AGGREGATED ANNUAL PROFIT ANALYSIS METHOD: A BENEFICIAL CLIENT TOOL FOR ASSESSING CONSTRUCTION CONTRACTOR FINANCIAL PERFORMANCE RISK

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Using aggregated annual profit analysis methods (AAPAM), over a study period, helps overcome limitations with evaluating traditional averages or medians of builders and construction contractors' annual profit results. Accounting standards permit contractors to include projects' estimated variation claim outcomes in profit statements. As project results may be years from finalisation, a contractor's true financial position is unknown. AAPAM as a tool to help overcome this limitation is justified for clients' use in a detailed study of 33 contractors listed on the Australian Securities Exchange, for a minimum four years, over 2010-2019 (i.e., outside COVID). Aggregated annual real profit (after tax, abnormals, outside equity interests) findings varied (median 1.7%, average 1.4%) from traditional average-of-annual-result considerations (median 1.5%, average -1.2%). Thirty percent of these contractors returned poorer aggregate profit results than their averaged-annual values. Three of the seven contractors who failed during the study period had lower aggregate profits compared to their average-annual values. Plotting respective aggregated profit results backwards in time shows AAPAM is an essential prequalification tool for non-accountants to better assess contractors' financial performance and potential-failure risk.

Keywords: Australian Securities Exchange; benchmarking; governance; insolvency; tendering

INTRODUCTION

Publicly listed civil engineering construction and general building contractors (contractors) operate under strict governance controls (Australian Securities Exchange (ASX) 2019). Delivering sustained profit results over an extended operational period, within fluctuating business and market conditions, indicates a contractor is meeting its governance objectives (including non-financial matters like reputational growth, customer satisfaction, employee performance, and process quality (Deng and Smyth 2014; Tripathi *et al.,* 2019)) and provides potential clients with a degree of comfort about the contractor's viability. However, given the permitted accounting standard vagaries including recognition of estimated financial outcomes from unresolved project variation claim disputes (Yee and Cheah 2006), evaluation of annual report

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Urquhart, S and Whyte, A (2025) Aggregated Annual Profit Analysis Method: A Beneficial Client Tool for Assessing Construction Contractor Financial Performance Risk, *In*: Thomson, C and Neilson, C J (Eds) Proceedings of the 41st Annual ARCOM Conference, 1-3 September 2025, Abertay University, Dundee, UK, Association of Researchers in Construction Management, 678-687.

financials does not always represent a reliable picture of a contractor's real financial position. The question arises as to what other options are available to clients, especially those with limited accounting knowledge, when assessing a contractor's financial security during a tender evaluation.

Applying aggregated annual profit analysis methods (AAPAM), over a longer study period, helps overcome these limitations. To demonstrate AAPAM's use, a longitudinal analysis of 33 purposive sampled ASX listed Australian contractors' aggregate profit results over a 10-year period (2010-2019) is compared against their individual annual results and evaluated.

LITERATURE REVIEW

Governance and Disclosure

Listed public companies must make risk management disclosures in their annual reports as part of their corporate governance obligations (ASX 2019). Jia et al.'s (2016) analysis of ASX100 companies' 2010-2012 annual reports found many provided qualitative 'boiler plate' disclosures over consecutive years with non-time-specific information. They argued this practice is to avoid negative consequences of disclosure, or not re-evaluating past annual report text in periods without regulatory change. In contrast, Linsley and Shrives' (2006) UK study found, while monetary risk exposure statements were uncommon, companies exhibited a willingness to disclose limited forward-looking positive or negative risk information. Real disclosures provide competitors with potentially sensitive information (Scantlebury and Alleyne 2015). Consequently, it remains difficult to adequately assess a company's real risk profile. This research addresses this gap, in the context of the financial performance of Australian construction companies.

