite significant...The intercept is somewhat higher than the return on relatively safe investments during the period ... and the relationship appears to be approximately linear." Sharpe and Cooper (1972:54) provide a tentative explanation for the high intercept by arguing that the "true market portfolio" is possibly less risky than an index on the NYSE, thus the intercept is higher than it should be in this study.

\textsuperscript{35} It is necessary to investigate this relationship in the long term, because by definition high-\(\beta\) securities are highly risky and may in the short term offer low returns.
3.5.3.2 **HYPOTHESIS TWO: LINEAR RELATIONSHIP BETWEEN RISK AND RETURN**

In section 3.5.3.1, we saw that the intercept of the equation is a higher than we would expect given that the \( R_t \) is known. This is a well known empirical finding and will be discussed below in more detail. Miller and Scholes (1972: 58) argue that this "flattening" of the slope of the (second pass) regression line may be indicative that the relationship between \( \beta_i \) and \( R_t \) may not be linear, but may be "curvilinear".

Miller and Scholes (1972) provide an analysis of the econometric and statistical problems that can arise when testing the CAPM. One of the errors that they identify is a specification error: the security market line should not be described as being linear. Miller and Scholes (1972:58) test for this specification error by testing whether the following equation can better explain the risk return relationship:

\[
R_t = \gamma_0 + \gamma_1 \beta_i - \gamma_2 \beta_i^2
\]

This is the equation of a concave function which if valid for the security market line would explain the slope been flatter than expected. Using data from the CRSP tapes (1954-1963) Miller and Scholes (1972: 58) estimate the following regression:

\[
R_t = 0.114 + 0.031\beta_i + 0.015\beta_i^2
\]

Note that this is the equation for a convex function, not a concave one. Any potential misspecification in the risk-return relationship does not manifest itself as a nonlinear security market line.

This evidence combined with that of the Sharpe and Cooper (1972) study implies that we can accept the relationship between \( \beta_i \) and \( R_t \) to be linear.

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36 A higher intercept implies that the slope of the line is flatter than expected. This occurs because a line is defined by two points. If we define the first point as the market portfolio \((1; R_m)\) and the other as the risk-free rate \((0; R_f)\) then the line will be flatter if the intercept becomes \((0; R_f + x)\).
3.5.3.3 HYPOTHESES THREE AND FOUR: SML CHARACTERISTICS

The empirical $\gamma_i$ should be equal to the theoretical risk premia ($R_m - R_f$) in order for the CAPM to have validity. We have already seen that $\gamma_i < (R_m - R_f)$. As the intercept and the slope are interrelated, we review the literature on hypotheses three and four simultaneously.

The classic article in this respect is Black, Jensen and Scholes (1972) who test the CAPM in the following manner:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \varepsilon_{pt}$$

In this test they consider the "excess returns" of the portfolios and the market over some risk free rate. Black, Jensen and Scholes (1972:84) argue that if the CAPM and the market model is valid, then $\alpha_p = 0$. The best way of testing the CAPM is to estimate the equation and determine whether $\alpha_p$ is significantly different from zero.

Using data drawn from the CRSP tapes for the period 1926-1966 and grouping them into ten portfolios for every year, Black, Jensen and Scholes (1972:89) found that $\alpha_i$'s were negative for high-$\beta_i$'s and positive for low-$\beta_i$ securities. This they interpreted as meaning that low risk securities earned more than that predicted by the CAPM and high risk securities earned less than predicted by the CAPM. This is consistent with an intercept that is higher than the $R_f$ and a slope of the empirical securities market line that is flatter than $\gamma$.

Black, Jensen and Scholes (1972:93-98) also perform cross-sectional tests on the data. The results of these tests were as follows:

- A linear relationship was found between $\beta_p$ and $R_{pt}$; and,
- The intercept and slope of the equation was not that predicted by the theoretical model.

When the average excess returns on the $\beta$-ranked portfolios was regressed against the portfolio $\beta$, the results was as follows:
Here we see that the slope of the regression is higher than that predicted. A result that is even more disturbing is that Black, Jensen and Scholes (1972: 96-97) calculate the securities line for four sub-periods where the slopes and intercepts are seen to vary over time. These results are as follows:

1\31 - 9\39: \( R_p - R_f = 0.00359 + 0.0108\beta_p \)
10\39 - 6\48: \( R_p - R_f = 0.439 + 1.065\beta_p \)
7\48 - 3\57: \( R_p - R_f = 0.777 + 0.333\beta_p \)
4\57 - 12\65: \( R_p - R_f = 1.02 - 0.119\beta_p \)

As can be seen, the slope of the line began as being steeper than that predicted by the CAPM, and has became over time, shallower than that predicted by the CAPM. In the last period, 4\57 - 12\65, the line is negatively sloped, ie. exactly opposite that predicted by the CAPM.

Black, Jensen and Scholes (1972:114) conclude their study by stating:

"From the evidence of both the time series and cross-sectional runs...we conclude that the traditional form of the capital asset pricing model is not consistent with the data."

