Modeling at MARC 2010-2016

- In-house ‘Paint the Town’ model
- Separate models for new development, redevelopment, decline, rural development
- SAS-based allocation process
Modeling at MARC 2017-2018

- Adopt online Urban Sim block model
- Model input development
- Calibrate model
MODEL DEVELOPMENT GOALS

- Forecast change by income group
- Utilize ACS block group rents and home values in location choice model
- Streamline scenario development
- Improve scenario evaluation, integration with Envision Tomorrow
- Improve iteration between household model and travel model
## UrbanSim Inputs

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Model Calibration
UrbanSim Test Run
Population Change 2011-2020

MARC 2016 Forecast
Population Change 2010-2020
Test model runs show evenly-distributed population or employment change.

Solution: define place types for model calibration

Place types are tracts with common growth characteristics.

Place types are created from regression analysis of housing unit change. Clustering algorithms use the most important regression variables to identify similar tracts.

Place types

Variables used:
- HBA housing permits (2010-2017)
- % non-white population
- Mean income
- Proportion of units built in 1990s
- Housing units per acre (2010)
- Jobs per acre (2015)
- Employment change per acre 2002-2010
Completed improvements:

• Bulk-loaded development project data
• Place types for model calibration
• Process for updating place types (by decade)
• Easy download of run results
Next improvements and tasks:

1. Re-specify the location choice models to better capture:
   a. adjacency to recent growth
   b. depressed neighborhoods
2. Forecast decline
3. Load control totals for household by income group
4. Adjust model via constraints, place type updates, development projects, control totals, incentivized areas, shifting capacities by user-defined percents
Creating a Transit-Oriented Development Scenario
Some history...

- In 2007-2008 we created two scenarios, baseline and “adaptive”, the former showing a continuation of trends from prior decades and the latter depicting a “what if”...what if 40% of the region’s growth between 2000 and 2040 were captured in the existing area?
- The forecast adopted in 2010 tamped this down to 15% as being more realistic.
- The 2010 Census showed the existing area, now more specifically defined as redevelopment area, still was a net negative contributor to growth between 2000 and 2010 by about -10%.
- The 2015 forecast assumed a 5% capture rate in the redevelopment rate.
Some history...

- The 2017 forecast adjusted at the tract level to be consistent with current data and trends, without setting a redevelopment target.

- After the forecast was completed, we discovered that trends since 2010, based on ACS, showed a 25% capture rate in the redevelopment area between 2006-10 data and 2012-16 data.

- When we tabulated the approved forecast, we discovered that was largely consistent with this new capture rate. It forecasts about 30% of regional population growth being captured in the redevelopment area.

- This forecast is being used as a baseline to test our transportation models, and so the availability of a recent land use forecast isn’t on the critical path for developing RTP 2050, the region’s long-range transportation plan, which must be adopted and approved by June 2020.
This scenario...

• Question: What might the benefits to the region be if transportation investment and local land use policy were aimed at, and successful in, creating transit-oriented development?
  • Does this affect what kinds of transportation investments RTP 2050 should prioritize?

• This is implemented as:
  • What if the amount of growth captured in the existing area doubled over the current forecast?
  • What if all of this growth occurred in Smart Moves corridors and mobility hubs?
Probability of New Development

2013 Forecast Probabilities
Average Value per Block

- Avg_prob_newd0
  - 0.70 - 0.90
  - 0.30 - 0.69
  - 0.20 - 0.29
  - 0.04 - 0.19
  - 0.00 - 0.03
Probability of Rural Development

2013 Forecast Probabilities
Average Value per Block

Avg_prob_rurd1
- 0.20 - 0.38
- 0.10 - 0.19
- 0.05 - 0.09
- 0.02 - 0.04
- 0.00 - 0.01
Probability of Redevelopment

2013 Forecast Probabilities
Average Value per Block

Avg_prob_red2
- 0.057 - 0.091
- 0.037 - 0.056
- 0.023 - 0.036
- 0.010 - 0.022
- 0.000 - 0.009
Disaggregation of 2017 Forecast: first to TAZs, then to blocks
Disaggregation of 2017 Forecast:
first to TAZs, then to blocks
2010-2040
Population Change

August 24 Scenario

Legend:
- 200 - 2,260
- 100 - 199
- 50 - 99
- 10 - 49
- 5 - 9
- 2 - 4
- 0 - 1
- -9 - -1
- -56 - -10
Disaggregation of 2017 Forecast:
first to TAZs, then to blocks
Difference between baseline and August 24 scenario
Difference between baseline and August 24 scenario
Difference between baseline and August 24 scenario
Disaggregation of 2017 Forecast:
first to TAZs, then to blocks

2010-2040
Employment Change

Disaggregation of 2017 Forecast:
first to TAZs, then to blocks
2010-2040 Employment Change

August 18 Scenario

Legend:
- 500 - 6,026
- 100 - 499
- 50 - 99
- 10 - 49
- 2 - 9
- 0 - 1
- -9 - -1
- -98 - -10
- -3,351 - -99
Difference between baseline and August 24 scenario

Employment per Block
2040

Difference between baseline and August 24 scenario
Population per Block
2040

Difference between baseline and August 24 scenario

Legend:
- 700 - 1,539
- 325 - 699
- 175 - 324
- 75 - 174
- 20 - 74
- 0 - 19
Still to do

• Use corrected probabilities
• Maintain the regional control totals by subtracting growth from other areas.
  • Proportionately?
  • From least probable first?
  • Some combination?
• Shift more growth eastward
  • Focus on fast-frequent corridors
• Test whether transportation model responds more to development focused along corridors vs. focused around mobility hubs.