Weighted Average Cost of Capital for WestNet Rail

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1 Introduction

WestNet Rail (WestNet) operates the standard, narrow and dual gauge network in the south west of Western Australia. The Economic Regulation Authority (ERA or the Authority) is charged with the task of regulating access to the network. One of the key inputs for the determination of access charges is the Weighted Average Cost of Capital (WACC).

When determining the WACC, the *Railways (Access) Code 2000* requires the Economic Regulation Authority (ERA) to undertake public consultation every five years. The public consultation is required before determining the WACC for the 12 months from 1 July 2008.

The Authority commissioned the Allen Consulting Group (ACG) to review the existing WACC calculation and to recommend any changes. ACG has completed its report and made a number of recommendations concerning the CAPM parameters for the freight business. These recommendations are reproduced in table 1 below.

Table 1 – ACG CAPM Estimates

CAPM Parameter	
Nominal risk free rate of return	5.99%
Inflation rate	3.00%
Real risk free rate of return	2.90%
Debt Proportion	35%
Market risk premium	6.00%
Asset beta	0.60
Equity beta	0.92
Debt margin	1.55%
Debt issuance costs	0.125%
Equity issuance costs	3.83%
Taxation rate	30%
Gamma	0.50

The ACG Report recommends the continued use of the CAPM in deriving the cost of equity parameters in the WACC calculation. This report will address many of those parameters recommended by ACG including ACG's logic and rationale in making the recommendations.

WestNet has requested Synergies Economic Consulting (Synergies) to provide an opinion regarding specific parameters used in the weighted average cost of capital

(WACC). In so doing, the report does not dispute the adoption of the real-pre tax approach to the determination of the WACC.

The report is structured as follows:

- section 2 reviews the risk free rate applicable to WestNet;
- section 3 considers the inflation rate assumption that is appropriate for WestNet's pre-tax real WACC;
- section 4 assesses the capital structure that should be adopted for WestNet;
- section 5 reviews asset and equity betas appropriate for WestNet;
- section 6 considers the market risk premium;
- section 7 reviews WestNet's cost of debt;
- section 8 considers the dividend imputation assumptions for WestNet's cost of capital;
- section 9 reviews the assumptions regarding debt and equity issuance costs; and
- section 10 provides a summary.

2 Risk-free rate

2.1 Introduction

The risk-free rate measures the return an investor would expect from an asset with zero volatility and zero default risk. The yield on long-term Australian Commonwealth Government bonds has been the most common proxy for a (nominal) risk-free return as the government can honour all interest and debt repayments.

2.2 ACG Recommendation

Even thought it has been common to use the Government bond yield as a proxy for the risk free rate of return, questions have arisen as to the appropriateness of this proxy due to the presence of a bias relative to the risk free rate it is representing. ACG identify that there may exist a bias in the yield on real government bonds[1] and that the bias also exists for nominal bonds to the extent of 42 – 44 basis points.[2]

2.3 Concerns with ACG approach

Synergies contends that:

- the existence of uniqueness bias in bonds should be recognised in the risk free rate; and
- ACG did not acknowledge the fact that the RBA has recognised the legitimacy of a uniqueness bias;
- the uniqueness bias should be quantified at the time of the setting of the risk free rate.

These issues are considered in turn.

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1 The Allen Consulting Group, 'Railways (Access) Code 2000: Weighted Average Cost of Capital 2008 WACC Determinations' page 12

2 Results of a study undertaken by NERA Economic Consulting 'Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free Rate'.

2.4 The existence of uniqueness bias

This desire to hold Government bonds is priced and results in an upward bias in price (downward bias in yield) which is commonly called the 'uniqueness' premium. Ignoring the recognised uniqueness bias jeopardises the appropriateness of using unadjusted Government bonds as a proxy for the risk free rate of return. It is therefore critical to correctly quantify the bias and adjust or remove the bias.

The reason that the yield on Government bonds is lower than the CAPM risk free rate is that the bonds are affected by a uniqueness bias which arises from the unique characteristics of these bonds given:

- the source of liquidity that government debt provides;
- that some investors have for desire for sovereign debt;
- Government bonds are the required collateral for futures trading, and
- Government bonds and simple to understand without any complicating attached covenants or features.

2.5 Acknowledgement of uniqueness bias

ACG state that: [3]

> the RBA and Commonwealth Treasury Department have both rejected the contention of a downward bias in returns on nominal government bonds.

However, this statement directly contradicts a statement by the RBA on the matter in 2004:[4]

> Premia for credit default swaps (CDS), which measure the cost of insurance against a specific company defaulting, have fallen sharply in the past year and spreads between corporate bond and swap rates have also fallen (Graph 21). In contrast, interest rate spreads between corporate bonds and Commonwealth Government securities (CGS) have risen over the past six months, although this appears to reflect strong demand for CGS, particularly from overseas investors, rather than a judgment about credit quality in the Australian corporate sector.

[3] ACG Report ibid p13

[4] March 2004 RBA Financial Stability Review Report p15

ACG also fail to recognise the large body of work[5] undertaken by noted academics which argues the risk free rate[6] to be used in the CAPM is materially above the Government bond yield.

2.6 Quantifying the uniqueness bias

Historically, it has been difficult to estimate the uniqueness bias in Government bonds. However, the growth in the market for credit default swaps (CDS) has made it possible to quantify the bias. A CDS is effectively an insurance premium that insures against default risk. If for example the yield on AA corporate bonds was 7% and the cost of the CDS was 50 points then a zero risk yield would be 6.5%. This yield can then be compared with the Government bond yield and the difference is the bias.

NERA[7] recently undertook a study and estimated that for January 2007, the 10 year Australian Commonwealth Government bond yield understated the risk free rate of return by 42 to 44 basis points. Synergies replicated the study[8] for October 2007 (see Table 2) and found that the average bias using AA and A non-government securities in 2007 ending October 2007 was 55 basis points.

Table 2 Risk free rate bias

	AA-Spread	AA-CDS	Implied Bias	A-Spread	A-CDS	Implied Bias
Jan-07	49	7	42	63	20	43
Feb-07	50	6	44	65	18	47
Mar-07	52	5	47	63	17	46
Apr-07	52	6	46	62	17	45
May-07	53	6	47	63	18	45
Jun-07	58	5	53	66	19	47
Jul-07	70	11	59	77	26	51
Aug-07	96	30	66	104	34	70
Sep-07	94	28	66	102	30	72
Oct-07	101	20	81	113	30	83
Average			**55**			**55**

Source: Reserve Bank, Capital Markets Yields and Spreads – Non-government Instruments F3

5 Collin-Dufresne, Pierre, Robert S. Goldstein and Spencer J. Martin , 2001, "The Determinants of Credit Spread Changes," Journal of Finance 56(6), pp. 2177-2207, Feldhütter, Peter and David Lando, 2006, "Decomposing swap spreads", Copenhagen Business School Working Paper.

6 The risk free rate of return in the CAPM is the return earned for zero beta equity.

7 NERA Economic Consulting, 'Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free Rate' March 2007.

8 The data was sourced from the RBA using F3 Capital Market Yields and Spreads – Non-government Instruments and F2 Capital Market Yields – Government Bonds.

Synergies contends that the risk free rate estimate used in the CAPM needs to be the sum of the 10 year Australian Commonwealth Government bond yield plus an adjustment for the 'uniqueness' bias of 55 basis points.

2.7 Conclusion

Synergies contends that uniqueness bias in Government bonds must be removed/adjusted to ensure the CAPM is correctly applied. The bias should be estimated at the same time that the risk free rate is calculated. The current bias (as at October 2007) has been quantified and requires an adjustment of 55 basis points be added to the yield on the 10 year Government bond.

3 Inflation

3.1 Introduction

Inflation is determined by the movements in the general level of prices. The rate of inflation in an economy changes over time. The Reserve Bank of Australia (RBA) now has responsibility for maintaining inflation within the target range of 2% to 3% per year. The most recent CPI figures released by the ABS show that the CPI rose 0.7% in the September quarter and 1.9% for the year to the September quarter.

3.2 ACG Recommendation

ACG recommends adopting an inflation rate of 3%. They base their estimate upon a number of factors including:

- the inflation rate implied in comparing nominal and real long term government bond rates even after stating that the estimate will not be unbiased. The forecast inflation rate derived from the 10 year bond was 3.33 per cent;
- the RBA's target range for inflation which is a band of 2% to 3%;
- forecasts made by interested parties cited by the Essential Services Commission including the Commonwealth Treasury, KPMG, BIS Shrapnel and financial institutions. The reported inflation rate from these parties was a short-term forecast.

After consideration of the numerous sources, ACG recommend an inflation rate of 3 per cent be applied for the next 5 years.

3.3 Concerns with ACG approach

Synergies contends that:

- the approach of considering a short-term rate contradicts the rationale of market convention using the 10 year bond;
- an examination of the sources cited by ACG as well as other credible sources reveals considerable uncertainty over longer term trends in inflation.

Synergies accepts the approach of moving away from the Fisher equation to estimate inflation. However, Synergies believes that on the basis of:

- the inherent uncertainty as to longer term inflation as demonstrated by the available evidence as to forecasts of longer term inflation;
- the last decade of Australia's inflation performance;
- the inconsistency of the assumption with well established RBA policy; and
- the recognition of the asymmetric consequences of regulatory error,

an appropriate forecast for a long term estimate of inflation is 2.5%.

These issues are considered in turn.

3.4 Long term view of inflation is required

The WACC to be adopted from the current process is to apply over the period from 1 July 2008 to 30 June 2013. It is completely inappropriate to base an inflation forecast for this period on short term inflationary trends, many of which are expected to have been reversed by the time the WACC decision comes into effect.

3.5 Inherent uncertainty in inflation estimates

Synergies has examined the three sources (RBA, Commonwealth Treasury and financial institutions) recommended by ACG to derive an estimate for inflation. The general consensus is a long term rate of 2.5%. The rate recommended by ACG is clearly outside the range of views expressed by the three recommended sources. Each of these three sources will be considered in turn.

3.5.1 Commonwealth Treasury

The Pre-Election Economic and Fiscal Outlook 2007 provides recent forecasts and projections of economic and fiscal conditions prepared prior to the recent Federal election. The Mid Year Economic and Fiscal Outlook 2007-08 also provides forecasts and projections.

The Treasury expects inflation pressures to ease in the medium term, although they will remain during the first half of 2008. The easing in inflation pressures is expected to be due to decreased demand pressure. Strong business investment is also expected to mitigate upside inflation risk. Global economic conditions, which are hard to predict accurately, may have a significant impact on Australian inflation outcomes. The impact of global financial market volatility has so far been relatively benign, but the future impact of financial market volatility being resolved in a less benign fashion could have adverse consequences for the Australian economy, lowering inflation.

Table 3 Treasury CPI Forecast

	2007-08	2008-09	2009-10	2010-11
CPI	2 ¾ %	2 ¾ %	2 ½ %	2 ½ %

Source: Pre-Election Economic and Fiscal Outlook 2007, p2 and Mid-Year Economic and Fiscal Outlook 2007-08, p4.

Commonwealth Treasury has very similar forecasts to the RBA in the medium term. The Commonwealth Treasury's long term estimate is 2.5% which is the mid point of the RBA target band.

3.5.2 RBA

The RBA's target range for inflation is currently between 2% and 3%. The RBA reports that inflation expectations in the economy remain "relatively high"[9] in the short term as momentum in the economy was stronger than expected during 2007 which created tight capacity conditions.

Whilst the RBA expects inflation in the short term to be relatively high, stating that "both CPI inflation and underlying measures are likely to rise above 3 per cent on a year-ended basis over the next two quarters"[10], it should be recognised that this period is not even relevant to a consideration of WestNet's cost of capital (which only comes into effect from 1 July 2008).

Accordingly, it is the medium to long term that is relevant to the inflation forecast for WestNet. In the medium term, the RBA expects inflation to ease. International growth will be of significant importance to the outcomes for the Australian economy, particularly if the US and China experience decreased economic growth. Domestic inflation pressures are likely to remain, although demand growth is expected to ease and a strong Australian dollar will ease inflation.

Table 4 RBA Inflation Forecasts

	December 2006	June 2007	December 2007	June 2008	December 2008	June 2009	December 2009
Consumer Price Index	3.3	2.1	2 ¾	3 ¼	3	2 ¾ - 3	2 ¾ - 3
Underlying Inflation	3.0	2.8	3 ¼	3 ¼	3	2 ¾ -3	2 ¾ -3

Source: RBA, Statement on Monetary Policy, November 2007, p69.

[9] RBA, Statement on Monetary Policy, November 2007, p67.

[10] RBA, Statement on Monetary Policy, November 2007, p68.

3.5.3 Financial Institutions

Financial institutions' published reports on inflation tend to have a short term focus which makes them of limited relevance to the current investigation. In general, financial institutions expect inflation to peak around mid 2008 and decline thereafter.

Economic Perspective published on 3 December 2007 stated that the Commonwealth Bank expected CPI to decrease to 2.6% in 2008-09. Similarly, ANZ are forecasting both headline and core inflation to drop to 2.6% over 2008-09.[11]

3.5.4 Summary

Synergies has obtained medium term estimates of inflationary expectations. While longer term inflation is harder to predict and publications from financial institutions normally focus on nearer term inflation expectations, the consensus presented above suggests that inflationary pressures in the economy will ease either before 1 July 2008 or in the 6 months thereafter.

There is considerable (indeed unusually high) uncertainty at present regarding the impact of international economic pressures – although it is expected that they are unlikely to drive Australian inflation outside the RBA's target range, and will also ease in the longer term.

Domestic demand and capacity constraints are likely to prove pivotal in the long term inflation outcomes and again these concerns are expected to ease from the significant investment that is occurring at present.

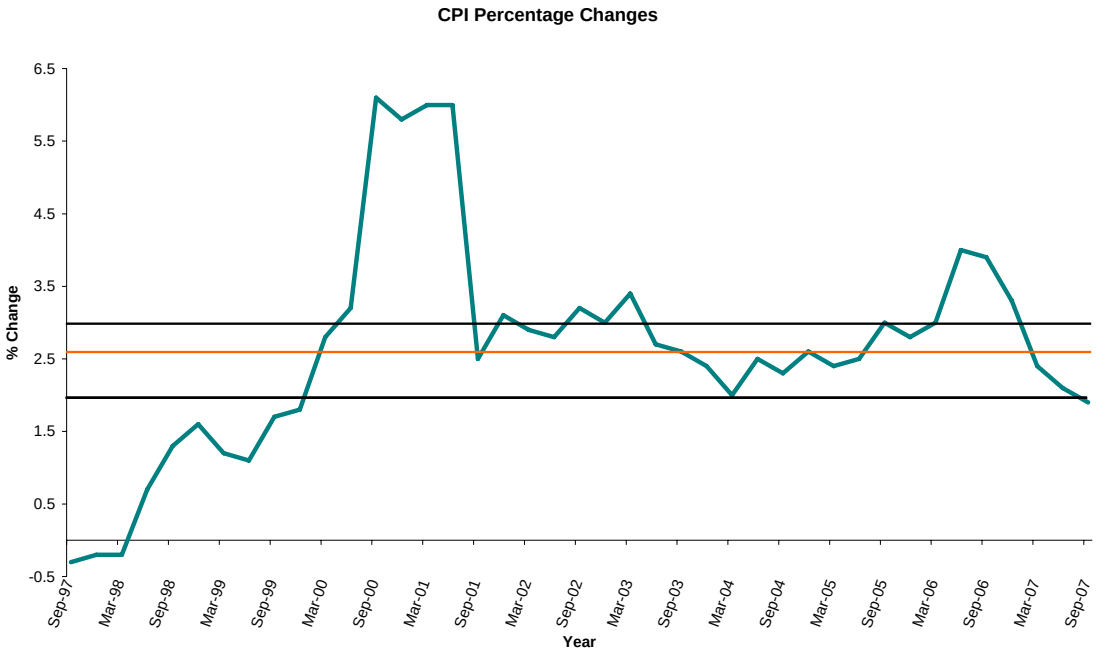
It would be most inappropriate for the Authority to adopt a long term inflation estimate based on short term data that is unlikely to be of particular relevance at the commencement of the period that the WACC is to be in place, let alone be relevant over the duration of the period in which it is to apply.

