Title

Navigating the Future: Land Redevelopment Scenarios and Broader Impact Assessment in Southern California

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Abstract: While land use and cover change (LUCC) modeling and simulation technologies have been widely disseminated in urban planning and other public decision-making domains, their application to site redevelopment is still limited. This chapter presents a case study in which land use change simulation and impact assessment models are employed to facilitate public dialogue for reuse of a decommissioned air force base site (known as the Orange County Great Park) located in Southern California. Emphasis is on the uniqueness of site renewal in an urban context that requires special attention in modeling, impact assessment, and decision support. It is also suggested that both relevance and coherence are crucial to the success of LUCC applications.

Keywords: Site renewal, Land use change simulation, Impact assessment, Southern California

1. INTRODUCTION

Land use decisions often fall into the realm of public deliberation. The presence of externalities – either negative or positive – makes it implausible to allow individual property owners to make the decisions just for their own sake even in a static world. In reality, land use may also need to be aligned with community visions or to be managed from a long-term perspective. This is especially true in a highly urbanized area where potential land use conflicts can emerge in a complicated, dynamic fashion, and the demand for systematic land management is high (see e.g., Plotkin, 1987; Kaiser et al., 1995; Taleai et al., 2007; Kim 2011).

Taking public interest into account can take place in many forms, and there is no single ideal way to accomplish this important task. One could claim that expert knowledge is essential, while others argue for a more participatory approach to attain "efficiency and effectiveness, currency, relevance, responsiveness and their supposed low cost … [and to] foster a sense of ownership of a plan and commitment to its implementation" (McCall and Dunn, 2012, p.81). Moreover, it is debatable to what extent price signals and other attributes of a market mechanism need to be employed in determining an appropriate use of land rather than relying on a political process (see e.g., Lee, 1981; Pennington, 1999; Cheshire and Sheppard, 2005).

In any case, land use decisions do require analytical support to enable us to navigate the future with careful consideration of the tradeoffs associated with the decisions. What is likely to happen? What if we implement an alternative action to modify the trajectory? Does it lead to a better future (from social, economic, and/or environmental perspectives)? Who gains, who loses?

This chapter provides a case study using land use and cover change (LUCC) simulation and impact assessment models to provide the analytical support for a land use decision. Specifically, we consider the reuse of a decommissioned air force base site, known as the Orange County Great Park area, located in Southern California. LUCC simulation techniques have been increasingly employed in spatial planning and other public decision-making domains (see e.g., Koomen et al., 2008; Koomen and Borsboom-van Beurden, 2011). However, their real-world applications have typically focused on cases of urban growth and physical expansion. Relatively little attention has been paid to urban decline and/or renewal, while the demand for decision support systems for these issues has been growing rapidly (Zheng et al., 2015). Our case study seeks to fill this gap in the literature and provide some meaningful lessons on ways of using LUCC simulation and associated tools for a broader scope of community and regional planning tasks.

The remainder of this chapter is structured as follows. Section 9.2 provides a description of the study area and discusses some unique characteristics of site renewal projects which need to be considered carefully in devising an analytical framework for decision making. Section 9.3 presents our methodologies, namely the land use change and impact assessment models, while the results and validation outcomes are reported in section 9.4 and 9.5, respectively. We conclude with a discussion of our case study findings in section 9.6.

2. TEST AREA AND DATA SETS

Our study area covers the former Marine Corps Air Station (MCAS) El Toro and surrounding land parcels, located in Orange County, California (figure 1). Over the second half of the twentieth century, the site was mainly used for various missions of the air station, and served "as a training facility in peacetime and a staging area for support of overseas military missions in times of conflict" (Orange County Great Park, n.d.). However, as a result of the 1993 Defense Base Closure and Realignment decision, the MCAS El Toro was closed in 1999, and reuse of the site (approximately five thousand acres of land) became an important planning agenda for the City of Irvine, which annexed the site in 2003, and for nearby communities within the county.