Financial Performance Studies

Notwithstanding annual reporting requirements, contractors focus on project performance measures (Hegazy and Hegazy 2012). In contrast, business outcomes' studies include investment suitability (Balatbat *et al.,* 2010); performance indicator development (Hegazy and Hegazy 2012); global event implications (Thangaraj and Chan 2012); prediction models (Jin *et al.,* 2013); aandstrategy and structure impacts (Deng and Smyth 2014) on contractors' business finances and profits. There is no consensus on how to evaluate contractors' financial performance (Jin *et al.,* 2013). Study timeframes range from two to 10 years, with some requiring contractors to be operational for the full duration (Deng and Smyth 2014) while others have not (Akintoye and Skitmore 1991; Yee and Cheah 2006). Fundamental analysis of a variety of financial ratios, sourced from appropriate financial databases, is common (Hegazy and Hegazy 2012). Where a study focus was primarily on profitability (Yee and Cheah 2006), net profit after tax (NPAT) expressed as a percentage of operating revenue is a common consideration (Balatbat *et al.,* 2010). Other profitability parameters may include return on assets (ROA) and return on equity (ROE) (Deng and Smyth 2014).

Despite sustained profitability performances indicating ability to increase revenue while controlling costs, given their project-based businesses, contractors' organisational performances receive comparatively little research (Deng and Smyth 2014). Representative business performance studies with civil engineering contractors include UK 1980-1987 (Akintoye and Skitmore 1991); USA, Europe and Japan 1997-2001 (Cheah *et al.,* 2004); International 1997-2003 (Yee and Cheah 2006);

International 1984-2003 (Devinney *et al.,* 2010); aandUK 2002-2011 (Deng and Smyth 2014). Balatbat *et al. (*2010) analysed 30 ASX listed contractors (all within Global Industry Classification Standards (GICS) 'Capital Goods') over 1998-2007, primarily for their investment potential. Eighteen were classified as civil, and the balance property construction companies. Resource-sector infrastructure contractors were excluded. Thangaraj and Chan's (2012) 2006-2010 study of 36 publicly listed and private companies only included eight building contractors. None of those operated in the resource construction sector, notwithstanding its importance to the Australian economy.

Direct comparisons between studies are not easy due to variations in: management distortion or manipulation of results through abnormal items (Cheah *et al.,* 2004); understating profitability to reduce tax obligations or other revenue recognition practices (e.g., estimated future variation claim successes) permitted under applicable accounting rules (Yee and Cheah 2006); and, holding cash on balance sheets (Devinney *et al.,* 2010). Given construction's cyclical nature and that finalisation of variation claims may be prolonged, clients would gain with longer study durations that smooth out short-term fluctuations (Yee and Cheah 2006). Management faces challenges to balance short and long-term performance (Deng and Smyth 2014), though most measures focus on shorter-term performance (Yip *et al.,* 2009). Short-term profit results made be impacted by deliberate low-tender (suicide bidding) strategies (Coggins *et al.,* 2016), to secure opportunities via variation claims to recover a position, that subsequently prove to be unsuccessful.

Under Australia's Corporations Act 2001, directors face severe penalties if they allow their company to trade while insolvent, i.e., cannot pay debts when due. Consequently, directors usually place the company into 'voluntary administration' (VA) before reaching insolvency. Contractor failures are time-dependent, with actual 'failure' not being immediately apparent. Financial distress, leading to insolvency or VA, often only becomes apparent in a contractor's final two years, when the failure process is virtually complete (Alaka *et al.,* 2016). This research provides clients, and contractors concerned with their own governance, with an earlier failure risk detection tool.

METHOD

A longitudinal study of annual financial reports of 33 purposive sampled ASX listed contractors provides an opportunity to assess effective business processes, applying at the large-contractor end of the Australian based market. The following sub-sections describe sample selection; financial parameters considered; and rationale and method behind the proposed 'aggregated annual profit analysis method' (AAPAM).

Contractor Selection Criteria and Sample

Drawing from the literature to select a suitable but varied range of contractors, four criteria were applied:

1. ASX listing for at least four years, between 1 Jan 2010 and 31 Dec 2019 - a full ten-year continuous listing was not required.
2. Mixture of contractor sizes but with >$20m turnover threshold.
3. At least 20% of turnover earned in the Australasian region; and
4. Selections from across five GICS, thus including resource sector infrastructure contractors, given its importance to the Australian economy.