3.6 Long term inflation performance

Australia's long term inflation performance is shown in Figure 1 below. Over the last 10 years, it is true that inflation (as measured by the CPI) has exceeded 3% for short periods – the increase in inflation over the period from 2000-2001 was due to the introduction of the GST.

[11] ANZ Australian Economics Weekly, 7 December 2007, p9

Figure 1 Historical inflation performance



Source: ABS

However, the key point is that the long term inflation average has been remarkably stable over this time – the 10 year average, incorporating the impact of GST is just above 2.5%. This highlights the unlikelihood of the ACG assumption of long term inflation being at 3% *over the entire 5 year period* being realised.

3.7 RBA monetary policy

It is clear from recent events that the RBA intends to keep inflation well within its target range. As ANZ recently observed: [12]

> Inflation persistently at the top of the target band is unlikely to be acceptable to the Reserve Bank.

We simply do not believe that it is credible that the Reserve Bank would allow an outcome representative of a long term inflation forecast being at the top end of its established band.

[12] ANZ Economic Outlook, 15 October 2007, p15.

3.8 Conclusion

As there is a bias in real and nominal risk free rates, it is not possible to derive an unbiased inflation rate using the Fischer equation. ACG recommend three ways of estimating a rate using RBA forecasts, Commonwealth Treasury and financial institutions.

Based on:

- the considerable uncertainty that exists over longer term inflation;
- the widespread recognition that short term inflationary pressures are expected to ease before the commencement of the period that the WACC is to be in place, let alone be relevant over the duration of the period in which it is to apply;
- the fact that a 5 year outlook of 3% inflation is unprecedented in modern Australian monetary history;
- the inconsistency of such an outcome with established Reserve Bank policy; and
- accepted regulatory wisdom that regulator's should have regard to the asymmetric consequences of regulatory error,

Synergies recommends that an inflation forecast of 2.5% be adopted by the Authority for the current upcoming period. The best long term estimate of inflation is 2.5% being the mid-point of the RBA's target inflationary band. In the absence of compelling evidence to the contrary this represents the best figure to underpin regulatory determinations.

4 Capital structure

4.1 Introduction

Capital structure is measured as the proportion of total assets that are funded by debt (or, debt to debt plus equity). For the purposes of WACC, this tends to be assessed based on the firm's long-term target capital structure, which is based on what is considered to be the 'optimal' long-term capital structure for the firm given its risk profile and the industry it operates in.

To determine an optimal structure it is necessary to examine market evidence. A comparator analysis is required as it is impossible to determine the optimal capital structure independently.[13] Capital structures for firms operating in the same industry type are normally fall within a reasonably narrow range. Where a firm from that industry should sit within the range is determine by firm specific issues which are evident from empirical studies.

It is also important to note that capital structure is expressed in market value terms. These market values can vary on a daily basis (for example, the market value of debt will vary in accordance with changes in interest rates), which could in turn lead to changes in the debt to total capital ratio. However, these fluctuations are not be significant, at least in the short-term.[14]

4.2 ACG Approach

ACG recognise that consideration needs to be given to market evidence for benchmarking a capital structure. ACG adopted a simple average of a range of firms that included a group of listed US and Canadian rail businesses and other transport sector entities operating in Australia and New Zealand.

4.3 Concerns with ACG approach

Synergies contends that:

[13] Myers, S. "The Capital Structure Puzzle', Midland Corporate Finance Journal. Fall 1985.

[14] Miller, M. "Debt and Taxes' Journal of Finance, May 1977 Vol 32 pp261-275

- ACG did not analyse the choice of the comparator firms and that closer examination would have revealed a more appropriate sample to underpin the analysis;
- ACG's sample may have included factual errors over the level of gearing; and
- ACG should have considered whether firm specific issues informed the analysis of capital structure rather than relying upon a simple averaging to arrive at gearing estimate.

These issues are considered in turn.

4.4 Choice of comparator firms

ACG chose a group of listed US and Canadian rail businesses and other transport sector entities operating in Australia and New Zealand. They did not analyse the choice of the comparator firms nor do they do more than some simple averaging to arrive at gearing estimate. It is imperative to use similar firms as comparator firms for the entity that is the subject of the analysis.

Firms other than Class 1 US and Canadian freight rail companies were rejected on the basis that capital structure or gearing is industry specific where firms within an industry exhibit similar levels of gearing but across industries, the level of gearing will be very different[15]. In section 4 of this report we address the appropriateness of individual comparator firms suggested by ACG but in this section the industry in which they operate is considered.

ACG recommend examining Australian intermodal and road infrastructure firms. While a small part of WestNet's business is intermodal, no part of the business operates towage (Adsteam Marine Limited) or toll roads (Macquarie Infrastructure Group). WestNet's business is freight rail where they haul mainly resources and grain and offer intermodal services. The ACG sample is not reflective of the industry within which WestNet operates and therefore gearing levels cannot be inferred upon WestNet.

The New Zealand comparator firms are equally inappropriate with the sample including an airport (Auckland International Airport Ltd), a port (Port of Tauranga Ltd), an energy, airport and transport services operator (Infratil Ltd) and an intermodal business (Toll NZ Ltd). Again these industries are different to the industry within

[15] This observation is well recognised in the finance literature, for example see Bradley M., G. Jarrell and E. Kim, 'On the Existence of an Optimal Capital Structure, Theory and Evidence', Journal of Finance, 1984 Vol. 39 pp 857-78.

which WestNet operates and WestNet's gearing cannot be inferred by the average of the samples.

To estimate the appropriate capital structure for WestNet's WACC, comparative Class 1 US and Canadian freight rail companies have been considered.

4.5 Possible inconsistency in ACG reported results

The comparative Class 1 US and Canadian freight rail companies were selected based on the relevance of their business to WestNet's activities. These businesses hauled grain, chemicals, coal, minerals and provided intemodal services. Capital structures for these comparative freight rail firms are listed in Table . Table also depicts a clear inconsistency between ACG's gearing estimates and those sourced from Bloomberg.

Table 5 Listed Class 1 Rail Companies Gearing

Company	Synergies Gearing	ACG Gearing
Burlington Northern Santa Fe	22%	30%
CSX Corporation	30%	44%
Canadian National Railway Company	18%	22%
Kansas City Southern	43%	41%
Norfolk Southern Corporation	25%	
Canadian Pacific Railway	24%	32%
Union Pacific Corporation	22%	

Source: Synergies Gearing obtained from Bloomberg November 2007

Based on a simple average, the average level of gearing for the comparative US and Canadian rail firms in 2006 was 26%. The data in Table 5 illustrates a reasonable degree of variability with the gearing levels of the firms varying between 18% and 43%.

We are not certain as to the reasons for the differences in gearing ratios for the identified companies between our sample and that of ACG. Synergies measured gearing by reference to debt to enterprise value where enterprise value is a measure of market value of the business.[16] The ratios included the latest reported and audited debt amounts. The ratios themselves were sourced from and calculated by Bloomberg in December 2007. These figures were different to the gearing level reported by ACG. ACG do not state that their reported gearing is measured in market value terms and they define gearing as debt/(debt plus equity)[17] and also debt to assets.[18] The lack of guidance and inconsistency makes it difficult to verify the reported data.

[16] Damodaran, A. Investment Valuation, Wiley, Second Edition 2002

[17] ACG Report ibid p18

It should also be noted that these gearing levels may not necessarily be the long-term target capital structure for these firms. For example the five year average level of gearing for the above firms is 34%. A five year average is required when calculating beta as the observations used in the beta calculation come from a five year period and for consistency the de-levering requires consideration of the gearing over that same five year period.

In this section we have used a cross section of the current years gearing as being indicative of a benchmark capital structure. This contemporary measure is commonly used as a measure of capital structure.[19]Why the current year's capital structure is relevant is because capital structures are reasonably constant year to year but there is some movement across longer time periods. As capital structure is being considered for the CAPM/WACC calculation, a forwarding looking estimate is required. The best predictor of next year's capital structure is the current year.

4.6 Firm specific considerations

The comparative firms have a divergent level of gearing so further investigation will be needed to establish an appropriate capital structure for WestNet. Based on market data, a capital structure assumption of between 20% and 40% is appropriate. Deriving a point estimate requires some further analysis based upon firm specific issues. These firm specific issues concern: [20]

- firm size and extent of diversification;
- risk of experiencing financial distress; and
- cost of financial distress.

4.6.1 Firm size and extent of diversification

Generally, larger and more diversified firms have greater debt capacity. The comparative analysis revealed that the Class 1 freight rail firms are larger than WestNet. Given WestNet's relative size, it should have a lower level of gearing than the average of the comparator sample of 26%.

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18 ACG Report p19

19 Damodaran, A. Investment Valuation, Wiley, Second Edition 2002 p388.

20 In practice, tax considerations will also significant influence gearing outcomes. However, it is not possible to establish forward looking tax expectations of the companies in the sample and accordingly, we have not considered tax related factors in detail.

Enterprise Value is normally calculated to determine market value. It is the sum of firm's debt plus the market value of equity less some adjustments for minority interests where applicable and cash. It is very commonly calculated in a takeover where it is the preferred calculation for determining the value of assets being acquired[21]. WestNet does not have an enterprise value but it does have a measure of assets. This measure is the regulate asset base or RAB. The RAB for WestNet is reported in Table 6.

Table 6 Enterprise Value

Company	EV AUD in billions
Burlington Northern Santa Fe	$42.99
CSX Corporation	$29.50
Canadian National Railway Company	$33.39
Kansas City Southern	$5.50
Norfolk Southern Corporation	$30.37
Canadian Pacific Railway	$14.71
Union Pacific Corporation	$50.72
WestNet Rail – RAB	$2.21

Source: Bloomberg and ERA

4.6.2 Risk of experiencing financial distress

Since the seminal work of Modigliani and Miller[22]it has been a clearly established principle that firms with a greater risk of experiencing financial distress will borrow less than firms with a lower risk of financial distress. WestNet's risk is in part determined by the customers with who it deals.

As identified in the beta first principles analysis in section 4, the major customers of WestNet have high levels of systematic risk. There is an inverse relationship between systematic risk and leverage. Bradley et al[23] found that firms with higher levels of systematic risks had a lower reliance on debt. Extending this finding, given the high systematic risk of the customer base and its effect on the systematic risk of WestNet, this should exert a downward influence on WestNet's gearing.

Default risk not reflected in the asset beta as this financial risk measure has been removed by de-levering the equity beta. A measure of default risk is the credit rating of the business. A determinate of credit rating is the customers of the business. Table 7

[21] Damodaran,ibid

[22] Modigliani F., M. Miller, 'The Cost of Capital, Corporate Finance, and the Theory of Investment' 1958 American Economic Review, Vol 48, June, pp 261-97

[23] Bradley M., G. Jarrell and E. Kim, 'On the Existence of an Optimal Capital Structure, Theory and Evidence', Journal of Finance, 1984 Vol. 39 pp 857-78

reports the credit rating of the major customers of WestNet. The 'best' client credit rating is A and most of the major clients are not rated (NR).

Table 7 Customer Risks

Firm	Gearing	Rating	Asset Beta
Alcoa	19%	BBB+	1.7
BHP	9%	A+	1.5
Iluka Resources	35%	NR	0.9
Mid West Corporation	0%	NR	2.9
Mt Gibson Iron	6%	NR	2.9
Portman	4%	NR	1.6

The above firms account for 70% of the tonnage hauled. Given

- the lack of diversification in the major customer base;
- the high systematic risk of the customers; and
- an average credit rating of customers being on the border of investment and speculative grade[24],

it is expected that WestNet has a slightly higher risk of experiencing some financial distress than the comparator firms. The influence of financial distress lowers the level of gearing for WestNet. If the average for the comparator sample is 26%, the level of gearing for WestNet should be lower.

4.6.3 Cost of financial distress

Financial distress is more costly for some firms than others. The costs of financial distress depend primarily on the firm's assets. In particular, financial distress costs will be determined by how easily ownership to those assets can be transferred. A firm with mostly tangible assets that can be sold without great loss in value will have costs of financial distress and therefore have an incentive to borrow more.

For firms that rely heavily on intangibles, such as employee talent or growth opportunities, debt will be less attractive since these assets effectively cannot be sold. The comparator analysis did reveal that WestNet has more growth opportunities than the comparator firms. Again this suggests that WestNet should have a lower level of gearing.

[24] These are Standard and Poor terms that indicate the probability of default.

4.7 Conclusion

Synergies agrees with ACG that a market based benchmark approach should be adopted for WestNet and that the capital structures of similar entities should be used for this purpose. Synergies established a sample of appropriate comparator firms based on listed US and Canadian rail businesses. With the comparator firms there existed a range of capital structures. The analysis revealed that the leverage should fall in the range from 20% to 40%. Firm specific factors were considered to determine the effect on WestNet's leverage relative to the sample average. Some firm specific factors had no effect while others suggested that WestNet has an optimal level of gearing lower than the comparator firms. Accordingly, for the purposes of the current review, it is recommended that 30% represents an appropriate gearing assumption for WestNet.

5 Systematic Risk

There are a number of approaches available for estimating the cost of equity capital. The most commonly applied approach and that recommended by ACG is the CAPM.

5.1 ACG approach

ACG consider comparable companies as WestNet is not listed on the ASX.

5.2 Concerns with ACG approach

Synergies contends that the process for assessing the systematic risk for WestNet should involve the following steps:

1. identify and assess WestNet's risk profile, with a view to assessing its exposure to systematic risk;
2. estimate the equity betas for firms identified as comparators for WestNet and de-lever the estimated betas to derive asset betas that reflect the risk of the business;[25]
3. undertake a first principles analysis of WestNet's business;
4. estimate the asset beta for WestNet based on comparators and first principles and based on the estimated asset beta and capital structure, derive an equity beta for WestNet.

Synergies contends that ACG should have:

- the chosen a more representative sample of comparable firms;
- undertaken a first principles analysis to determine where WestNet sits in the range formed by the comparable companies; and
- in some cases, adopted a different level of gearing applied to de-lever the equity beta.

Each of these will be considered in turn.

[25] In assessing the beta for WestNet Rail, we adopt the approach to levering and de-levering beta applied by ACG.

5.3 Comparable Companies

In undertaking a comparable companies analysis, we:

- consider WestNet's business;
- critique the sample of comparable companies developed by ACG;
- develop a more representative sample of comparable companies; and
- estimate a beta range based on the comparable companies.

5.3.1 WestNet's business

WestNet Rail is a rail infrastructure owner and rail access provider operating the 5,100 kilometres of standard, narrow and dual gauge network in the south west of Western Australia. WestNet's core functions include train control, access management, infrastructure maintenance and signalling and communications. It has a long term arrangement to lease track from the Western Australian government. Between 1999 and 2006, the volume of freight hauled increased from 29 million tonnes to 50 million tonnes.

The below-rail business revenue is derived from access charges paid by above rail operators or directly by underlying customers. The cash flows of the business are affected by a variety of factors. WestNet Rail is subject to line segment regulation which is based on revenue ceilings. There exists ample spare capacity on lighter gauge lines and the ability to increase capacity to meet:

- the demands of the WA economy;
- global economic activity and commodity demand; and
- existing users and addition of new users.

To obtain a better understanding of the product mix, we have examined the traffic mix of WestNet and have found that 16% of the traffic is intermodal, 11% is grain and 73% is resources based.

5.3.2 Firms included in ACG sample

ACG use a sample of rail firms that do not include all of the Class 1 railways in the US and Canada and they include a short haul railway in the sample. As we show in the following discussions, the Class 1 US and Canadian rail freight companies are the most suitable group of comparable firms.

