Partial Taking Valuations: PART 2

A common math error resulting in significant overvaluation

BY SCOTT B. ARENS, MAI, SRA, AND DANIEL M. KANE

Part 1 of this article was printed in the January/February 2025 issue, which covered the crucial difference between Average Unit Price and Marginal Contribution and how confusing them can result in flawed conclusions. In Part 2, we present arguments about appropriate levels of accuracy in partial interest valuations in relation to these concepts. A case is also made for the ubiquity of decreasing returns in most markets. Finally, some arguments for ignoring the ideas set forth this this article are put forth and addressed.

We Are Still Not That Accurate

There is another perspective from which an appraiser who understands the difference between Average Unit Price and Margin Contribution might still say, "We are not that accurate" when discussing this issue. This perspective is summarized in the following statement (though it is generally not stated this explicitly):

> *"We are accurate enough to arrive at a credible before condition value, but not accurate enough to estimate marginal contribution"*

This statement has a certain logical feel, but upon closer is examination is logically flawed. Consider that correctly estimating Marginal Contribution requires the following:

1. **Estimating the Before Taking Value**
2. **Estimating the Slope of Average Price/Unit Line**

Each is discussed separately, as follows:

Estimating the Before Taking Value

The job of an appraiser is to estimate market value. We do that over and over and the vast majority of the time we arrive at one final number estimate. As all appraisers know, there are assignments where the final estimate is obvious and little judgement is needed. Conversely, there are assignments in which there is limited market data and/or where data is contradictory. For purposes of illustration, imagine a ridiculously flawed approach to reconciling in a situation in which the data is less than compelling, as follows:

An appraiser has five comparables indicating the following adjusted prices/square foot for the subject:

Comp	Adjusted Price/SF
1	$34
2	$56
3	$23
4	$78
5	$83

The comparables appear to be more-or-less equally strong indicators of value. The lack of correlation makes it difficult for him to feel particularly good about any final estimate. Therefore, he concludes, the final estimate should be $100/square foot because it is a nice, clean round number, and by using such a nice clean round number, at least he is being intellectually honest about his low certainty.

No sane appraiser would do this, and no informed client would accept it. Regardless of how nice and clean the $100 figure is, it is outside his own range of data and therefore, according to his own analysis, cannot be correct.

Instead, appraisers do their best to analyze and understand the data and use their experience and judgement to come up with the best estimate. There usually is no choice. An appraiser's job is to estimate a final number because the client needs one. Further, and this is a key point, regardless of how much judgment is needed or used, that best estimate could be correct. The nice, clean $100/square foot figure cannot.

Estimating Slope of Average Price/Unit Line

When an appraiser says they are not accurate enough to arrive at a slope of the Average Price/Unit, they are missing a fundamental point — they have no choice. When doing a partial interest valuation, the math requires a decision about slope to be made. Assuming the Average Price/Unit is the same as Marginal Contribution is just a default assumption of a slope of zero. If diminishing returns exist in the market, the slope cannot be zero and assuming it is zero because it is a nice, clean number, is using the same flawed logic as in the example above. The resulting conclusions cannot be correct.

Approaching it in this way *feels like* it avoids the question because it uses a number (the average price/square foot) which already exists and thus requires no additional work or thought. It is an example of observational bias that occurs when people search for something where it is easiest to look. This tendency is commonly referred to as the Streetlight Effect based on the following joke:

> *A policeman sees a drunk man searching for something under a streetlight and asks what the drunk has lost. He says he lost his keys and they both look under the streetlight together. After a few minutes, the policeman asks if he is sure he lost them here, and the drunk replies, no, and that he lost them in the park. The policeman asks why he is searching here, and the drunk replies, "This is where the light is."*[1]

There is an important difference between the drunk in the story and the appraiser. Because the drunk is looking for actual keys in the wrong place, he is not going to find them. Sooner or later, that reality must be faced. In contrast, appraisers are looking for something conceptual. As there is nothing in reality to demonstrate the flawed logic, this mistake can be made over and over again with nothing to demonstrate the error.

It is true that deriving the slope requires some additional effort on the part of the appraiser. But considering the impact it has on the final conclusion, the appraiser must make some reasonable attempt at estimating it.

Decreasing Returns in the Real World

Assume, for a moment, the above discussion is accurate, but we live in a world where decreasing returns are rare. If so, mistakes resulting from confusing Average Unit Price and Marginal Contribution would be equally rare and therefore less of a concern. Alternatively, assume decreasing returns are ubiquitous (or nearly ubiquitous). If true, this confusion is a major, ongoing problem. Which is it?

This paper suggests that decreasing returns almost mirror gravity in their ubiquity. Not just in real estate markets, but in all markets.[2] Much has been written on this subject, and the consensus seems aligned with its ongoing presence.

To test the issue, appraisers can do simple data studies in markets where there is a high degree of conformity regarding other attributes but variability in size. Such a test is demonstrated below using residential land sales in a semi-rural community of Ramona (92065) in San Diego County, California. Ramona covers a large area (38.4 square miles) where vacant parcels sell frequently and at varying sizes. Additionally, it has reasonable consistency in terms of desirability, topography, views, zoning, etc. These features make it a good test market for studying the impact size has on value.