ASX records a company's status as 'Trading', 'Delisted' or 'Suspended' at any enquiry date. These terms are adopted here. At 31 Dec 2019, 17 of the 33 contractors remained classified as Trading, with the other 16 as Delisted. Seven contractors were Delisted, during 2010-2019, because they had entered VA, herein referred to as 'Failed'. The other nine were Delisted because they were bought out by another company ('Buy-out'). Two long-term Suspended (for non-compliance with ASX listing rules) were grouped with the Delisted Buy-out contractors for this analysis.

While the selected 33 contractors are not a cross-sectional representation of the wider industry (Australian Bureau of Statistics (ABS) 2013), the sample reflects the targeted larger contractors in the Australian construction industry, a market heavily dominated by a few major contractors. For comparison purposes, contractors were also grouped by turnover: Tier 1 (>$1,000m pa); Tier 2 ($100m to $1,000m); and Tier 3 (<$100m). These groupings align with common industry references (Australian Contractors Association (ACA) 2020). Sample demographics are summarised in Table 1. The nine 'Buy-out' contractor demographics, not shown for formatting reasons, are $964m average turnover and average 18.5 years on the ASX.

Contractor Trading status numbers varied considerably over the study period, from a peak of 33 (2011-2013) down to 17 at 31 Dec 2019. Tier 2 sized experienced the biggest decline in numbers (50%) over 2010-2019. Only fifteen contractors in the sample were listed for all 10 years (four Tier 1, eight Tier 2 and three Tier 3, though three Tier 2 subsequently grew to achieve regular Tier 1 turnovers post 2019).

Table 1: Contractor sample demographics by groupings

	All	Trading	Failed	Tier 1	Tier 2	Tier 3
Number	33	17	7	8	20	5
Average years on ASX	19.5	22.6	13.4	33.3	14.2	18.4
Average turnover ($m)	1,953	3,051	557	6,816	479	69

Financial Performance Parameters Considered

Data used in this study were sourced from the Morningstar DatAnalysis Premium database (DatAnalysis n.d.) which carries company results released to the ASX. As this study's focus was sector performance rather than evaluation for investment purposes (Balatbat *et al.,* 2010), annual profit and loss result parameters were the prime consideration. Beyond ASX listing information and company backgrounds, data evaluated included: operating revenue; earnings before interest and tax/depreciation and amortisation (EBIT/DA); NPAT; NPAT before abnormals (NPATBA); NPAT after abnormals (NPATAA); outside equity interests; ROA; and ROE. Given contractors' senior and middle management place great importance on profit as a percentage of operating revenue, profit was logically used as the performance comparison parameter, aligning with Yip et al.'s (2009) approach.

Values were not escalated to 2019 dollars, using index adjustments, as escalation formulae do not improve past profits reported. As contractors vary in using 30 June or 31 Dec as their end of financial year, annual results are referred by calendar year without half-year alignment adjustments. For Delisted their last reported full year results were used, with final part-year data excluded - as per Yee and Cheah (2006).

Justification for Applying AAPAM Application

Most profit performance studies analyse averages, or medians, of individual year results (average-of-annual-results method) over a study period, rather than considering

aggregated profit outcomes over that period (Deng and Smyth 2014). Utilising individual year-by-year results does not provide a true picture of real financial positions. Contractors' business results derive from amalgamating their individual projects under contract, durations of which are not discretely divisible by annual reporting periods. Large construction projects, common within this sample, run for years. Individual annual reports do not necessarily reflect true profit positions in any one year (Assaad and El-Adaway 2020). A project's real financial position may not be known for years, especially when extended defect liability periods apply (7+ years is not uncommon on Australian Government Road infrastructure D&C contracts).