ACG include as comparable firms Australian and New Zealand comparator transport sector firms. These firms are included in the sample as ACG indicate that their betas may be indicative of the beta for freight rail. ACG are correct only if the comparator businesses operate as businesses similar to WestNet. The proposed comparators should have similar risks to a rail haulage business, have similar customers carrying freight that is similar to WestNet, for similar markets with similar operating structures and react to market movements in a similar fashion. On reviewing the sample of comparable firms we found that this certainly was not the case. For example:

Macquarie Infrastructure Group: The group consists of 11 businesses which are mainly toll roads. Of the total revenue only 9% is generated in Australia[26]. We fail to see and ACG fail to establish how the systematic risk of a toll road is similar to that of freight rail. Most importantly, we expect a toll road to exhibit a materially lower beta than a freight railway as the majority of movements on a toll road are passenger movements that are unlikely to co-vary with economic activity to any material extent.

Adsteam Marine Limited: A group of companies generating revenue from mainly harbour towage but also related services. Adsteam Marine is a leading international provider of harbour towage and related marine services. Principal operations are located in Australia and the United Kingdom and cover major container, bulk and general cargo ports in Australia, the South Pacific and the UK. With activities including towage, line running/mooring, workboat and offshore services, vessel management, salvage, emergency response and ships' agency, Adsteam Marine is a leading international provider of maritime services. The systematic risks of harbour towage need not be highly positively collated with freight rail when passenger shipping, salvage, emergency response and ship's agency type work is considered in the revenue base. ACG report an asset beta for Adsteam of 0.65

Toll Holdings: Australia's largest logistics and transport group. Pacific National (rail business) only contributed 2.5% of the total revenue in 2006[27]. Toll Holdings do offer services by road, rail and air but the structure of the industry is completely different to regulated rail freight. Given the nature of the Toll Holdings business, we believe that it represents a good comparator for only the inter-modal component of the WestNet operation. ACG report an asset beta of 0.71.

Patrick Corporation Ltd: Patrick is Australia's leading provider of port-related services to importers, exporters and shipping lines. Its focus on productivity, efficiency and innovation, along with its assets and infrastructure management expertise, places the

[26] Macquarie Infrastructure Group Annual Report 2007

[27] Toll Holdings Annual Report 2006

Patrick businesses at the forefront of the ship-to-shore and shore-to-door service providers for both domestic and international trade markets[28]. The business break-up is 36% of the revenue is generated by port activity, 42% by air and 22% from rail. Again given the nature of the Toll Holdings business, we believe that it represents a good comparator for only the inter-modal component of the WestNet operation. ACG report an asset beta of 0.99.

Auckland International Airport: An airport that accounts for 76% of the domestic traffic in New Zealand. The largest income generator in 2007[29] was the retail business (30% of revenue) followed by airfield income (20% of income). The systematic risk of the airport it completely different to the systematic risk faced by WestNet.

Infratil Ltd: Infratil is an owner and operator of businesses in the energy (mainly renewable), airport and public transport sectors. Its energy operations are predominantly in New Zealand and Australia. The Company owns Wellington Airport in New Zealand and three airports in Europe. Infratil's public transport services are in Auckland and Wellington, New Zealand. The systematic risk of the airport it completely different to the systematic risk faced by WestNet.

Port of Tauranga Ltd: Owns land for the storage and transit of cargoes; has berthage, cranes, tug and pilotage services; leasing of land and buildings; container terminal ownership; storing, cleaning, washing and inspecting shipping containers; owns and operates deepwater commercial port; log scaling; stevedoring; inventory management etc. The systematic risk of the airport it completely different to the systematic risk faced by WestNet.

Toll NZ Ltd: Toll NZ is New Zealand's leading multimodal freight transport and distribution company. The Company offers an integrated national network of rail, road and sea freight transportation, distribution and logistics management services, and inter-island and urban passenger services. We believe that it represents a comparator for only the inter-modal component of the WestNet operation but not one that should be relied upon as heavily as Toll's Australian operations. ACG report an asset beta of 0.45.

ACG fail to offer a reason for their sample of comparator firms and it is obvious that some are poor comparators when considering the systematic risk of WestNet. Of the firms suggested as comparable, it is only the Class 1 rail freight firms that are suitable comparators.

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[28] General information obtained from Patrick's web site

[29] Auckland International Airport 2007 Annual Report

Developing an appropriate range of comparator companies

5.3.3 Comparable companies analysis

To scope a plausible range for the asset beta for WestNet Rail we have considered listed international firms that have been classified in the Global Industry Classification Standard (GICS) of rail transport. The group, rail companies, is described as those rail companies that provide predominately services.

The group consisted of 71 firms but a number of these were dual listed firms appearing on two exchanges and hence manifest as two observations in our sample. In accordance with normal practice, we eliminated the secondary listings. A complete list of rail companies from the original sample are contained in Attachment A.

The other processes that were followed to identify a sample that would be as relevant as possible to WestNet Rail were as follows:[30]

- compare business descriptions to ensure that the sample used had similar business risks to WestNet Rail; and
- test for the intrinsic robustness of the beta estimates themselves.

Compare business descriptions

The sample included firms that had other business arms including amusement parks, casinos and unrelated businesses. These types of firms were eliminated. Other companies had different operating conditions, for example Chinese rail companies that are highly regulated or a Hong Kong firm whose operations did not in any way reflect the operating and business risks of WestNet. Again these types of businesses were eliminated. The firms that were excluded from the sample typically had business risks that were not comparable to WestNet Rail.

The average equity beta for the filtered sample was 0.98.[31] However, this beta estimate did not have regard to the quality of the beta estimates themselves.

Intrinsic robustness of beta estimates

The second filter that was applied looked to the intrinsic robustness of the beta estimates themselves. Unfortunately the sample contains a number of firms having

[30] The sample firms had differing financial risks but de-levering and re-levering to reflect a consistent capital structure overcomes any associated problems with financial risk.

[31] All beta estimates have been calculated using 60 monthly observations over a five year period.

equity betas which exhibit little explanatory power (low R^2 s) and relatively high standard errors (low t statistics). As outlined, care must be taken as the resulting estimated parameter is not a 'true' estimate of an appropriate beta.

The sample was reduced to only include those firms which displayed similar business risks to WestNet and had betas that were statistically significant and therefore meaningful. These firms are listed below.

WestNet freights iron ore, coal and other commodities including general freight. The type of freight is very similar to the freight for US railways. In the US, the freight railways are critical to the US economic health and global competitiveness[32]. As reported in the Overview of US Freight Railways in January 2007, the Class I freight railways move approximately 40% of the nation's freight, including the same type of freight as WestNet, to connect businesses with each other across the country and with overseas markets. The operations of the US Class 1 freight railways are parallel to the operations of WestNet. They too haul coal, iron ore, grain and offer intermodal services.

At the end of 2005 there were 562 common carrier freight railroads operation in the US. Of these, seven Class 1 railroads accounted for 68 percent of the rail freight mileage and 93 percent of the freight revenue. They ranged in size from 3,200 to 32,000 miles operated and they concentrated on long-haul and intercity traffic lines. Historically intercity passenger rail service in the US was provided by the same companies that provided freight service. When Amtrak was formed, the rail freight companies were given permission to exit the passenger rail business.

The US railroads operate in a competitive transport marketplace. They do face regulation as the regulator has the authority to set maximum rates and take certain actions if the railroad is found to have market dominance or to have engaged in anti-competitive behaviour.

At this stage of the analysis, Synergies has two possible courses of action for the comparative analysis. One is to obtain a sample of firms that have systematic risks that are reflective of the grain industry, another sample that has systematic risks that are reflective of the intermodal business and a final sample that is reflective of the resources part of the business. The next step would be to weight the three samples to reflect the business mix of WestNet. From this range of betas, use a first principles analysis for each of the three business mixes and weight the results of the first principles analyses to arrive at a point estimate for beta. Given the imprecision of the

[32] Association of American Railroads, 'Overview of US Freight Railroads' January 2007

beta estimates, the breadth of the beta ranges and the extensive subjective judgement that is necessary we believed that this approach was not desirable.

A second alternate is to have a sample of firms that have in their business mix, exposures to grain and resources and offer intermodal services. This is exactly what our sample of Class 1 freight railways offers. Comparing WestNet with the Class 1 railways is a meaningful exercise and a first principles analysis will yield valuable insights into an estimate of an appropriate beta for WestNet. Synergies has decided to adopt this second approach while not completely disregarding the first. It is observed that appropriate comparators for intermodal services (that account for 16% of WestNet's business), as reported by ACG, have similar asset betas to the Class 1 railways.

Given the similarities between the Class 1 railroads and WestNet, we have systematically used them as the appropriate comparative firms. The sample includes those firms which displayed similar business risks to WestNet and had betas that were statistically significant and therefore meaningful. The sample includes seven firms, all of which are from other jurisdictions:

> **Burlington Northern Santa Fe Corporation,** through its Burlington Northern and Santa Fe Railway Company subsidiary, operates a railroad system in the United States and Canada. The Company transports a wide range of products and commodities, including the transportation of containers and trailers, coal, grain, chemicals, metals, minerals, forest products, autos, and consumer goods.
>
> **CSX Corporation** is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
>
> **Canadian National Railway Company** operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulfur, and fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and railcars.
>
> **Kansas City Southern,** through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
>
> **Norfolk Southern** Corporation owns and controls Norfolk Southern Railway Company, a freight railroad, and Pocahontas Land Corporation, a natural resources company. The railroad system extends throughout the southeastern and

Midwestern United States, and the Canadian province of Ontario. Pocahontas Land manages coal, natural gas, and timber resources in the United States.

Canadian Pacific Railway Limited is a Class 1 transcontinental railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centers in the United States Midwest and Northeast.

Union Pacific Corporation, through its subsidiaries, operates as a rail transportation provider. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products, across the United States and portions of Mexico.

5.3.4 Beta range based on the comparable companies

Before progressing to the more detailed analysis, it is important to be aware of the susceptibility of beta to estimation error. Estimation error means that the resulting beta estimates can be of limited reliability and caution should be exercised in applying these estimates in a forward-looking analysis. We have taken the steps outlined above to minimise the error effect in our analysis – however, imprecision remains and this is an important consideration for regulatory decision making. Data for each company is presented in Table 8.

Table 8 Asset Betas

Company	Gearing	Equity Beta	t statistic	Asset Beta
Burlington Northern Santa Fe	22%	1.18	4.18	0.83
CSX Corporation	30%	1.13	3.90	0.63
Canadian National Railway Company	18%	0.91	3.57	0.71
Kansas City Southern	43%	1.34	3.37	0.76
Norfolk Southern Corporation	25%	1.43	2.98	0.89
Canadian Pacific Railway	24%	0.76	2.73	0.51
Union Pacific Corporation	22%	1.34	4.97	0.95

Source: Bloomberg

The average asset beta was 0.76. It can be seen from the data that while all asset betas are statistically significant and are in the range from 0.51 to 0.95. We require a point estimate for WestNet. To arrive at a point estimate, a first principles analysis of the risk of WestNet relative to the firms in the sample is required. This analysis provides confidence that WestNet will have an asset beta from within the identified range. We now turn to consideration of the estimation of beta using first principles.

5.4 First Principles Analysis

The comparator firms provide a range of asset beta estimates. It is therefore important to conduct a first principles analysis to determine where WestNet would most likely sit within the range of asset betas identified in the comparator set. ACG do not appear to have undertaken a first principles analysis. A first principles analysis allows for some justification of choice of a point estimate for the asset beta as opposed to a subjective choice as appears to have been exercised by ACG.

A first principles analysis considers the following factors:

1. nature of the product or service;
2. nature of the customer;
3. duration of contracts with suppliers and customers;
4. regulation;
5. degree of monopoly power;
6. growth options;
7. operating leverage.

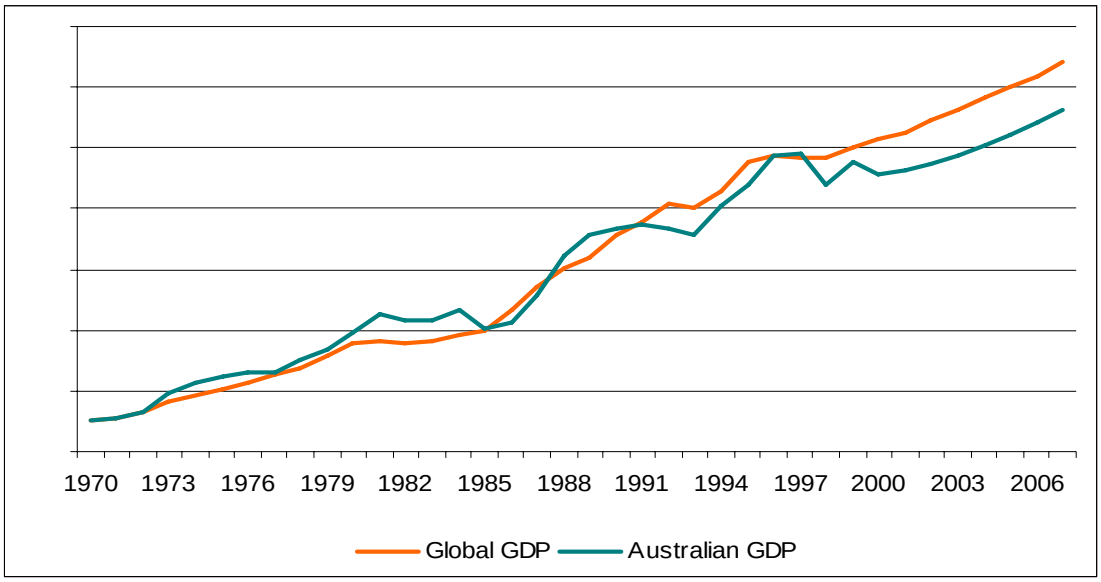
5.4.1 Nature of the product

WestNet's operations are very much export focused. As stated earlier 73% of the traffic is resource based, 11 % grain and 16% intermodal. This may lead some readers to think that WestNet has a low level of systematic risk. This is not the case. The correlation between global economies as measured by GDP growth and the growth of the Australian economy (again measured by change in GDP) is 0.70 for the period from 1970 to 2006. Clearly, an analysis incorporating global comparators or global markets is appropriate as there is a strong positive effect in Australia.

The relationship between global markets and Australia would be as a result of global output driving Australian output and hence the resulting strong positive relationship. Therefore, overseas sample firms can be used as comparators and WestNet, having a global export market, still has a high correlation of volumes with Australian domestic economic activity given the high positive correlation.

The correlation between Australian GDP and global GDP was measured using yearly rate of change. Figure 1 presents this change using an index. The high correlation can be clearly seen using this approach.

Figure 1 Australian and Global GDP



WestNet offers services that are very similar to that offered by the Class 1 freight railways. They too provide intermodal service and haul resources including coal and iron ore and grains. It is reasonable to assume that when looking at comparative rail firms, the similarity between nature of the product would suggest no change to the average asset beta estimate.

5.4.2 Nature of the customer

WestNet's customers include major 'blue chip' companies with international operations. The customer base includes Alcoa, BHP, Iluka Resources, Mt Gibson, Mid West Corporation and Portman and these three customers account for approximately 70% of the freight transported.

While these customers are 'blue chip' customers, WestNet must face similar systematic risks to what these customers face. Given the high concentration of freight shipped on behalf of these customers also exposes WestNet to the risks of just these customers. Table 9 provides some evidence of the credit and systematic risks of the customers of WestNet.

Table 9 Customer Risks

Firm	Gearing	Rating	Asset Beta
Alcoa	19%	BBB+	1.7
BHP	9%	A+	1.5
Iluka Resources	27%	NR	.9
Mt Gibson	7%	NR	2.9
Mid West Corp	0%	NR	2.9
Portman	4%	NR	1.6

The asset betas of the customers are statistically significant and are reflective of high systematic risk[33]. This is not to suggest that WestNet must therefore have as a high level of systematic risk but it is reasonable to assume that when looking at comparative rail firms, the high level of systematic risk of WestNet's customers would suggest that an estimate from the upper end of the range be appropriate.

5.4.3 Duration of contracts

WestNet holds a number of contracts with a small group of customers, the average term of which is understood to be fifteen years. The average term is highly affected by some evergreen contracts for a few customers. Contract duration is highly skewed.

