Memorandum

To:	David Johnston
From:	Euan Morton, Dominic Byrne
Subject:	**Summary of independent expert report analysis**
Date:	17 February 2022

Synergies has been engaged by Queensland Treasury Corporation (QTC) to investigate the relationship between total market returns (TMRs) calculated by independent experts and prevailing government bond yields. This is a key financial relationship of interest when estimating the rate of return.

The findings of this analysis will be used by QTC to inform its submission to the Australian Energy Regulator (AER) 2022 Rate of Return Instrument review process.

Context

QTC is seeking to quantify the relationship between TMRs used by independent experts and prevailing yields on Commonwealth Government Securities (CGS).

To date, QTC has found evidence of a positive, but less than one-for-one, relationship between the TMR and CGS yields. However, until now, QTC has had only a small number of data points from a single financial expert (Leadenhall) available for analysis.

We have expanded on this sample using the Thomson Reuters Connect 4 database, which gives us over 200 observations with information on the TMR.
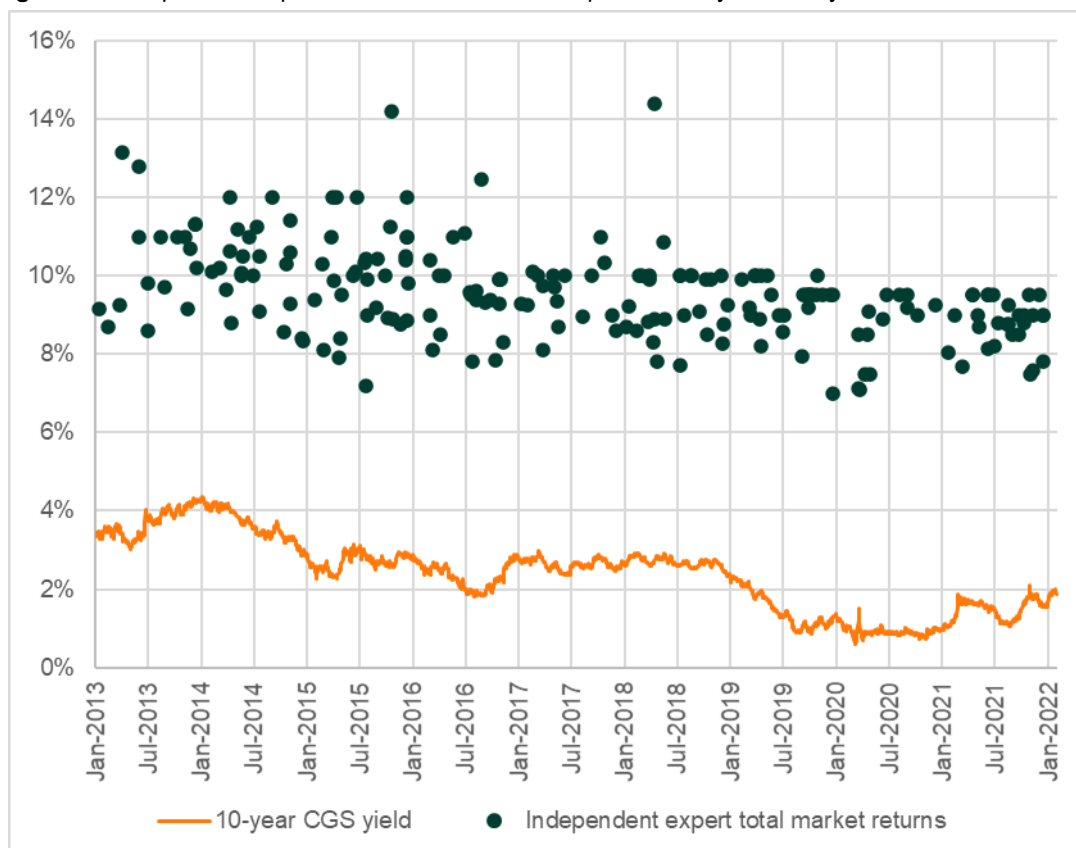
Connect 4 database

The Connect 4 database (provided by Thomson Reuters) contains independent expert reports for companies listed on the ASX. These reports provide valuable evidence and insights into the methods financial practitioners use to compute cost of equity estimates under current Australian market conditions.

For the Australian sample, we have investigated all 582 independent expert reports relating specifically to acquisitions, takeovers, divestments, demergers and merger

schemes from 1 January 2013 to 31 January 2022.[1] Of these 582 reports, only 278 (48%) made explicit reference to the use of a WACC or discount rate, and only 210 (36%) provide a detailed description of their WACC methodology. These 210 observations form the basis for the regressions that we have estimated in this note.

As illustrated in Figure 1, the average TMR applied by independent experts since the beginning of 2013 was 9.56%, while the median was 9.50%. Over the 12 months to 31 January 2022, the average TMR was 8.80%, while the median TMR was 9.00%.

Figure 1   Independent expert total market returns compared to 10-year CGS yield

Data source: Synergies analysis using RBA data and Connect 4 database

Methodology and regression specifications

In order to evaluate the relationship between independent expert TMRs and government bond yields, we have implemented a simple linear regression

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1   To facilitate an efficient interrogation of the database, we restricted our analysis to transactions with a deal size greater than $AUD10 million.

specification. This regression examines the effect of a change in the 10-year CGS yield on the TMR as estimated by independent experts.