Individual year-by-year reported results are subject to exclusions buried in notes, albeit within accepted accounting practices (Cheah *et al.,* 2004). Contractors may apply different financial policies, within relevant accounting standards, to meet their strategic objectives. Results are permitted to include estimated recoveries from submitted, but not finalised, contract variation claims (Yee and Cheah 2006). Ambitious claim success estimates, raising profit figures one year, may be negated by a final lower resolution value reported years later, especially if arbitration or litigation is involved. As an example, the previously ASX listed CIMIC carried a projected $1.15b project variation claim outcome in its profit results from 2015 to 2020 that subsequently proved to be unsuccessful (CIMIC 2020). True profit results for an earlier year may never be fully disclosed (Bloomfield 2002), being 'lost' in subsequent reporting or balanced out by later profitable projects.

AAPAM helps negate these industry specific issues, as well shorter-term market fluctuations, smoothing out poorer result years or individual project profit result anomalies. Use of AAPAM in this research addresses Deng and Smyth's (2014) identified need for empirical studies of contractor performance assessments to consider the year-by-year performance fluctuations that occur over longer project/company time frames.

Calculation of Aggregated Profit Results

Various profit result parameters were analysed, e.g., EBIT/DA, and NPATBA and NPATAA. Abnormals include costs incurred by selling or re-structuring once normal business units to recover a loss position. For this paper's purposes, profit results analysed were calculated by considering NPATAA plus outside equity interests, called here 'Real Profit' (in some jurisdictions termed 'statutory profit'). As Real Profit is not openly publicised in DatAnalysis (n.d.), values were calculated for each contractor each year before application of AAPAM. Aggregated results were progressively calculated each year over 2010-2019 and then expressed as percentages of operating revenue: for example, 2012 being values for 2010, 2011 and 2012; while 2019 figures included the whole 2010-2019 period. Frequencies of negative annual Real Profit (i.e., Real Loss) were recorded, together with when negative abnormals were reported. Financial data were not winsorised to remove extreme outliers (other than one case detailed below), as those contractor results still exist. Given the non-normality of results medians, rather than averages, are presented, reflecting Deng and Smyth's (2014) approach.

RESULTS AND DISCUSSION

Differences Between Averages of Individual Year and Aggregate Real Profit Results
Across the sample, individual annual Real Profit results ranged from -122.3% to +20.9%. Aggregate Real Profit variations were smoothed out, over the 10 years,

varying from -13.2% to +14.9%. Results by contractor groupings are summarised in Table 2. The median of contractors' aggregate Real Profit was smaller than expected (1.7%), though Trading's was relatively like ABS's indicative heavy and civil construction contractors' profit of 2.3% (ABS 2013). These figures exclude one contractor's >300% loss in its final year (2015), when their costs were over a very small operating revenue base just before going into VA.

Contractors do not always deliver profits. Aggregate results are impacted by the frequency of Real Loss years. Only two (6.1% of the sample) returned Real Profit every year for the 10 years. Two others, undertaking resource sector construction, did so for each of the nine years they were ASX listed. Seven (21%) made Real Profit each listed year, though one went into VA the next year. Across the sample Real Loss occurred every fifth year. Abnormals, unlike their title, were regular features in various contractors' annual reports. Aggregated over the 10 years, negative abnormals represented a considerable impact on Real Profit (see Table 2), 68% of potential Real Profit in the case of Tier 1s, who declared negative abnormals every second year - considerably more frequently than other groupings.

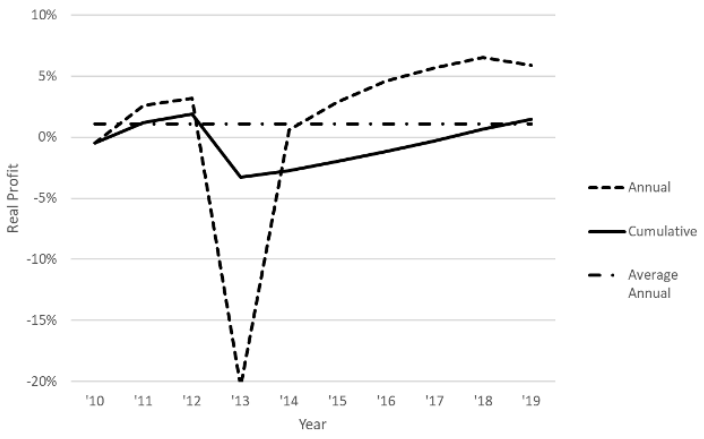
Table 2: Median annual and aggregate Real Profit levels for contractors (2010-2019)