As the major customers have high systematic risk this means that WestNet will be exposed to the high level of systematic risk for a long period of time. This again suggests that the systematic risk of WestNet or alternatively the asset beta will be in the high end of the range for the comparator firms.

On the other hand, some argue that long term contracts would provide WestNet with increased revenue certainty over time, particularly if pricing becomes largely take-or-pay. Importantly, long term contracts are like long term bonds, the longer the duration, the greater the risk.

The effect of beta depends upon the movement in the economy. If costs increase and WestNet does not have the ability to pass on the cost increases due to the long term nature of the contracts then the effect may be to increase the systematic risk for WestNet. As Prof Lally noted:

[33] WestNet has other customers who have betas that are not statistically significant. It is not possible to meaningfully interpret an insignificant result.

> By contrast, in the presence of an adverse cost shock (which induces an adverse-wide reduction in output), the same restriction on output price also prevents a firm from immediately raising its output price to mitigate the adverse cost shock, and this magnifies its beta.[34]

Not knowing the duration of a typical Class 1 contract, we are unable to state the effect on the beta estimate for WestNet.

5.4.4 Regulation

WestNet is subject to regulation. Implicit in the regulatory assessment would be that it has a substantial degree of market power. Regulated firms tend to have lower betas given the stable and predictable nature of their revenue stream.

However, this is unlikely to be the case for WestNet Rail. Whilst regulation may reduce volatility in some markets, the key point about WestNet Rail's business is that currently *all* of the revenue it is earning is not subject to the regulatory cap. Consequently, WestNet Rail exposure to systematic risk is much like that of an unregulated entity.

Moreover, the nature of the regulatory environment is such that WestNet Rail's pricing can be very variable between customers and customer groups. Capacity of traffic to pay is clearly a crucial consideration to the free cash flows WestNet Rail generates from its operations. This level of pricing risk is again unusual in the regulated sector.

In addition to price risk WestNet Rail has substantial volume risk. As we have already shown, WestNet is exposed to both the domestic and global economy and as demonstrated the two are highly correlated – one needs to look no further at WestNet's dramatic traffic growth that has co-incided with the current economic boom in Australia. Hence, WestNet Rail's volume risk is likely to be strongly systematic in nature. Again, this would tend to result in upward pressure in WestNet Rail's asset beta.

The sample of firms used in the comparative analysis have similar regulatory risks as WestNet. The Class 1 freight rail operators the regulator has the authority to set maximum rates and take certain actions if the railroad is found to have market dominance or to have engaged in anti-competitive behaviour. Therefore it seems logical to not adjust the average asset beta for regulatory risk.

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[34] Lally M, (2004), 'Cost of Capital for Regulated Industries', prepared for the QCA

5.4.5 Market power

Whilst WestNet possesses a degree of market power, the extent of that power is considerably less than other regulated infrastructure providers. This is because:

- there exists competition from other transport suppliers for some of the markets serviced by WestNet (such as intermodal and grain);
- for its other traffics, WestNet's other customers are large industrial customers that possess a degree of countervailing power. This is due to:
  - WestNet's assets have very specific uses and long asset lives, which leaves it vulnerable to the loss of traffic;
  - WestNet's cost structure (low marginal cost) is such that it is particularly exposed to a loss of traffic;
  - WestNet is highly reliant upon a small number of large users exerts a discipline on its prices;
  - WestNet's customers operate in globally competitive industries such that excessive input costs will impact upon customer's locational decisions.

The relatively limited market power is further evidenced by the fact that WestNet does not currently earn sufficient revenue in any of its markets to exceed the regulatory cap.

This is not to suggest that WestNet does not possess any market power in its markets – however, for the purposes of assessing systematic risk, it is suggested that the level of market power is not materially different to the sample of firms used in the comparative analysis. Therefore it seems logical to not adjust the average asset beta for market risk

5.4.6 Growth options

The existence of growth options (such as the ability to extend the network, or to handle more traffic) increases WestNet's sensitivity to market changes[35]. Growth options have been found to be positively correlated to changes in the market and therefore have the effect of increasing a firm's beta.

A good example of the real options values in the WestNet Rail network arises in the potential opportunities that exist in the Mid-West region east of Geraldton. WestNet Rail's existing alignment is used to carry grain from locations south east of Geraldton to Geraldton. However, this corridor may well prove to be crucial in developing the MidWest region, particularly for those mines in the south (such as Gindalbie Metal's

[35] Between 1999 and 2006, the volume of freight hauled increased from 29 million tonnes to 50 million tonnes.

iron ore and iron concentrate) who are potential WestNet customers. This highlights the unusually significant growth options that exist for WestNet.

WestNet has spare capacity or readily expandable capacity on many lines. This is different to the US experience where the days of excess rail capacity on critical corridors or locations are over.[36] This again highlights the growth options open to WestNet relative to comparator firms. Having greater growth options than the comparator firms would again place WestNet's asset beta in the higher end of the range.

5.4.7 Operating leverage

The nature of a firm's cost structure will also impact beta. All other things being the same, a high proportion of fixed costs will increase beta, as it magnifies the impact on free cash flows to any economic shock (positive or negative). A capital intensive infrastructure provider such as WestNet exhibits particularly high operating leverage with a significant proportion of its cost base being fixed.

Indeed, the nature of railway operations is such that below rail operations have significantly higher operating leverage than above rail operations. This can be seen in the marginal nature of the access charges adopted by the regulator for the Central Queensland Coal system. Here, the volume sensitive parameter, being AT1, constitutes around 10-15% of the total access charge. This can be contrasted with haulage operations where at least 30% and commonly over 40% of the costs are variable (comprising fuel, wagon and locomotive maintenance and crewing).[37]

Consequently, WestNet Rail's operating leverage would be expected to be at the upper end of the range of vertically integrated comparator firms (as vertically integrated firms will have considerable revenue from haulage operations which have lower operating leverage).

5.4.8 Conclusion: first principles analysis

The essence of the asset beta is that it reflects the extent to which the returns of a company vary with returns on the market as a whole. This in turn reflects the extent to which economic conditions affect company earnings.

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[36] Association of American Railroads, 'Overview of US Freight Railroads' January 2007

[37] Historically a greater proportion of costs would be said to be variable however these estimates use contemporary new rollingstock costs which have subject to substantial increases relative to inflation in recent years.

The key point to emerge from this analysis is that WestNet has an asset beta from the higher end of range of possible asset betas. The possible asset betas have been calculated for comparative firms, firms with similar business risks and operating conditions as WestNet.

The effect on the asset beta estimate as a consequence of the first principles analysis is summarised in the following table.

Table 10 Summary of First Principles Assessment

Factor	Assessment of range
Nature of the product or service	Sample average
Nature of the customer	> Average
Duration of contracts	Sample Average
Regulation	Sample average
Market power	Sample average
Growth options	> Average
Operating leverage	> Average

5.5 Level of Gearing

ACG use a debt to asset ratio as a measure of gearing. They state that they use an average level of gearing over the last five years to de-lever the equity beta and estimate an asset beta. We fail to see how the debt to assets ratio, used as the gearing ratio, could be so high. For example we use a debt to enterprise ratio which is based on market values. We use market values as capital structure, equity beta, market risk premium, RAB, equity and debt issuance costs, debt margin and the risk free rate are all estimated using market values observations. Our measure of gearing as reported in Table 11 is lower than that reported by ACG. Our gearing ratio is averaged over the period over which the data was taken to estimate the beta, that is, the previous five years.

As stated, Synergies used the average level of debt to enterprise value over the last five years. As our ratios are lower than those reported by ACG we attempted to verify the gearing reported by ACG. We checked debt to asset ratios as reported in annual reports. We found that these book value ratios were very close to the report debt to asset ratios contained in the ACG report. It appears that ACG may have used gearing ratios based on book value as opposed to market values to de-lever the equity beta.

Table 11 Gearing

Company	Synergies Gearing	ACG Gearing
Burlington Northern Santa Fe	22%	43%
CSX Corporation	30%	77%
Canadian National Railway Company	18%	28%
Kansas City Southern	43%	70%
Norfolk Southern Corporation	25%	
Canadian Pacific Railway	24%	48%
Union Pacific Corporation	22%	38%

Source: Bloomberg and ACG Report

A review of chapter 4 of the ACG report shows that the level of gearing is different again to the numbers reported in chapter 6. For example Kansas City Southern changes from 70% to 41% and RailAmerica changes from 132% to 57%. These discrepancies are not explained in the report.

5.6 Conclusion

In this section Synergies identified and assessed WestNet's risk profile to obtain a better understanding of its exposure to systematic risk. As we could not estimate WestNet's beta directly we estimated the equity betas for firms identified as comparators for WestNet. Our comparator sample included businesses that had similar business risks and hence systematic risks as WestNet and had beta estimates that were statistically meaningful. The equity betas were de-levered to derive asset betas that reflected the systematic risk of the business. This resulted in a range of asset betas from 0.51 to 0.95 with an average of 0.76. To determine a point estimate we undertook a first principles analysis that compared systematic risk drivers for WestNet with the comparator group. The result of the first principles analysis suggested that the asset beta for WestNet should be higher than the comparator sample average. We conclude that an appropriate (and conservative) asset beta for WestNet is 0.80.

6 Market risk premium

6.1 Introduction

The market risk premium (MRP) is the amount an investor expects to earn from a diversified portfolio of investments (reflecting the market as a whole) that is above the return earned on a risk-free investment. The key difficulty is estimating the MRP. Estimates of the MRP have typically relied on estimating a plausible range for the MRP using historical data, and then choosing a point (or constrained range) within this range.

The generally accepted range for the MRP among corporate finance professionals in Australia has been 6% to 8%. This range is largely favoured because of empirical evidence of the historical, realised MRP in Australia dating as far back as 1882.

In regulatory decisions regulators have consistently adopted a value for MRP of 6%. The fact that economic regulators have tended to adopt relatively low estimates of the MRP is a matter of some policy concern given the asymmetric consequences of regulatory error.[38] Further, as is evident from both a review of the literature and our own analysis, the average MRP has in fact been well above 6%.

6.2 ACG Recommendation

ACG rely on two studies to state that an estimate of 6% is at the high end of the range.

One study is based upon historical data while the other the future expectation of Dr Shane Oliver, the chief economist at AMP who suggests:

> '.. that the MRP for the coming 5 to 10 years might be around 3.8 per cent.'[39]

The other study was that of Brailsford[40] et al which concluded that the MRP using an arithmetic average returns was between 5.1 and 7.3 per cent.

[38] Productivity Commission (2002), *Review of the National Access Regime*, PC Inquiry Report.

[39] ACG Report ibid p25

[40] Brailsford, T., J. Handley, and K. Maheswaran 2006, 'A re-examination of the historical equity risk premium in Australia, 1 August, Working Paper, UQ Business School.

6.3 Concerns with ACG approach

Synergies contends that:

- empirical evidence on the MRP supports a value well in excess of 6%;
- an analysis of the MRP demonstrates that the parameter is mean reverting with no structural change such that an historical average remains the best estimate of a future MRP value.

These issues are considered in turn.

6.4 Empirical evidence on the MRP

The problem with the ACG recommendation is the over whelming contradictory evidence. For example ACG report the opinion of AMP suggesting an MRP of 3.8% while Australian regulators have referred to a survey study by Welsh[41], who surveyed academics finding a MRP of 7.1%.

The other study relied upon by ACG is the work conducted by Brailsford[42] et al which concluded that the MRP using an arithmetic average returns was between 5.1 and 7.3 per cent. However, this study is clearly inconsistent with a large body of empirical evidence indicating that the MRP is above 6 per cent.

One of the reasons regulators originally adopted a 6% MRP despite long term average MRPs being higher was the perception that the MRP had been falling. Indeed, the yearly MRP (based on the ASX 200) to December 2005 was 17.5% and for the previous year 22.4%.

[41] I Welch (2000), "Views of Financial Economists on the Equity Premium and Other Issues", *The Journal of Business*, 73(4), pp501-537 and Welch, I. (2001), 'The Equity Premium Consensus Forecast Revisited', Working Paper, Yale University.

[42] Brailsford, T., J. Handley, and K. Maheswaran 2006, 'A re-examination of the historical equity risk premium in Australia, 1 August, Working Paper, UQ Business School.

Table 12 summaries the key Australian studies.

Table 12 Selected Australian estimates of market risk premium

Author	Year	Period	MRP (%)
Officer[43]	1985	1882-1987	7.9
Australian Graduate School of Management	1989	1974-1983	6.3
		1977-1983	11.7
Australian Graduate School of Management	1998	1964-1995 (incl Oct 1987)	6.2
		1964-1995 (excl Oct 1987)	8.1
Hathaway	1995	na	6.6
Davis[44]	1998	na	4.5-7.0
Dimson et al	2002	1900-2000	7.5
Hancock[45]	2005	1974-2003	4.5-5
Hathaway[46]	2005	1875-2005	1 year arithmetic: 7
			1 year geometric: 7
			10 year arithmetic: 7.2
			10 year geometric (adj): 6.5
		1960 - 2005	10 year geometric (adj): 4.5*
			**recommended estimate*
Gray & Officer[47]	2005	1975-2004	7.7
		1955-2004	6.43
		1930-2004	6.58
		1905-2004	7.15
		1885-2004	7.17

Sources: QCA (2000), Draft decision on QR's Draft Undertaking, Working Paper Number 4; Lally, M. (2004), Estimating the Cost of Capital for Regulated Firms; S. Gray & R. Officer (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, A Report Prepared for the Energy Networks Association; J. Hancock (2005), The Market Risk Premium for Australian Regulatory Decisions, The South Australian Centre for Economic Studies.

6.5 Estimating the Market Risk Premium

6.5.1 The objective of the study

The CAPM is an ex-ante model which requires the use of an expected MRP value. Clearly, there is no measure of an expected MRP. Consequently, the issue arises as to the statistical validity of ex post MRP averages. An ex-post measure of the MRP can be

[43] B. Officer (1989), "Rates of Return to Shares, Bond Yields and Inflation Rates: An Historical Perspective", in Share Markets and Portfolio Theory, University of Queensland Press.

[44] K. Davis (1998), The Weighted Average Cost of Capital for the Gas Industry, Report Prepared for the Australian Competition and Consumer Commission and the Office of the Regulator-General.

[45] J. Hancock (2005), The Market Risk Premium for Australian Regulatory Decisions, The South Australian Centre for Economic Studies.

[46] N. Hathaway (2005), Australian Market Risk Premium, Capital Research Pty Ltd.

[47] S. Gray & R. Officer (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, A Report Prepared for the Energy Networks Association

used if the MRP is stationary over time. Accordingly, there is merit in investigating whether:

- the observed MRP is volatile around a mean
- the observed MRP is mean reverting in a random manner;
- there is any evidence of structural change in the mean MRP over time.

If these conditions are satisfied then one can reasonably conclude that there is no statistically valid alternative to the long term average MRP as the forward looking MRP for Australia.

6.5.2 Approach

The MRP is estimated from historical data relating to the excess return of equities over long term government bond yields. Ex-ante the MRP is assumed to be constant when using the CAPM to estimate the cost of equity. However, ex-post, the MRP is variable over time and consequently there is debate surrounding the period over which it should be estimated.

Short term estimates may be unreliable for one of two reasons. Short-term estimates are less precise from a statistical point of view and when long-term forecasts of the MRP are required, short-term conditions may not continue to prevail. It is imperative therefore to address:

- is it best to estimate the MRP over the long term or the short term, and
- what is the value of the MRP.

One approach is to use as long a time horizon as possible to compute an average MRP as an estimate of the ex-ante MRP. This implies that the MRP has remained stable over the period of analysis. If one believes that the market has undergone significant structural change, then only more recent data would be relevant.

Gray and Officer summarise this trade-off between short term and long term estimation as follows:

> A long period of data provides better statistical precision (the mean estimate has a lower standard error), but data from long ago may be less representative of current circumstances. It is generally agreed, however, that the minimum period required to provide sensible estimates is 30 years.[48]

[48] S. Gray & R. Officer (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, A Report Prepared for the Energy Networks Association, p.21.

