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VALUATION UNCERTAINTY v NEGLIGENCE: WHAT IS REASONABLE CARE? IS IT BEING ACHIEVED?

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INTRODUCTION

There exists discord both amongst and within the valuation profession, academia, and the judiciary regarding the interpretation, application and, even, legitimacy of value ranges, variations, and related concepts.

One of the most illuminating and frequently quoted passages on this matter is furnished by Bingham M.R. in *Banque Bruxelles Lambert SA v Eagle Star Insurance Co Ltd* (1995) QB375 at 403-404:

> (The valuer's) duty to (the lender) is to take reasonable care to give a reliable and informed opinion of the open market value of the land in question at the date of valuation. In the ordinary way (the valuer) does not warrant that the land would fetch on the open market the value he puts on it, any more than a medical practitioner warrants that he will cure a patient of illness. In each case the duty is to exercise a reasonable standard of professional care in the circumstances, no more and no less.

It is clear that the valuer must demonstrate reasonable professional care but attainment of this standard has, at times, been reduced to a simple assessment of whether a value lies within acceptable parameters of the figure regarded as representing the correct value. The extent of the acceptable range of values is highly contentious: the subjective and often arbitrary nature of any such determination renders the concept open to well founded censure.

This paper examines the major elements of valuation error, and three propositions are tendered as the basis for further research to be conducted as part of an ongoing project. Initially it is appropriate to define the usage of the terms uncertainty, error, range and variation, as applied in this paper, in relation to valuations.

valuation uncertainty is the inability to determine a single ideally correct value because of the assumptions, inferences and opinions within the valuation process.

valuation error is the result of the use and/or application of inappropriate methodologies, inferences, simulations or judgements by the valuer. It is inappropriate if the valuer has not taken reasonable care to determine the appropriate figure, data or approach.

value range is the difference between valuations and a specified correct value, or, the estimation of a probable range of resultant values by a valuer.

valuation variation is the difference between valuations undertaken by different valuers.

Three propositions are advanced in this paper:

1. Reasonable care requires a valuation exercise to be free of major errors.

2. Reasonable care cannot rightly be measured in terms of a valuation range or valuation variation.

3. Reasonable care requires the identification and quantification of the uncertainty of the input data in a valuation exercise.

The propositions place the emphasis on the acceptability of uncertainty and the non-acceptability of error as determinants of reasonable care.

The paper will deal with the both the international and domestic literature on this topic, explain the concepts of valuation uncertainty and error and then argue the importance of the three propositions advanced before identifying options for further researching these propositions.

LITERATURE REVIEW

The objective of this section is to survey a sample of the core literature on quantitative analysis of valuer performance within both an intra-group and transactional context. The literature is grouped by major research area: 1) valuation accuracy; and 2) valuation variation. The former is concerned with the assessment of valuations relative to subsequently realised sale prices, and the latter focuses on 'valuation versus valuation' analysis. These two fields, though separate and distinct, are nevertheless intimately associated, with the one serving to inform the other. The central studies addressing these issues are detailed below and their findings summarised. The review is neither intended nor designed to be exhaustive in nature, its purpose is to briefly overview the key literature in the areas of valuation accuracy and variation and the serious reader is urged to consult the references provided herein. All papers reviewed emanate from the United Kingdom unless otherwise indicated.

Additionally, passing comment will be offered on the case law relevant to the areas under consideration herein.

Valuation Accuracy

The literature on valuation accuracy considers the relationship between valuations (applied in this context to refer to opinions of value) and subsequently realised transaction prices. An appropriate starting point for reviewing the literature in this field is the *Mallinson Report* (1994a, 1994b) in which comment is offered on the issue of valuation uncertainty. The paper serves, *inter alia*, to both contribute to, and stimulate, the valuation accuracy debate and in doing provides much of the impetus for the subsequent attention accorded this matter by the academic community. The report states that all valuations are to one extent or another uncertain. It concludes that valuations essentially represent an expression of expert opinion, and as such, valuers may, in considering the same property, rightly and appropriately differ in the value conclusions at which they arrive. It is in this way that uncertainty is held to manifests itself for there exists no single "ideally correct value for a given piece of land"[1]. The report continues on to note that whilst all value estimates carry with them some degree of uncertainty this must be kept within reasonable bounds of reliability. Brown, Matysiak, and Shepherd (1998) maintain it is well accepted in the market that there will be a degree of uncertainty attached to individual valuations and that this has lead to the widely held (though apparently arbitrarily established) perception that valuers are capable of valuing to within 5% to 10% of market value/price.

One of the earliest studies to consider the relationship between valuations and sale prices was undertaken by Brown (1985). In assessing valuation accuracy the report's findings provided support for the proposition that valuations serve as a good proxy for market prices/values.

[1] *Fenton Nominees Pty Ltd v Valuer-General* (1981) 47 LGRA 71 at 76.

Using a sample of 29 properties Brown regressed their appraised values against the actual sale prices subsequently achieved and found that there existed a high correspondence between valuation and price. The R-squared of 0.99 obtained indicated that 99% of the valuations were explained by the sale price, suggesting the attainment of a high level of valuation accuracy.

A succeeding valuation accuracy study undertaken by Drivers Jonas and Investment Property Databank (IPD) (1988) considered the issue employing a similar regression-based methodology to that utilised by Brown. The 1988 study comprised a sample of nearly 1,450 properties for which a sale price in the period 1982 to 1988 was available and a minimum of two valuations in the 24 month period prior to the sale had been conducted. All valuations undertaken within four months of any sale transaction were disregarded to ensure the sale price was unknown at the date of valuation. On average valuations were conducted almost 10 months prior to sale date. The analysis produced an R-squared of 0.93. They concluded that there is a high level of correspondence between valuations and sale price. The findings were very similar to that derived by Brown. This high correspondence again indicates a high level of valuation accuracy to be present. In addition, the Drivers Jonas/IPD findings also revealed that the valuations assessed displayed a conservative bias.

The original Drivers Jonas/IPD study has subsequently been regularly updated and its focus broadened to consider such matters as sectoral accuracy. The fifth publication in the series was released in April 2000 in which the study period is extended to December 1998 and almost 10,000 transactions are analysed. The latest results, summarised in the table below, indicate that in 1998 84% of valuations assessed lay within a range of plus or minus 20% of actual sale price, whilst 63% fall within 10%. The figures for the entire study period, 1983-1998, are somewhat lower with 77% of valuations within plus or minus 20% of sale price and 53% located in a range of 10% either side of price. The results indicate that a relatively high level of accuracy has been realised over the study period, particularly since 1991. Results for the eight year period from 1991 indicate an average of nearly 60% of all valuations have fallen within a range of plus or minus 10% of the sale price realised, and 83% have been made within 20%. The average time lag for the full study period is nine months.

