Elder Housing

Four New Types of Quantitative Analysis

Part 3 of 3

by G. William Bailey and Avijit Banerjee

Nobel laureate Richard Feynman once said, "Science is a way of trying not to fool yourself." The senior housing industry has been fooling itself for some time by certifying the traditional, subjective method—practiced by analysts from Big Five accounting firms on down to the smallest analyst—as protection against risk in perhaps 99+% of all assisted living facility (ALF) development. This article discusses four new types of quantitative analysis based on a net demand model: point, comparison, area, and simulations.

As established in the first two articles of this three-part series, the traditional, subjective method of market analysis for elder housing does not withstand even casual common-sense scrutiny. For example, the method assumes that a competing facility five miles away is equal to one next door and that there is no differentiation in demand within the market area. Any differences due to travel time are not accounted for. Previous articles in this series have dealt with other serious problems with the method, its subjectivity (and thus its inability to learn from experience), its carelessness with data, and its bias toward approval of marginal projects.

There is an efficient solution for replacing the flawed traditional method without "throwing out the baby with the bath water"—combining quantitative and traditional analysis. The key to reform is the use of quantitative design and techniques, in trained hands, as the core. The combination would preserve what traditional analysts already do well—supply analysis and local subjective market research—while opening the door for them to participate in the four new types of analysis.

This final article introduces four new types of quantitative analysis, based on a net demand model, that examine site, comparison pricing, a thousand-block-group analysis grid, and simulations for chain purchase and takeover decisions. The rules for using these advances include:

1. Replicability.
2. Quantitative analysis.
3. Conclusions based on what people do over what they say.

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4. Use of small demographic units (usually block group to preserve boundary detail).
5. Confirming data drawn from within the market area wherever possible.

The fifth rule cannot be overstressed. Nationally, a statistic might be valid. Locally, things are likely to be different. The traditional method's dependence on national or regional averages to make predictions within local market areas—when hard data can be drawn from actual behavior within the market area—is not justifiable.

Three key elements are required for any analysis:

1. Rigorous boundary selection is fundamental. Using quantitative travel time traces can repair the signature failing of the conventional method—arbitrary or random market boundary selection that precludes replication of any later step.
2. Demand model estimates can be moved out of the guesswork category by quantitative techniques (but never made perfect), using data from within the market area.
3. Traditional supply estimates are already excellent, and most subjective-traditional analysts can easily adapt to quantitative protocols.

Skilled people are important. Appropriate experience in interpreting quantitative output is a key feature of any solution. The word "appropriate," however, requires inspection, as was outlined in previous articles.

Incorporating a quantitative standard or yardstick in the analytic process is well within reach. The new techniques hold the potential to change market analysis and to save far more than their extra cost by (1) mitigating the huge losses that have marred recent attempts of the subjective-traditional method to identify risk, (2) providing realistic pricing for a site rather than the exuberant estimates of the late 1990s, and (3) finding opportunities at realistic price points where subjective analysis fails to identify any opportunity at all.

Four New Types of Analysis

1. The point analysis is a building block. The Net Demand Model shown in Figure 1 is the core of a point analysis. It incorporates six key variables: supply, demand, net demand, price elasticity of demand, breakeven, and maximum initial daily rate (MIDR) in one analysis.

Power. Figure 1 is a powerful tool. It shows feasibility and opportunity issues at a glance. It gives replicable, quantitative estimates for all the most important major variables in elder housing development. It is easy to understand, and it can be used for rigorous comparisons. No, it does not tell about the "feel" of facilities visited, nor does it have an opinion (yet) about the "mix" of single and semi-private rooms. What it does, it does well; what it cannot do, it does not attempt.

The demand curve is dashed. Demand minus supply = net demand. As one might expect, demand diminishes as price increases. Likewise, the supply of beds increases as price increases. Net demand, of course, is the vertical distance, in beds, between the two curves.

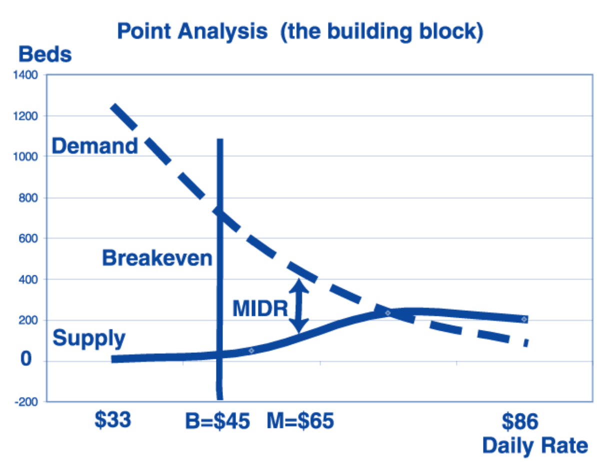
In this particular market area, adjusted (adjusted due to travel time, explained later) demand is quite high at low prices, over 1,200 beds at a daily rate of $33.

Supply is a solid line. At $86 per day, the total demand is about 170, well below the supply of beds. Where the supply curve is above the demand curve, net demand is less than zero—not a happy area for a facility offering units at $86 per day.

