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Research paper

Looking for logic: The zoning—land use mismatch

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HIGHLIGHTS

- In Phoenix, AZ, U.S., 13% of single-family parcels are zoned multi-family.
- The mismatch is not random, but spatially clustered.
- The mismatch is not well explained by urban features or planning goals.
- The mismatch occurs in tracts that are predominantly white and lower-income.
- The mismatch is evidence of the lack of demand for higher intensity development.

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ABSTRACT

In this paper, we investigate the disconnect between a parcel's actual land use and its corresponding zoning designation, focusing in particular on how single-family residential parcels are zoned. Using a unique set of detailed parcel information, we quantify the extent to which single-family land use is zoned as multi-family in the city of Phoenix, AZ. We carry out local spatial autocorrelation analysis, spatial regression, and regression models for proportions to analyze the pattern and associated explanatory factors for the fraction of single-family land use acreage by census tract that was zoned as multi-family. We find that the basic driver of mis-matched parcels at the tract scale is socio-economic, not physical or planning goal oriented.

1. Introduction

In the U.S. and elsewhere, zoning has long held the position in urban planning of being both powerful and unloved. For decades, leading planners and economists have written forcefully about its failures (Reps, 1964; Babcock, 1966; Mandelker, 1971; Levine, 2005; Fischel, 1990, 2015, Talen, 2009, 2012a). For example, zoning is critiqued for its exclusionary effects (Pendall, 2000), for being "unreasonable, inequitable, and irrational" (Siegan, 1972: 21), for being an "incomprehensible" tool fostering "unlimited sprawl" (Feiss, 1961: 121–122), and for being a tool easily manipulated for political gain (Schwieterman and Caspall, 2006). Zoning is believed to engender disconnected, single-use development, guaranteeing "maximum consumption of units of time, energy, hardware, and land" for the execution of daily life (Krier, 2009: 103). Attempts to reform zoning have been in place almost since it emerged in the 1920s (Talen, 2012b).

Although the inefficiencies, social inequities, and added costs of conventional zoning codes have been documented extensively, little is known about the connection between zoning and actual, on the ground land use and development, especially at smaller geographical scales. Typically, zoning is coarsely measured at the scale of an entire jurisdiction. Further, economists who study the effects of zoning have tended to focus on land and housing prices (McMillen, McDonald, & Zhou, 2008), rather than land use as such, for example, linking housing values to large lot zoning (Isakson, 2004). In part, trying to understand the direct link between zoning and land use is difficult because zoning is equated with complex rules and outcomes that are not easily comprehended (Fischel, 2015).

In this paper, we investigate the disconnect between a parcel's actual land use and its corresponding zoning designation, focusing in particular on how single-family residential parcels are zoned. This is motivated by a striking mismatch between the land use and zoning observed in several metropolitan areas. For example, using

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data at the parcel level in 2013, we found that the share of single family residential parcels that were not zoned as such ranged from 8% in Seattle, WA, to 13% in Phoenix, AZ, U.S., and even as high as 33% in Miami, FL (a detailed discussion of the data sources and methodology is given in Appendix A). Most of the single-family residential parcels that were zoned differently were zoned as multi-family (e.g., ranging from 85% in Seattle to 96% in Phoenix). We focus in particular on this disconnect and carry out an extensive case study for the city of Phoenix using detailed parcel information obtained from the Planning Department and the Assessor's Office.

Although this paper focuses on the U.S. case, it should be emphasized that zoning has been in place for centuries in cities all over the world. In Europe, building ordinances and regulations influencing all manner of urban form were common in the seventeenth century, and standard fare by the nineteenth, most often implemented for the protection of the very rich (Hall, 2009). The modern theory of zoning has been traced to a 1810 decree of Napoleon I, which divided industry into three classes, and established the boundaries of a protected district. German cities adopted use and bulk zoning throughout the 1880s and 1890s. As transmitted to the U.S., zoning was designed to remedy the negative externalities of the industrial city, stabilizing residential property values, maximizing profit for commercial areas, and keeping industrial areas efficient and functional. Now, all major cities in the U.S. (except Houston, Texas) have comprehensive zoning ordinances that are primarily focused on the separation of land uses.

We address three main questions. First, what is the quantifiable extent of the mismatch between single-family residential land use and single-family zoning at different spatial scales in a large American city such as Phoenix? Second, are there any spatial regularities to the mismatch—i.e., is it random, or patterned? Third, what are the important correlates that might help explain any non-randomness, and do these correlates match expectations drawn from normative ideals? In our case, the normative context is that single-family residences located in multi-family zones might be residuals from previous designations. These uses remained in zones that are now intended to intensify land use and stimulate more housing units. Examples of such areas might be zones associated with transit-oriented development and similar initiatives (Talen, 2013).