Summary of Drivers Jonas/IPD (2000) Findings

Percentage Variation from Sale Price (±)	Percentage of Valuations within each Accuracy Range	
	1998	Full Study Period 1983-1998
< 10%	63%	53%
< 20%	84%	77%

The regression based methodologies employed by Brown (1985) and IPD/ Drivers Jonas (1988, and updates) were however subsequently challenged. Lizieri and Venmore-Rowland (1991) questioned the soundness of the statistical analysis conducted in these regression-based studies, and thus the integrity of the findings derived therefrom. They suggested the presence of extreme values in the samples employed breached one of the fundamental assumptions underlying regression analysis; namely the requirement for the residuals to display an equal variance, the result being that the coefficients estimated for the variables are apt to be biased (a phenomenon referred to as heteroscedasticity). In the absence of the inclusion of information on the statistical tests undertaken by Brown and IPD/Drivers Jonas in their studies, the statistical validity of their findings remains uncertain. Further, the statistical robustness of the Brown research may be queried given the small sample size employed in the study.

Matysiak and Wang (1995) levelled broader criticism at the valuation accuracy research undertaken, arguing that studies considering the correspondence between valuations and prices could never assume a conclusive nature. They suggested that consideration should instead be accorded, *inter alia*, the issue of valuer behaviour in response to market changes over time. Whilst their study sought primarily to consider valuer performance under different market conditions, it did, as a by-product of the principal line of inquiry, serve also to provide information concerning the broader question of valuation accuracy. A sample of 317 properties sold in the period 1973-1991 for which valuations had been conducted in the period 3-6 months prior to sale were identified from the JLW Property Performance Analysis System. Assessment of this data indicated that the probability of producing a valuation lying within a range of plus or minus 10% of the sale price was approximately 30%, within plus or minus 15% was 55% and within plus or minus 20% was 70%. Drivers Jonas/IPD (2000) provides more favourable estimates to Matysiak and Wang suggesting that there exists a 53% probability of a valuer valuing to within a range of 10% either side of a subsequently agreed sale price.

Further, in considering valuation accuracy in different market conditions, the results reported by Matysiak and Wang anecdotally suggested that valuers tend to undervalue property in bull markets and overvalue property in bear markets leading to a smoothing effect. This pattern was recently confirmed in the Australian study of Newell and Kishore (1998). Of the 317 properties assessed in the Matysiak and Wang study 177 were found to be undervalued in relation to sale price by an average of just over 21%, whilst 134 were found on average to be overvalued by 11.5%. Matysiak and Wang further reported the overall average percentage variation to be approximately 7% whilst the average absolute variation lay in the region of 17%.

Summary of Matysiak and Wang (1995) Findings

Percentage Variation from Sale Price (±)	Percentage of Valuations within each Accuracy Range
< 10%	30%
< 15%	55%
< 20%	70%
Average Absolute Difference	17%

A more recent study conducted along similar lines was undertaken by Blundell and Ward (1997). The database employed by Matysiak and Wang was again utilised, but a larger sample group of 747 properties, for which sale prices were available over the period 1974-1990 and for which valuations had been obtained in the period 3-6 months prior to sale, was identified. The findings indicated approximately 80% of the valuations lay within plus or minus 20% of the sale price, and only 35% were within plus or minus 10% of the sale price. The results are somewhat above those advanced by Matysiak and Wang, particularly at the 20% level. Additionally, the study provided evidence suggesting a conservative bias in the valuations assessed with the sale price found to be on average 7% higher than the valuation in absolute terms. The extent of the undervaluation was not of the same magnitude as that identified by Matysiak and Wang (1995) but the results, when taken with those derived in previous studies, may be seen to lend credence to the veracity of the phenomenon.

Comparisons between the previous two studies reviewed and those of Drivers Jonas/IDP and Brown are problematic. The latter studies selected cases where valuations had been conducted within a period of three to six months prior to sale providing a time lag significantly lower

than that seen in the former studies. For example, the 10 month time lag present in the initial Drivers Jonas/IPD study and the similar time lags associated with its updates. The negative relationship between the length of the time lag and the level of accuracy achieved hampers direct comparison between the studies. Similarly, the disparity seen in the study periods employed by the researchers, with study periods ranging from five years to 19 years, introduces a further comparability problem given that one would anticipate reduced variation to be associated with longer time periods. Attempts to draw direct comparisons are further hampered by the recency, or lack thereof, seen in the data sets employed. Only the Drivers Jonas/IDP study considers records after the early 1990's, a consequential issue as it is from this period to 1998 that their study finds accuracy to be at its highest levels (perhaps, *inter alia*, as a result of recent methodological advancements and the widespread introduction of comprehensive practice standards). Questions as to the integrity of the findings in light of the many criticisms levelled at them regarding methodological soundness, potential sample specificity, and the like, still remain largely unanswered and as a corollary a prudent degree of caution must also be applied in interpreting the results deriving from these studies.

Blundell and Ward (1997) attempted to address one of the principal shortcomings identified in the accuracy studies, namely the inherent 'time lag' problem, by adjusting the data to reflect subsequent movements in the market. They acknowledged the deficiencies in such a crude approach, noting it failed to capture differential movements in the market on a geographical basis. However, the findings are worthy of consideration if viewed with an appropriate degree of caution. Analysis of the adjusted data still suggested sale price to be on average higher than the corresponding valuation, and a figure in the region of 3% was advanced. It was further suggested that 85% of the valuations would lie within a range of plus or minus 20% of the sale price, and that only 55% would lie within a range of 10% of sale price.

Parker (1998) provides some insight into the accuracy issue in an Australian context. The sample group utilised in the study consisted of a small group of properties which were being offered for open market sale by tender. The subject properties were independently valued by one national valuation company as at the date on which the tender closed, being a day in November 1995. Each valuer was furnished with identical instructions, together with a data set containing full information on the properties, and a normal market fee for undertaking the appraisals was charged. Further, the portfolio contained seven standard (i.e. not special or unusual) industrial, office and retail investment properties. The methodology adopted was notable in that it served to overcome many of the limitations and problems inherent in previous studies in this area. Not least amongst these was the absence of any time lag, with the concurrent performance of the sale transactions and valuation exercises. The results indicated an overall average absolute variation of 7.7% was present whilst the overall average variation was –3.2% (a negative result indicating the valuations were above sale price). On a sectoral basis, lower variation, and hence higher accuracy, was exhibited by retail property (-2.6% average variance) followed by commercial property (4.1% average variance) and industrial (-8.5% average variance). On an individual property basis the variation ranged between a low of 1.6% to a high of 14.3%. Additionally, 15% of the subject valuations were found to lie within a range of 5% either side of sale price, 85% within a range of 10%, and all valuations fell within plus or minus 15% of sale price. The results appear to compare favourably with those of the United Kingdom based studies reviewed above with a significantly higher level of accuracy indicated in the Parker study than generally seen in the findings emanating from the United Kingdom. However, as noted previously, direct comparability is problematic, and as such a degree of caution is necessary in interpreting the results.

