



Analysis

The greener, the happier? The effect of urban land use on residential well-being



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ABSTRACT

We investigate the effect of urban land use on residential well-being in major German cities, using panel data from the German Socio-Economic Panel and cross-section data from the European Urban Atlas. We reduce concerns about endogeneity by employing fixed-effects (within) estimators, with individual and city of residence fixed effects, while controlling for a rich set of observables. The results show that access to green urban areas, such as gardens and parks, is positively associated with, whereas access to abandoned areas, such as waste or leftover land, is negatively associated with life satisfaction. The effects are strongest for residents who are older, accounting for up to a third of the size of the effect of being unemployed on life satisfaction. We calculate the marginal willingness-to-pay of residents in order to have access to green urban and abandoned areas in their surroundings, as well as the life-satisfaction maximising amounts of them. Finally, we provide a policy case study, while discussing limitations and avenues for future research.

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1. Introduction

In major cities, space is a scarce commodity, and urbanisation puts increasing pressure on areas that provide important ecosystem services. Acknowledging that urban areas, such as parks and green space, contribute to their climate and environmental policy objectives, the European Commission promotes their preservation by incorporating them into national and regional policies across the European Union (European Commission, 2013), whereas the Federal Government in Germany promotes their preservation by incorporating them into its national strategy on biodiversity protection (Federal Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety, 2007).

These ongoing policy initiatives, meant to preserve urban ecosystem services, are encouraged by a growing body of literature that highlights their amenity value for residents in their surroundings, suggesting that urban areas, such as parks and green space, have positive effects on residential well-being and health (see Bell et al. (2008) and Croucher et al. (2008) for reviews). Using cross-section data on residential well-being from the Household, Income, and Labour Dynamics Survey in Australia and the amount of green space in the collection districts of major Australian cities, Ambrey and Fleming (2013) show that green space is positively associated with life satisfaction.¹ Smyth (2008) and Smyth et al. (2011) confirm that green space per capita is positively associated with happiness in urban China, whereas, in a case study of Adelaide, Australia, Sugiyama et al. (2008) show that residents who rate to live

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¹ In related studies, using the same dataset and empirical strategy, the authors also find that there is a positive relationship between scenic amenity and protected areas on the one hand and life satisfaction on the other (Ambrey and Fleming, 2011; Ambrey and Fleming, 2012).

in greener areas report higher mental and physical health. Importantly, these effects seem to be heterogeneous: Ambrey and Fleming (2013) suggest that single parents and people with lower levels of education benefit more in terms of life satisfaction, whereas, in the United Kingdom, Richardson and Mitchell (2010) find that men benefit more in terms of lower rates of cardiovascular and respiratory diseases, and Mitchell and Popham (2008) find that low-income households benefit more in terms of reduced health inequalities (Jorgensen and Anthopoulos, 2007). Maas et al. (2006) confirm the heterogeneous effect for people with lower levels of education in The Netherlands, and also add that older residents in greener areas show better general health (Jorgensen et al., 2002). Most of these studies, however, use cross-section data, with the notable exception of White et al. (2013), who find positive effects of green space on life satisfaction and mental health in England.²

In sharp contrast to these studies stand another stream of literature that investigates the disamenity value of vacant or abandoned areas in post-industrial cities. Using a quasi-experimental difference-in-differences design, Branas et al. (2011) show that the greening of vacant lots in Philadelphia, Pennsylvania, reduces certain crimes, in particular gun assaults and vandalism, and improves the self-reported health of residents in their surroundings, leading to lower levels of stress and higher levels of exercise. Using qualitative interviews in the same city, Garvin et al. (2013) find that respondents perceive vacant land to lead to lower community well-being, as well as physical and mental health. Kuo et al. (1998) suggest similar effects when it comes to common space on the one hand and perceived safety and fear of crime on the other. These results are supported by studies on the relationship between foreclosure, vacancy, and crime: Ellen et al. (2013) and Katz et al. (2013) find increases in violent and property crime following foreclosure in New York City and Glendale, Arizona, respectively. Cui and Walsh (2015), using a difference-in-differences design and a more comprehensive dataset from Pittsburgh, Pennsylvania, show that this increase in crime is not due to foreclosure itself, but rather due to vacancy following foreclosure. The authors report an increase of roughly 19% for violent crime once dwellings become vacant. Although these studies do not directly investigate the effect of vacant or abandoned areas on life satisfaction, they still suggest that vacant or abandoned areas are associated with lower life satisfaction, in particular for residents that are more vulnerable, as health and safety are important determinants of subjective well-being (see, for example, Krekel and Poprawe (2014) and Dustmann and Fasani (2015) for related analyses).

