

# **Private Equity Investments: A Review of Current IRR Practice and an Alternative Approach to Evaluating Private Equity Investments**

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## **OVERVIEW**

Generally, the analysis of potential Private Equity (PE) investments includes a 5-year Internal Rate of Return (IRR) model. How important this 5-year model is in the investment process depends on the portfolio manager's ("PM") confidence in the enterprise's ability to produce the results presented in the proposed business plan.

The goals of this paper are to:

- (1) Consider which cash flows should be used in the IRR model.
- (2) Determine the appropriate required minimum return to use for PE investments.
- (3) Suggest a better method of evaluating potential PE investments, using a 3-year Scenario/Option Pricing Model with associated probabilities.

We believe the conventional IRR analysis using 5 years of cash flows is too long for reviewing PE investments. Research indicates that over 70% of all successful investments are realized within 3 years. For this reason, and other reasons described herein, we suggest that a 3-year IRR evaluation of the enterprise's cash flows would be a more appropriate timeframe to review the investment opportunity.

The growth of PE investments over the last two decades has led to more research on the expected returns from this specific asset class. From this, investors have expectations of annual returns from new PE investments currently of approximately 17% net of management, performance fees, and other fund expenses. This net return requires the PE fund to earn returns of a minimum of approximately 25% annually on the investment portfolio. Accordingly, the discount rate for the IRR analysis of an individual PE investment is a minimum of 25% annually. Over time, these percentages will change as circumstances change.

We suggest PMs should employ a 3-year Scenario/Option Pricing Model. This timeframe is more in line with the likely hold period for a successful PE investment. More important, this model forces PM's to analyze the business plan on a rigorous basis with a number of benefits:

- (1) The key factors in the business plan are examined closely to determine the likelihood of achieving the business plan.



- (2) Outcomes other than the business plan are determined with their probabilities and the financial implications of those outcomes quantified.
- (3) Milestones occurring within the period of the business plan are identified whereby significant decisions (or options) are to be made by the enterprise or the PE investor.

In practice, the PM will likely spend more time on outcomes other than the business plan which will highlight the strengths and weaknesses of the business plan itself.

## **CURRENT PRACTICE**

In evaluating potential PE investments, one key component is the preparation of a Discounted Cash Flow (DCF) analysis. This analysis yields an IRR for the proposed PE investment.

The IRR is typically determined using 3-5 year projections provided by management consistent with a business plan. Within the 3-5 year timeframe, PMs will identify key elements of the business plan (i.e. acquisitions, plant/building upgrades, etc) which are essential for the successful implementation of the proposed business plan. In general, a maximum of five key elements in any business plan should be identified.

The 5-year business plan has been the mainstay for the PE industry in the analysis of potential investments. It is generally thought that the 5-year cash flow analysis has an important advantage compared with a shorter timeframe: it reduces the influence of the terminal value on the total present value. However this apparent advantage is deceptive for a number of major reasons:

- (1) In many instances business plans do not have distributions to shareholders over the 5-year period and therefore all the value resides in the terminal value anyway.
- (2) There is an implied assumption that the cash flows in years 4 and 5 are reasonably accurate. We do not have data on this but, since the cash flows of years 4 and 5 are dependent on the flawless execution of the business plan in the earlier years, this assumption is questionable at best.
- (3) The target minimum IRR for a potential PE investment is set at say a minimum of 25%, and applied to each of the 5 years under review. However, the investment profile changes over this period and the investment risk will likely be reduced significantly as the enterprise achieves the business plan and gains market share and size.

- (4) Most important, the cash flows only represent the outcome when the business plan is implemented successfully and all of the key underlying elements are executed properly. Clearly, any analysis should include scenarios which incorporate results that represent partial or incomplete success in the implementation of the business plan.

Research conducted by Das et al. concluded that approximately 71% of successful “Late Stage” PE investments are realized within 3 years of the initial investment. “Late Stage” PE investments are investments in more mature enterprises and contrast with “Early Stage” or Venture Capital investments. This would suggest that the business plan projections, DCF analysis, investment analysis and other considerations should reflect timelines shorter than 5 years.

We believe the analysis of potential PE investments should be over a 3-year time because:

- (1) It better reflects the actual time horizon experienced for successful PE investments. Put simply, it better reflects reality.
- (2) It better reflects the realistic return expectations of the PE investor, that is, the investor and the PM should expect the PE investment to realize the required IRR for a maximum of 3 years but no longer.