<< Insert figure 1 about here >>

At the very beginning, "*[i]n November 1994, … Measure A was passed by Orange County voters, designating MCAS El Toro for commercial aviation use. The Orange County Board of Supervisors, supported by the John Wayne Airport neighbors [i.e., those living around an existing airport in the area], hoped to develop a large commercial airport that would serve 38 million passengers annually, and eventually replace John Wayne as Orange County's airport. As plans for the El Toro airport project were made public, the communities surrounding El Toro organized to oppose it and developed a competing plan, the Orange County Central Park and Nature Initiative. The initiative supported the development of a 1,300 acre public space that would include a sports park, botanical garden, and cultural terrace. After an intense grass-roots campaign, the initiative was placed on the ballot as Measure W and passed by a 58 percent to 42 percent vote on March 5, 2002. The next day, the U.S. Navy and the City of Irvine announced plans for the development of the Orange County Great Park*" (Lamb, 2009 – Guide to the UCI's special collection on the development of the El Toro Airport, 1992-2003). But, the detailed plan/layout of the site reuse was not finalized immediately. Rather, it has been the subject of lengthy analyses, plan revisions, and debates among various groups of local stakeholders (Kranser, 2005; Stockstill, 2014). Recently, a modified project plan, which incorporates the ideas of mixed-use community creation and transit oriented development, has gone through a comprehensive impact analysis to meet the California Environmental Quality Act requirements (City of Irvine, 2012). In its current general plan, the City of Irvine creates a separate land use category, called "Orange County Great Park" with the following definition: "*The development of regionally significant conservation and open space, parks and recreation, educational facilities, and other public-oriented land uses, integrated with privately developed multi-use, residential, commercial, and industrial properties, at the former MCAS El Toro site*."

Although unique in many respects, our study area presents some key attributes of site renewal projects that require special considerations in modeling/simulation, impact assessment, and decision support. Among others, given that site renewal opportunities often arise in highly urbanized areas, the land use decision is likely to involve tensions among various community groups who can be largely influenced (either positively or negatively) by the detailed renewal plan. It is not unusual that local politics can come into play. Sometimes, consideration has to be given to the interests of nearby jurisdictions.[1] Existing policies in and outside of the jurisdiction can be a barrier to renewal, and thus may need to be modified through systematic cooperation among policy authorities. Furthermore, to be successful, large-scale site renewal projects often require strong public support, which can be gained from consensus building or other forms of collaborative planning.

To deal with this complicated situation effectively, a comprehensive impact assessment needs to be conducted, covering not only immediate traffic and environmental impacts but also

[1] Our study site, although annexed into the City of Irvine in 2003, is surrounded by multiple jurisdictions, such as Lake Forest and Laguna Hills.

long-term socio-economic consequences. Multiple relevant scenarios may also need to be explored in a coherent manner for communication and informed decision making. When a LUCC modeling/simulation approach is employed, the models need to be designed in a way that can reflect the detailed site reuse pattern at an appropriate scale. In other words, a binary or crude land use/cover classification is less likely to be precise. A detailed urban land use categorization based on land parcels is more likely to be appropriate for this purpose, while a grid cell-based technique can also provide meaningful decision support.

For our study site and other parts of the metropolitan area, the Southern California Association of Governments (SCAG) provides detailed parcel-level land use information, dating back to 1990. The parcel data file is based upon SCAG's land use coding system with over 100 categories, ranging from low density single family to duplexes, low-rise, medium-rise, and high-rise apartments as well as detailed commercial, industrial, institutional and open space designations. This dataset enables us to investigate the dynamics of land use change within the region at a finer scale, as it reveals the evolution of land use over the last fifteen years (1990-2005) in a consistent format.

In addition to the parcel-level land use, we combine a variety of spatially-explicit data, needed for the investigation of causes and consequences of land use change. These include elevation/slope, transportation infrastructure, and locations of key attractors (including the shoreline) within the Southern California metropolitan area, made up of Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. We also use a range of neighborhood-level socio-economic data, derived from Census products and other sources of information. For instance, to investigate how land use changes can influence surrounding neighborhoods, we gather Zipcode Business Patterns data provided by the US Census Bureau and the data on average loan values and average household income of in-movers coming from the Federal Financial Institutions Examination Council (FFIEC), which collects the information under the Home Mortgage Disclosure Act (HMDA).

3. METHODOLOGY AND PRACTICAL APPLICATION TO THE DATA SETS

In an attempt to support more informed decision making, we conduct a baseline land use change simulation and scenario-based impact assessment. For the baseline simulation, we employ a multinomial logit model, which has been widely used for empirical investigations of urban land use change (see e.g., Zhou and Kockelman, 2008; Fragkias and Geoghegan, 2010; Kim et al., 2017) and can be briefly expressed as follows.

$$p_{ij} = \frac{\exp\,(X\beta_{ij})}{\sum_m \exp\,(X\beta_{im})}$$

where p_{ij} indicates the probability of parcel-level land use conversion from i to j; X and β_{ij} represent land use change factors and the estimable coefficients, designed to capture their effects on the i-to-j probability, respectively.