MIDR. Assume a developer wants to build a 100-bed facility. At what price can this be done? Find the spot where the two curves are 100 beds apart; read down to the daily rate (M=$65). This is the MIDR, the maximum

Figure 1

Net Demand Model



initial daily rate, and one is advised not to price above it.

Breakeven is dot-dashed and vertical. This line shows the breakeven daily rate for the facility, B=$45. To the left of the breakeven line, the facility loses money.

The "sweet spot" is between the breakeven daily rate, $45, and the MIDR, $65. In this range the facility can be operated at a profit. The higher the daily rate, the more profit and the more slowly the facility will fill.

Price elasticity of demand. The rate at which the curves separate provides the market's rate of expected response to changes in price.

Comparisons. The most powerful feature of this model is its ability—derived from a replicable, nuanced, and clear market boundary—to do comparisons. Even the best total demand model is going to have some error. However, with this model that problem—in sharp contrast with other models—is minimized when doing comparisons.

- The supply line *is* a count from within the market and is unlikely to change significantly.
- The demand line's slope and shape are determined by the census data for the market area and will not change significantly.
- The vertical height of the demand curve, total demand, is the most difficult to estimate. Moreover, no one can guarantee its exact height.
- This model does allow valid *comparisons* because the importance of the absolute value of the height of the demand curve is minimized when making comparisons, given that the relationships are unlikely to change. This fact enables the comparison and area analyses.

Precision. Because they *are* comparisons and not absolute values, the results of quantitative comparison can be reported in single digits, rather than ranges, without violating the "improper operations" concept outlined in the previous article.

The ability to compare (very accurately) allows for additional confidence in the next three types of analysis, each of which depends on comparisons and each of which is impossible in traditional analysis. Since comparisons include "triangulation" against facilities that already exist and have been filled, the absolute value of demand becomes relatively less important.

2. Comparison analyses. If it is possible to do one point analysis, it is possible to do three. Two can rigorously compare two sites, A and B, with a comparable third site, C, that has already been completed, staffed, and filled. We can then triangulate on facility C for a reality check. What can we compare? The MIDR. Here is how it works.

Imagine two sites, one, A, next to a fast road, and another, B, relatively inaccessible with slow roads in each direction. Equal 25-minute travel time traces are differently shaped; A is long and B tends to be round. A is many acres more than B. Assuming the data in the market area validates the concept, the two market areas may look quite different but are basically the same because of their equal travel times. Thus, the MIDRs can be compared.

Assume Site A is for sale at $1 million and has a MIDR of $75 per day; Site B is $500,000 and has a MIDR of $65 per day. Which should be purchased? Is B a bargain at $500,000 less?

Make standard assumptions for a 100-bed facility and do appropriate arithmetic.[1] Now, $1 of the daily rate can be converted to a $250,000 difference in capitalized value at sale after a facility is occupied. Therefore, Site A, though priced higher, is worth $2.5 million more than Site B.[2] The asking-price difference is $500,000. The net advantage is $2 million, and it is invisible to the subjective, traditional method. What is the value of this information?

3. Area analysis. If it is possible to do three point analyses, it's possible to perform a thousand. Select an area to be searched for sites. Do the appropriate field research: set the market boundaries, determine the demand model coefficients, and map supply. Set a rule for locating 500-1,000 (imaginary) sites, such as using the centroid (computed balance point) of each block group in the area as a surrogate "site." Select a desired daily rate and the number of beds to build—say, 80. The computer then takes over, completing 1,000 individual point studies—not a trivial task. It takes 24-48 hours on a fast machine.

The process colors each block group of the 1,000 according to its net demand.

- Red indicates net demand of zero or less. Consider a site that has negative net demand. Imagine a developer siting a new $8 million facility in a red block group, quite possible with the subjective-traditional method. That's *risk*.
- Blue indicates net demand of 80 or better. As a bonus, it is possible to rank-order the "sites" with the best first. That's *opportunity*.

4. Simulations. It is beyond the scope of this article to explore the many possibilities of simulations. The point analysis, repeated many times in a demographic field filled with competing facilities, can provide insights for a developer who may be considering acquisition of a chain. The ability to incorporate the six variables in the model and to use the price elasticity of demand for each site to compute the effect on the field of small price changes can yield insights about individual property purchase, unit rental pricing, renovation, and operation that can be related to a unified discounted cash flow timeline.

Modeling

A word about the concept of (quantitative) "modeling." Each model has variables and coefficients.

- The variables are the basic elements of the model and are shown in the illustration above as a curved line on the net demand graph. Roughly, the variables capture the "idea."
- The coefficients are the constants that define both the shapes of the variable curves and also where the curves will intersect each other and intersect the axes of the graph. Roughly, coefficients capture the local "reality." It is very important that these coefficients, which are, in fact, only hypotheses, *not* be drawn blindly from national averages without confirmation from within the market area. This is a key flaw of the traditional method. Rather, these general average values, even if valid, must, wherever possible,[3] be *tested* against data from within the market area.

