

## Discussion

Uri Avin and Daniel A. Rodriguez discuss

“The Role of Employment Subcenters in Residential Location Decisions”

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*Uri Avin writes:*

The paper by Eun Joo Cho, Daniel A. Rodriguez, and Yan Song in the Fall 2008 issue of the Journal of Transport and Land Use (*The role of employment subcenters in residential location decisions*, JTLU vol. 1 no. 2) was of great interest to me both because of its intrinsic subject matter and because I spent four years working in Charlotte/Mecklenburg County on a variety of projects, starting with the 1998 integrated transit/land use plan that preceded the bond referendum.

I was moved to respond to the paper from the perspective of someone familiar with the place and its peculiar and unique evolution which, I believe, needs to be factored into any evaluation of its job accessibility/housing relationships.

1. I used “peculiar and unique evolution” above for good reasons. Several seminal factors driving the growth and development of the city/county are very pertinent to its urban form and housing pattern which the paper assumes as cross-sectional givens. These include:
  - i. Unlike most major metropolitan regions, Charlotte came to its beltway very late—its construction occurred incrementally, I believe, between 1994 and 2002 or so. Much of the super-rapid growth that occurred in the county happened in the 1990s before the influence of the new circumferential was felt (though some of the developments, of course, were built in anticipation of it) and the historically rapid growth of the 1980s predated it and thus was related to an atypical radial pattern of highways and arterials that played to the dominance of the Central Business District (CBD).
  - ii. The CBD, by contrast, grew to a dominant role in the region in the 1980s through the 1990s with the advent of banking and finance, much aided by a close-in internal circumferential (not shown in the paper’s network diagram) that facilitated easy ingress and egress from the region to the core, unthreatened by a beltway’s draw for edge locations.
  - iii. The core had long been ringed northwest to northeast by predominantly African-American residential areas, the location of which may be determined by racial politics rather than by job access.
  - iv. The move of the government center, courts, and jail from the core to a location 2/3 mile to the east in the early 1980s also influenced neighborhood gentrification and

- job location in the core in the 1980s and 1990s, playing to access from the inner beltway.
- v. The city was developing only in the southwest to southeast quadrants through the 1970s and 1980s, and the city government sought to balance this pattern by opening up the northeast and north areas through the introduction of sewer service; this jump-started a huge spurt of growth just as the banking/finance industry was taking off. This resulted in permits in excess of 8,000 per year, with much of the building activity concentrated in the newly available north to northeast quadrants where employment around the University was also growing concurrently.
  - vi. The city's zoning policy for multifamily housing was to disperse it all over to avoid ghetto-ization of higher density areas and create life-cycle communities, thus directing the market within the county for multifamily, leaving the six incorporated towns as havens of single-family (i.e. mostly white), anti-growth areas, particularly in the southern half of the county.
  - vii. In light of Charlotte's very differentiated quality of schools and its storied battles with busing and desegregation, combined with the above mentioned dynamics, leaving out school quality as a variable is problematic (although race may be a surrogate for it to some degree).
  - viii. Only in the 1990s did the city choose to zone for and encourage downtown housing so that the lack of supply of housing and its advent in the late 1990s and early part of this decade perhaps represents a market constraint that perhaps cannot be captured by the model used in the paper.
  - ix. All of the dynamics noted above mean that the timing of highway building and residential construction (i.e. longitudinal studies) are especially important in explaining cause and effect beyond job proximity; given the pro-growth policies and zoning and the rush of jobs and housing over two decades, one has the sense of many choices to many jobs via reasonable commutes (until the mid-1990s) so that historical and neighborhood and racial factors were, perhaps, very important; when congestion became an issue in the early 1990s, this could have changed the dynamics of housing so that *when* housing was built *where* becomes very important. For example, the gentrification of the southwest corridor (subcenter 10) during the 1990s through today, took advantage of the existence of older industrial buildings being reused as incubator space and older rehab-able housing opportunities catering to "Creative Class" types.
2. I was also wondering about the use of four employees per acre as a threshold, which seems somewhat low and verging on diffuse employment characteristics. The employment centers must be over a largish area and must be a gross acreage measure, right? I am used to employment centers as being at least 10+ in suburban locations...you may be interested in WashCOG's product on regional clusters and centers and their threshold criteria and mapping—all online.

In fact, to me a pertinent question here (*pace* Robert Lang) is whether the other 46 percent of jobs in the non-subcenter county are so widely diffused and dispersed that their ubiquity is as important a factor in housing location as the concentrations. If one observes the great surge of housing in the northern areas of the county in the 1990s (after

the installation of sewers), where the amenity of Lake Norman was pivotal, the diffusion of smaller scale employment in the three small towns in the north and Davidson College may all be important drivers; so too, may the realistic expectation of major planned employment centers at the beltway and the north interstate in Huntersville that gave the housing developers and buyers confidence in the future accessibility of this area.

On dispersal/concentration, my sense is that when the market is as hot as it has been in Mecklenburg County over the past decades, there is a different dynamic at play in terms of developer/homebuyer behavior. There is such a feeding frenzy that the desire just to get into the area, almost anywhere, is the overriding impetus. We have just finished a Comprehensive Plan for Gwinnett County, Georgia, a hypergrowth county for 30 years now (e.g. 14000 new homes per year!) wherein we tried to validate our household allocation model based on accessibility factors and it failed miserably. Development popped up wherever developers could get or provide sewer and land was available, so great was the demand.