More specifically, our model is constructed with the following 10 land use categories, obtained through an aggregation of the SCAG's coding system, to avoid some drawbacks of a highly disaggregated scheme that can emerge in multinomial logistic regression (particularly due to an insufficient number of land parcels for a certain category of land use transition in the dataset) – 0: No development, 1: Single-family residential, 2: Multi-family residential, 3: Other residential, 4: Commercial & Services, 5: Industrial, 6: Transportation, Communication, & Utilities, 7: Public facilities, 8: Mixed use, and 9: Open space & Recreational (see table 1). The model is calibrated using the region-wide data (all parcel observations with valid land use information within the Southern California metropolitan area, including unincorporated areas) for 1990-2005 with consideration of a range of potential land use change factors, including each parcel's physical/ecological attributes (e.g., parcel size, shape, slope), accessibility measures (e.g., proximity to employment centers and transportation infrastructure), and neighborhood characteristics (e.g., socio-demographic variables and surrounding land uses).

<< Insert table 1 about here >>

Our main focus in the baseline simulation is to reveal how (in terms of land use) the decommissioned MCAS El Toro site will be transformed in the future, if no special action is implemented. In other words, we attempt to use a calibrated model, based on the past development patterns of the larger region, to generate a baseline reference about what is likely to occur in this particular site, if the parcels in this site follow the past trend (or market forces) in the metropolitan area. The simulation outcomes are expected to inform the stakeholders involved, particularly to help them understand the gap between their desire and the probable future without action beyond status quo. The outcomes, when presented and delivered effectively, can also contribute to building consensus about the need for actions toward a more desirable future.

Although useful, the baseline simulation alone does not enable us to determine what actions are needed or how the site needs to be redeveloped. Therefore, to provide decision support and facilitate planning dialogue more effectively, we develop a set of alternative site reuse scenarios and conduct an impact assessment for each of the scenarios. More specifically, we consider the following five possible ways of reusing the site (for each scenario, we set the percentage park area to 20% where the existing Great Park is located).

- Housing-heavy development: housing at 80%, others at 0%
- Industrial-heavy development: housing at 50%, industrial at 30%
- Retail-heavy development: housing at 50%, retail at 30%
- Office-heavy development: housing at 50%, office at 30%
- Mixed development: 50% housing, combined with industrial, retail, and offices at 30% (i.e., each at 10%)

Basically, these scenarios acknowledge the desire to use this site to accommodate the increasing need for housing within the City of Irvine (in each scenario, at least 50% of the site is allocated to housing – single-family, multi-family, and other residential combined). More importantly, this set of scenarios roughly represents stakeholders' (conflicting) aspirations to have more space for diverse commercial/industrial purposes, although they do not articulate the detailed configuration within the site. The scenarios can also enable stakeholders to easily comprehend the impacts of an increase in a certain type of land use within the site and the associated tradeoffs (e.g., what if we decide to reuse more space for housing rather than industrial, retail, or office uses).

With these scenarios, we conduct an impact assessment with a focus on the following key socio-economic indicators: 1) average home sales price, 2) unemployment rate, 3) change in three types of jobs (white collar; blue collar; retail), 4) average household income of in-movers, and 5) average home loan values.[2] These indicators are considered important in the decision

[2] Given the data availability, the first three variables are analyzed at the zipcode area level, while our analysis of the remaining two are carried out at the census tract level. Census tracts are advantageous over zipcode areas given that they are smaller and typically considered more representative of "neighborhoods", even though tracts do not always work perfectly in delineating neighborhoods (Chaskin, 1998; Hipp, 2007). However, loan amounts may not be an ideal measure of home prices in a neighborhood, and therefore we use data aggregated to zipcode areas that captures sales price information obtained from the RAND Corporation's statistics service as well as the tract-level average home loan

making process, but they have not been systematically analyzed. Our impact assessment focuses on these variables to fill the information gaps left behind by the previous impact analyses which mainly focused on the environmental and transportation implications of the proposed redevelopment plans.