Summary of Parker (1998) Findings

Percentage Variation from Sale Price (±)	Percentage of Valuations within each Accuracy Range
< 5%	15%
< 10%	85%
< 15%	100%
Average Absolute Difference	7.7%

A further Australian based study undertaken by Newell and Kishore (1998) assessed sale prices relative to valuations for 101 office properties and 117 retail properties in the Sydney area over the period between 1987 and 1996. The time period covered allowed not only the issue of accuracy to be considered but also permitted some assessment to be made of valuer performance in different market states. Data was drawn from the Commercial Property Monitor database, records of the New South Wales Valuer-General, and information furnished by the the Independent Property Trust Review. The study included only those properties for which a professional valuation in the 12 months prior to sale was undertaken. The time lag present in the data was accordingly relatively short with an average time period of 4.5 months between the date of last valuation and sale present. The data was also adjusted to reflect market movement in the intervening period between valuation and sale using the Property Council of Australia Indices. The study employed a regression based methodology similar, though more sophisticated in nature, to that seen in Brown (1985) and Drivers Jonas/IPD (1988 and updates). Whether this study escapes the criticisms levelled at the aforementioned research by Lizieri and Venmore-Rowland (1991) is indeterminable. Again, as with both the Brown and Drivers Jonas/IPD analysis, the Newell and Kishore study fails to provide comprehensive details concerning the statistical tests employed in assessing the data. Thus, in the absence of such information, the issue of the soundness of the statistical analysis conducted remains unresolved. Nevertheless, the findings provide some evidence of the accuracy of valuations in an Australian context. The analysis indicated that 65% of the valuations assessed were within a range of plus or minus 10% of the sale price and 91% lay within plus or minus 20% of the sale price. The results are again well below those seen in the majority of the studies emanating from the United Kingdom. Further, an average overall variation of approximately 2% was determined. This average variation was similar to that seen in an American study prepared by Webb (1994, cited in Newell and Kishore, 1998) in which a sample of 469 properties were assessed with data relating to the twelve year period to 1990. It is however below the figures seen in the United Kingdom based studies in which the average overall variation is seen to lie in the vicinity of 7% (Blundell and Ward 1997, Matysiak and Wang, 1995).

In considering the overall average absolute variation a figure of approximately 9% was determined in the Newell and Kishore study. This is similar to the figures reported in a number of American studies. For example, Coles, Guilkey, and Miles (1986, cited in Parker, 1999) provided a variance estimate of 9.5%; Miles, Guilkey, Webb, and Hunter (1991) report the average absolute variation between valuation and sale price for properties in the NCREIF database to be 10.7%; and 11% was reported by Webb (1994, cited in Newell and Kishore, 1998). However, the results derived in the Newell and Kishore study again lie well below the level of average (absolute) variation reported in the UK studies. Newell and Kishore also calculated the average absolute percentage difference between sale price and valuation after adjusting for the time lag, a resultant figure of 5% was derived. The analysis further served to confirm the findings of Matysiak and Wang with the statistics again providing evidence

suggesting that valuers tend to undervalue property in bull markets and overvalue property in bear markets.

Summary of Newell and Kishore (1998) Findings

Percentage Variation from Sale Price (±)	Percentage of Valuations within each Accuracy Range
< 10%	65%
< 20%	91%
< 15%	100%
Average Absolute Difference	9%
Average Absolute Difference after adjustment for time lag	5%

In summary, an almost alarming level of variation may be seen to exist in the research, with the indications being that anywhere between 30% (Matysiak and Wang, 1995) and 63% (Drivers Jonas/IPD, 2000) of UK valuations may fall within a range of 10% either side of the subsequently agreed sale price. In an Australian context the range would appear more acceptable at 65% (Newell and Kishore, 1998) to 85% (Parker, 1998). Whilst this may be seen to suggest the attainment of higher levels of accuracy in Australia, the reader is cautioned against drawing any such conclusion given the presence of only two Australian studies (one of which considered a mere seven valuations). In general, the range of results reported in the studies clearly fails to support the widespread belief that valuers are capable of valuing to within 5-10% of market value/price (Brown, et al., 1998). The research would perhaps appear to raise more questions than it resolves. What can be said with certainty is that answers regarding the generally prevailing level of valuation accuracy attained in practice remain illusive.

However, whilst considerable disparity is seen in the results reported in the valuation accuracy studies, they unanimously indicate the presence of a large proportion of valuations beyond a range of 10% either side of sale price. In each case the number of valuations falling within the range rises as the band is extended, but even at the 20% bracket many of the studies still indicate the presence of valuations outside this range. The literature bears testament to the inherently imprecise nature of valuations, but, for the survival of the profession, this imprecision must know some bounds.

Valuation Variation

Whilst the majority of existing research considers the issue of valuation accuracy, the 1985 paper by Hager and Lord, which provided the impetus for much of the later accuracy related work, considered valuation variation (valuation versus valuation). The report provided an overview of the property investment market but a small section focused on the range of values realised when the value of the same property is assessed by a group of valuers. For the purposes of the study all valuers were given identical valuation instructions, and two properties were valued, a rack rented office property, and a reversionary retail shop. The spread of resultant valuation figures was expected to lie approximately 5% plus or minus the control value figures determined by an expert valuer. The value figures derived for the office property, a summary of which is provided in the below table, saw 40% of the sample group furnish assessments which lay within 5% of the control value, and 90% of the valuers provide figures within 10% of the control. The valuations submitted on the retail premises saw 50% of the valuers' value within 5% of the control value, with 80% valuing to within 10% of the control value. Of the ten valuations undertaken on each of the two properties all but one lay

within a range of 20% from the control value. The limited sample of both properties and valuers utilised has however seen the study criticised (Brown, 1985). Further Reid (1985, cited in Parker, 1998) questioned the instructions and information furnished to the valuers and the quality of the valuations as no fee was involved. Acknowledging the limitations of the study, no solid conclusions may be drawn, but the valuation variation reported undoubtedly serves to raise questions concerning valuation accuracy with a large number of the valuations falling outside the target 5% range. Clearly it infers valuers may be failing in their duty to accurately determine market value with higher levels of variation by implication suggesting the presence of higher levels of inaccuracy.

