Parcels Through Time: Using Parcel Data to Assess Economic Changes

Team

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Our team's goal was to investigate some possible uses for historical information at the parcel level. As a proof of concept, we choose to look at how the development of the Blue Line and the Target Field affected nearby property values. A stretch goal was to to analyze the effect of teardowns (replacement of low value homes with much more costly new homes) on the value of nearby homes, since that was a hot issue last year in Southwest Mpls.

At a technical level, our team also wanted to learn GIS tools, particularly QGIS, the Leaflet javascript library and conversion of GIS data files.

Initially, it appeared that parcel level data over multiple years was not available, though the Minneapolis web site (http://apps.ci.minneapolis.mn.us/AddressPortalApp/) allows one to view the history for any one parcel back to 1988

Kristen found that Metro GIS actually provides seven county parcel data for 2002 to 2011. Later years are available by contacting the county. We decided to focus on Hennepin county.

In some cases, the Hennepin county data is actually gathered by the municipality, such as by Minneapolis.

Mid-afternoon on the first day we found that the city had done a map aimed at some of the same questions

http://hennepin.maps.arcgis.com/apps/StorytellingSwipe/index.html?appid=0721185e3625452192fc957be4556b2b&webmap=ee4c3f89eac640928118f9cf8dc7e586

Unfortunately, this map does not give the reader a way to compare the changes in estimated property values in the focus areas versus changes that were occurring in other parts of the city. Although the data are made available for use in ArcGIS Online, it seems that ESRI does not allow someone else to add additional attributes, even on their own map.

We spent time with the challenges of working with datasets that have 300 thousand features. This is well above the limits for the free version of ArcGIS Online, and even with Kristen's subscription it took forever to load the data for a single county for a single year. I loaded QGIS and began the process of loading and massaging the data. Although the user interface for QGIS is non-intuitive for beginners, it does seem to have all the capabilities that we need.

We looked several options for dealing with the temporal nature of the data. Ideally, all the data would be in a single dataset and we could compute year-over-year changes using a query that joined to the previous year. Instead, I imported each year's data as a separate layer, created an explicit join to the previous year and made a new attribute that was the ratio between the EMV and the EMV from the layer for the previous year. We found that the datasets in the MetroGIS lacked an attribute to indicate whether a parcel was residential. That should be available from http://gis.hennepin.opendata.arcgis.com, but that server hung when we tried to download the Parcel Base data set. This should be fixed now, but in the meantime we were fortunate that Jessie had the data sets on a thumb drive. I added a layer with the Parcel Base. Because the county data uses PID whereas the MetroGIS files had a PIN that included the county identifier as part of the PIN, I added a new attribute to Parcel Base. Then I could join on the PIN and create a map that was filtered to just the residential, single family, properties. I also installed the open-layers plugin for QGIS and added the STAMEN-Toner as a basemap. We felt that it was important to provide the reader with an understanding of how the changes in an area compared with other parts of the city. In this simple version of the map, parcel that changed more that the city-wide median are shown in green whereas the one in red appreciated less than the city-wide median. Staticversion of the map is here:
https://drive.google.com/file/d/0B01Y2vB76OvcSHJ5VWRndXVPR2c/view?usp=sharing

Kelly pointed us to this article that looked at non-residential land values along the Hiawatha line http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=1922 I haven't had a chance to read it.

All of this was predicated on our assumption that the Estimated Market Value was a good set of raw data. However, discussions with several county employees revealed that the assessment process has some quirks that mean that our map reflects the assessment algorithm as much as it reflects the true changes in the local economics. In particular, estimated property values are changed each year based on some sort of average of sale prices for the neighborhood and city. Since a neighborhood may include properties both near to and far from a new development like the Blue Line, the parcel-level estimate is not really at the fine spatial level that it would seem. Since it is based on sale prices, it might make more sense to go back to that raw data, but that is a challenge for another day. It also sent us in search of better measures of local economic activity. Tax receipts? rents?