	All	Trading	Failed	Tier 1	Tier 2	Tier 3
Annual Real Profit (%)	2.9	4.2	0.0	3.0	3.3	2.4
Aggregated Real Profit (%)	1.7	2.2	-1.0	1.8	2.0	0.6
Years with negative abnormals (%)	30	30	12	55	20	20
Years with negative Real Profit (%)	20	20	25	16	20	40

Buy-out's results, not shown in Table 2, were 1.2%; 2.0%; 71%; and 17% respectively. Their high percentage of recording negative abnormals, while still having a lower frequency of Real Loss years, may explain why they became buy-out targets. It was beyond the scope of this study to investigate this finding further.

Given managements' use abnormals in reporting, it highlights AAPAM's value in gaining a global picture of profit performance. For many *contractors, the* differences between AAPAM calculated and average-of-annual-results Real Profit was minimal. For *others, the* differences were greater, especially when longer term contracts and single big annual losses significantly impacted overall profitability for years - for Tier 1s: 1.8% aggregate compared to 3.0% average-of-annual. Individual company variations could be considerable. As an example, see Figure 1 for a Trading Tier 2. There were (unsurprisingly) statistically significant differences in aggregate Real Profit results between Trading and Failed (p=0.018).

Figure 1: A Trading Tier 2's annual and cumulative aggregate Real Profit result variations



Similar aggregate and annual comparisons were made for EBIT and EBITDA, though are beyond the scope of this paper. However, those median aggregate EBITs were like Balatbat et al.'s (2010): 4.3%, for the All, Tier 1 and Tier 2 groupings; higher for Trading; but, lower for the Tier 3 and Failed groupings.

Using AAPAM as an Additional Contractor Evaluation Tool

For nearly half the sample the average-of-annual-results method produced a lower/more conservative Real Profit than the AAPAM calculated position. The difference of 0.7 percentage points is considerable given the sample's median aggregate Real Profit of 1.7%. There was no material differences between the two methods found for approximately a quarter of the sample (see Table 3). Averaging annual results considerably underestimated Trading contractors' real financial positions. Hence for those cases average-of-annual-results evaluations would still meet a client's objectives of a financially stable contractor. For two thirds of the Buy-out (not shown in Table 3) their average-of-annual Real Profit was lower than their aggregate. Again, this may be a reason for them becoming acquisition targets for other contractors. Perhaps unsurprisingly, for about half the Failed averaging annual values overestimated their aggregated Real Profit position.

Table 3: Comparison of average-of-annual and cumulative aggregate Real Profit results, (percentages may not add due to rounding)

	All	Trading	Failed	Tier 1	Tier 2	Tier 3
Average of annual < cumulative aggregate (%)	48	35	57	38	50	60
Median of value difference (percentage points)	0.7	1.6	0.5	0.1	0.5	7.2
Average of annual > cumulative aggregate (%)	30	35	43	25	35	20
Median of value difference (percentage points)	0.4	0.3	0.5	0.3	0.3	0.4
Values the same (%)	21	29	0	38	15	20

On a straight calculation basis AAPAM may be no better an indicator/predictor of increased risk of contractor failure than traditional assessment approaches. However, AAPAM's benefit becomes clearer when cumulative aggregate Real Profits are plotted backwards in time for different contractor groupings. Trading and Failed median cumulative aggregate and individual annual Real Profits are plotted in Figure 2. Faileds' results are taken from their last full year before VA (Year 0) back eight years (Year -8). For comparison, Trading results are plotted backwards from 2019, as Year 0, in a similar manner.