Summary of Hager and Lord (1985) Findings

Percentage Variation from the Mean	Percentage of Valuations within each Variation Range	
	Rack Rented Office Property	Reversionery Interest Retail Premises
< 5%	40%	50%
< 10%	90%	80%
< 20%	100%	90%

A more recent study examining this issue was undertaken by Adair, Hutchison, MacGregor, McGreal, and Nanthakumaran in 1996. They too considered the question of valuation variation in the UK commercial property market. A sample of valuers were invited to value a number of properties. The perceived shortcomings in the 1985 Hager and Lord study were addressed by utilising a considerably larger sample of properties and valuers in this study. The sample included hypothetical retail, office, and industrial property in 14 main centres throughout the UK. For each of the 14 centres five valuers from local firms, and five from national firms were to provide valuations on hypothetical subject properties in actual locations. However, whilst prior agreement to participate in the study had been given by all valuers approached a response rate of only 56% was achieved yielding 446 valuations. This resulted in uneven sample sizes and as such the findings concerning variation differences seen between local and national firms and by urban area must be viewed with some caution. Further, the valuations were conducted on hypothetical properties (though real locations were used) and the study participants were not paid for completing their valuations which has lead some to question the quality of the valuations submitted (Brown, 1998). The resultant variation reported in the study may, *inter alia*, be a product of these factors. Nevertheless, the results are worthy of consideration.

The overall findings reported by Adair et al. indicates the presence of a wide variation with only 61% of all valuations conducted on the rack rented properties lying within a range of 10% of the mean of the valuations, and 85% within a range of 20% of the mean. A lower level of variation was seen in the reversionary valuations with 69% of the valuations lying within a range of 10% of the mean, and over 90% of the valuations falling within a range of 20% of the mean. The overall absolute average variation seen in the sample was 9.53% with a figure of 8.48% for the reversionary properties and a higher 10.5% associated with the rack rented properties. A summary of the findings is furnished in the below provided table.

On a sectoral basis rack rented retail showed the lowest overall variation followed by office and then industrial property. For the reversionary valuations lower levels of variation were seen, with only a nominal difference present in the results between the three sectors. The findings tend to support those of the earlier Hager and Lord study. The range of values

present in the study clearly fails to support the widespread belief that valuers are capable of valuing to within 5-10% of the mean value (Brown, et al., 1998).

Summary of Adair et al. (1996) Findings

Percentage Variation from the Mean	Percentage of Valuations within each Variation Range	
	Rack Rented Properties	Reversionery Interest Properties
< 10%	61%	69%
< 20%	85%	90%
Average Absolute Variation	10.5%	8.48%

A further study in the field was undertaken by Brown et al. (1998) aimed at addressing many of the perceived shortcomings seen in the above detailed studies. The research approached the issue of variation from a different perspective moving from the *ex ante* studies previously conducted to an *ex post* examination of the uncertainty, as manifest in value ranges, in mean valuations. Again, the study considered three sectors (retail, office, and industrial). Property records derived from the Independent Property Databank Annual Index covering the period 1980–1995 were used, to which a bootstrapping procedure was applied. Thus, unlike previous studies the results were not sample specific, nor were they tied to a specific valuation date. Further, the approach inherently considered the influence of market movements over time. Brown suggested the bootstrapping technique utilised provides a considerably more valid and robust method of statistical analysis than seen in both the previous valuation accuracy and variation research, particularly in light of the sample sizes utilised in much of the prior work.

Brown et al. found that valuers have approximately a 10% chance of producing valuations that lie within 5% of the mean of the valuations and approximately a 20% chance if the range is increased to 10% of the mean. The results point to the uncertainty inherent in valuation being considerably higher than previously accepted. Brown et al. further concluded that uncertainty, giving rise to valuation variation, is an inherent component of valuations, and a normal function of an active market in which valuers will adopt different views regarding the factors that contribute to value and consequently different views regarding value itself. The report concluded that concern should not rest with valuation uncertainty but rather that attention should focus on valuation errors resulting from inadequate research, data deficiencies or poor quality valuation practice.

The issue of valuation variation was further considered by Crosby, Lavers, & Murdoch (1998a) in which further analysis was conducted on data collected by Morgan (1993, cited in Crosby et al., 1998a). The data set utilised contained 120 retail, office, and industrial investment properties in eight individual portfolios within the United Kingdom, for which two professional valuations had been undertaken. The analysis considered the paired valuations, one provided by one firm, and the second furnished by one of four firms. The difference between the valuations was then determined (not the difference between the valuations and their mean as seen in previous research). The average overall variation was determined to be in the order of 8.6%. Over 40% of the valuations lay within a range of 5% either side of each other, over 65% were within 10%, and 90% were within 20%. The average absolute variation was found to be the lowest for retail property followed closely by office property. Crosby et al. (1998b) notes that the robustness of the simple analysis conducted may be questioned, and that the need for a more sophisticated methodology to be employed may be argued. Further, the data limitations inherent in the study must be acknowledged, in particular, the limited time

period must be considered, with all data relating to valuations conducted in the period 1983 to 1985, and all valuations assessed in the study being undertaken by only five companies.

Several recent American studies have also considered, though not always as a primary focus, the issue of valuation variation. A study undertaken by Diaz and Wolverton (1998) focused on assessing the degree to which valuers are influenced by valuations they have previously conducted; the hypothesis being that valuers would anchor onto their prior value estimates and thus be inappropriately influenced by this figure when conducting a subsequent re-valuation. Whilst the research was designed to consider the issue of anchoring leading to appraisal smoothing it serves by default to additionally address valuation variation. The authors' arranged for three sets of valuations to be conducted on the same hypothetical Atlanta apartment property within the space of 12 months from April 1995. The sample group of valuers appraised the property and subsequently, eight months later, were requested to revalue the property in light of specified property and market changes. Diaz and Wolverton also obtained at this time 'control' valuations from an independent sample of valuers. All valuers were furnished with identical instructions and a detailed data set on the property. The 46 valuations gathered were then examined to assess the variation seen in the results. They found a very low level of variation, with an absolute average variation of between 3.74% and 5.31% seen in the three sets of valuations. Almost 70% of the valuations obtained lay within a range of 5% of the mean of each set of valuations, and only 6.5% of the valuations were further then 10% from the mean. On the issue of appraisal smoothing, the primary research focus, the evidence derived clearly indicated the presence of anchoring with valuers failing to apply sufficient adjustments to their previous value determinations when performing subsequent revaluations on the same property.