The question as to whether or not the market has undergone significant structural change can be determined empirically.

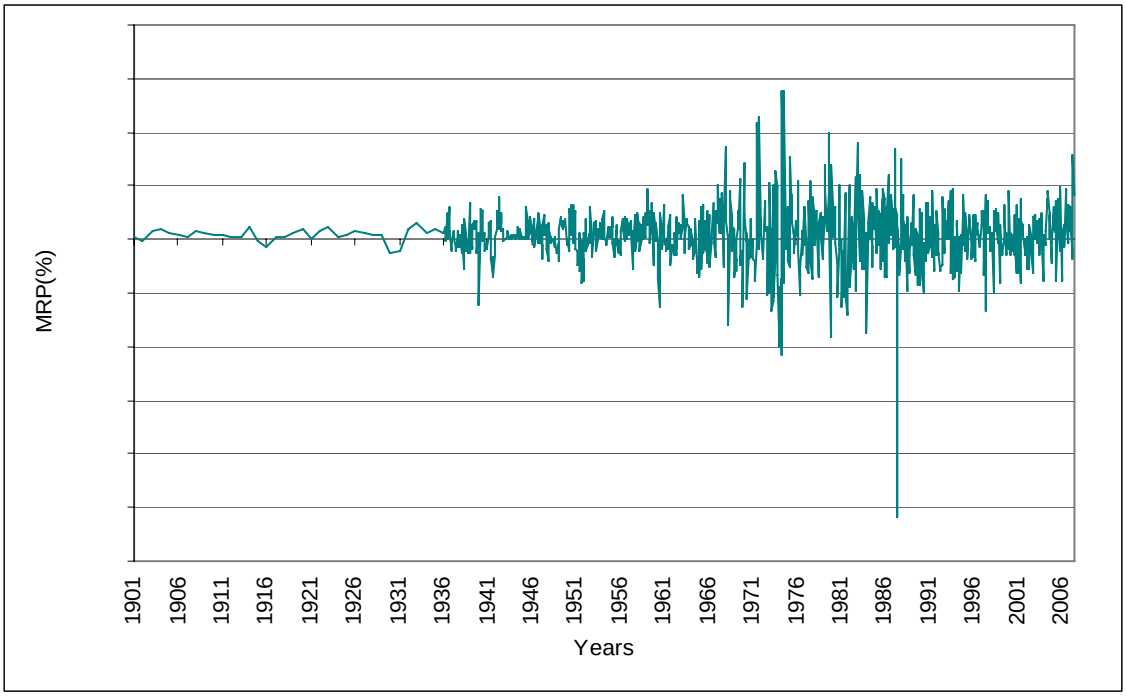
The following analysis will provide a MRP estimate. While both the short- and long-term averages are supplied, further analysis provides evidence that we can be confident of using long term averages because the MRP has not undergone any significant structural change over time. As discussed, use of a long-term average provides the most statistically reliable estimate of MRP. If the MRP has not undergone a structural change then the ex-post estimate would be equal to the required ex-ante estimate.

6.5.3 Data

This analysis is based on Australian equity accumulation returns and Government bond yields from June 1901 to October 2007. Prior to July 1936, annual observations of each series have been used with annualised figures based on monthly data being used after this date.

Figure 2 shows the MRP for the period in question (it is clear where values change from annual to annualised monthly). The overall volatility of the MRP is immediately obvious. It is this feature of the data that makes a longer historical record preferable, of at least 30 years, when computing the average MRP.

Figure 2 Observed MRP



Data source: Bloomberg, RBA and various publications

6.5.4 Historical averages

In computing historical averages for the estimation of an ex-ante MRP, following Gray and Officer, an arithmetic mean is used.[49] They suggest a geometric mean is more appropriate when computing the average return from a buy and hold investment strategy held over a long period of time. An arithmetic mean is relevant as the CAPM requires a simple expected value.[50]

12 contains estimates of MRP (and associated standard deviations) computed over a range of time horizons, the shortest being 16 years and the longest 106 years.

[49] S. Gray & R. Officer (2005), op.cit.

[50] The CAPM is a single time horizon model. This implies that arithmetic rates of return as opposed to compound returns are required. Compounding implies multi period holdings like a buy and hold investment strategy.

Table 12 Average MRPs

Start of Period of Averaging (to October 2007)	Average Market Risk Premium (Standard Deviation)
June 1991	8.1% (45%)
June 1981	7.2% (61%)
June 1971	6.2% (68%)
June 1961	6.4% (65%)
June 1951	6.4% (60%)
June 1941	7.1% (56%)
June 1931	6.8% (55%)
June 1921	6.8% (54%)
June 1911	6.8% (54%)
June 1901	6.8% (54%)

Data Source: Bloomberg, RBA and various publications

The estimated averages vary a great deal as additional 10 year blocks of data are included (8.1% down to 6.1%). These estimates are associated with relatively large standard deviations, with the exception of the data since 1991. Thus if one believed that the market has undergone significant change in recent times, a short horizon would be used (of at least 30 years) but this would lead to an imprecise estimate of the MRP.

The preferred alternative to obtain a more precise estimate of MRP is to utilise a longer time period. There is no change in the MRP estimate of 6.8% (with relatively low standard deviation) once the time period contains data dating back to 1931. While this represents a more precise MRP estimate, the issue of whether the MRP has remained constant (in a statistical sense) must be addressed.

6.5.5 Has the MRP changed over time?

To rely on this long-term estimate we must be confident that the MRP has not undergone any significant change over the period. To achieve this, a state-space model treating the observed MRP as an unobserved time-varying expected value plus random noise was developed. The observation equation of this model is given by:

$$MRP_t = E_t^{MRP} + \varepsilon_t . \qquad (1)$$

where

MRP_t is the observed MRP series,

E_t^{MRP} is the time-varying expected value of the MRP,

and $\varepsilon_t \sim N(0, \sigma_\varepsilon)$.

The process governing the time-variation in the expected value of the MRP was modelled as a mean-reverting process whereby the expected value of the MRP reverts toward a long-tem mean level. This is represented by the following state equation:

$$(E_{t+1}^{MRP} - \overline{MRP}) = \beta(E_t^{MRP} - \overline{MRP}) + v_t. \qquad (2)$$

where,

$\overline{MRP}$ is the long-term mean MRP,

β is an autoregressive coefficient, and

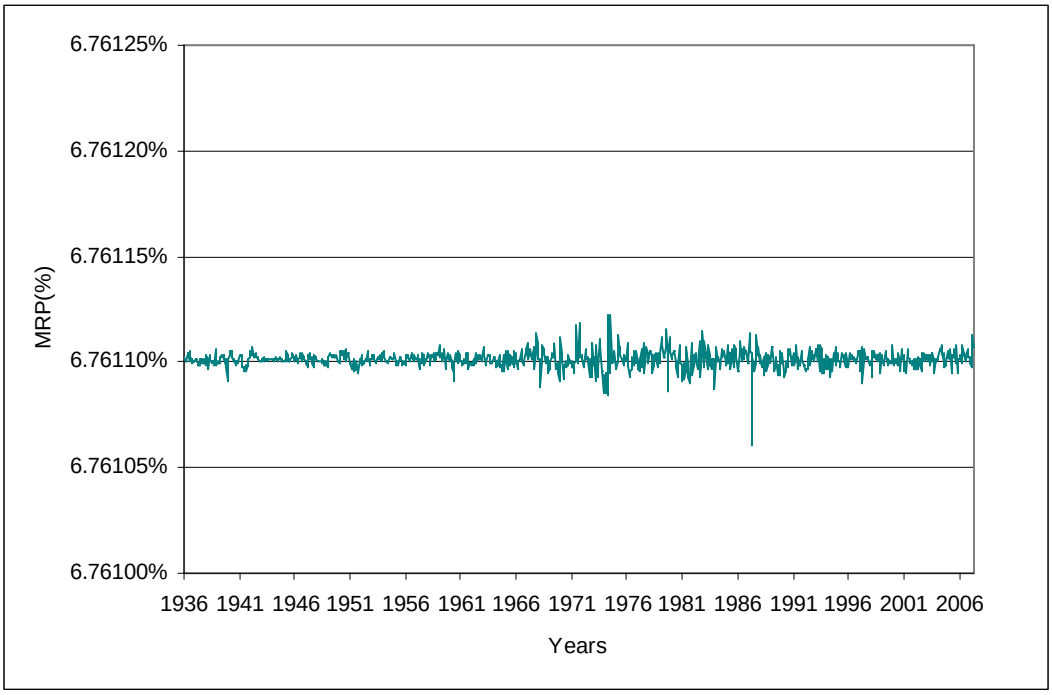
$v_t \sim N(0, \sigma_v)$.

If the estimated value for $\beta < 1$, MRP is a mean reverting process where it reverts toward its long-term (or steady state) value of $\overline{MRP}$. Importantly, if this were the case, longer-term historical records can be used to estimate the MRP. If the estimated value for $\beta = 1$, MRP is in fact a random walk process and does not revert to a long-term level and hence historical records could not be used to estimate the MRP.

If the estimated value for $\beta = 0$, the deviation between the time-varying expected MRP and its long-term level is simply a random process. In this case there is no persistence in the deviations around $\overline{MRP}$. Equations (1) and (2) are in state-space form with the Kalman Filter used to estimate the parameters, $\overline{MRP}$, β, σ_v and σ_ε.

This analysis was based on data post July 1936 given that all subsequent data was available at a monthly frequency. If all the dataset was used this would incorrectly be assuming that all observations were equally spaced in time. Figure 3 plots the estimated time-varying expected value of the MRP and clearly shows there is virtually no variation in the expected value of the MRP. It appears to vary around a constant level over the entire time period.

Figure 3 Observed MRP and time-varying expected value.



Source: Synergies analysis of Bloomberg and RBA data

Parameter estimates reported below in Table 12 confirm this pattern. The estimate of $\overline{MRP}$ indicates that the long-term average the MRP is 6.76% and estimated with a great deal of precision. The estimate of β is not significantly different from 0 and shows that the MRP is mean-reverting in the sense that deviations around $\overline{MRP}$ are simply random draws from $v_t \sim N(0, 0.001)$.

Given that the MRP has found to be a random mean process, we can be confident that it has not undergone a structural shift and long-term records can be used for estimation. Thus the results reported here indicate the MRP of 6.76% is justified.

Table 12 Parameter Estimates

Parameter	Estimate (Standard Error)
β	1.6749e^{-6} (4.1394e^{4})
σ_v	0.0001 (2.6218e^{4})
$\overline{MRP}$	0.0676 (0.0101)
σ_ε	0.5489 (7.2771)

Source Synergies calculations

6.6 Conclusion

We show that it is valid to use historic data to estimate an ex-ante MRP given that the 'true' or mean MRP is stationary over time. As the MRP is stationary with no structural changes, issues regarding long term estimates and short term estimates are no longer relevant. We clearly show that there is only one appropriate MRP and it has a value of 6.76%. Accordingly, in our view there is no basis for ACG's assertion that an MRP of 6% is at the upper end of the range of reasonable estimates.

7 Determining the cost of debt

7.1 Introduction

The cost of debt capital is normally calculated as the risk free rate plus a margin for the risk of the debt.[51] Recognising the costs in the WACC gives the following formula for estimating the cost of debt capital:

$$R_d = R_f + DRP$$

where the parameters are the cost of debt (R_d), the risk free rate (R_f), and the debt risk premium (DRP).

As there is no one 10 year bond, a yield curve needs to be derived from observed bonds with differing maturities but all of the same credit risk. In deriving a yield curve from the observed bonds, some type of regression analysis is used. Different financial services like Bloomberg and CBASpectrum use different approaches to derive the yield curve.

7.2 ACG Recommendation

ACG recommends a BBB rating for WestNet where the credit spread is to be averaged over 20 business days preceding the determination. ACG suggest that the 'fair value' yield used to derive the BBB credit spread and reported by both Bloomberg and CBASpectrum needs to be adjusted.

ACG derived a yield curve and compared their findings with both Bloomberg and CBASpectrum. They report findings based upon a sample of 4 bonds used to derive a BBB yield curve with a 10 year maturity. None of the four bonds had a 10 year duration and three of them had a duration of 6 years or less[52]. The 10 year BBB curved was derived based upon an assumption of:

> '..the error identified above is constant across bonds with a term of greater than five years.'[53]

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[51] The issuing of debt can have significant transactions costs. While adjusting the debt margin for debt issuance costs is sometimes undertaken, they are more appropriately reflected in the cash flows.

[52] The reported maturities were 5, 5.51, 6 and 8.08 years.

[53] ACG Report ibid p21

7.3 Concerns with ACG approach

Synergies contends that:

- the adjustments recommended by ACG to be questionable as the 'fair value' yields are reported by reputable financial information providers; and
- the ACG work was based on a small sample of only four bonds, none of which had a 10 year maturity.

Synergies suggests using a financial service that uses a methodology for deriving a 'fair value' yield curve that is generally agreed and is free of bias.

7.4 Bloomberg v CBASpectrum

Both financial services are highly reputable and provide reasonable estimates of a 'fair value' yield curve. CBASpectrum use a process in estimating a 'fair value' yield that introduces a downward bias in the yield. Their technique introduces a 'phantom' observation[54] into the calculation that has the effect of distorting the long end of the yield curve.

> There is substantive argument that CBASpectrum's estimator technique creates a material downward bias in estimates of 'fair spread' for long dated and low rated bonds.[55]

As CBASpectrum report a yield that contains a downward bias then clearly we should either:

- adjust for the bias, or
- use a financial service that reports a yield that does not contain any bias.

The common alternate to CBASpectrum is Bloomberg as a provider of financial information. The Bloomberg methodology has been reviewed previously by Professor Bruce Grundy and he has found that there is no bias evident with the Bloomberg technique for estimating yield.

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[54] The 'phantom' observation is an estimate of the 'fair value' yield for the next highest credit rating at 10 years to maturity.

[55] Report by Kevin Davis, 'Estimating Credit Spreads on Long Term, Low Rated Bonds' September 26, 2005, p1

> Bloomberg's estimation technique does not introduce the tendency for estimated yields to understate actual yields that the CBA Spectrum's estimation technique exhibits.[56]

Clearly the preferred yield is the Bloomberg yield and as no bias exists. We suggest that the average, as reported by Bloomberg, of the 20 business days prior to the date of the Determination.

ACG recommend a margin of 155 basis points. Over the last 12 months, a 20 day average has varied from 112 basis points to 169 basis points. The spread was small earlier in the year prior to the 'sub prime' collapse. It is now at a more realistic level of around 170 points.

7.5 Conclusion

ACG recommends a credit spread of 155 basis points for WestNet. The recommendation was calculated after adjusting the reported yields of both CBASprectrum and Bloomberg. We contend that the Bloomberg yield be used to determine the margin. The margin needs to be calculated over the 20 days prior to the Determination.

[56] NERA Report, 'Critique of Available Estimates of the Credit Spread on Corporate Bonds', A Report for the ENA, May 2005, p12

8 Tax and imputation (gamma)

8.1 Introduction

Before the introduction of dividend imputation in Australia on 1 July 1987, corporate profits were subject to double taxation. The imputation system removed this double taxation, allowing the proportion of tax collected at the corporate level on profits distributed to shareholders to be rebated as a credit against the personal tax liabilities of the shareholder, if an Australian tax-paying resident (or other eligible entity, such as a superannuation fund).

A quantification of the market's value of franked dividends is a direct input in the calculation of company cash flows and/or cost of capital. As gamma is essentially a prepayment of personal tax, an adjustment therefore needs to be made so that only the corporate tax is reflected in these cashflows.

Officer[57] shows that the adjustment to be used is gamma (γ), which is the proportion of the marginal shareholder's personal income tax on their income from dividends that has been prepaid at the corporate level (or, the proportion of corporate tax paid which can be claimed as a tax credit against personal tax). It will take a value between zero and one.

8.2 ACG Recommendation

The ACG Report recommends the continued application of a value of 0.50. ACG rely on the 2004 work by Hathaway and Officer[58], Handley and Maheswaran[59], and Beggs and Skeels[60].