More specifically, for these variables, we estimate neighborhood change models in which measures at one point in time are used to project the level of the measure of interest during the subsequent years, having the following general form.

$$\Delta y_{k,t} = \alpha + \beta \cdot y_{k,t-1} + \theta \cdot X_{k,t-1} + \rho \cdot WX_{k,t-1} + \tau \cdot T + \varepsilon_{k,t}$$

where $\Delta y_{k,t}$ represents the change in a socio-economic variable of interest in neighborhood k between year *t-1* and *t*; $X_{k,t-1}$ and $WX_{k,t-1}$ indicate a set of covariates, including land use variables, and their spatial lags, respectively; T represents a collection of binary variables included to capture the fixed effects for years; $\varepsilon_{k,t}$ is an error term assumed to have a normal distribution; $\alpha, \beta, \theta, \rho$ and τ are the parameters to be estimated.[3]

For instance, to account for the (spatio-temporal) complex nature of job growth, we include a broad range of potential predictors as well as land use composition metrics in each job change model. Specifically, to explain the annual change in jobs at a zipcode area scale, we consider several measures of the number of jobs in the spatial area around a zipcode area, such as the number of jobs of the same type within 1 mile, from 1-5 miles, and from 5-10 miles and similar spatial measures showing how the number of such jobs changed in the prior two years.[4]

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values. Analyzing these two variables – i.e., zipcode area-level sales price and tract-level loan amounts – enable us to check the possible scale sensitivity of the analysis outcomes.

[3] In addition, for the job projection models we include the change in jobs in the prior year in the models as this added significantly to the model fit. Such a measure is not included in the other models.

[4] For all of these spatial buffers, we compute the measures with an inverse distance decay function. This essentially means that neighborhoods closer to the neighborhood of interest have a stronger effect than do neighborhoods further away.

These are meant to capture both potential agglomeration economies and diseconomies (i.e., centripetal and centrifugal forces that can largely shape business location patterns). To assess the possible cross-sectoral effects, in modeling the growth in one type of jobs, we include both neighborhood and nearby measures of other jobs (e.g., blue-collar and retail jobs considered in the white-collar job change model).

The neighborhood change models are estimated using the annual data from 1990 to the most recent year for the outcome variables. We use the coefficient estimates from those models for our forward simulations. We then substitute various values for the land use measures in the key zipcode areas or tracts of interest in the Great Park based on the five scenarios. We then project forward in time based on the models to compute predicted probabilities of home values, unemployment, jobs, and income in the area.

4. RESULTS

We present our baseline land use change simulation results in the following two ways: 1) the most likely development of the parcels *without any restrictions* (figure 2, left) and 2) 2) the most likely development of the parcels, *without "no development" as an option* (figure 2, right). The first presentation shows what is likely to happen over the next fifteen years using our land use change model calibrated with the data for 1990-2005, if the parcels simply follows the region-wide trend of parcel-level land use change. In other words, it provides an answer for "what if no conscious plans or actions are implemented?" Basically, the second presentation also assumes no actions, but it reflects the possibility of high demand for redevelopment in the area and shows the most likely development of individual parcels within the site. It needs to be noted that the model estimates are contingent upon the assumption that the Great Park parcel characteristics are given. Changing the size and shape, as well as the grade, of the parcels would affect the model results.

<< Insert figure 2 about here >>

As shown in the figure (left), without any actions, our simulation indicates that no development would be the most likely outcome for a majority of the parcels. Under this baseline scenario, a handful of large land parcels are projected to be reused for urban open space and recreational purposes. It is also expected that approximately 22 acres of the land, mostly small parcels, will be transformed into single-family residential units.

If all of the parcels are assumed to be reused for urban purposes, open space and recreational uses would occupy over 85% of the site (in terms of land area), as demonstrated in figure 2 (right). Single-family residential units could also expand, while no multi-family units are expected to be built. In this case, some parcels near the interstate highway (I-5) would be developed into commercial or industrial space, given their large sizes and proximity to freeway which have a significant effect on the probability of development for such purposes.

These presentations of the baseline simulation are useful in the sense that they show what is likely to happen in the future without conscious actions and help to figure out to what extent the outcome meets the community's expectations. However, these two presentations are not enough to facilitate the dialogue for devising a better land use layout with careful consideration of the forces behind the outcome. Looking at the detailed probability patterns can enable us to have a more fruitful conversation and discuss ways to meet the desire for reusing the site more intensively for a variety of urban purposes. Figures 3, 4, and 5 demonstrate the probability distributions for each type of possible development.