A further American study conducted by Young and Graff (1999) considered the issue of random appraisal error. Utilising 747 pairs of simultaneous valuations of retail, office and industrial property commercial property during the period 1989 to 1997. Whilst the study considered only random error, not total error (average (absolute) variation), the evidence anecdotally indicated that the degree of variation seen in their data was less than that present in the Diaz and Wolverton study.

The issue of valuation variation was considered in an Australian context by Daniels (1983, cited in Rossini, 1999). A small scale study conducted in South Australia assessed the matter in relation to residential properties. Two freehold detached residential houses, one a 'typical' mid-value property located in a 'typical' suburb, and the other a more difficult exercise being a large home in a superior suburb, were valued as at the same date by 18 different valuers. Each valuer inspected both properties on the same day but (we are assured) all inspections were conducted at different times. The mean absolute error determined was 5.3% for the 'simple' property and 8.9% for the more 'complex' property. Additionally, for the 'simple' property, the findngs indicated that 50% of the valuations lay within a range of plus or minus 5% from the mean of the valuations, 95% fell within the 10% bracket, and 100% lay within the 15% range. The results determined for the 'complex property were somewhat higher, with 39% of the valuations lying within a range of 5% either side of the mean, 50% found to be within 10%, and 95% within 15% of the mean. Whilst no solid conclusion can be drawn from such a limited study, and it must be noted one would anticipate lower variance for straightforward residential valuations, the findings are favourable when viewed against those generally seen in the research, particularly that emanating from the United Kingdom.

Summary of Daniels (1983) Findings

Percentage Variation from the Mean	Percentage of Valuations within each Variation Range	
	'Simple' Property	'Complex' Property
< 5%	50%	39%
< 10%	95%	50%
< 15%	100%	95%
Average Absolute Variation	5.3%	8.9%

In summary, the anecdotal evidence provided by Hager and Lord (1985) indicates that 85% of the valuations considered fell within a range of 10% of the control valuation and only 5% of the valuations fell outside the 20% range. The study undertaken by Adair et al. (1996) provides more conservative figures, with 65% of the valuations analysed found to lie within a range of 10% of the mean of the valuations and that only 10% falling outside the 20% bracket. The findings reported by Adair et al. were subsequently confirmed by Crosby et al. (1998a, 1998b). In contrast, Brown et al. (1998) furnishes estimates well below those provided in the above detailed to studies, suggesting that valuers have only a 20% chance of producing valuations that lie within 10% of the mean. The small scale Australian study conducted in this field reported more favourable results, with 95% of the valuations assessed found to lie within a range of plus or minus 10% of the mean. The results must however be interpreted with some degree of caution given the small sample size employed. Nevertheless, the Australian findings do appear to compare favourably with those generally reported in the studies emanating from the United Kingdom, and are more closely aligned to the findings generated in the American based studies reviewed.

Again, as with the valuation accuracy research, the disparity present in the valuation variation studies precludes the establishment of firm conclusions.

Whilst the valuation accuracy research is of little direct relevance in the context of assessments of reasonable care, Crosby et al (1998a) notes that the studies in this field have been utilised by some analysts to comment on the extent of valuation variation. Of more direct significance is the valuation variation research which serves to provide some relevant insight into the margin of error concept (as formalised in valuation negligence cases). The present application of the margin of error concept involves an allegedly negligent valuation being considered against the testimony supplied by an expert witness (or witnesses) who advise the court on both the 'correct' value and the margin of error (size of the bracket within which value may acceptably lie).

Case Law

A review of the case law relevant to the areas under consideration falls outside the scope of this paper, and is in fact quite unnecessary given the excellent and comprehensive papers recently produced on this topic by Crosby (2000) and Crosby et al. (1998a, 1998b). The serious reader is urged to consult these works.

It is however, for our purposes, appropriate and constructive at this juncture to consider the concluding comments offered by Crosby (2000).

> The margin of error concept is an example of institutionally accepted (in)accuracy … the nature of the (valuation) beast is that some variation will occur and "experts may differ without forfeiting their claim to professional competence."

> In some legal jurisdictions this entitlement to differ is not unconstrained and "gross over-valuation … may be strong evidence either of negligence or incompetence". In a few cases in the UK, this has been extended to the principle of any valuation outside the bracket being enough to find the valuer guilty irrespective of other issues surrounding the case. Evidence from Australia is that the concept has not been extended to this latter interpretation … Why should valuers alone among professionals be judged by the result. Doctors do not always cure the patient, lawyers do not always win the case; but they are all judged by the way in which the task was approached rather than any concept of result. The same should be true of valuers.
>
> The paper concludes that the margin of error principle … is lacking in any empirical basis and indeed runs counter to the available evidence. Its use as a means of establishing negligence by a valuer is fundamentally flawed.

VALUATION UNCERTAINTY

When determining the market value of property, the existence of a range of possible values is increasingly being accepted by the courts and clients because of the complexities of the valuation exercise where the product is "real property"[2]. Real property is a heterogeneous product with many unique or diverse characteristics. It is necessary to interpret the decision-making processes of the market players in order to assess the market value of real property.

Numerous external and internal factors impact on the decision-making processes of the market players and these factors influence the input variables utilised within the valuation exercise. The property valuer is required to make judgements regarding the input variables as it is not possible to assign definitive or "correct" values to variables in most instances. Hence there exists a degree of uncertainty and valuers should determine a range of possible values as well as a most probable figure. However, the degree of uncertainty varies substantially accordingly to the reliability and availability of data used in determining the values assigned input variables and the level of difficulty associated with the individual valuation exercise. This point and the basis to evaluate the level of uncertainty are discussed in Boyd (1990).

The literature has shown that there is no uniformly accepted range of values and this is not surprising because of the differing levels of reliability of the input variables. It is fallacious to assume that all values can be determined within a specified range of figures, such as 10%, about a mean or selected figure.

It is the valuer undertaking a valuation exercise who should quantify the degree of uncertainty associated with the resultant figure. This point was made in the Mallinson Report (1994, cited in Brown, et al., 1998) and we to are of the opinion that the valuer is the appropriate party to identify the range of values applicable to their own valuation exercises.

The distinction between **value uncertainty and value error** is superbly described by Lord Hoffman in *Lion Nathan Ltd v Coca Cola Bottlers Ltd* (1996) 1 WLR 1438:

[2] RICS note that "the valuer and most informed users of the valuation recognise that there will be a degree of uncertainty attached to the (valuation) figure provided (1997, p. 26).