Thus it would seem that the CAPM fails to fully explain the return generating process. Black, Jensen and Scholes (1972:81) state that, "[t]he data indicate that the expected return on a security can be represented by a two-factor model such as" follows37:

\[ E(R_i) = E(R_f)(1 - \beta_i) + E(R_{mt})\beta_i \]

Jensen (1979:38) comments on this finding by stating, "[t]he fact of the matter is that although we can write down a mathematical expression which seems to describe the empirically observed phenomena we do not really understand these phenomena in any fundamental sense. That is, we have no generally accepted theoretical understanding of the basic nature or causes of this phenomena."

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37 A full discussion of the zero-\( \beta \) model of Black (1972) is beyond the scope of this chapter which has been restricted to the standard form CAPM.
3.5.3.4 **HYPOTHESIS FIVE: UNSYSTEMATIC RISK**

In the CAPM, we differentiate between two types of risk: systematic and unsystematic risk. Much of this chapter has concerned itself with the theoretical development of and justification of using systematic risk to explain security returns. In this section, we review an empirical test of whether or not systematic risk explains returns or whether unsystematic risk also plays a role. The CAPM predicts that unsystematic risk plays no role in explaining returns.

The classic study in this field is Fama and MacBeth (1973) who tested the following relationship:

$$R_p = \gamma_0 + \gamma_1 \beta_p + \gamma_2 \sigma_p^2 + \gamma_3 \delta_p + \eta_p$$

This equation is testing more than one hypothesis, it is a joint test of the linear hypothesis and a test of the no-unsystematic risk hypothesis. If the CAPM is valid, then: $$\gamma_3 = 0$$; and, $$\gamma_5 = 0$$.

Using data from the CRSP tapes over the period 1935 - 1968, Fama and MacBeth (1973:622-623) calculate various forms of the estimating equation. The average value for $$\gamma_3$$ for the full period is 0.0198, which is not significantly different from zero. Fama and MacBeth (1973:623) also report the values of $$\gamma_3$$ for various sub-periods during the period (both five and ten year periods). $$\gamma_3$$ was found to follow a random walk, with both positive and negative values. Thus it was concluded that residual risk plays no role in explaining security returns (Fama and MacBeth 1973:633). They also show that it is impossible to predict the value of $$\gamma_{3,t+1}$$ given the value of $$\gamma_{3,t}$$.

Similar results occur when Fama and MacBeth (1973) tested for non-linearity.
3.5.3.5 SUMMARY

The empirical tests can be summarised as follows:
- there is a positive relationship between $\beta_i$ and $R_i$;
- the relationship between risk and return is linear, evidence of non-linearity has little implication for investment strategy as the effects of this non-linearity is unpredictable with an average value of zero;
- the slope of the empirical security market line is less than that predicted by the CAPM and its intercept is higher than the average $R_i$ in the periods used for testing; and,
- unsystematic risk is not related to security returns.

As we have seen the studies have not been able to entirely support the CAPM. Jensen (1973:38) argues that "the simple version of the asset pricing model ... does not provide an adequate description of the structure of security returns." This may seem a harsh conclusion to draw, after reviewing the evidence, (as Jensen 1973 did). Modigliani and Pogue (1974:82) state, "[o]bviously, we cannot claim that the CAPM is absolutely right. On the other hand, the empirical tests do support the view that beta is a useful risk measure".

3.6 SOME (UNIVARIATE) TESTS OF THE CAPM

3.6.1 INDIVIDUAL STOCKS

In this section, some of the traditional tests of the CAPM will be featured using SA data. Price and dividend data taken from the I-Net service was used to construct a total (monthly) returns file for the period January 1981 to December 1990. The defined population for the study was all stocks that had been continually listed for the full period. The total sample period was divided into two periods; 1981-1985 and 1986-1990. For the first period one hundred

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3 This summary is synthesized from Modigliani and Pogue (1974: 82) and Jensen (1979: 37).
and fifty eight total return files were formed, for the second period, one hundred and ninety eight total return files were formed\textsuperscript{39}. Two indices were used as a proxy for the market:
- the JSE all share actuaries index; and,
- an equally weighted index consisting of the sample returns in each period.

The following steps were taken:
- \( \beta \)'s were calculated using the market model in both the total return and excess returns form;
- SML's were calculated;
- the explanatory power of \( \beta \) was compared to that of standard deviation; and,
- the linearity of the SML was investigated.

No adjustments were made for thin trading as the robustness of these adjustments are doubtful\textsuperscript{40}.

The initial set of results refer to the total return form of the market model. The excess returns results follow. The first and most obvious test of the CAPM is to estimate the security market line. Table 3.10 shows the SML for both periods, using the ALSI as a proxy for the market.

\textsuperscript{39} The discrepancy in numbers arises due to data limitations contained within the I-Net service.

\textsuperscript{40} No adjustment for thin trading is made anywhere in this paper for this reason. In effect, an assumption of no liquidity costs has been made throughout. This is a potential source of bias in the paper and its conclusions.