An analysis predicated on a 5-year period is likely to lead to valuation error, mispricing and the rejection of attractive PE opportunities.

In summary, a 3-year cash flow analysis is the appropriate timeframe for evaluating potential PE investments. Where the investee company has a 5-year cash flow prepared based on its business plan, we think it is advisable for the PE investor to focus on a 3-year time horizon.

## **EXPECTED RETURNS**

In order to deliver the returns that investors require, PMs must be aware of investor expectation of returns for the particular asset class given the associated level of risk. Several studies have been undertaken to determine the expected returns of both private and publicly traded companies. These will be discussed in the following paragraphs.

Generally, expected returns are determined based on one or more risk premiums which are summed and combined with the risk free rate of return (RFR) to determine an overall investor expected return. The nominal return on a given PE should also include inflation in the return.

David Swensen, former CIO of the Yale Endowment Fund concluded that the PE portion of that fund's portfolio is expected to return approximately 12.5% (real return) with a standard deviation (sd) of 25%. This is considerably lower than the historical data which indicates that PE provided the fund an average return of approximately 19% (real return) with a sd of 20% (Yale PE Portfolio 1982-1997). Swensen's statistical research further concludes that 1<sup>st</sup> quartile performers in Venture Capital and Leverage Buyout funds returned on average 17.1% and 23.8% respectively (1980-1997).

Shannon Pratt summarized a study by Ibbotson Associates in 1988 which is still widely used. They determined the following risk premiums:

Equity Risk Premium	=	8.3%
Small Stock Premium	=	3.7%
Total Premium	=	12.0%

James Schilt's Risk Premiums are based on 4 different categories. Only Categories 3 and 4 could be applied to Private Equity.

“Category 3: Businesses in a highly competitive industry that require little capital to enter, no management depth, element of risk is high, although past record may be good.  
Risk Premium 16-20%”

“Category 4: Small business that depend upon special skill of one or two people. Large established businesses that are highly cyclical in nature. In both cases, future earnings may be expected to deviate widely from projections.  
Risk Premium 21-25%”

Pratt's risk premium would be combined with a liquidity premium and the RFR to determine the expected return. Schilt's premiums would be combined with the RFR to determine the expected return for similar private equity investments. If we assume a risk free rate of 2.0% to determine the expected return, we can obtain the expected nominal return as shown in Appendix A.

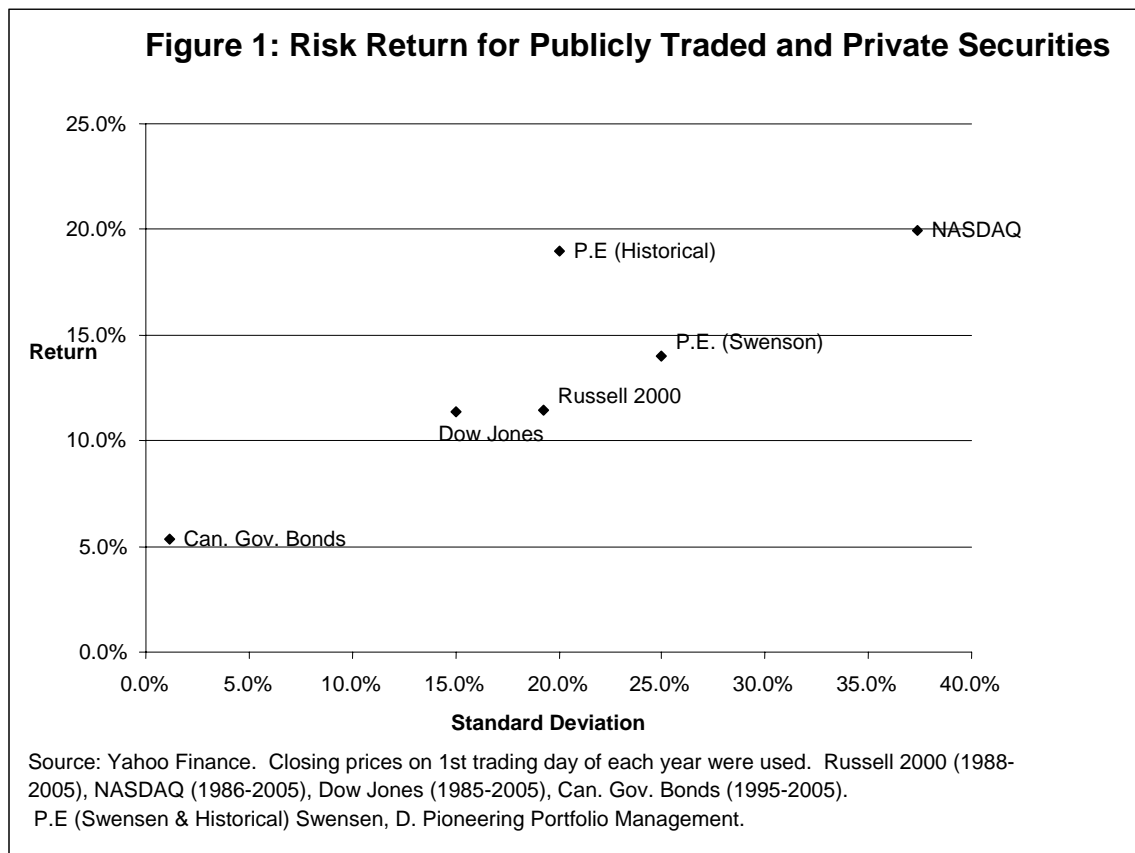
Appendix A shows six expected net returns reflecting on various risk premiums including studies shown earlier and with our adjustments to incorporate inflation rates and RFR. The analysis is rudimentary but provides a guide. The range of these six returns is broad (10.7% to 26.5%) with an average of approximately 17%.