Most empirical zoning studies, such as the ones cited above, use aggregate, jurisdictional-level measures of zoning regulations. Instead, we use a unique dataset that starts with information at the parcel level and allows aggregation to larger spatial units (census tracts) needed to introduce a range of explanatory variables characterizing the social and built landscape. This level of detail pertaining to parcel-level land use and zoning designation, as well as its aggregation to the tract level, has not been previously reported in the literature. We therefore contribute to the body of knowledge on zoning evaluation by providing quantifiable insights into the association between zoning and land use at an "on the ground," spatially explicit and detailed scale. To our knowledge, this is the first time such precise quantification has been carried out. The main value of our study is therefore that it lends an empirical basis to critiques that are often anecdotal or based on small sample size. Our aim is to improve the generalizability of a topic that lies at the core of urban planning practice.

In the remainder of the paper, we first outline the evaluative framework for our study and review several hypotheses that have been suggested to explain the land use-zoning mismatch. We next discuss the data sources and provide the context for our study. This is followed by a detailed empirical analysis, moving from spatial data exploration and mapping to a more structured multivariate regression framework that includes an extensive sensitivity analysis. Next, we discuss the results and provide an interpretation. We close with some concluding remarks.

1.1. Evaluative framework

What is the current level of understanding of the relationship between zoning and land use, and what would explain the disconnect that exists? Broadly, research on zoning exposes a paradoxical mix of weak effects (perhaps due to allowance for non-conforming uses) vs. effects that result from zoning's successful implementation—effects that may run counter to objectives like access, affordability and social equity.

That zoning is not always in sync with existing land use is a long-standing observation and critique (Onsted and Chowdhury, 2014). If zoning and land use were more aligned, it might be an indication that zoning, as a policy tool, is having the intended effect. In that case, over time, we would expect zoning to be a strong predictor of future land use. Although there is little actual empirical documentation, there seems to be an implicit understanding in the literature that zoning and land use are not always in sync, but it is not known precisely to what extent this is the case.

The disconnect between zoning and land use may be a matter of historical allowances. Perhaps the land use existed before zoning was enacted, and was either explicitly permitted or "grandfathered in" as a non-conforming use. Or, if zoning came first, perhaps the zoning designation contained wide latitude regarding permitted uses, or variances could be readily obtained. In these cases, property development may not have caught up with zoning's intended effect in terms of land use.

The lack of association between zoning and land use adds complexity to the issue that zoning and comprehensive planning are often misaligned. In the U.S., this disconnection has a long history. When city planning was first developed as a profession in the U.S. in the early part of the 20th century, planners were faulted for failing to adequately distinguish between planning and zoning, which, according to influential planner T.J. Kent, caused decades of confusion (Kent, 1964). The argument in favor of separating planning and zoning was that planning was supposed to be about the future vision and the long-term aspirations of a community, whereas zoning was supposed to deal with immediate building issues. The notion that zoning for the regulation of land use should be included as one element of a comprehensive plan was rejected on the grounds that doing so would confuse legal enforcement with planning aspiration (see Kent, 1964; Gerckens, 1994; Scott, 1969). The problem created by this insistence on separation has been the failure to adequately leverage zoning as a way of implementing long-range land use goals.

Zoning's lack of connection to existing land use puts further distance between the land use change aspirations of comprehensive planning and its possible implementation through regulation. And yet zoning dominates. As early as 1927 in the U.S., there were three times as many zoning ordinances as comprehensive plans, and by 1941 the ratio had increased to 10–1 (Burgess, 1996). The system that evolved is now one of "good plans, bad zoning", and many have pointed out that zoning continues to defy the best-intentioned plans (Russell, 2000). Lacking a connection between long-range land use goals and implementation via zoning, the result can be a random and disorganized pattern of land use (Talen, 2009, 2012a).

The situation worsens over time when zoning ordinance amendments are enacted piecemeal, without a clear connection to community goals. Using the city of Phoenix as an example, there were 246 zoning amendments to the city zoning ordinance between 1990 and 2012. When these amendments are combined with baseline zoning requirements, the result is a wide number of permutations. Most cities in the U.S. employ a similar complexity. While there may have been a spatial logic to zoning patterns initially, over time the pattern may become more aligned to existing land use than aspirational pattern as zones are modified to fit unique conditions and owner requests. With no meaningful set