Both groupings experienced a decline in cumulative aggregate and individual annual Real Profit over that timeframe, with market positions being likely contributors as described earlier. Faileds' aggregate Real Profit declines are more pronounced (significance levels of $p=0.130$ for Year -1 and $p=0.075$ at Year 0). Contractors did not suddenly 'fail' but rather experienced a steady, though increasingly rapid, reduction in aggregate Real Profit in the years immediately preceding VA. These findings reflect Alaka et al.'s (2016) secondary research-based proposition.

AAPAM has strengths and weaknesses, not least being it may not provide a material numerical difference to the traditional average-of-annual-results approach. However, for clients at tender or pre-selection stages AAPAM's value, as a further financial evaluation metric tool, is when it is used to compare a tendering contractor's progressive aggregate Real Profit performance against a wider benchmark sample of (Trading) contractors. The main effort in undertaking AAPAM assessments relates to

accessing and maintaining contractors' financial results data to enable establishment of benchmark aggregated profit curves, against which an individual contractor's results can be compared.

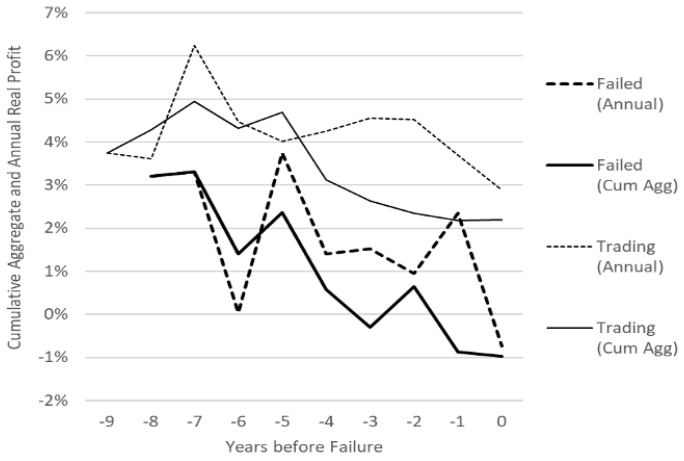


Figure 2: Steady decline in median aggregate and annual Real Profit towards failure

Ideally a client has access to spreadsheeted-based data of publicly listed contractors, from sources like DatAnalysis, which enable ready calculation of aggregated results. Alternatively, a client may need to manually calculate aggregated profits from contractors' annual reports (3-5 years commonly required) submitted with their tenders. Retention of this data facilitates ongoing subsequent benchmarking.

CONCLUSIONS AND RECOMMENDATIONS

Contractors' annual financial statements can be masked by larger longer duration projects and provisions for estimated variation claims outcomes on individual projects. Ultimately these projects may not be as successful as previously reported, thus resulting in lower overall profit levels within a contractor's overall portfolio of work. High frequency of loss years may increase a client's concern regarding a potential contractor's ongoing financial viability, especially when loss years coincide with major turnovers.

Profit results of 33 contractors, listed on the Australian Securities Exchange during 2010-2019, were analysed using traditional average-of-annual-results methods and the presented aggregated annual profit analysis method (AAPAM). For approximately a third of those contractors, averages-of-annual-results analysis overestimated their real long term profit positions. This finding itself may not change clients' approaches to how they evaluate their tendering contractors' potential financial security. However, comparing failed contractors' (those having gone into VA) time-based aggregated profit results with those still trading contractors showed aggregate differences became more pronounced. As part of their tender evaluations, clients can plot a potential contractor's AAPAM calculated progressive aggregate Real Profit backwards in time and compare it against a benchmark set of contractors' aggregate Real Profit results. Similar AAPAM approaches may be applied to assess broader profitability factors, including EBIT/DA, ROA and ROE.

While this study used Australian contractors' data, AAPAM evaluations are applicable in other countries, especially those where their accounting standards permit builders and construction contractors to adjust profitability reporting by including estimated, but not yet achieved, variation claims outcomes on longer running projects.

AAPAM provides clients, especially those with non-accounting backgrounds, with an additional means of addressing contractor viability, beyond consideration of averages-of-annual-profit results, to further minimise the risk of their selected contractor being one who goes into voluntary administration during their project's delivery.

ACKNOWLEDGMENTS

The authors acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research.

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