> A forecaster who predicts that profits in a given period will be, say, $2,223,000, is not doing anything so silly as to say that in his opinion the profits will be precisely that figure. He is saying that $2,223,000 is in his opinion the most probable outcome but that figures slightly higher or lower are almost equally probable and that on either side of them there is a range of possible figures which become increasingly less probable as they deviate from the mean. The forecaster, if asked, should be able to supplement the bald figure with a statement of the limits of deviation to which confidence can be attached. In some cases, the information, which he has, may enable him to say that the probability of deviation outside fairly narrow limits is very small. In other cases, the possibility of the outcome being affected by unknown or unforeseeable factors may be much greater and the limits of foreseeable deviation therefore much wider. The same is true of a valuation of property, which is no more than an estimate of what a property would fetch on a given date, based upon induction from information about what similar property has fetched . . .There is no connection between the range of foreseeable deviation in a given forecast and the question of whether the forecast was properly prepared. Whether a forecast was negligent or not depends upon whether reasonable care was taken in preparing it. It is impossible to say in the abstract that a forecast of a given figure 'would not have been negligent'. It might have been or it might not have been, depending upon how it was done … The purchaser has accepted the risk of any deviation attributable to factors which were unforeseeable, unknown or incalculable at the time of the forecast. He has accepted the risk of such deviation whether its true extent would have been foreseeable at the time of the forecast or not. But he has not accepted the risk of *any* deviation which attributable to lack of proper care in the preparation of the forecast. The only tolerable forecast is one which, on its facts, was prepared with reasonable care (pp. 1444/5).

VALUATION ERROR

Recent judgements in Australia have highlighted that the duty of reasonable care should not be measured against a range of value deviation but rather by errors, sometimes referred to as inaccuracies, within the valuation process. The errors may relate to methodology, data selection, or data interpretation. Any of these errors may be interpreted as demonstrating negligence. The authors believe that all practising valuers should be aware of these recent judgements on "reasonable care" by valuers. In particular, the Myer case (Interchase Corp) which raises a number of issues regarding negligence. Aspects of this judgement relating to value error or inaccuracies are described below:

Interchase Corporation Ltd v ACN 010087573 Pty Ltd and Others (2000) QSC 013

This is a recent judgement in the Queensland Supreme Court and relates to the valuation of the Myer Centre, Brisbane, on completion of the development in May 1988. Two valuers (A and B) valued the property in 1988 for $500m and $490m respectively, (the valuers mentioned in this judgement will be referred to as alphabetic letters as the names are irrelevant). Subsequently (in the late 1990's) three further valuers (C, D & E) valued the property, as at 1988, but clearly with the benefit of hindsight and in the knowledge of the advancements in the body of valuation techniques seen during the previous decade.

The findings of White J in this case are of profound significance to the valuation profession. She clearly identifies errors in methodology, data, and analysis by the valuers. Valuer A

admitted liability and settled with the plaintiff. Valuer B's activities were extensively examined and the judge found errors in his methodology, data, and analysis. It is worth highlighting the issues under these three headings:

(1) **Valuation Methodology**

White J on page 87 of the judgement commented:

> It is not clear from Valuer B's valuation report which methods or method was used by him in his approach to the task. At page 49 of his valuation report he states:
>
> "From our experience in both the sale and valuation of properties in today's real estate market, we believe that the ceiling price for "Retail Investment Properties' is reflected by the capitalisation of the relevant net income."
>
> On page 46 he gives the yields for five comparable sales. On page 48 having concluded that there were no comparable sales he stated:
>
> "In the absence of good comparable market evidence, we prefer our future income IRR analysis as to bases for the valuation herein."
>
> When asked about these differences in his oral examination on 10 December 1993 in the Federal Court he demonstrated a degree of confusion about which was his prime method of valuation . . . Valuer B worked from the discounted cashflow computer model and reached his valuation by using that model.
>
> It is not unlikely that after obtaining a valuation using this model Valuer B then considered segmented capitalisation rates and employed those that had been used in the November 1987 review which had an end capitalisation rate of 7 per cent for the discounted cashflow model … Valuer B did concede that there was no capitalisation of earnings calculation in the valuation report nor in any of the drafts or papers upon which he was working and which were produced (pp. 87 - 88).

Further comments on methodology by White J are:

> The expert valuers who had prepared reports and gave detailed evidence as to the practice of valuers in 1988 were Valuers C, D & E … The differences between the valuers lay in matters of detail and although significant for the final valuation figure nonetheless make it possible for a common approach to be recognised. Their methodology differed significantly from that of Valuer B.
>
> The valuers agreed that the principal valuation method to be used in valuing an income-earning investment property such as The Myer Centre in 1988 was the capitalisation of sustainable income. In 1988 there were alternative methods which tended to be used to check the capitalisation of earnings method. These included, ascertaining a rate per square metre value for the net lettable floor area which could then be easily compared to that of comparable properties; an analysis of future cash flow to determine at the adopted value that a satisfactory internal rate of return (IRR) is demonstrated, and the summation

> method of valuation which requires the valuer to ascertain the land value and construction cost less depreciation as a comparison with the valuation figure arrived at by the capitalisation method . . . As explained by Valuer C the capitalisation of income method involves four basic steps:
>
> - the ascertainment of passing rental for the property;
> - the ascertainment of market rental for the property;
> - the adjustment of rental up or down to a sustainable level as indicated by the market and other relevant factors; and
> - a selection of an appropriate capitalisation rate having regard to all relevant factors including market sales evidence and security of the income adopted and applying it to that income (p. 84).

White J, after hearing the evidence of several valuers, made a strong point for a segmented capitalisation rate:

> The segmented capitalisation rate was regularly used even before 1988 … It was and is a convenient and rational way of approaching the difficult exercise when the income of the property derives from disparate rental components. Failure demonstrably to do so would not of itself suggest negligence but a valuer would need to make a very nice adjustment to the rentals of a shopping centre without trading form, one would think, not to go astray if this process was not used.

Our commentary on valuation methodology

The valuation of the Brisbane Myer property was complex and unique at the time; while most of the leases were in place there was no proven income stream. In 1988 there was limited use made of targeted rates of return and present value calculations; if anything the comments by the valuers on IRRs appears to confuse rather than assist the judge in understanding this approach. White J refers to separate exercises to capitalise earnings and to capitalise net income. It is not clear from the judgement what is meant by earnings capitalisation, it could relate to tenant turnover analysis.

