



# Yardi Matrix

## Forecasting During COVID-19

The COVID-19 pandemic has forced us to rethink our multifamily rent forecasting methodology. Since the late 2000s we have enjoyed a fairly unexciting period where the markets behaved in a relatively consistent and predictable way. We were able to leverage that familiarity and predictability to produce forecasts using standard vector autoregression techniques. The onset of the global health crisis has upended many of the predictable relationships that we exploited in the past. It is prudent to adjust our techniques to better capture the new, changing dynamics. To that end, our new model is simpler in some ways, as it doesn't rely as much on the intricate dynamics that are exploited by the vector autoregression method.

The vector autoregression model (VAR) is entirely endogenous, which means that all elements included in the VAR influence every other element. The prediction for next month's rent in any given market is not only influenced by the known values of the other variables in the system (income, population, and employment), but those rent predictions are at the same time affecting the future values of income, population, and employment, creating a rolling feedback loop through our prediction horizon.

The new method essentially does one very important thing that differs from the vector autoregression model. It breaks the endogeneity feedback loop so future rent values can no longer have any effect on the other future variables. This has a couple of big benefits for forecasting during a period of high uncertainty.

1. We expect that all the previous intra-model relationships that existed prior to the spread of the virus are different. For example, the \$600/week stimulus checks to supplement unemployment claims changed the relationships between employment and income – a loss of employment no longer necessarily meant a loss of income. Similarly, eviction moratoriums meant that the relationship that existed between rents and incomes was likely no longer valid. By severing the feedback loop and making the model unidirectional we eliminated a lot of noise. Rent no longer affects the other variables, and the other variables no longer affect each other. They have in effect been sequestered. Population, employment, and income still affect rent, but they no longer have any direct effect on each other, and rent has no effect on them.
2. We can now fully leverage Moody's forecasts for our drivers, which removes much of the heavy lifting that we had to do, so we can now update faster and react more quickly to changes. With the previous method it was difficult to include new information in a timely fashion into the model. For example, a new government program would potentially require a full economic analysis to try to determine what broad effects it would have on the economy, and to the drivers in the model. Relationships could change that weren't previously built into the model and incorporating them would be a research-intensive task. However, now we can rely on Moody's team of forecasters to handle most of that, and use their new updated forecasts as the drivers of our rent model, without digging into the intricacies of how we expect some esoteric government policy to affect income projections in Boise, ID.

Once we get through this period of extraordinary turbulence and emerge in more stable economic times, we will likely revert to vector autoregression techniques again. In the interim we will continue to work to improve our model and the speed with which we can react to major changes. The changes to our methodology have made us better prepared to handle our current situation, and we are now in a better position to react quickly to the constant flux wrought by the COVID-19 pandemic.