Generally, for the amenity and disamenity values associated with green urban and abandoned areas, as well as other types of urban land use, no directly observable market prices exist. Therefore, they are typically valued using stated preference approaches, such as contingent valuation and discrete choice experiments, or revealed preference approaches, such as hedonic pricing (see Brander and Koetse (2011) for a review).

We investigate the effect of urban land use on residential well-being in Germany and value different land use categories monetarily, using the *life satisfaction approach* (Welsch, 2007). To this end, we merge panel data from the German Socio-Economic Panel for the time period between 2000 and 2012 with cross-section data from the European Urban Atlas for the year 2006. Trading off the impact of different land use categories on life satisfaction against the impact of income, the life satisfaction approach allows us to calculate the marginal willingness-to-pay of residents in order to have access to different land use categories in their surroundings, as well as the life-satisfaction maximising amounts of them. As this approach has already been applied to value various other public goods and bads monetarily, including air pollution (Ferreira et al., 2013; Ambrey et al., 2014), noise pollution (van Praag

and Baarsma, 2005; Rehdanz and Maddison, 2008), scenic amenity (Ambrey and Fleming, 2011), landscape intrusions due to energy infrastructure construction (Krekel and Zerrahn, 2015), and natural land areas (Kopmann and Rehdanz, 2013), we contribute to a growing literature.

Specifically, the richness of our data allows us to contribute to the literature on the relationship between urban land use and residential well-being in several ways. First, using the German Socio-Economic Panel allows us to estimate the effect of urban land use on residential well-being by employing fixed-effects (within) estimators, with individual and city of residence fixed effects, while controlling for a rich set of observables. This reduces concerns about endogeneity, especially simultaneity, as the effect is identified by between-city movers, who are less likely to move for reasons related to different land use categories in their surroundings. Second, using the European Urban Atlas allows us to employ data on land use rather than cover. This has the advantage that information based on actual usage is much more consistent in terms of provision of utility than information based on, for instance, cover. Moreover, this dataset allows us to jointly estimate the effects of different land use categories on residential well-being. We focus on green urban areas, forests, waters, and abandoned areas.³ Third, merging both datasets through geographical coordinates allows us to calculate the exact distances between households and different land use categories, as well as the exact coverages of different land use categories in a pre-defined radius around households. This has the advantage that measuring access based on distances and coverages is much more precise than based on aggregated areas, which simply sum up the amounts of different land use categories in a district. Moreover, using both distances and coverages serves as a robustness check, as they are substitutes for measuring access to different land use categories. Finally, the literature on vacant land focuses mostly on its effect on health and safety. As health and safety are known to be important determinants of subjective well-being, the results of this study may also contribute to this literature.

The rest of this paper is organised as follows. Section 2 describes the data and provides detailed definitions of the different land use categories employed. Section 3 introduces the empirical model and discusses identification issues. Section 4 presents the results, while Section 5 gives policy implications. Section 6 discusses the results and limitations of this study against the status quo of the literature, and concludes by providing avenues for future research.

2. Data

2.1. Data on Residential Well-Being

The German Socio-Economic Panel is a comprehensive and representative panel study of private households in Germany, including almost 11,000 households and 22,000 individuals every year. It provides information on all household members, covering Germans living in the old and new federal states, foreigners, and recent immigrants (Wagner et al., 2007; Wagner et al., 2008). Most importantly, it provides information on the geographical locations of the places of residence of individuals, allowing to merge data on residential well-being with data on urban land use through geographical coordinates.⁴ As such, the dataset is not only representative of individuals living in Germany

³ Green urban areas are defined as “land for predominantly recreational use”, including, for example, gardens and parks. There is an important distinction between green urban areas and forests, as forests within an urban setting, showing traces of recreational use, are classified as green urban areas. Abandoned areas are defined as “areas in the vicinity of artificial surfaces still waiting to be used or re-used”, including, for example, waste land and gaps between new construction areas or leftover land (European Environment Agency, 2011, p. 21).

⁴ The German Socio-Economic Panel provides the geographical coordinates at the street block level, which is very accurate in urban areas.

² Alcock et al. (2014) are a spin-off of White et al. (2013), focusing on residents who move.

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