Figure 1 shows risk returns for different types of asset classes with the annual returns and standard deviations. The chart should be used with caution because the periods for the asset classes vary, however it is illustrative of historical

returns. The return of 14% shown as “P.E.(Swensen)” is not a historical return but represents Swensen’s expected return of 12.5% plus our addition of 1.5% for inflation. Our estimate of 17% is between this estimate and the historical average PE return of 19% (real return).

This level of expected returns of 17% is achievable if past performance is an indication of future performance. The historical returns referred to by Swensen and shown earlier exceed this level of expected returns. In addition, Christophe Rouvinez of CapitalDynamics has studied the returns of Private Equity fund of funds from data for 1994 to 2003 provided by Venture Economics and found the median IRR to be approximately 23%.

It should be noted that this level of expected returns of 17% is for new investments and that the general consensus is that returns for the next two years from PE funds in existence today will likely be significantly less than this level.



For the IRR analysis, we need to determine the appropriate required minimum rate of return or discount rate for a PE opportunity. To do this, we need to determine the average IRR required from the portfolio of PE investments to yield a net return of 17% to cover the fees and expenses of the PE fund.

Typically, PE funds charge management fees of 2.0% on committed capital during the commitment period and performance fees of 20% on the profits returned to investors in excess of a benchmark, usually 8-10% per annum. PE funds never have all the committed capital invested for the entire term of the fund, and may not at anytime for a number of reasons:

- (1) At the start of the fund's life, no investments have been made and it typically takes a number of years for the fund to draw down on all of the commitments.
- (2) Investments are realized and the proceeds are then distributed to the investors.

We consider that 4.0% per annum on invested capital (not committed capital) is a reasonable estimate for the management fees and fund expenses.

A net return of 17.0% requires the portfolio investments to earn on average approximately 25.3% as calculated below:

Nominal Return (before fees)	25.3%
Fees and expenses	<u>(4.0)</u>
Subtotal	21.3
Performance fee (20%)	<u>(4.3)</u>
Net Return	<u>17.0%</u>

From the above analysis, the PM must consider PE investment opportunities on the basis that the minimum IRR is 25%. This analysis provides the framework for determining the required minimum IRR, however over time the percentage will change as circumstances change.

### **AN ALTERNATIVE APPROACH**

In proposing an alternative method of evaluating PE investments, we seek to improve the PM's ability to find profitable investments and to better understand the inherent risks.

Given that the majority of successful PE investments are realized within three years, an alternative approach based on a 3-year cash flow analysis seems to be more reflective of reality. The proposed model will include the evaluation of multiple outcomes/scenarios and assigning probabilities to each of those outcomes.