<< Insert figures 3, 4, and 5 about here >>

Figure 3 demonstrates that small parcels tend to have a higher score for residential development, particularly single-family residential purposes, as our land use change model captures a negative association between parcel size and the probability of this type of development. Non-residential development shows quite distinct patterns, as small parcel areas would not be appropriate for these purposes, unless assembled. For instance, commercial and service development (figure 4) exhibits a higher probability for medium-sized parcels next to arterial roads. Industrial development as well as transportation, communications, and utilities is found to be suitable in large parcels, especially those with great proximity to the interstate highway and exiting industrial lands. Public facilities (figure 5) have a high score in the areas where open space and recreational purposes are found to be feasible, suggesting that these two land uses are likely to compete with each other.

As explained in the previous section, for our impact assessment, we test five land use scenarios that roughly reflect stakeholders' varying desires: 1) Housing-heavy development, 2) Industrial-heavy development, 3) Retail-heavy development, 4) Office-heavy development, and 5) Mixed development. The results for each of the scenario impact analyses are summarized in table 2. We consider scenario 1 (housing-heavy development) to be the reference to which we compare the other scenarios. Therefore the results in the table all compare the expected change in the various measures for the particular scenario compared to the change under this scenario of 80% housing with 20% of land for the park area.

<< Insert table 2 about here >>

In the first scenario, a housing-dominant development is generally expected to result in a relatively slower pace of job growth in the area. For instance, this scenario would generate a much smaller number of white-collar jobs compared to scenarios 4 and 5, while the growth rate of white collar jobs is found even lower under the third scenario (i.e., retail-heavy development). The growth rate of blue collar jobs would also be lower in this scenario than under a majority of other scenarios. However, it appears that the housing-heavy development would lead to a lower level of unemployment in the area, even though its contribution to job creation that can benefit a broader region is questionable.

Scenarios 2 through 4 suggest that job creation can be achieved more effectively by devoting a certain proportion of the land to non-residential uses. This does not mean that all types of jobs can be equally generated through the provision of non-residential space. Rather, the mechanism is found to be quite complex, since each type of non-residential land use has not only direct effects on white-collar, retail, and blue-collar jobs but also indirect effects via the linkages among job types (e.g., a negative effect of white collar job change on retail job growth). Industrial development (scenario 2), for example, would induce a large increase in blue-collar jobs and a moderate increase in white-collar jobs, while the retail job growth could be dampened. The office-heavy development scenario (scenario 4) can create even a larger number of white-collar jobs, but again at the expense of retail job opportunities.

A mixed development of housing, retail, offices, and industrial sites (scenario 5) shows a possibility to moderate the conflicts among three different types of jobs. It is projected that this mix of land use can add white-collar and blue-collar jobs by +29% and +18% respectively, while the retail job growth rate is not as high as that of the housing-heavy development. It needs to be noted that both the average household income of new residents and the average home loan values are found to be the lowest under this mixed development scenario.

In sum, we see complex tradeoffs that need to be taken into account in the collective land use decision making process. One of the tradeoffs is the tension between job growth (considered important from a regional perspective) and the creation of a residential community attracting residents with a lower level of unemployment (often supported by local stakeholders). The impact assessment also reveals that the land use decision is highly associated with detailed job change patterns in the area and that tradeoffs exist between white/blue-collar and retail jobs.

5. MODEL VALIDATION

We validate our statistical models through the following steps. First, we estimate the model for the entire region from 1990 to 2001 and obtain the coefficient estimates. Second, we compute the land use change that actually occurred in census tracts or zipcode areas from 2001-2005. Third, we multiply those land use changes by the coefficients from the model, and also multiply the values of the other exogenous variables in the model by the estimated coefficients and compute the predicted value of the outcome variable of interest in 2005. We then compute the predicted values for each subsequent year by multiplying the coefficients by the values of the exogenous variables and the predicted value of the outcome variable of interest from the previous year.

This approach can put our model projections at risk of diverging from actual values further into the future. For example, whereas the correlation between the predicted value of the model and the actual sales price value ranges from 0.92 to 0.97 from 1992-2001 (when the data are actually being used to estimate the model), the correlations fall to 0.64 to 0.67 during 2002-2006 (when the data are outside the range of the model, but we do not use the predicted values of the prior year sales price to compute new predicted values, but rather the actual prior year sales price values).[5] The key question then is how the model does when projecting time points beyond the data (after 2006, when we are using the predicted values of the prior year sales price to compute new predicted values).