Computing the Market Boundary; Weighting Supply and Demand

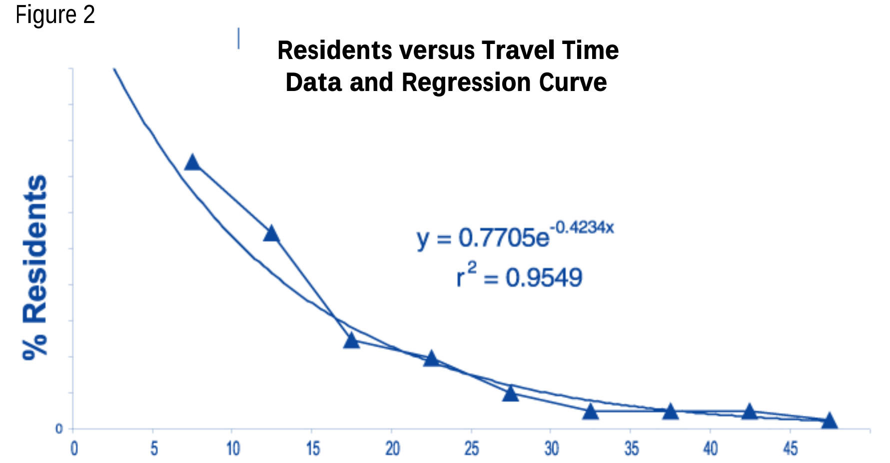
The scope of this article allows only the briefest explanation of the quantitative process. However, since the traditional method uniformly fails at market selection, replicability, weighting of near-versus-far, and learning from experience, it is fair to explain one way it can be done correctly.

The market boundary is computed in a geographic information system (GIS); the computed traces are 100% replicable and link to what people actually do. All the streets in the market area are mapped in the computer and converted to a network. The network is solved for (usually) nine specific values of travel time, creating concentric traces that work outward from a defined site at five-minute intervals.

Market boundaries are strange shapes and cannot be guessed. Imagine that wherever there is a fast road, the market boundary trace will "point" along the fast road, with "lollipops" at the exits as the exit road fans out into a residential neighborhood. Only a pool table will have round travel time traces.

Most traditional analysts, when they guess at the market area, miss this point entirely, offering roughly rectangular traces for the market area. Particularly with all-private-pay facilities, travel time is a far more important predictor of enrollment than is distance. New residents from outside the market area and transfers from within the market area are handled with separate techniques. However, the correlation coeffi-

Figure 2



cient in Figure 2 indicates 95% of the variability in the "from home" enrollment data (diamonds) is explained by the curve. Each situation is different, but this characteristic is not unique.[4]

If a competing facility has 100 beds (of supply) at price and amenity point, and the travel time data shows that the facility lies in a travel time band associated with 5% of the population, then the weighted competitive value of that facility is five beds of supply. Demand is handled by the same technique. By contrast, the market boundary selection process of the traditional method assumes that 100 beds of supply or demand next door have the same effect as 100 beds five miles away. Thus, the problem of weighting near-versus-far is solved with a substantial degree of confidence.

Contrast this disciplined, reproducible process with the traditional analyst, who, taking pencil in hand, draws an arbitrary trace on the map and calls it a "psychological and physical boundary." Sure, the traditional method is cheaper—and now it is obvious why.

Conclusion

Of course, there are no certainties. However, it's necessary to contrast quantitative analysis, which follows the rules of science, with the traditional method. Science builds. Einstein stood on the shoulders of Newton. Traditional analysis cannot build because it has inadequate rigor and cannot be replicated.

Traditional analysis requires guessing at everything but the supply of competing beds. There is simply no comparison between the quantitative and the traditional approaches. It is like comparing science with alchemy. There is much work to do, scientifically, but there is already a yawning gap. Over time, this gap will increase. The quantitative techniques of science offer far more effective answers than the traditional method, which, in 30 years, has learned essentially nothing permanent and will never be capable of learning more than anecdotes.

However, there is no reason why alliances cannot be formed between quantitative analysts and traditional analysts. Further, there is no reason why both groups and their clients cannot be better for the alliance. Developers need to recognize that quantitative analysis can easily pay for itself in new opportunity but the basic price tag is higher. Face it. One gets what one pays for.

The place to start is to reexamine lenders' inadvertent complicity in the mistakes of the past, to stop certifying traditional analysts "because we have always done it this way." Risk minimization and identification of opportunity will be better served by revamping certification to incorporate competent quantitative analysts in the process of project funding. The change can only help to find risk and opportunity that have been expensively invisible in the past. ❐

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Notes

1 93% occupancy, 100 beds, and capitalization rate of 13%: (.93 * 100 * 365)/(.13) = $261,115.

2 $10 difference in daily rate, @ $261,115 per dollar, is ~$2.5 million.

3 There are practical considerations when access to data within the market area is denied and a demographically matched area must be used.

4 It is beyond the scope of this article to explain that this curve and most of the others in this article have around them a "confidence interval," normally expressed in probabilistic terms. Moreover, do not expect the r^2 for demand models to be nearly so high.