This model ensures the focus is on the key factors of the business plan. It also quantifies and assigns probabilities to different outcomes, which forces more

attention on the elements of the business plan, the probability of their occurrence and conversely the likelihood that the elements of the business plan are not achieved and the quantification of the financial impact.

The scenario analysis will also enable PMs to develop milestones for meeting objectives, and determine the proper times to evaluate and make decisions during the 3-year investment period. When decisions involving additional capital inflows are made subsequent to the initial investment the model then becomes an Option Pricing model.

The following example will help to illustrate the Alternative Approach.

Proposed Investment:

Initial Investment \$100

Value or Payout Amount after 3 years (according to the Business Plan): \$274

Inherent IRR: 40%

To simplify the example, no distributions are made during the 3 year period and a valuation of the investment is made at the end of year 3 which would reflect the cash flow ability of the enterprise.

Taken by itself, this supports an investment assuming the required minimum IRR is 25%. The minimum IRR has been taken from the results of the previous section. However, if the likelihood of achieving the business plan is about 30% and alternative outcomes are considered a different conclusion might be reached.

Two alternative outcomes will be incorporated with their financial implications. These alternatives and their assigned probabilities will be dependent upon the PM's assessment of management's previous performance, industry factors and other relevant variables:

Alternative Outcome 1:

Value or Payout Amount in year three: \$133

Probability: 50%

Implied IRR: 10%

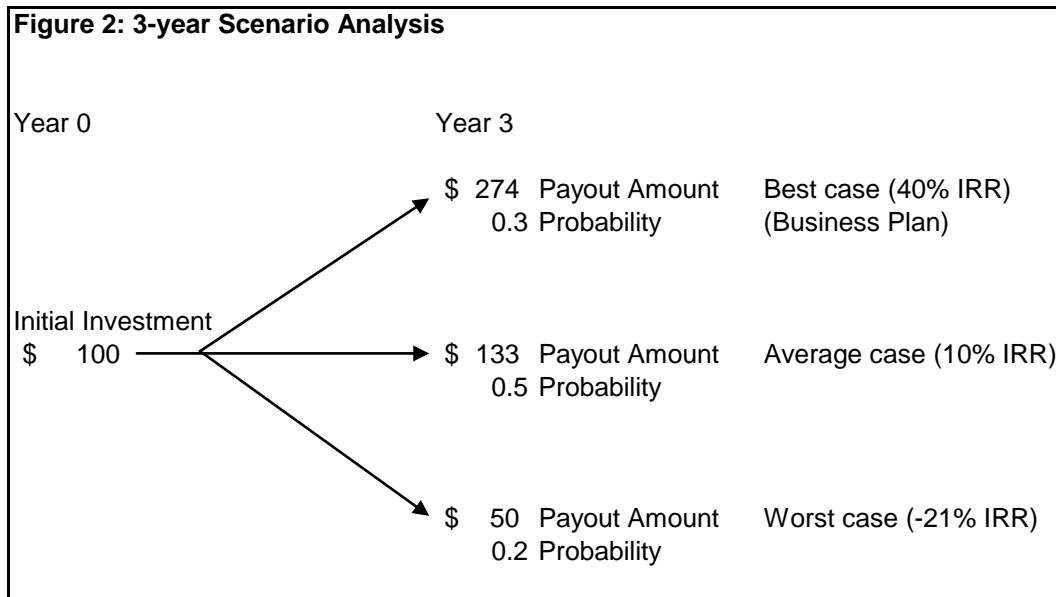
Alternative Outcome 2:

Value or Payout Amount in year three: \$50

Probability 20%

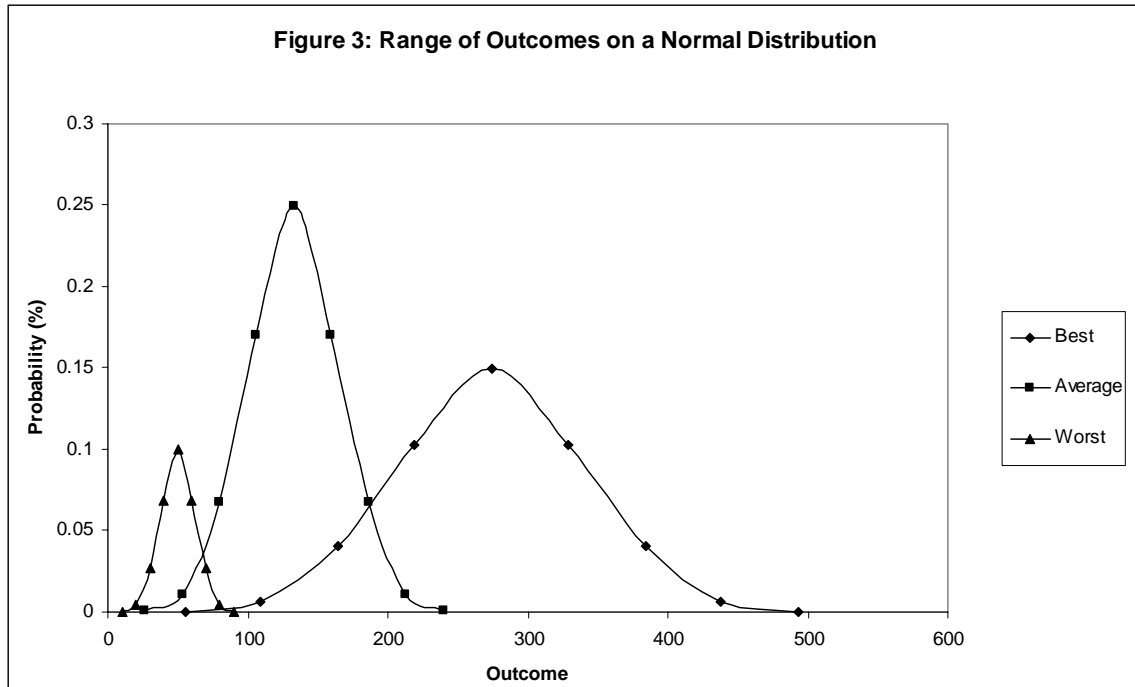
Implied IRR: -21%

This can be illustrated in a decision tree as shown in Figure 2



Each of the three outcomes is itself a subset, or an average of many outcomes, which are distributed around these three outcomes. Assuming normal distribution, the distribution of outcomes surrounding each alternative (shown in Figure 3) has been prepared assuming a sd of 20%, which is the historic standard deviation of returns provided by Swensen. These are the only two assumptions made in this model.

- (1) The outcomes are normally distributed around the average.
- (2) The 20% standard deviation is realistic.