The judge favoured the segmented capitalisation rate because it permits the allocation of differing risk/return levels for the various components of the centre. This is logical but there appears little evidence on how the specific capitalisation rates attached to individual tenants (Myer), the taverns, the entertainment area and the parking were assessed..

The use of a direct capitalisation rate to assess the value of a $400m property is a crude tool and, hopefully, in the twenty-first century valuers will undertake more sophisticated exercises. The use of discount rates to quantify the differing risks related to the various cashflows is more appropriate. Both a direct capitalisation and a present value approach should be used to determine the market value of property of this type and size. Furthermore the valuation exercise should include risk analysis to identify the degree of value certainty achievable for a property of this nature.

(2) **Valuation Data**

In the Interchase case, White J found that:

> I have little difficulty in concluding that as a consequence of Valuer B's approach to aspects of the valuation he negligently accepted rentals which were unsustainable and was inappropriately influenced by "the client" and this ultimately led to too high a valuation figure (p. 108).

There were numerous allegations that the valuation report of Valuer B did not reflect the correct valuation data. Several of the alleged errors of fact in the judgement are:

> "*Leasings"*
>
> The statement that the vacancy of retail speciality space "is expected to be (zero) 0% by the end of this financial year according to the managers … is not in accordance with the relevant appendix. Appendix 4 records the Centre Manager (Mr Clare) predicting a vacancy rate of 2 per cent or less.
>
> "*The Beaumont Interests*"
>
> The report describes the Beaumont interests as a percentage of "a total specialty lettable area of 35,387 square metres." The net lettable area of specialties was approximately 18,000 square metres … The area quantified in the report is for the whole Myer Centre (including car park, theatres) excluding only the Myer Store itself.
>
> The report describes the Beaumont rent as a percentage of "total specialty rental income of $30,618,000." The specialty rental adopted by Valuer B is approximately $18,094,000. The rental quantified in the report is for the whole Myer Centre, excluding only the Myer Store.
>
> *"Specialty Shops, Kiosks & Storage Areas"*
>
> The IRR model allows for vacancies from year 4 (and not year 3 as is stated in the report) onwards.
>
> "*Theatre Complex"*
>
> There is an incorrect statement in the report about the rent review clause of the Hoyts lease as being reviewed every 5 years. The clause calls for no rent review for the first three years, with an annual increase thereafter of 7.5 per cent.
>
> *"Car Park … Percentage Rental"*
>
> The report states in respect of the car park that "We understand that the rent may remain constant for the first few years … Therefore, in our financial projections, we have allowed an income from the car park to be fixed for the first five years. We have then applied a growth factor to provide for rental growth from year 6 onwards." In reality in projections, Valuer B allowed for a

continual increase in the car park rent at a rate of 10 per cent per annum from year one which was inconsistent with the terms of the lease.

"Sundry Incomes"

The report states that "we have ignored [electricity profit] as any surplus balance will be consumed as the lessor's contribution to the promotional fund". Valuer B's calculations included the electricity profit but neglected to deduct any contribution by the lessor to promotional funds.

"For the vacant specialty shops …"

The report states that, "for the vacant specialty shops, we have … adopted an estimated market rental level which we believe is appropriate for those areas. This level of rental is often below the target rent the developer has set for the vacant space. However, we believe it provides a measured degree of flexibility between the rents that are asked and the rents that may be achieved."

Valuer B initially assigned rents to vacant specialty shops which were often below the developer's target. These assessed rents were disregarded and the developer's target rents adopted when undertaking the valuation calculation.
(pp. 89 – 92).

Our commentary on the valuation data

This case demonstrates the importance of accurate data. It is not unusual that information provided to the valuer is incomplete and it may, at times, be misleading. However it is the responsibility of the valuer to exercise reasonable care in the acceptance and use of valuation data. It is not reasonable to infer that valuers are negligent because the information they utilise is subsequently found to be inaccurate, but the valuer must demonstrate expertise in attempting to obtain the most accurate information available. The question is whether the valuer has exercised "reasonable care" when evaluating all data provided by outside sources.

The valuer's responsibility extends to an evaluation of the reliability and accuracy of the data within the risk analysis; and the subsequent quantification of the degree of uncertainty in the valuation figure.

(3) **Value Analysis**

The third type of error in the valuation process is the analysis of information and the calculation of value.

In the Interchase case the Judge, at page 92, makes the following remarks:

> Calculation and other mechanical errors had an impact on Valuer B's calculation of the value of The Myer Centre.

Electricity profit

Valuer B conceded that he had erroneously included the profit from the sale of electricity without an offset from the loss of outgoings in his computer model. This meant that the income for The Myer Centre for the first year was overstated by $506,000. When this was inserted into the computer model this income was treated as growing at an annual rate of 7 per cent for 10 years and capitalised in the eleventh year at a rate of 6.75 per cent. As a result the value of the centre was effectively overstated by approximately $6.6m.

Rental from the car park

The computer model recorded the car park rental as growing at a rate of 10 per cent per annum for the 10 years of the model but the car park lease provided for the rent to remain fixed for the first three years and thereafter to increase at a minimum of 5 per cent per annum. The model capitalised the eleventh year's income at a rate of 6.75 per cent. The effect of this error was to overstate the value of The Myer Centre by approximately $16.3m.

Rental from Hoyts

The computer model recorded the cinema rental growing at rates between 0 per cent and 24 per cent when the lease itself provided for the rent to remain fixed for the first three years and thereafter to increase at a fixed rate of 7.5 per cent per annum. The model capitalised the eleventh year's income by reference to these increases at a rate of 6.75 per cent. The error lead to overstating the value of The Myer Centre by $1.135m.

Developer's budgeted rental for vacant specialties

Valuer B said that he had assessed the market rental for vacant specialty shops. The computer model applied the developer's budgeted rents rather than his assessed market rental which resulted in an overstatement of the rents for the specialty shops of $229,239. This rent was shown on the model as growing through the 10 years cashflow period and capitalised in the eleventh year at a rate of 6.75 per cent. The effect on the value of The Myer Centre was to overstate it by $8.6m.

Butler's rental

The computer model set out the rental from Butlers growing in the first year at 20.4 per cent rather than 7 per cent as Valuer B had intended and showed this rental as growing throughout the 10 years of cashflow period and capitalising the eleventh year's income at a rate of 6.75 per cent. The effect on the value of The Myer Centre was to overstate it by $8.6m.