8.3 Concerns with ACG approach

Synergies contends that:

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57 R. Officer (1994). "The Cost of Capital of a Company under an Imputation Tax System" Accounting and Finance, 34, 1-17.

58 Hathaway, N. and B. Officer, 'The Value of Imputation Tax Credits', Update 2004, 2 November 2004

59 Essential Services Commission, 2007, Gas Access Arrangement Review 2008-2012, Draft Decision, 28 August 2007

60 D. Beggs and C. Skeels (2005), "Market Arbitrage of Cash Dividends and Franking Credits" Working Paper #947, University of Melbourne, Department of Economics.

- ACG quote the results of some empirical studies indicating a high value for gamma and ignore contradictory evidence;
- rely on the Hathaway and Officer study while not highlighting the research problems that the authors recognised and tried to overcome; and
- do not consider the changing taxation legislation which reduces the value of gamma.

We will consider each of these issues. Synergies recognises the difficulty that the researchers need to overcome to estimate a statistically significant result. To alleviate this problem we undertake a study to determine if gamma can be 1, 0.5 or 0. Our results indicate that the 'best' estimate for gamma is 0.

8.4 Body of Evidence

ACG quote the results of some empirical undertaken by Handley and Maheswaran indicating a high value for gamma. There are numerous studies available and the body of evidence supports a lower gamma than what would be derived using the Handley result. The following summarises some of the body of work.

Table 13 Summary of Studies

Study	Methodology	Time Period for Estimation	Value of franking credits (V)	Value of gamma (γ)[a]
Bruckner, Dews and White (1994)[61]	Dividend drop-off	1987-1990	0.34	0.24
		1990-1993	0.69	0.49
Partington & Walker (1999)[62]	Contemporaneous pricing of shares with and without franking credits	1995-1997	0.96 (average)	0.68
Hathaway and Officer (2004)	Dividend drop-off	1988-2002	0.5	0.36
Beggs & Skeels (2005)	Dividend drop-off	1987-2000,2000	0	0
		2001-2004	0.57	0.41
Bellamy & Gray (2004)[63]	Dividend drop-off (adjusted)	1995-2002	0	0
Cannavan, Finn & Gray (2004)	Analysis of futures and physical market (no arbitrage framework)	Pre- 45 day rule	Up to 0.5 (high-yielding stocks)	0.36
		Post- 45 day rule	0	0

a Assumes a distribution rate of 71%.

A number of studies have concluded that franking credits have some value, although the estimates vary considerably. More importantly:

- these studies include data from the period prior to the introduction of the 45 day-rule. This will produce an upward bias in the estimated value of gamma, given that franking credits would appear to have had some value prior to this change, and a zero value following the change; and
- a number of methodological issues have been identified. One of the most significant ones that is consistently encountered is the multicollinearity that will arise in dividend drop-off studies due to the strong relationship between the value of cash dividends and franking credits.

A number of studies have concluded that the value of franking credits is zero (or, we cannot reject the hypothesis that they have no value). One of the more notable recent works is the study by Cannavan, Finn and Gray, which, using an arguably more robust

61 Brucker, Dews and White (1994), Capturing Value from Dividend Imputation, McKinsey & Co Report.

62 G. Partington and S. Walker (1999). "The Value of Dividends: Evidence from Cum-Dividend Trading in the Ex-Dividend Period", Accounting and Finance, 39, 275-296.

63 D. Bellamy and S. Gray (2004), Using Stock Price Changes to Estimate the Value of Dividend Franking Credits, Working Paper, University of Queensland.

methodology than dividend drop-off studies, concluded that since the introduction of the 45-day rule[64], franking credits are of no value to the marginal investor.

ACG do provide the results of the work undertaken by Cannavan, Finn and Gray which indicated a value for gamma of zero but ACG attempted to discredit the work based not on the results of the study by on the basis of a comment made by one of the researchers.

8.5 Hathaway and Officer and Research Problems

ACG report that Hathaway and Officer found that between 1988 and 2002 an average of 71 percent of franking credits were distributed to Australian shareholders and that the value placed on the distributed credits was around 63 percent.

It is important to note that the study period straddled:

- a period of changing corporate taxation rates – reducing the value of imputation credits to all;
- the introduction of the 45 day rule – reducing greatly the value of imputation credits to the marginal investor, that is the investor identified by Officer to be the one who determines the value of gamma;
- the introduction of the concessional treatment of capital gains;
- the removal of inter-company dividend rebates; and
- introducing the ability to obtain a rebate where the franking credit is greater than the tax payable – increasing the value of gamma for some investors.

In this changing environment Hathaway and Officer[65] found:

> 'The Australia-wide average gamma over all companies and over the entire period between 1988-2002 is 0.355.'

They derive their results by undertaking two studies. Why two studies – because of the problems with the data and the noise in the results. For example they make the following comments in their report:

> 'We have to be very careful in using these data as there is much double counting in the flow data produced by the ATO.'[66]

[64] Te introduction of the 45 day rule which restricts the ability to trade credits and reduces the value of gamma,

[65] Ibid p7

> 'However, much caution should be exercised when interpreting such sub-sector valuations because there is considerable 'noise' in the individual results.'[67]
>
> '..recognising that this estimate (credits redeemed) is based on some data that we cannot observe and must infer.'[68]
>
> 'It is hard to believe, as the results would imply, that cash would be valued at only 50 cents in the dollar but a credit, which is not readily realizable as a cash dividend, would be valued higher at 89 cents in the dollar.'[69]
>
> 'Both (results) strongly indicate that credits are indeed value in the market place but nowhere near their theoretical full face value.'[70]

Obviously given the difficultly of estimating the value of gamma different studies provide different estimates.

ACG report the results found by Beggs and Skeels, who replicated the Hathaway and Officer study, provided contradictory results to Hathaway and Officer. The contradictory results are probably as a result of the estimation problems associate with valuing gamma.

It is obvious that there is great contention around the research method for determining the value of gamma and the results of various studies. One would expect the results of studies to all differ due to the different data sets and time period (taxation regime) over which the study was undertaken. All researchers would agree:

- the introduction of the 45 day rule which restricts the ability to trade credits reduces the value of gamma, and

  . '..foreign investors (indeed, anyone who cannot access the value of the credits) would not pay anything for the value of future imputation credits impounded in Australian share prices.'[71]

- the lower the corporate tax rate the lower the value of gamma

  'Obviously, the change in the tax rate will alter the quantum of credit per fully paid franked dividend.'[72]

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66 Ibid p4

67 Ibid p5

68 Ibid p14

69 Ibid p21

70 Ibid p25

71 ibid p6

The work relied upon by ACG provides results that are not definitive and they would overstate the value of gamma today for the following reasons,

- the study was from 1988 to 2002. With the introduction of the 45 day rule, the value of gamma post 2000 would be much smaller than the value of gamma pre 2000. Given that 90% of the work by them is pre 2000, the applicability of the results today are questionable; and
- an average tax rate used was 36%. This was not the tax rate for each year during that period. With a corporate tax rate today of only 30%, the value of gamma would be less.

Given the changing legislation and the difficulty in arriving at a gamma estimate, Synergies has undertaken a study that examines dividend imputation post 2000 and test wether gamma could have a value of 1.0, 0.5 and 0.0.

Before providing the results of the study, we first need to address the question of the marginal investor.

8.6 The identity of the marginal investor

Officer's seminal work on dividend imputation specified that gamma is the proportion of the *marginal* shareholder's personal income tax on dividend income that had been prepaid at the corporate level (rather than the average shareholder's). The marginal shareholder is the price-setting investor. The price at which this shareholder transacts becomes the market clearing price, or the price equating the demand for capital by the firm with supply. It is this market-clearing price that will determine the firm's cost of capital. This is consistent with the approach used to determine other WACC parameters. Professor Lally[73] states that market equilibrium is a consequence of the aggregate of investors. It does not follow that market prices are determined by investors in aggregate. The transacted share price is the price that resulted from the transaction undertaken by the marginal investor. What is of relevance is the marginal investor and not the average investor.

The key question is therefore the identity of the marginal investor. In open capital markets such as Australia, which have large capital requirements but an insufficient internal capital source, external capital must be drawn upon. In the context of

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72 Hathaway and Officer ibid p23

73 Lally, M. 2005, Review of the value of imputation credits for regulatory purposes. Report prepared for the QCA December 5 2005.

imputation credits this means that both foreign and domestic investors will hold shares in Australian companies.

It makes no sense to segment the market between foreign and domestic investors for the gamma effect. All of the remaining WACC inputs have been estimated in an integrated market as opposed to a segmented market. It would be inconsistent to now segment the market when estimating the gamma value.

As noted above, non-resident shareholders are unable to derive any direct benefit from franking credits. Previously this could be indirectly derived via the trading of shares around dividend dates. Schemes were established by investment banks to allow foreign investors to extract value from franking credits, which relied on these investors selling their shares to domestic investors in the period leading up to the payment of the dividend (that is, before the shares go 'ex dividend', which is when the holder is no longer entitled to receive that dividend). The domestic purchasers would receive the cash dividend and franking credit, and subsequently sell the share back to the foreign investor at a small premium.

Some twelve years after becoming aware of these schemes the Commonwealth Government changed the Australian taxation law to introduce a minimum period of holding, requiring that shareholders have to be 'at risk' for a period of time in order to obtain the benefit of franking credits. This amendment, called the 45-day rule, was effective from 1 July 1997, although was not introduced until some time later (July 1999).

Under this law, investors are required to hold shares for a period of 45 days during a qualification period around the dividend event (without substantial hedging) in order to be eligible to rebate franking credits against their tax liabilities. This therefore significantly extended the window over which the previous trades between foreign and domestic investors could be made, to the extent that the extra price risk borne by the parties meant that such transactions were no longer worthwhile.

As a consequence, the return to a foreign investor comprises dividends and capital gain only, whereas the return to a domestic investor comprises dividends, capital gain and franking credits. If both foreign and domestic investors had the same expectations about the future earnings of the firm, which is a well-established tenet of economic theory, then the foreign investor would demand a lower price than the domestic investor, as the foreign investor receives a relatively lower return.

Therefore, in the presence of insufficient domestic capital it is expected that foreign investors shall be the marginal investors. As outlined above, even if the clear majority of the shareholders are domestic but there is some reasonable presence of foreign

investors, then economic theory dictates that the marginal investor will be foreign because this investor will set the market-clearing price that determines the cost of capital.

In Australia, one can therefore conclude that as the price-setting investor in the 'average' firm is most likely to be foreign, franking credits are now worthless.[74] While they may have had some value prior to the introduction of the 45-day rule, there is no longer any basis for foreign investors to derive any benefit from these credits and their value will therefore be zero.

It should be noted that the notion that the marginal investor is foreign has not necessarily been accepted by regulators. There are two arguments that have been made here by regulators. Firstly, many regulated businesses have a 'unique' domestic shareholder base (for example, they are government owned businesses) and hence the marginal investor won't be a foreign investor. However, this argument is erroneous as WACC parameters are determined with reference to an 'efficient' benchmark firm. For the reasons outlined above, it is appropriate to conclude that such a firm would have at least some of its shares held by foreign investors.

Secondly, it has been proposed that if we are to consider the presence of foreign investors, we should be using an international CAPM to determine the WACC, not a domestic CAPM (and hence, all parameters would need to be respecified in a global market context). The most appropriate model to use is the domestic CAPM and that standard practice is to recognise the presence of foreign investors in estimating parameters such as gamma. Excluding their influence is both unrealistic and impractical.

Further, a recent paper by Gray and Hall[75] (2006) finds that setting gamma to zero does not, unlike the values of gamma maintained by regulators, violate the deterministic relationship between the value of franking credits, the market risk premium and the corporate tax rate. Thus, taking gamma of zero is both agreed to by the theory and empirical bulk, and also is robust to the applicability of this assumption.

One implication of this is that it provides strong support for a gamma of zero, as if the value of franking credits is zero then so too must be gamma. However, for this to hold the marginal investor must be foreign and therefore unable to extract value from

[75] S. Gray and J. Hall (2006), "The Relationship Between Franking Credits and the Market Risk Premium", Unpublished Working Paper, University of Queensland.

franking credits since the introduction of the 45-day rule. Tax law changes that only affect domestic investors, such as the introduction of a cash rebate for unused franking credits in 2002, should have no effect on the market's value of franking credits.

We now summarise the results of a relatively simple diagnostic test we have undertaken as a further test of the hypothesis that the value of gamma is not different to zero.

8.7 Simple diagnostic

In order to circumvent the host of econometric and sampling issues involved with estimating gamma, a basic and simple behaviour test can prove fruitful. The test aims to determine whether or not the market responds, on average, differently to franked dividends from how it responds to unfranked dividends. Whilst this may seem a different approach which does not measure the value of franking credits, it tests for the presence of their value.

In particular, it tests whether or not the ratio of the ex-date price change to cash dividends is significantly greater for franked dividends than unfranked dividends. That is, if it is found that shares with franked dividends behave in a manner that is not significantly different from shares with unfranked dividends on the ex-dividend date, this would lead to the conclusion that franking credits are valued at zero (leading to a zero value of gamma).

If, on the other hand, shares with franked dividends do behave in a manner that is significantly different, it would be concluded that this difference is due to the market placing value on franking credits. If this were the case, gamma would not be zero and further empirical investigations would need to be undertaken to estimate its value.

The data used in this investigation was sourced from Bloomberg and contains observations on firms listed in the S&P ASX 200 from January 1996 to January 2006. Trusts and other entities which have a dissimilar tax structure to companies were excluded, resulting in 3188 observations in total. Whilst this sample only spanned the top 200 stocks, because ex-date behaviour is analysed it is important to exclude thinly-traded stocks from the dataset (otherwise large errors may be introduced due to lags).

There is still considerable thinness in trading in this sample: of the 3188 observations, 36% (1140) have a delay of more than one day in price observations about the ex-dividend date. However, only 96 observations have a delay of more than three days, which takes dividends paid on Mondays into consideration and these were excluded. Partially franked dividends were excluded from the examination as this avoids complications in selecting an appropriate level of franking as the cut-off point.

For the full period, there were 516 events with unfranked dividends and 2138 events with fully franked dividends. The sample standard deviations of the drop-offs ratios were such that a test for equality of variance would conclude that the standard deviations of the samples were unequal[76]. As a consequence, the common parametric test for equality of means is invalid so the simple, non-parametric paired test is used instead.

The sample of fully franked events is substantially larger that that of unfranked events, so a random sample of it is taken to produce the same number of observations, which was then paired with the full set of unfranked observations. If the theoretical hypothesis is true (that is, the market value of franking credits is zero), it should be the case that half of the fully franked drop-off ratios are greater than the unfranked drop-off ratios.

There was found to be insufficient evidence to reject this hypothesis[77] and as such it is concluded that the market responds equally to fully franked and unfranked dividends. The same test is used for the sample of data from 1 July 1997 onwards as the parametric test is invalid[78] and the nonparametric test leads to the same conclusion[79]. This evidence that the market does, on average, respond equally to fully franked and unfranked dividends is further evidence that the market places no value upon franking credits.

This test can also be extended to see whether the drop-off for franked dividends behaves significantly differently from unfranked dividends if franking credits are valued at some proportion of their face value.[80] In this case, the proportional value will be 50% and 100%. In other words, rather than testing the hypothesis that the value of franking credits do not have a value other than zero, we are testing the hypothesis that these credits have some value, which in this case is either 0.5 or 1.

It has already been found that the market behaves the same way for franked and unfranked dividends on the ex-date, by only moving on average by the amount of the cash dividend. Therefore, if it is found that these new ratios are significantly different across franked and unfranked dividends then the market must not value franking credits. The sample data was again restricted to observations after 1 July 1997 and to

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76 F-test for variance equality: $s_1 = 5.6736$, $s_2 = 1.9994$, p-value < 0.0001

77 Paired sample test: sample proportion = 0.527, theoretical proportion = 0.50, p-value = 0.11

78 F-test for variance equality: $s_1 = 6.0972$, $s_2 = 2.0996$, p-value < 0.0001

79 Paired sample test: sample proportion = 0.528, theoretical proportion = 0.50, p-value = 0.12

80 That is, rather than consider the ratio of price decline to cash dividend, the ratio of price decline to cash dividend and some proportion of the face value of the franking credit is considered.

fully-franked and unfranked dividends. The same nonparametric test is used and it is found that the ratios are different across fully-franked and unfranked dividends with a half-valued franking credit[81] and with a fully-valued franking credit[82].

