Machines vs Humans: Real Estate Valuation During the Coronavirus Crisis

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Real estate assets are traditionally valued manually, wherein computer tools are used in a supportive role. However, more sophisticated, machine learning-based valuations have gained traction in recent years. As the coronavirus crisis has posed serious challenges to the valuation community, in this article I assess the role of machines in asset valuation during such crises.

Machines have learned how to wade through gargantuan data: Structured or unstructured, visual or textual. Machines are incredibly fast, more accurate and less biased. In short, machines can indefatigably take up complex, routine tasks with phenomenal efficiency. Human intelligence, on the other hand, is prone to biases, fatigue and cognitive limitations. Although unparalleled in processing abstraction, humans get bored of routine tasks.

Valuation of Assets

Commercial assets are valued for the future cash flows they promise. Future projection of cash flows, returns and risks are slaves to what were observed in the past. Mass produced financial assets, such as stocks, bonds or derivatives are identical within a batch, like toothpastes produced in a factory. Besides, in sophisticated markets, they are "liquid", implying frequent buying and selling.

A lot of trading in these assets is characterized by human perception that dictates the pricing. As trades happen, pricing patterns emerge. The patterns can be documented using relatively simple and comprehensible mathematics.

But other less liquid investments, like commercial real estate (or private equity, art work, wines, etc.) must be valued individually. Each asset is unique with few common features within a "class" (e.g. luxury hotels or Bordeaux wines of 2011 vintage).

As a result, valuation is a burgeoning profession. Based on this theme, I will discuss real estate valuation in this article.

Traditional Valuation Methods

Valuers use several methods, but let us focus on two prominent ones: Income approach and comparison approach.

The income approach encompasses detailed cashflow forecasts and an in-depth assessment of investment risk in a subject asset. This method requires a great deal of subjective judgement and a human ability to wade through data (or its absence thereof), which may be cognitively challenging. As a result, the method is often criticized for its inconsistencies.

The comparison approach is less fundamental. It seeks to extract a pattern in which investors have priced assets with differing qualities. The pricing pattern is then applied to the subject asset to estimate the likely price a typical investor would pay. The price estimate is posited as the value.But the comparison approach is a double-edged sword: As each asset is unique, other assets from which the pricing patters are extracted may not be truly comparable. This warrants a large number of "adjustments" to pricing, across all the significantly different attributes of the assets. Such transactions are scarce and collecting data on large number of comparable assets is challenging.

With proprietary databases, the issue of data scarcity, fortunately, has been minimized. But dealing with the swathe of data becomes a cognitive challenge for human appraisers. This is where machines come to the rescue.

Valuation by Machine-learning

Computer algorithms are applied to transactions data replete with detailed information on price, asset characteristics and geographic attributes. These algorithms could be based on econometric models or on relatively "black box" data science advancements such as artificial neural network.

When two assets differ in pricing, the difference may be allocated to a large number of factors across which the two assets are themselves different from each other. In theory, there could be thousands of these pricing factors. Practically, the factors considered may be less in number. But even, these "parsimonious" models are difficult to analyze by humans. Computers are adept at such analysis if sufficient data is available.

First, machines "learn" from a training data of asset transactions. The central idea is to identify significant patterns in pricing: How do specific factors (e.g. asset characteristics) add to (or diminish) value? They identify which factors are significant in pricing or which factors do not matter. More importantly, they are also able to quantitatively "allocate" price differentials to individual factors (or their complex combinations). In short, with incredible speed and accuracy, the machine learning approach disentangles asset quality differences into replicable combination of pricing factors. Then, the combination is vetted against a "test" data set and the combination with the least pricing error is the winner. Identifying the "winner" algorithm is the genius of this valuation method which becomes the "magic" formula for estimating the price of an asset which is, otherwise, unknown.

Markets are consensus-seeking voting machines

Valuations based on machine learning are, perhaps, a reality of the future and the current efforts to operationalize it are, definitely, praiseworthy. At their core, such valuations are an expedition to seek the past market consensus on valuation. The consensus thus documented is, essentially, retrospective; a powerful documentation of how the market has priced specific attributes of the assets.

The machine learning based valuation method works so long as the market perceptions of value remain broadly stable. But,what if the market perceptions change quickly? Take coronavirus, for instance…

Can machines help us in dealing with coronavirus-like predicaments?

Assume hypothetically that the machine detects a 20% price premium assigned by the market to hotels that have spa facilities. In stable economic scenarios, it may be fair to assign a similar price premium to the next hotel being valued which also has a spa. But who in the Covid-19 era prefers a hotel because it has a spa? If the pandemic retains its place in investor memory for coming times, the 20% perception may not be valid anymore. It may reduce to a lower level, if not transformed into a discount. To estimate the change, the machine needs to be re-trained. The new consensus needs to be documented afresh.

Hence, the new training of machines will need new data on latest transactions. These transactions will be rare and their pricing patterns relatively uninformed. The generalizability of the current pricing patterns will be questionable, as they may be based on numerous "outlier" prices. Given their retrospective approach, machines-learning based valuations, at least as they stand now, fail to rescue us from difficult predicaments.

Humans versus machines

The recent past does not reflect the extraordinary current period, therefore the machine-learning based valuation is doomed to fail in today's times. What we need now is a prospective (forward-looking) valuation method. We already have one: The income approach. Indeed, the income

approach itself is greatly based on our observations of the past. But the human touch may potentially promise a way out, especially in terms of estimating the risk metrics. This time, the assessment of risk must weigh more heavily on the emerging consensus of investors, rather than the appraisal community itself.

We cannot be sure yet about whether the impact of coronavirus on real estate will be long-lasting or just a blip in the history of asset prices. If it is a short-lived situation, future machine learning endeavors can comfortably exclude the transactions of current times from its training data or strongly "control for it". This is how the few years of the recent global financial crisis (2007-09) have been treated.

Since it has been generally speculated that Covid-19 may fundamentally shift our worldview on work, travel, living and social interactions, the machines will have to wait longer for human agents to generate new data and settle the new pricing patterns. Either way, human valuers will come to rescue the machine's endeavors. For now, we are still in command.

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