3. Given their location on or close to the beltway, I find the characterization of neighborhoods 6 and 7 as lacking good regional access curious. Historically this was true of these outlying areas, but no longer. Charlotte has yet to realize the accessibility-related influence of the beltway (despite the arguments of Charlotte-based David Hartgen). The radial polycentric pattern will morph into a circumferential/radial polycentric pattern.

I look forward to the next installments of this important research effort.

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*Daniel A. Rodriguez responds:*

Uri Avin raises important comments for contextualizing Mecklenburg County's spatial structure. His description of the development of the County is excellent and provides important information that often gets relegated in the interest of space and parsimony. Given the cross-sectional nature of the study, many of the effects suggested could not be adequately measured or incorporated into the model and hence the suggestion of using longitudinal data to identify the role of racial and local neighborhood factors in influencing location decisions is a good one.

We did go through great effort to ensure that the paper's conclusions do not over-reach. We were careful in stating the conclusions so as to address limitations in the research design. For example, we never imply causality in the associations identified, and we do not suggest that accessibility is/was the most important driver in location decisions in Mecklenburg County.

We also want to clarify four other points raised about the paper:

1. Regarding the omission of school quality, the exclusion of this variable is not problematic precisely because of the busing, school choice, and magnet school policies that have ebbed and flowed within the district from the early 1960s until today. These policies have resulted in school assignments that do not conform to geographic proximity between homes and schools, so local school quality will be less of an attractor for residential choice makers. The integrated nature of the county-city schools further lessens this concern.

2. The use of a relatively low cutoff point of four employees per acre to determine employment centers. We used four employees per acre and a combined minimum of 5000 employees to identify centers. One issue that clouds comparability with similar efforts elsewhere is that these are not small zones. The boundaries of the zones were the local community analysis zones (akin to traffic analysis zones), and the measure of density is gross, not net. As a result, the cutoff point of four employees per acre appears to be smaller than in reality.

As detailed in the manuscript, we tested higher thresholds but those captured very few centers. We sought local guidance to increase our face validity. For this we conferred with local planners in Mecklenburg County about the various center definitions, and there was agreement that the four employees per acre threshold more closely resembled their conception of centers in the County. The centers also match up well with the 2025 transit plan.

Table 1 suggests that if we increased the min threshold to six employees/acre or so, a similar result would emerge (not guaranteed, though, since some of the TAZs will fall out and more centers could emerge). Further, according to Table 1, our sample of centers had an average gross employment density of 16.6 employees/acre, which exceeds the WashCOG average. If the outlying high density center (#1) is excluded, the average density would be 11.8 employees/acre—well within the lines of WashCOG’s approach. This is an “apples to oranges” comparison, because the areas are different, but the results are not outlandish—i.e. they have some face validity.

The bigger question which merits attention, to which Avin alludes in his commentary, is not how to make center definitions comparable, but how to make them relevant. Our work, and other work like WashCOG’s and other attempts to define centers elsewhere (Cervero 1989; Giuliano and Small 1991; Heikkila *et al.* 1989) use arbitrary thresholds and are sensitive to changes in the unit of analysis, also known as the modifiable aerial unit problem. They are also sensitive to the study area (for obvious reasons). Others have attempted to use non-parametric statistical methods to get around these issues (Kohlhase and Ju 2007; Redfearn 2007), but the methods are hard to communicate and suffer from lack of transparency.

The related question of whether what matters is the ‘concentrated’ 54 percent or the ‘dispersed’ 46 percent is intriguing, but it strays away from the paper’s intent. The emphasis was on the importance of subcenters (formed or aided by agglomeration economies; e.g. center 7 in the southeast, which focuses on warehousing and distribution activities) for location decisions. Can dispersed employment play a role in location decisions? Perhaps—although, *ceteris paribus*, concentrations may exert a stronger pull than dispersed jobs (due to the concentration) as per the study carried out in Boston by Shen (2000).

3. Qualitatively, neighborhood types 6 and 7 may appear to enjoy high accessibility due to their proximity to the beltway. Without question, these areas have better accessibility than before the beltway was built. Even so, with the beltway and with current employment centers as defined, we find them to have low values of regional access relative to other areas. The measure of access was the denominator of a mode choice model: the log sum. Indeed, those neighborhood types have some of the lowest access scores. Rea-

sons for the low access levels include very limited transit service (if any), no pedestrian supports, and high travel time to employment centers. We surmise that the circumferential development will not be driven by new residential opportunities relative to existing centers; instead, it will be driven by commercial and office development and by residential development relative to these new employment options in the area. As before, and to further enhance the face validity of our neighborhood characterization, we provided local planners with our two most promising neighborhood characterizations. The one planners selected was the one we decided to use in the paper (and which is being used in subsequent research).

4. Regarding other omitted variables, Avin points to other factors that could have been included in our analysis, and that may have some influence in the results presented. Of these, we agree that the variable measuring access to Lake Norman and small towns around it such as Davidson, which could attract prospective residents, could improve the explanatory power of the model.

Overall, Avin points to the importance of contextualizing quantitative research with generous qualitative data about the development of a region. We appreciate the insights and are sure that they will be very helpful in related work.

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