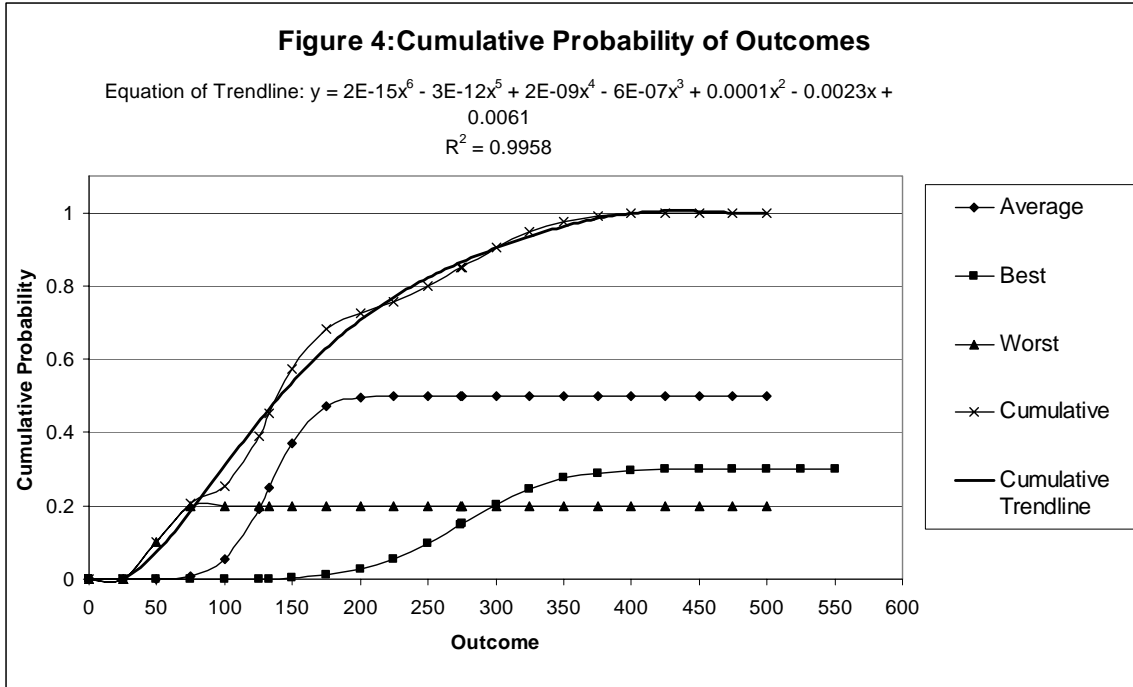


The next step is to determine the cumulative probability of each return based on all the outcomes and their probabilities. This can be seen in Figure 4. This graph can be used to analyze the likelihood of a given return; the return can then be translated into an IRR for the investment.

The IRR of 40% is equivalent to a value of \$274 in the third year. From Figure 4 it can be determined that a value of \$274 has a cumulative probability of approximately 85%, which means our probability of exceeding a 40% IRR is 15%.

To determine the probability of a 25% IRR, which would be the expected minimum required return from the previous section, the equivalent value must be calculated,  $\$100 * 1.25^3 = \$195$ . The chances of a value of \$195 or less estimated in Figure 4 is about 70%, which indicates the investment in this example has a 30% chance of meeting or exceeding the expected return of 25%. This analysis suggests the investment should be rejected; a different conclusion from the traditional analysis.

This model will allow the PM to support a decision based on quantified probabilities and risks inherent in a specific investment. Obviously, the determination of the alternative outcomes and the probabilities that are assigned becomes the tallest order in this model as all subsequent decisions are based on these two variables. The importance of the model is that it forces the PM to focus on these variables.



The proposed model can be expanded to include Option Pricing, which would be applicable for investments which require subsequent cash injections to pursue the business plan.

**CONCLUSION**

The traditional 5-year IRR analysis of cash flows is too long for PE investments, as approximately 71% of all successful investments are realized within 3 years. A 3-year IRR evaluation of the enterprise’s cash flows would therefore be more appropriate.

The historical data indicates that PE investments should provide investors with gross returns of approximately 25%, or 17% net of fees and expenses.

To help ensure potential investments provide the expected IRR, PMs could employ a 3-year Option Pricing Model, which would allow them to quantify risk and evaluate the probability of a given return. This will equip them with more information to make more informed investment decisions. The use of 3-year Option Pricing model will provide the PM with a more realistic analysis of potential returns that could result from a proposed investment.

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## APPENDIX A

### Expected Returns from Private Equity

The following is a small sample of research undertaken on private equity returns. The figures in bold are from the source material and we have made adjustments and assumptions to seek comparability. The analysis is rudimentary and therefore is useful only as a guide.

	<u>Swensen</u> (Expected Returns)	<u>Swensen</u> Historical Returns (Median)	<u>Swensen</u> Historical Returns (1 <sup>st</sup> Quartile)	<u>Schilt</u>	<u>Ibbotson Associates</u>	<u>UBS</u>
Risk premiums				<sup>(3)</sup> <b>23.0%</b>	<b>12.0%</b>	<b>9.9%</b>
Liquidity premium					<sup>(4)</sup> 2.0	
Risk Free, Rate, assumed				<u>2.0</u>	<u>2.0</u>	<u>2.0</u>
Real Return	<b>12.5%</b>			25.0	16.0	11.9
Inflation rate, assumed	<u>1.5</u>			<u>1.5</u>	<u>1.5</u>	<u>1.5</u>
	<u>14.0%</u>	<sup>(1)</sup> <b>10.7%</b>	<sup>(2)</sup> <b>20.5%</b>	<u>26.5%</u>	<u>17.5%</u>	<u>13.4%</u>
Average		<u>17.1%</u>				

Notes:

- (1) Average of historical data for venture capital (8.1%) and leverage buyouts (13.2%) for 1980 – 1997. Inflation for the period is included.
- (2) Average of historical data for venture capital (17.1%) and leverage buyouts (23.8%) for 1980 – 1997. Inflation for the period is included.
- (3) Mid point of Category 4 (21-25%).
- (4) A liquidity premium of 2.0% has been added.