Our validation checks suggest that for the average sales price models, the correlations between our predicted values and actual values are 0.51 in 2007, 0.45 in 2008, 0.43 in 2009, 0.41 in 2010, 0.40 in 2011 and 0.40 in 2012. The validation checks for the unemployment models using data aggregated to zipcode areas show correlations of 0.66 in 2007, 0.53 in 2008, 0.46 in 2009, 0.39 in 2010, 0.35 in 2011, and 0.31 in 2012. For the models predicting types of jobs, validation checks show correlations for each type of jobs are found to be over 0.95 from 2007 to 2010. For the average loan values models using data aggregated to tracts, the validation checks show correlations of 0.82 or 0.83. Similarly, for the average income level of new residents in tracts, the correlations range from 0.75 to 0.82.

These validation checks assess how well our model does in explaining the neighborhood change trajectories compared to what actually occurred and indicate that our models project well the future number of jobs, the average loan values, and the average income of new residents. The models are basically satisfactory, although less effective, in projecting average sales prices

[5] For the unemployment models in zipcode areas, the correlations in the earlier years are above 0.98 from 1992-2001, and 0.87 to 0.99 from 2002-2006. For the average loan values models using data aggregated to tracts, the earlier year correlations range from 0.57 to 0.92 from 1991-2001 and about 0.91 to 0.92 during 2002-2006. For the average income level of new residents the earlier year correlations are 0.34 to 0.91 from 1991-2001, and about 0.86 to 0.89 during 2002-2006.

and unemployment rates in zipcode areas. It may be that these larger units negatively affect the performance of the models, although we cannot be certain without a more rigorous investigation beyond the scope of this study.

6. CONCLUSION AND OUTLOOK

Urban site renewal presents a great potential as a means to curb unchecked urban expansion (generating serious social, fiscal, and environmental problems – see e.g., Ewing, 1996; Johnson, 2001; Burchell et al., 2005), to prevent abandonment of core areas, and thus to attain a more sustainable urban development. However, in reality, site renewal projects in urban areas have often been impeded not only by real estate market uncertainties but also by many regulatory and political barriers (Farris, 2001). Difficulties also exist in building consensus and garnering public support, particularly when the projects are anticipated to generate large impacts on nearby areas.

In this chapter, we provide a way to utilize LUCC simulation and impact assessment models to support site renewal and associated decision making processes. As discussed above, these tools can help us understand what is likely to happen and test various alternative scenarios in a coherent manner. Moreover, they can provide an opportunity to complement traditional environmental or transportation impact analysis techniques and fill the information gaps in a way that can facilitate dialogue among various stakeholders as well as planning professionals. The site future can be effectively communicated with the public through land use visualization, land use-based scenario development, and relevant socio-economic projections or bringing stakeholders into the process of LUCC modeling and simulation (Voinov and Bousquet, 2010; Pettit et al., 2011; Voinov et al., 2016). However, LUCC simulation technology does not always guarantee success. It is challenging to handle intrinsic nonlinearities, scale dependency, and other sensitivities in LUCC simulation (Kim, 2013). Stakeholders also often fail to understand various assumptions behind simulation models and differentiate the model results from reality (Becu et al., 2008). Understanding how to convey the model information (including the model specification, assumptions, inputs, and outputs) is crucial to realizing the great potential of LUCC simulation and impact assessment models.

It is also important to put model results in context. While this type of model-generated information is generally valuable in the planning process, it must be tempered with an understanding of the effects of land use decisions over time on communities situated in a particular planning context. Land use decisions can have a cumulative effect on a community, often with unintended consequences. For example, in our case, years of under supply in the residential market has resulted in high rents and home purchase prices. In fact, the Orange County Business Council, in its 2015 Housing Scorecard, asserts that "Insufficient planning for, and provision of, workforce housing supply will impede Orange County's growth potential and continue to perpetuate the region as 'desirable but unattainable' for recent graduates, many new families, and workforce talent that might otherwise move to the county" (p.43). Land use distributions, therefore, must be assessed, not merely on past job creation and future housing values being high, but also on whether past growth has created the setting for a healthy economy and vibrant communities in the future.

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