In equation form, this regression can be expressed as follows:

Regression: $Independent\ Expert\ TMR = \beta_0 + \beta_1 10Y\ CGS\ Yield + \varepsilon$

Where:

β_1 indicates the change in the independent expert TMR associated with a 1 percentage point change in the 10-year CGS yield. For example, if β_1 were equal to 0.5, this would tell us that every time the 10-year CGS yield increases by 1 percentage point, we would expect an independent expert's TMR estimate to increase by 0.5 percentage points.
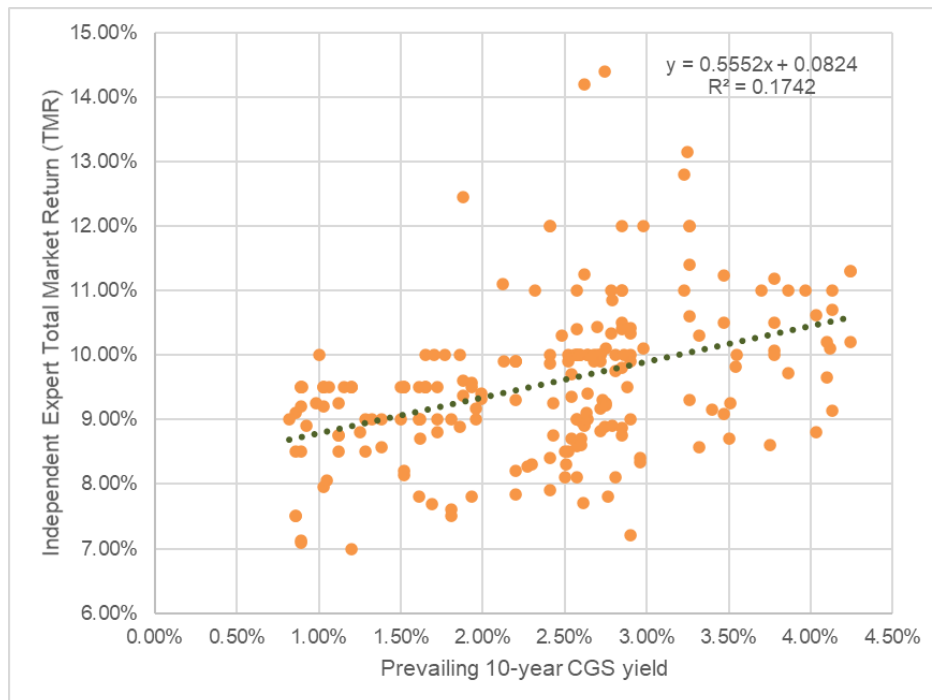
β_0 is an intercept. In terms of its economic interpretation, it can be thought of as the estimated TMR when the risk-free rate is zero.

ε represents the error term for the regression equation

Results

The results for this regression are displayed in Figure 2.

Figure 2   Relationship between independent expert TMRs and prevailing 10-year CGS yield

Data source: Synergies analysis using RBA data and Connect 4 database

The estimated equation can be expressed as follows:

Independent Expert TMR = 8.24% + 0.5552 * 10-year CGS yield

These results can be interpreted as follows. A 1 percentage point increase in the 10-year CGS yield is associated with a 0.56 percentage point increase in the TMR. The magnitude of the coefficient is very similar in magnitude to QTC's analysis (which found a 0.62 percentage point increase) using only 15 observations of Leadenhall data.

Further statistics for the regression are provided in Table 1. This estimated relationship between the TMR and CGS yield is strongly statistically significant, as evidenced by the high t-statistic of 6.62, and the low p-value of 0.0000 (to four decimal places).[2] The 95% confidence interval around the estimated effect of 0.56 percentage points is [0.3900, 0.7204] (i.e. a TMR increase of 0.39 to 0.72 percentage points per 1 percentage point increase in the TMR).

Table 1   Regression output

Coefficient	Estimate	Standard error	t-statistic	p-value	95% confidence interval lower bound	95% confidence interval upper bound
Intercept	0.0824	0.0021	38.8219	0.0000	0.0782	0.0866
Slope for 10-year CGS yield	0.5552	0.0838	6.6247	0.0000	0.3900	0.7204

Source: Synergies analysis

In order to illustrate how Synergies' estimated regression compares with QTC's existing analysis, Table 2 compares the TMR predictions of QTC's model with those of our model for a selection of CGS yields. Compared to QTC's regression estimate based on Leadenhall data, our regression has a higher intercept and a flatter slope. As a result, our TMR predictions tend to be larger for lower CGS yields, but the difference narrows for higher CGS yields.

Table 2   Comparison of QTC and Synergies' predictions for TMR

CGS yield	QTC estimate	Synergies estimate	Difference
1.0%	8.14%	8.80%	0.65%
1.5%	8.45%	9.07%	0.62%
2.0%	8.77%	9.35%	0.58%
2.5%	9.08%	9.63%	0.55%
3.0%	9.39%	9.91%	0.52%

Source: Synergies calculations

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[2]   An estimate is significant at the 1% level if its p-value is less than 0.01, which is the case here.

Conclusion

In summary, we have expanded on QTC's existing analysis by incorporating the total market returns used in independent expert reports from the Connect 4 database.

The relationship between independent expert TMRs and prevailing government bond yields that we detect is very similar to the relationship QTC found when using only the 15 Leadenhall data points. In particular, we find that a 1 percentage point increase in government bond yields is associated with a 0.56 percentage point increase in the TMR (QTC found a 0.62 percentage point increase). In other words, the TMR does not move one-for-one in line with changes in the risk-free rate.