

Response to ACG Global Beta Report

April 2005

Background

The Queensland Competition Authority (QCA) engaged The Allen Consulting Group (ACG) to undertake an investigation of issues relating to the Queensland Government's submission in connection with the Draft Decision on DBCT.

ACG had particular concerns with:

- The use of a weekly observations over a two year period to estimate beta
- The inclusion of small capitalisation companies in the portfolio of firms analysed
- The inclusion of companies from countries who are trading parties with Australia and who have market structures different to Australia
- Inclusion of companies by GIC code
- Inclusion of companies traded in a number of markets

ACG fail to appreciate the portfolio approach adopted by Queensland Treasury. Many of the misdirected arguments put forward question the appropriateness of individual selection/calculations. A portfolio or aggregate approach overcomes the problems associated with individual selection.

Portfolio Approach

The approach adopted by Treasury is a portfolio approach. This approach was chosen for a number of reasons.

To estimate a beta for a firm that is not traded, a typical approach is to use "pure play" where the beta estimate of a direct comparison proxy firm is used as the estimate. If no direct comparison can be made it is necessary to obtain an estimate by another method. Beta is a measure of systematic risk and firms within the same industry have similar betas. An industry beta can logically be used as a reliable estimate.

The beta is estimated and it is applied over a future regulatory period. Ideally the future or forecasted beta should be used for the regulatory period. Due to forecasted betas being non observable, historic betas are used as a surrogate measure. It is imperative that there be stability in beta over time.

The estimates for individual securities are subject to error¹ and numerous studies have examined the stability of beta and they have reached similar conclusions. Levy examined weekly rates of return and concluded that beta estimates for individual securities are not stable². Due to the unreliable nature of individual securities, Queensland Treasury adopted an industry or portfolio approach.

Empirical evidence by Levy indicates that the stability of the beta for portfolios increases dramatically (500%) over that for individual securities and in addition, the larger the portfolio the greater the stability. Blume also found similar results.³ Tole found that there was a substantially greater stability in beta as the portfolio size increased.⁴

There exists a distinct advantage of obtaining a reliable beta estimate by using a portfolio approach as opposed to unstable individual estimates.

Another compelling reason for a portfolio approach is that by having a large number of firms chosen on the basis of a Global Industry Classification (GIC), idiosyncratic issues are averaged away leaving only systematic issues. This is discussed later.

Weekly Betas

Betas were calculated using weekly data over a two year period. The choice between using monthly data and weekly data involves a trade-off between any bias caused by infrequency of trading and the preference towards recent data.

¹ As evidenced in Table 1.2, page 7 ACG report 'Analysis of Global betas' March 2005

² Robert A. Levy, "On the Short-Term Stationarity of Beta Coefficients", *Financial Analysts Journal* 27, no. 6 (November-December 1971) 55-62

³ Marshall E. Blume, "On the Assessment of Risk", *Journal of Finance* 26 no. 1 (March 1971) 1-10

⁴ Thomas M. Tole, "How to maximise Stationarity of Beta", *Journal of Portfolio Management* 7, no. 2 (Winter 1980) 45-49

Infrequent trading causes a bias as the beta calculation does not involve contemporaneous observations. A longer interval, say daily to weekly may overcome this problem and remove the bias.

The "best" interval depends upon the number of trades which is a function of firm size and is firm specific. Scholes and Williams⁵ claim that when shares are traded very frequently or infrequently beta estimates are biased down and with average trading frequency the betas are biased up. The use of a portfolio which contains a mixture of frequent, infrequent and average traded stocks removes the individual bias.

Note that if the portfolio was constructed selectively by only using say average traded shares, there would be an upward bias in the estimate. It is important that frequency of trading is NOT a selection criterion for portfolio inclusion. A reliable estimate requires frequent, infrequent and average traded shares where a portfolio approach is adopted.

There are many published sources of beta including the AGSM, Merrill Lynch, Ibbotson, Barra, Value Line, S&P, Morningstar, and Bloomberg. Beta estimates are normally calculated using either weekly or monthly observations. Some services calculate beta using monthly observations (AGSM and Merrill Lynch) while others use weekly observations (Bloomberg and Value Line). It is apparent that if global services like Bloomberg⁶ and Value Line use weekly data, it must be an acceptable and reliable estimate.

Not only do some data service providers prefer weekly data but weekly data in some cases is the most appropriate methodology. For example Roenfeldt⁷ compared betas derived from 48 months of data to the subsequent betas for the coming year and found that they were poor estimators. Australian Academics also believe that weekly calculations may be the preferred approach:

“An alternate response to the instability problem which may be appropriate in some circumstances is:

- to reduce the return measurement interval, for example from monthly to weekly returns, and

⁵ M. Scholes and J. Williams, "Estimating Beta from Nonsynchronous Data", *Journal of Financial Economics*, (December) 1977 309-27

⁶ Bloomberg provides a financial service 24 hours a day to more than 260,000 users in over 125 countries

⁷ R.L. Roenfeldt, G.L. Griepentrog, and C.C. Pflamm, "Further Evidence on the Stationarity of Beta Coefficients", *Journal of Financial and Quantitative Analysis* 13, no 1 (March 1978) 117-121

- simultaneously to reduce the estimation period, for example from four years to two years.”⁸

It is apparent that for individual securities, betas are not stable and the interval over which the beta is calculated affects individual beta calculations. Using a combination of a portfolio approach with weekly data helps to overcome any trading bias and it appropriately introduces beta stability into the analysis. Bias removal and beta stability occur while using most recent data⁹ which is preferred due to its relevance.