The land sales data was pulled[3] using the following parameters:

Type:	Lots/Land
Status:	Closed
Zip Codes:	92065
Lot Sizes:	10,000 SF to 1,000,000 SF
Sale (COE) Dates:	1/1/2015 to 1/1/2020

These parameters resulted in 168 sales which are plotted graphically (unadjusted) based on lot size and price/square foot in Figure 4, as follows:

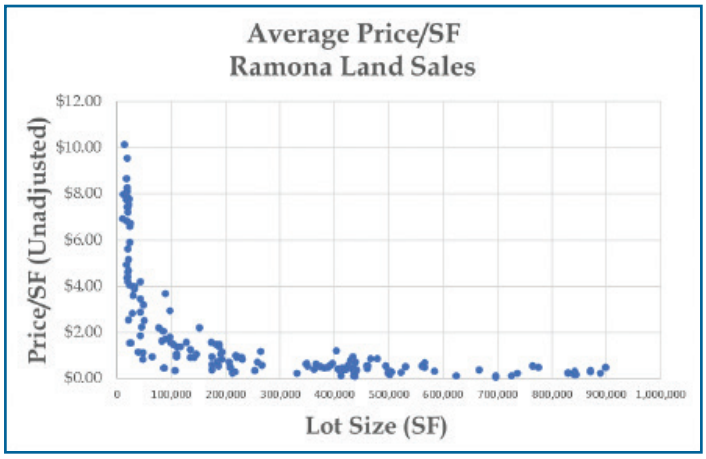

Figure 4

As expected, there is a clear downward trend in prices/square foot as size increases. This general trend is virtually ubiquitous in both land sales and improved sales in most markets. While it is more obvious in markets of high conformity, like Ramona, even when not obvious it still has influence.[4] If there is doubt remaining about the influence of size on price, one way to test it would be to ask a competent appraiser. It would be difficult to find one who would not just acknowledge this force but routinely adjust for it in their valuations.

Arguments For Simplified, but Technically Wrong, Approach

There may be appraisers who understand the difference between Average Price/Unit and Marginal Contribution but still believe partial interests can be computed using the simplified Average Price/Unit approach. Here are some such arguments:

- The clients in these situations often prefer inflated figures as it makes the person losing the land more likely to accept the offer rather than fight it. In the long run the money saved by avoiding conflict will offset the overpayments.[5]
- The simpler methodology of assuming Average Price/Unit is equal to Marginal Contribution has been the standard in our profession for a long time and should be maintained for reasons of consistency and precedence.
- Overvaluing a property in a partial taking situation is the nice thing to do since the people involved are going through a lot and deserve some extra compensation.

This article is about mathematical principals rather than the philosophical and moral issues surrounding this issue. Appraisers make their own decisions about how to approach valuations. However, *appraisals cannot be misleading.* Assumptions made and consequences of those assumptions should be clear to the reader. If an appraiser decides to use a methodology that overvalues certain rights significantly, readers should be told. Giving clients a deceitfully inflated value for a condemnation appraisal is no different than giving a client a deceitfully inflated value for a mortgage loan. In both cases, the appraiser's client may be happy , but in both cases, the appraiser has provided a misleading appraisal.

Conclusion

Albert Einstein famously said, "Everything should be made as simple as possible." We can all agree that conflating Average Price/Unit and Marginal Returns simplifies the valuation process, which has benefits. But Einstein followed that quote with "…but not simpler," a warning that simplicity can be taken too far. Considering the magnitude of the flaws resulting from the conflation of these concepts, a strong argument is made that this simplification has gone too far. While it is true that doing these valuations correctly is more complicated and adds some extra work, appraisers should not have the option of ignoring reality just because doing so makes their jobs easier. ✪

[1] The anecdote reportedly goes back at least to the 1920s, which may explain why a policeman would be helping a drunk find his keys.

[2] You almost always pay less per scoop of laundry detergent in a large box than in a small box. The same is true of things that can be sold separately (e.g. cans of beer or soda). Purchasing a case is usually cheaper per can than a 12-pack. The 12-pack is usually cheaper per can than a six pack, etc.

[3] San Diego, California, MLS, Paragon.

[4] This can easily be illuminated within most communities by deliberately searching for comparables which are very small and then very large, but otherwise similar. Unit prices will usually be vastly different in such cases. Those differences help isolate and illuminate the impact of decreasing returns in that market.

[5] This is often explicit in condemnation-related situations where the market value definition specifies highest probable value.

Scott B. Arens, MAI, SRA, is the owner of Arens Group, Inc. a real estate appraisal firm in Carlsbad, California. Arens Group provides appraisals with a wide range of property types including significant numbers involving partial takings and easement work (e.g. condemnation, title claims/disputes) as well as expert testimony.

Daniel M. Kane is an associate professor at the University of California San Diego with a joint appointment between CSE and Mathematics. His research interests include number theory, combinatorics and Boolean analysis, though most of his recent work has been in computational statistics.