On this basis, we can reject the hypothesis that franking credits have a value of 0.5 or 1. In addition, we believe this is likely to be the finding irrespective of the value tested for the valuation of franking credits.

This inconsistency with the result for the ratio of price decline to cash dividend only is further evidence that the market does not value franking credits.

8.8 Conclusion

A number of studies have sought to estimate the value of gamma and the results vary considerably. The key concerns we have with some of these studies are that:

- studies using the dividend drop-off methodology need to be treated with extreme caution given the collinearity between dividends and franking credits;
- the introduction of the 45-day rule resulted in a major structural change that has fundamentally impacted the value of franking credits. Any studies that seek to estimate gamma using data prior to this date will over-estimate the value of gamma.
- Recent empirical investigations have concluded that the value of franking credits is zero since the introduction of the 45-day rule (Bellamy and Gray, 2004; Cannavan, Finn and Gray, 2004).

A basic but informative test of the market's behaviour with regards to the ex-date price response finds that for fully-franked and unfranked dividends, the market responded equally to the cash dividend only, which is further evidence of the worthlessness of franking credits.

As an extension to this model, it was tested whether or not franking credits were valued by the market at 50% and at 100% of their face value, which was emphatically rejected. All in all, there is insufficient evidence to reject the theoretical hypothesis that franking credits are worthless. Fundamentally, the implication of these findings is that gamma should be set to zero. This also means that there is no basis for adopting an assumption of 0.5.

[81] Paired sample test: sample proportion = 0.590, theoretical proportion = 0.50, p-value < 0.0001

[82] Paired sample test: sample proportion = 0.595, theoretical proportion = 0.50, p-value < 0.0001

9 Debt and Equity Issuance Costs

9.1 Introduction

When an organisation acquires assets, one of the costs is the transaction cost associated with obtaining the required funds to purchase or construct the asset. The asset owner must be compensated for the transaction cost (both equity and debt raising cost) or an investment in the asset would not occur as the investment would have a negative NPV on average, in a competitive market. Therefore, it is common to include an allowance for the notional costs of raising additional debt and equity to finance new investments, where these 'notional costs' represent the typical costs incurred by an efficient benchmark firm.

There exists two issues relating to these legitimate costs and these are:

- The quantum of the costs. This is a question that can only be answer by empirical evidence; and
- The treatment of the cost. Are the costs included in the regulated asset base (RAB), or are they a WACC adjustment or even are they treated inconsistently i.e. debt issuance costs in the WACC and equity issuance costs in the RAB.

9.2 ACG Recommendation

The ACG report recommends that the debt issuance cost be 12.5 basis points and this be added to the WACC each year. Equity issuance costs are estimated by ACG to be 3.83% and these are added to the RAB.

9.3 Concerns with ACG approach

Synergies contends that ACG's adoption of an estimate of equity raising costs on a small sample of firms resulting in these costs to be under-estimated.

We will consider this issue and report the results of our study.

9.4 Equity Raising Costs

Equity raising costs are a legitimate cost of running a business. The owner must be compensated for such costs or business investments would not be undertaken in a competitive market. A key issue is the quantum of the costs.

The evidence from the United States is different to that in Australia. Lee[83] et al provides benchmark numbers on the cost of raising equity in the United States. This paper suggested that the average direct cost for an initial public offering of equity was 11%. These costs varied depending upon the size of the funds raised, e.g. for funding of less than 10 million USD the cost was 16.96% of funds raised while for 500 million USD the equivalent cost was 5.72%.

Ritter[84] too found that the equity raising costs had a large fixed cost element. For large issues the average equity raising cost was 9.34%. A recent study[85]of 1,297 US issues found that, on average, the equity raising costs were 9.61% of funds raised.

Australian evidence is slightly different. The ACCC analysed five recent Australian equity raisings for infrastructure businesses. They too found that the equity raising cost percentage varied with the size of the proceeds being raised. The average cost was 3.548%. This cost is the basis of Australian regulatory decisions where 3.55% is the allowance where the equity raising costs have been accepted.

As the Australian study had a sample size of only five, the results of the study should not be considered definitive. In our opinion, 3.55% is at the lower end of a reasonable range of compensatory percentages that could be applied. ACG added another two observations to the sample and estimated equity raising costs to be 3.83% being the median of the sample.

We undertook our own study. We analysed 75 equity issues concluding in October 2007 (going back in time). The costs that were available to be analysed were the direct equity costs associated with the underwriter. Therefore these costs were only the selling, underwriting and management costs. They did not include the legal or accounting costs required with an equity issue. ACG have previously estimated that the legal and accounting costs amount to approximately 60 basis point[86].

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[83] Lee, I., S. Lochhead and J. Ritter, *The Costs of Raising Equity Capital,* The Journal of Financial Research, Spring 1996, p.62

[84] J.R. Ritter, *The Costs of Going Public*, Journal of Financial Economics 19 1987.

[85] G. Lee, *Three Essays in Equity Offerings and Related Issues,* Phd Dissertation, Graduate School of Vanderbilt University, December 2006, p58

[86] ACG Report 'Debt an Equity Raising Transaction Costs' 2004, prepared for the ACCC

We found that for the total sample of 75 firms, the direct equity costs (excluding accounting and legal costs) amounted to 4.27% of the capital raised. Importantly we segmented the sample to extract infrastructure type firms. As infrastructure firms newly listed on the ASX are limited in quantity, we used capital intensive industries as a suitable proxy. We wanted a reasonable size sample to improve the accuracy of the results. The larger the appropriate sample, the more confidence in the results as volatility reduces dramatically.

The 3.83% recommended by ACG is based on a sample size of seven. Our study was based on an initial number of 75 observations, with the segmented capital intensive sub-sample being 23 (refer Attachment B). The results of the findings are displayed in table 13. For capital intensive industries, the direct costs of raising equity (excluding legal and accounting costs which are equivalent to 0.6%) are 5.1%. The total direct equity raising costs which are legitimate costs of running an efficient business are therefore 5.6%.

Table 13 Equity Raising Costs

Industry	Costs
Engineering & Construction	3.5%
Mining	5.8%
Iron/Steel	5.0%
Oil & Gas	4.5%
Coal	4.0%
Average	**5.1%**

Source Bloomberg

9.5 Conclusion

The equity issuance cost recommendation of 3.83% understates the direct costs of raising equity capital. The direct cost of raising equity capital is estimated to be 5.6% of the capital raised.

10 Conclusions

This report contains the results of a number of arguments and studies. We summarise the finds below.

Inflation

We estimate inflation to be 2.5%.

Risk-Free Rate

The risk-free rate historically has been based on the ten-year Australian Commonwealth Government bond rate. The Government bond rate has a bias due to a number of factors using the Government bond rate as a proxy for the risk free rate understates the risk free rate estimate. Corporate bond yields coupled with derivatives that remove default risk can provide an estimate of the bias. We estimated the current bias to be the equivalent of 55 basis points. An adjustment should be made for this bias at the time that the risk free rate is assessed.

Capital Structure

The approach that we adopted for determining a benchmark capital structure for WestNet is consistent with the regulatory approach generally. We used comparative firms and found naturally that a range existed. To arrive at a point estimate we used the relationship findings based upon theories from the finance/economics paradigm and supported by empirical studies. We found that a conservative point estimate benchmark gearing level for WestNet was 30%.

Beta

It is imperative to undertake an analysis of the systematic risk of WestNet, comparator firms and additionally a first principles approach. We have gone through a detailed assessment in considering an appropriate beta estimate for WestNet. The result of the first principles analysis was a point estimate for an asset beta of 0.80.

Market Risk Premium

Regulators have consistently adopted a value of 6%. There is considerable evidence to support a value higher than this. We adopted a view that the observed MRP was the sum of a mean MRP and some noise. We filtered out the noise and also found that the

MRP was mean reverting. The mean MRP estimate did not experience any structural changes over time. The results of our analysis demonstrate that ex-ante estimates can be based on ex-post data. There is stationarity of the estimate and as the MRP is mean reverting one should use estimates based upon longer term calculations. The appropriate MRP estimate is 6.76%

Gamma

Notwithstanding the consistent regulatory precedent of 0.5, we believe there is an increasingly persuasive case to support a value of zero. The other reason 0.5 has been assumed is because in the face of the difficulties in reliably estimating the value of gamma. Our analysis suggests that we cannot currently conclude that gamma has some value other than zero.

Debt Margin

We continue to rely on Bloomberg as being the appropriate financial information provider. We do not believe it necessary to adjust the reported margin.

Equity Raising Costs

These are legitimate costs of running an efficient business. The business must be compensated for these costs or investments will not be undertaken. ACG recommend 3.83% based on a sample of seven equity issues. We undertook a more comprehensive study based on 75 equity issues and we conclude that an appropriate cost is 5.6% of the equity funds raised.

A Comparator Rail Firms for Beta

The table below lists the 70 firms used in determining a sample of suitable comparator forms for establishing WestNet's beta.

To derive a suitable list of comparator firms the first selection criteria was systematic risk. Systematic risk is reflective of the industry risk of an entity i.e. how sensitive the entity is to economy wide shocks like interest rate changes, changes in inflation and changes in GDP. We obtained a list of all firms that were listed with the Global Industry Classification Standards (GICS) of rail transport. This search produced the following table which was considered the most suitable sample to begin the analysis.

Continuing with the first selection criteria we needed to filter firms that were not indicative of the nature of WestNet's business. This removed,

- the Chinese listed rail firms are so heavily regulated that they were not representative of the systematic risk of WestNet;
- the Japanese rail firms that had other business arms like real estate and amusement parks;
- other firms that do not reflect the of the systematic risk like Metrovias offering a suburban rail service only or First America that is a 'fun train' service.

After applying this filter there were 42 firms remaining. The next filter applied was designed to minimise measurement errors. A firm was not considered suitable if there was not five years of data available to derive a reasonable beta estimate.

If there was five years of data available the next requirement was that the standard error of the beta needed to be sufficiently small to result in a t statistic of at least 2. Without this requirement any calculated beta could not be relied upon to allow any meaningful interpretation.

The result of the application of the above filters resulted in the seven Class 1 freight rail firms. We then researched the firms to ensure that the business operations were sufficiently similar ensure a meaningful comparison. The firms needed to haul minerals, resources, grain, offer intermodal services and transport for the domestic and export market. The seven remaining firms were considered similar enough to make meaningful comparisons.

Table 2 – Sample Firms

Ticker		Basis for Deletion				
	Firm Description	t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
3350Z US	Union Pacific Railroad Company operates various railroad and railroad-related businesses. The Railroad has route miles linking Pacific Coast and Gulf Coast ports to the Midwest and eastern United States gateways.			Delete		
355348Z NA	Jarvis Estonia BV, incorporated in The Netherlands, is the holding company for the Estonian rail operation.				Delete	
525 HK	Guangshen Railway Company Limited provides railroad passenger, freight transportation, railway facilities, and technical services. The Company also sells food, beverages and merchandise on aboard and in train stations.		Delete			
600125 CH	China Railway Tielong Container Logistics Co., Ltd. provides railroad, truck, and water transportation and related warehousing services. The Company also manufactures concrete, develops real estate, and operates in commercial trading.		Delete			
601006 CH	Daqin Railway Co,.Ltd. mainly provides coal transportation service in Northern China. It also		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	operates passenger transportation business.					
66 HK	MTR Corporation Limited provides public transport services in Hong Kong. The Company owns and operates the Mass Transit Railway. The Company also develops, sells, and manages residential and commercial properties.		Delete			
795996ZTI	Turkiye Cumhuriyeti Devlet Demiyollari (Turkish State Railways) operates the public railway system in Turkey.				Delete	
820881QLN	Prism Rail PLC comprises the operations of Prism Rail and the subsidiaries Prism Developments and Prism Engineering. The Group provides various passenger rail services for the London, Tilbury and Southend Line (LTS).				Delete	
9001 JP	TOBU RAILWAY CO., LTD. mainly provides passenger rail and bus transportation services in the Kanto area. The Company also operates a variety of real estate businesses which construct and sell apartment buildings and single houses, and lease buildings.		Delete			
9003 JP	SAGAMI RAILWAY Co., Ltd. provides both passenger and		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	freight rail transportation and bus transportation services from Yokohama station to central part of Kanagawa prefecture. The Company also sells and leases real estate, operates travel agents and golf courses.					
9005 JP	TOKYU CORPORATION provides passenger rail transportation, bus transportation, truckload services, and air transportation serving the Tokyo and its surrounding areas. The Company operates department stores, real estate leasing, and hotel businesses.		Delete			
9006 JP	Keihin Electric Express Railway Co., Ltd. provides rail and bus mass transit services in Tokyo, Yokohama, and the Miura Peninsula. The Company also has non- transportation interests including real estate development, hotel operation and leisure facilities.		Delete			
9007 JP	Odakyu Electric Railway Co., Ltd. provides passenger rail and bus transportation services in the Kanto and Chubu areas including Tokyo. The Company also operates department stores, amusement parks, hotels, real estate, and travel businesses.		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
9008 JP	Keio Corporation mainly provides rail and bus transportation services for passengers in the Kanto area. The Company leases real estate and operates department stores and supermarkets. Keio also operates hotels in the Shinjuku and Sapporo areas.		Delete			
9009 JP	Keisei Electric Railway Co., Ltd. provides passenger rail and bus transportation services in the Metropolitan Tokyo and Chiba prefecture areas. The Company operates department and supermarket stores, hotels, travel agents, movie theatre and restaurants,		Delete			
9010 JP	FUJI KYUKO CO., LTD. provides passenger rail and bus transportation and taxi services in Shizuoka, Yamanashi, and Kanagawa prefectures. The Company leases and sells real estate, operates department store, and offers construction works.		Delete			
9012 JP	Chichibu Railway Co., Ltd. provides passenger and freight local electric rail transportation services in Kumagaya, Saitama prefecture. The Company also provides bus transportation for tourists and sells and leases real		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	estate.					
9014 JP	Shin-Keisei Electric Railway Co., Ltd. provides rail and bus transportation services between Tokyo and Chiba areas. The Company also leases and sells real estate. The Company is affiliated with Keisei Electric Railway Co.		Delete			
9020 JP	East Japan Railway Company provides rail transportation services in the Kanto and Tohoku regions, including Tokyo. The Company's services include the shinkansen (bullet train) network and the Tokyo metropolitan network.		Delete			
9021 JP	West Japan Railway Company provides rail transportation services including the shinkansen network (bullet train) in North Kyushu, Kinki, Chugoku, and Hokuriku including Kyoto and Osaka. The Company also operates ferries in Miyajima and manages real estate.		Delete			
9022 JP	Central Japan Railway Company provides rail transportation services between Tokyo and Osaka, including the Tokai region. The Company, through its subsidiaries, also provides bus transportation		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	services, leases real estate, and operates department stores.					
9031 JP	Nishi-Nippon Railroad Co., Ltd. provides rail and bus transportation services in the northern Kyushu area. The Company also offers truckload and air cargo transportation services, leases, sells, and maintains real estate, and operates hotels and travel agencies.		Delete			
9033 JP	Hiroshima Electric Railway Co., Ltd. mainly provides rail and bus transportation services based in Hiroshima. The Company operates department stores, leases and sells real estate, and designs and offers construction works and land development services.		Delete			
9041 JP	Kintetsu Corp provides passenger rail, bus, taxi, and freight truck transportation services in the Kinki region including Osaka, Kyoto, and Nara prefectures. The Company also offers ground, air, and marine logistics services.		Delete			
9042 JP	Hankyu Hanshin Holdings, Inc. is a passenger rail company serving the Kansai area. The Company also provides passenger bus transportation		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	and logistics services. In addition, Hankyu Hanshin Holdings operates housing and urban development and department stores					
9044 JP	Nankai Electric Railway Co., Ltd. provides passenger rail and bus transportation services which cover South Osaka and northern part of Wakayama, including a railway line to new Kansai International airport. The Company maintains, leases, and sells real estate.		Delete			
9045 JP	Keihan Electric Railway Co., Ltd. mainly provides passenger rail and bus transportation in Osaka and Kyoto prefectures. The Company operates department stores, hotels, travel agents, and restaurants in the vicinity of its railway system.		Delete			
9046 JP	Kobe Electric Railway Co., Ltd. primarily provides passenger rail and bus transportation and taxi services in Kobe and its surrounding areas. The Company operates supermarket stores, hotels, and travel agents, leases and sells real estate.		Delete			
9048 JP	Nagoya Railroad Co., Ltd. mainly provides passenger rail and bus transportation services in the Chubu area. The		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	Company also leases and sells real estate and operates leisure-related businesses such as department stores, hotels, and travel agents.					
9049 JP	Keifuku Electric Railroad Co., Ltd. provides electric local rail and bus transportation services in Kyoto city and Fukui prefecture. The Company also leases real estate and operates leisure businesses such as amusement parks.		Delete			
9052 JP	Sanyo Electric Railway Co., Ltd. is a local rail and bus transportation company that operates mainly in Hyogo prefecture. The Company also operates real estate businesses and department stores. Sanyo Electric provides leisure-related services.		Delete			
9074 JP	JAPAN OIL TRANSPORTATION CO., LTD. transports oil and chemical products by rail and tank truck. The Company also provides leasing services of tankers, containers, and refrigerated cargoes. Japan Oil operates truck cargo transportation as well.		Delete			
ALLL11 BZ	All America Latina Logistica (ALL) transports freight. The				Delete	