Queen Street Eat rental

The computer model set out the rental growing during the first year at 22.5 per cent rather than 7 per cent which Valuer B had intended and showed that rental as growing through the 10 year cashflow period and capitalised the eleventh

> year's income at 6.75 per cent. The effect of this error was to overstate the value of The Myer Centre by 7.8m.
>
> The total of those errors in the calculations carried out to support the valuation was $43.6m. ... The calculation errors, which were not exposed until after cross-examination, would suggest that … without more indicates a departure from the standard of a reasonably competent valuer in 1988 (or at any time) (pp. 92 – 93).

Later the judge adds:

> It does not seem unfair to state that the impression gained from looking at the various drafts of the computer model … was that Valuer B was experimenting with figures rather than considering the issues that a valuer would consider when assessing the risks which would directly relate to the sustainability of the rents being sought.
> (pp. 107- 108).

Our commentary on the value analysis

The judge refers to several cases of wrong interpretation of lease conditions and cash flow expectations and concludes that the valuer has not exercised reasonable care. The comments by White J above on experimenting with figures is highly pertinent today. The ease of manipulation of figures in a spreadsheet format allows the adjustment of input variables to arrive at a desired result. Extreme caution should be exercised in adjusting figures to ensure that the most appropriate input is used at all times.

Further concerns in the Interchase case referred to the analysis of sales and market demand. Emphasis was placed on the need to analyse and draw logical conclusions from market evidence and to take into account market demand. The judge was critical of certain valuers in respect to their judgement of market demand and, in fact, their ability to apply hindsight in a competent manner. White J commented:

> No witness said that in mid-1988 there was any hint of the severe downturn in property values which occurred a year later. The mood was one of buoyancy and optimism and aspects of Valuer C's valuation failed to reflect this … He, of all the valuers seemed to have difficulty in confining himself to the discipline of a retrospective valuation (pp. 115 – 116).

Another important point brought out in the judgement concerned the number of inaccuracies present in the final valuation report. The use of word processors allows greater speed in presentation with frequent use of copying from other or earlier valuation reports. This often leads to typographic errors and valuers must take great care to read and edit valuation reports for erroneous statements for these may serve to infer negligence.

OTHER RECENT AUSTRALIAN CASES

The Interchase case is not the only recent case in which valuers have been found to be negligent because they did not exercise "reasonable care." In most of the situations the valuer has failed to use relevant, available information and/or has failed to professionally analyse the available information. Two further cases are summarised below:

1. *Oz Finance (Pty) Ltd v JLW (Queensland) Pty Ltd* (unreported, Supreme Court of Queensland, Williams J, No 1180/1995, 7 August 1998, BC 9803617)

   In this case a valuation was undertaken of industrial land in Brisbane for loan purposes. His Honour, at page 66, found:

   > In the circumstances the valuation was negligently prepared because of (the defendant's) failure to meet the standard of care required of him in the circumstances.

   In the judgement, Williams J noted:

   - that not only did the defendant base his valuation on so called "comparable sales" which were clearly distinguishable, but he failed to give appropriate weight to a sale of land in the immediate vicinity;

   - the cost of filling the subject lands was a critical factor in arriving at the valuation, and that the defendant's most glaring error was in failing to appreciate the extent to which the land would have to be filled before it could be used for development purposes;

   - the defendant had made no specific enquiries of the Brisbane City Council with respect to sewerage. Enquiries by the plaintiff's valuers clearly established that any major development of land would require upgrading of the sewerage mains and that the Brisbane City Council would pass on the cost of that (at least in part) to the developer;

   - there was little market evidence to justify the increase in the value of the property, "the difference between a sale price in September 1989 of $1.1m and a value in January 1993 of $2.3m, without there being any improvement of the land, called for some explanation" (Teague, 2000, p 14).

2. *I & L Securities Pty Ltd V Lamberts (Australia) Pty Ltd* (unreported, Supreme Court of Queensland, Chesterman J, No 4846/1997, 28 July 1998, BC 9803428)

   This case relates to the valuation of a developed industrial property in Brisbane (Lutwyche Road) which was capable of redevelopment. The defendant valued the property on the basis of its highest and best use and referred to three sales in close proximity on Lutwyche Road. Analysing the sales he arrived at a rate of $\$570/m^2$ for the lot. However a valuer for the plaintiff used six sales and analysed the sales to a rate of $\$250/m^2$ for the subject land.

Chesterman J found:

> the defendant was remiss in overlooking the evidence of value provided by the sale of the land at 108 Lutwyche Road and that it failed properly to analyse the sales on which it did rely for its expression of opinion" and his Honour concluded that the defendant's valuation "was not prepared with reasonable care".(Teague, 2000, p 5)

CONCLUSIONS

The international literature and the recent Australian cases highlight the importance of avoiding errors in valuations and the need to identify the risks inherent in the valuation process. The authors endorse the final recommendation offered by Brown et al. (1998):

> Recommendation 34 of the Mallinson Report should not, therefore, be so concerned with valuation uncertainty. This is not the important issue. The focus should shift to identifying errors in valuations that might arise through the use of poor information or poor valuation practice (p. 12).

In Australia the crucial issue is the identification and correction of errors in valuations. There is an urgent need to improve professional practice and ensure a reasonable standard of care is attained and maintained.

Returning to the three proposals proffered in the introduction, the authors conclude that the recent legal cases in Australia demonstrate that *reasonable care requires a valuation exercise to be free of major errors* (proposition 1). However, it is necessary to identify what constitutes "major error(s)". Several examples have been shown in the legal cases but further research is needed to identify what errors or inaccuracies are occurring in practice. A survey of valuers and clients may be appropriate to assist in this study.

Proposition 2 that *reasonable care can not be measured in terms of a valuation range or valuation variance* is a sound proposition in the opinion of the authors. However, the market place and the courts have, at times, inferred error or inaccuracy from value ranges or variances. The distinction between uncertainty and error must be clearly understood by the industry. An industry standard would assist in clarifying the difference between uncertainty (range and variance) and error.

The third proposition that *reasonable care requires an identification and quantification of the degree of uncertainty of the input data in a valuation exercise* is more contentious. It places the onus on the valuer to specify the quality of the input data. The authors propose to evaluate the reaction of the profession to this proposal. It will require a major shift in professional practice to upgrade to the level where an assessment of the degree of uncertainty is an integral part of the valuation exercise. However, we feel that the profession must be more responsive to market needs and believe that the assessment of the degree of uncertainty is a desired output driven by market demand. We are considering researching the opinion of valuation clients and valuers on this issue to evaluate the market expectation of valuers.

If other academics or practitioners wish to participate in this ongoing research into valuation uncertainty and error, we would welcome their input and be better placed as a result of it.

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APPENDIX. Table of Cases

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