Composition of Portfolio

Firms in the sample were chosen on the basis of their Global Industry Classification (GIC). GICS is an industry classification system developed by Standard & Poor's in collaboration with Morgan Stanley Capital International (MSCI).

GICS is currently comprised of 10 Sectors, 23 Industry Groups, 59 Industries and 122 Sub Industries. A company is assigned to a single GICS sub industry according to the definition of its principal business activity as determined by Standard & Poor's and MSCI. Revenues are a significant factor in defining principal business activity; however, earnings analysis and market perception are also important criteria for classification. If DBCT was a listed firm, the likely sub industry classification and related sub industries would be ports, coal and mining services.

Queensland Treasury chose these portfolios based upon a universally accepted industry classification system. To select firms as a proxy for an industry on any other basis would be nonsensical. The data had not been “mined” so that the resultant beta is an unbiased estimate for the industry.

If a ‘pure play’ approach was to be adopted then firms would be rejected/accepted on the basis of their business activities. DBCT does not have a ‘pure play’ comparator. It is inappropriate to reject firms from the industry average. The inclusion of all firms is necessary so enable idiosyncratic issues to be diversified away. Using a smaller sample with a biased selection process will

⁸ S.R. Bishop, H.R. Crapp, R.W. Faff and G.J. Twite, *Corporate Finance*, 4th Edition, Prentice Hall 2000 page 171

⁹ ACG op. cit. p7 – ACG state that there is a preference for more recent data due to relevance of the data

result in a less reliable beta estimate where an industry beta is being calculated – as is the case with Queensland Treasury’s submission.

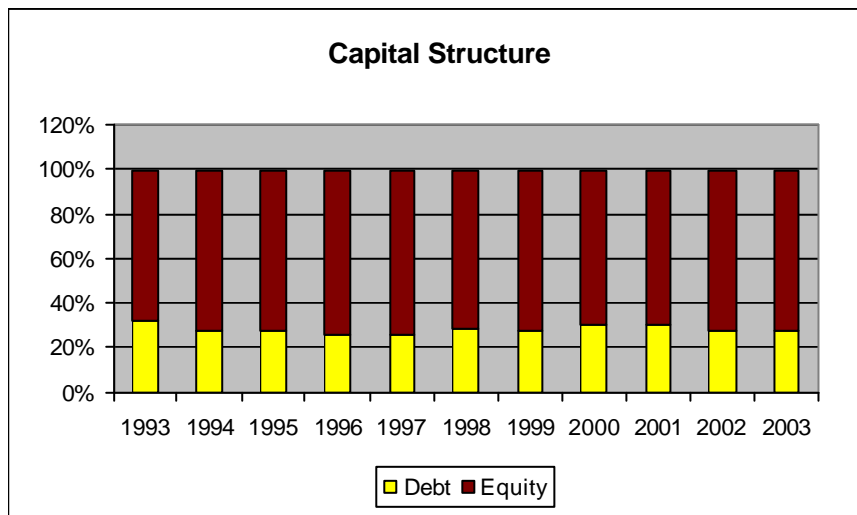
The above arguments apply equally to country selection for a global industry beta.

Gearing

ACG question the gearing methodology.

“The most recent observation on company capital structures was used, rather than an average for the period over which the betas were estimated.”¹⁰

Again as a portfolio approach was adopted, individual capital structure changes as identified by ACG¹¹ will have a negligible impact. Capital structures for large samples display little change over time. Miller¹² made this observation when revisiting the Optimal Capital Structure issue. He observed capital structures of US firms remaining unchanged over time as taxation rates changed. The Australian evidence supports Miller as the following table illustrates the gearing of firms in the ASX200 over time.



¹⁰ ACG op. cit. p7

¹¹ ACG ibid. Table 1.3

¹² M. Miller, “Debt and Taxes”, *Journal of Finance* (May), pp 261-75

Source Bloomberg

Companies Traded in Two Markets

Macarthur Coal is traded in the Australian market and also on the DAX. For the DAX the beta is calculated using the change in the quoted euro price and the change in the DAX index. Should this firm be included twice when it is traded in two markets is a matter of opinion. As a global index one can argue for its inclusion.

In terms of reliability of the beta estimate, the inclusion or rejection of Macarthur Coal has a trivial effect as the equity beta for the global coal industry is 0.71 regardless.

Conclusion

ACG has argued against the Queensland Treasury portfolio approach on the basis of individual issues when individual issues are not relevant to the portfolio estimate.

An industry beta using weekly data provides a stable and reliable estimate. Importantly different firms from different countries have been included to reduce idiosyncratic risks and provide an unbiased estimate of an industry beta. Individual firm's capital structure changes are found to be relevant only when individual estimates are required as opposed to the portfolio betas suggested by Queensland Treasury.

The Queensland Treasury submission contains a reliable estimate of beta using a portfolio approach.