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	Company ships grain and consumer goods by rail in Brazil and Argentina. ALL also offers warehousing, logistics, and other services.					
AWRY US	Allegheny and Western Railway Company owns a line of railroad 62 miles long which lies between Punxsutawney and Butler Junction, Pennsylvania. The Company leases its railroad to Buffalo, Rochester, and Pittsburgh Railway Company.				Delete	
BNI US	Burlington Northern Santa Fe Corporation, through its Burlington Northern and Santa Fe Railway Company subsidiary, operates a railroad system in the United States and Canada. The Company transports a wide range of products and commodities, including the	4.18				
CAF SM	Construcciones y Auxiliar de Ferrocarriles SA manufactures railroad cars and components, as well as complete turnkey transportation systems. Exports are increasingly important to the Company, with customers in the UK, Finland, Poland Hong Kong and Brazil					Delete (0.8)
CCRI IN	Container Corporation of India Limited supplies railway cargo		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	services, via its fleet of container trains. The Company also provides bonded warehousing services.					
CKI CN	Clarke Inc. provides intermodal transportation and logistics services for less-than-full-load shippers who use rail as their predominant means of freight conveyance. The Company provides complete door-to-door services to shippers.		Delete			
CNR CN	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulfur, and fertilizers, intermodal, and automotive products.	3.57				
CP CN	Canadian Pacific Railway Limited is a Class 1 transcontinental railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancover.	2.73				
CSX US	CSX Corporation is an international freight transportation company. The Company provides rail,	3.90				

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	intermodal, domestic container-shipping, barging, and contract logistics services around the world.					
CSX3 US	CSX Transportation, Inc., a subsidiary for CSX Corporation, provides rail transportation and distribution services. The company operates in 20 states, the District of Columbia, and the the Canadian province of Ontario.			Delete		
DBHN GR	Deutsche Bahn AG is the German railway. The Company provides passenger and cargo transportation. Deutsche Bahn also offers logistics services to its customers.				Delete	
FAUV FP	Fauvet-Girel is a holding company with interests in railway and train component manufacturing and industrial investment companies.					Delete (1.2)
FEA GR	Florida East Coast Industries, Inc. is a holding company with interests in rail transportation and real estate development, The Company operates a regional freight railroad, and leases and manages office parks in Florida.		Delete			
FNM IM	FNM S.p.A is a holding company for a group which					Delete (0.8)

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	operates in the rail transportation industry.					
FTRJ US	First American Railways, Inc. provides entertainment-based passenger rail ser- vice. The Company operates a "Fun Train" between south and central Florida. First American also owns the Durango & Silverton Narrow Gauge Railroad Company.				Delete	
GETNR FP	Groupe Eurotunnel SA holds the concession to operate the two rail tunnels beneath the English Channel, terminals in Folkestone in the United Kingdom and Coquelles in France, and shuttle cars that transport cars and trucks.				Delete	
GREGF US	Groupe Eurotunnel SA holds the concession to operate the two rail tunnels beneath the English Channel, terminals in Folkestone in the United Kingdom and Coquelles in France, and shuttle cars that transport cars and trucks.				Delete	
GWR US	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The Company also provides railroad switching and related		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	services to United States industries.					
JFN SW	The Jungfraubahn Holding AG founded in 1994, was the result of a merger between two primary railways, the Jungfraubahn and the Wengernalpbahn. These railways provide transportation for vacationers to the mountains of the Jungfrau region of the Swiss alps.					Delete (1.0)
KSU US	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets.	3.37				
MAGP US	Magplane Technology, Inc. has developed an intracity transporation system. The Company's system uses individual passive vehicles, levitated above a magway trough, or semi-circular cross section. Magplane Technology has developed projects for several cities.		Delete			
MLCFD FP	Chemins de Fer Departementaux is active is the railroad industry. The Company					Delete (0.1)

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	manufactures locomotives, rail cars and other rail vehicles, manages some local and private railway sytems, and offers rail related services such as maintenance and training.					
MRSA6 BZ	MRS Logistica S.A. operates a railroad system in Brazil. Through its subsidiary Malha Sudeste da Rede Ferroviaria Federal S.A., the Company transports iron ore, steel products, coal and other freight. MRS Logistica operates the rail lines of Juiz de For				Delete	
MVIA AR	Metrovias S.A. operates five subway lines and train service to and from suburban Buenos Aires.				Delete	
NSC US	Norfolk Southern Corporation owns and controls Norfolk Southern Railway Company, a freight railroad, and Pocahontas Land Corporation, a natural resources company. The railroad system extends throughout the southeastern and Midwestern United States.	2.98				
NYRR US	New York Regional Rail Corporation is the holding company for New Cross Harbor Railroad, a rail floatbarge operation that crosses New York Harbor. The Company's					Delete (0.2)

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	operation enables New York City, Long Island, and Southern New England to connect to the national rail freight system.					
OMRLZ JP	OHMI RAILWAY CO., LTD. provides transportation services including railroad, bus, and taxi in Shiga prefecture. The Company also operates amusement facilites such as ski ground, bowling alleies, hotels, and restaurants.		Delete			
OPRT3 BZ	Opportrans Concessao Metroviaria SA offers rail transportation services. The Company operates the subway system in the State of Rio de Janeiro. Opportrans was founded in April 1998 and operates under the Metro-Rio logo.		Delete			
P CN	Railpower Technologies Corp. develops new technologies with applications in rail transportation and distributed power systems. The company is also in the development phase of a prototype hybrid switcher locomotive.		Delete			
PPM OF	Parry People Movers Limited is working on the development and marketing of flywheel/hybrid powered trams. They are also looking into the design of a new		Delete			

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	ultra-light rail system.					
PRR US	Pioneer Railcorp is a railroad holding company. The Company provides short line railroad service in the United States. Pioneer also leases railroad equipment, such as locomotives, railcars, and other railroad related vehicles and equipment to the Companies subsidaries.				Delete	
PWX US	Providence and Worcester Railroad Company is a regional freight railroad. The Company conducts its operations over the Northeast corridor between New Haven, Connecticut and the Massachusetts/Rhode Island border.					Delete (1.9)
RYSAS TI	Reysas Logistics transports freight. The Company ships cargo by air, rail, and truck.				Delete	
SIL NZ	SkyCabs International Ltd. designs passenger transport systems. The Company's system comprises of low-impact elevated two-way rapid transport.		Delete			
STS IM	Ansaldo STS SpA designs and constructs parts of, or entire, mainline and urban electrified mass transit systems.				Delete	
TNU FP	TNU SA designed, financed,					Delete

Ticker	Firm Description	Basis for Deletion				
		t statistic	Nature of Business	Duplication of Listing	Insufficient number of Observations	Low t statistic
	and constructed the tunnel that runs under the English Channel and connects the United Kingdom and France. TNU will operate the project until the year 2086.					(1.8)
TWE GR	Teutoburger Wald-Eisenbahn AG owns and operates a local railway transportation system in the Lower Saxony and Nordrhein Westfalia area. The Company offers passenger, as well as industrial and consumer goods transportation services.					Delete (.6)
UNP US	Union Pacific Corporation, through its subsidiaries, operates as a rail transportation provider. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products, across the United States and portions of Mexico.	4.97				
VT9 GR	VTG AG offers rail car hire, rail logistics, and tank container logistics services.				Delete	

B Equity Raising Costs

The table below lists the 75 firms used in determining equity raising costs.

Table 1 Sample Firms

Firm	Industry	Date	Amount Raised ($ Millions)	Variable Direct Cost (Excl Accounting and Legal Costs)
AGL Energy Ltd	Electric	21/02/2007	933.08	2.0%
AMP Capital China Growth FD	Country Funds - Closed-end	20/11/2006	280.00	2.5%
APA Group	Pipelines	16/11/2006	35.44	1.9%
Arasor International Ltd	Telecommunications	23/03/2007	34.31	4.0%
Aurium Resources Ltd	Mining	15/06/2007	3.50	5.0%
Aussie Q Resources Ltd	Mining	21/03/2007	10.00	6.0%
Bluefreeway Ltd	Advertising	24/11/2006	36.32	4.0%
Boart Longyear Group	Engineering & Construction	4/04/2007	2347.94	3.0%
Boss Energy Ltd	Oil & Gas	11/05/2007	2.50	6.0%
Centro Retail Group	Real Estate	2/03/2007	173.72	2.5%
Challenger Kenedix Japan-PP	Real Estate	19/03/2007	300.20	2.5%
China Century Capital Ltd	Investment Companies	18/07/2007	2.50	6.0%
China Yunnan Copper Australia	Mining	27/08/2007	4.00	5.2%
Clancy Exploration Ltd	Mining	22/05/2007	3.50	6.0%
Cloncurry Metals Ltd	Mining	29/08/2007	10.00	6.0%

Firm	Industry	Date	Amount Raised ($ Millions)	Variable Direct Cost (Excl Accounting and Legal Costs)
Commquest Ltd	Advertising	2/10/2007	30.26	5.0%
Datasquirt Ltd	Software	4/07/2007	10.00	5.0%
Ellerston Gems Fund	Closed-end Funds	25/05/2007	600.00	2.3%
Galileo Japan Trust	Real Estate	15/11/2006	284.00	2.0%
Global Construction Services	Building Materials	6/07/2007	20.00	5.0%
Global Iron Ltd	Iron/Steel	2/08/2007	2.50	5.0%
Goldminex Resources Ltd	Mining	18/09/2007	22.05	4.8%
Greater Bendigo Gold Mines	Mining	24/11/2006	4.00	1.0%
Greencross Ltd	Pharmaceuticals	3/05/2007	11.00	5.0%
GTI Resources Ltd	Mining	22/06/2007	3.00	6.0%
Halcygen Pharmaceutucals Ltd	Pharmaceuticals	23/05/2007	12.50	5.0%
Hedley Leisure & Gaming Prop	Real Estate	25/06/2007	126.00	2.5%
Helicon Group Ltd	Healthcare-Products	20/06/2007	4.00	6.0%
Hexima Ltd	Biotechnology	6/07/2007	40.00	6.0%
ImpediMed Ltd	Healthcare-Products	11/09/2007	8.78	5.0%
ING Real Estate Healthcare F	Real Estate	13/02/2007	4.46	2.0%
Intrapower Ltd	Internet	11/07/2007	12.07	5.0%
ITX Group Ltd	Computers	22/02/2007	8.75	6.0%

Firm	Industry	Date	Amount Raised ($ Millions)	Variable Direct Cost (Excl Accounting and Legal Costs)
Key Petroleum Ltd	Oil & Gas	13/03/2007	19.20	6.0%
L&M Petroleum Ltd	Oil & Gas	24/11/2006	20.00	6.0%
Lincoln Minerals Ltd	Mining	30/01/2007	5.00	6.0%
Liontown Resources Ltd	Mining	14/11/2006	7.00	5.0%
MAC Services Group	Lodging	7/03/2007	64.50	4.0%
Macarthurcook Asain RE SEC	Closed-end Funds	21/02/2007	50.00	6.0%
Mariner American Property IN	Real Estate	16/02/2007	13.19	4.8%
Mercury Mobility Ltd	Telecommunications	25/06/2007	3.00	4.0%
MFS Ltd	Diversified Financial Services	23/03/2007	73.17	4.4%
Multiplex European Property	Real Estate	20/04/2007	184.45	2.0%
Natural Fuel Ltd	Energy-Alternate Sources	17/11/2006	83.00	5.0%
NIB Holdings Ltd	Insurance	29/10/2007	86.99	12.6%
Norfolk Group Ltd	Electrical Components & Equipment	22/06/2007	196.84	2.8%
NRW Holdings Ltd	Engineering & Construction	27/07/2007	281.59	3.0%
Odin Energy Ltd	Oil & Gas	19/06/2007	12.00	0.4%
Orchard Industrial Property	Real Estate	14/05/2007	205.00	3.5%
Patrys Ltd	Pharmaceuticals	8/06/2007	25.00	5.3%
Plan B Group Holdings	Diversified Financial Services	17/05/2007	30.00	5.0%
Platinum Asset	Diversified Financial Services	10/04/2007	561.00	1.8%

Firm	Industry	Date	Amount Raised ($ Millions)	Variable Direct Cost (Excl Accounting and Legal Costs)
Management				
Primary Health Care	Healthcare	11/09/2007	184.45	1.3%
Queensland Gold and Minerals	Mining	28/07/2006	3.00	5.0%
RAMS Home Loans Group PTY	Diversified Financial Services	27/06/2007	695.25	2.3%
Record Realty	Real Estate	21/02/2007	29.25	2.8%
Record Realty	Real Estate	21/02/2007	29.59	2.8%
RP Data Ltd	Internet	5/12/2006	72.27	3.0%
Rubicon Europe Trust Group	Real Estate	20/02/2007	67.90	3.0%
Rubicon Japan Trust	Real Estate	13/02/2007	58.00	3.0%
Rubicor Group Ltd	Commercial Services	14/05/2007	75.84	3.0%
Southern Cross Electrical	Engineering & Construction	30/10/2007	58.80	4.5%
Suncorp-Metway Ltd	Banks	15/03/2007	22.90	2.0%
Superior Resources Ltd	Mining	29/08/2007	12.50	15.0%
Texon Petroleum Ltd	Oil & Gas	26/03/2007	20.00	4.0%
Thinksmart Ltd	Internet	9/05/2007	85.62	3.2%
Tishman Speyer Office Funs	Real Estate	16/02/2007	125.28	2.0%
Transfield Services Infrastu	Investment Companies	3/05/2007	285.66	2.8%
Tutt Bryant Group Limited	Distribution/Wholesale	3/02/2007	1.82	1.3%

Firm	Industry	Date	Amount Raised ($ Millions)	Variable Direct Cost (Excl Accounting and Legal Costs)
Uranoz Ltd	Mining	2/05/2007	8.00	5.0%
Viridis Clean Energy Group	Electric	20/11/2006	13.53	2.8%
Vita Life Sciences Limited	Pharmaceuticals	11/07/2007	5.50	8.0%
Whitehaven Coal Ltd	Coal	3/05/2007	1.90	4.0%
Wilson HTM Investment Group	Diversified Financial Services	16/05/2007	26.65	4.0%
Zingmobile Group	Telecommunications	10/10/2007	9.00	6.6%