

The value of open spaces in coastal land prices

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Coastal areas are, due their attractiveness, submitted to a strong urban pressure. This pressure has significant impacts on ecosystems, due to the conversion of land from natural to residential and/or economic uses, but also in terms of various types of pollution, especially due to the increase in daily mobility following population growth. Within these areas, land tenure and land use conflicts are particularly acute. Thanks to the different planning tools available to them according to their level and functions (PLU, SCOT, environmental zoning, preemptive rights, ZAD, etc.), French local public actors play a direct, immediate or delayed, role in the regulation of land uses. Our study area, the Arcachon Bay, is an emblematic French coastal site for both landscape and ecological reasons. It is a highly attractive region thanks to its closeness to the urban area of Bordeaux. This attractiveness has led to strong urban pressure on natural and agricultural zones, which in turn has incited several national and local authorities, including national agencies such as the 'Conservatoire du Littoral' and the "office national des forêts", the Departmental Council and municipalities to implement different types of land-use regulations, especially zoning restrictions. This paper aims to understand the impact on the land and housing markets of regulatory systems of land use such as zoning.

The consequences of zoning on land and property prices are supposed to increase land prices through two main channels. First, the scarcity effect acts on the supply side. Indeed, zoning makes both the surface of building land and the number of new buildings scarcer. This double restriction leads to an increase in prices in land

and property markets, that is even greater than the demand is inelastic to price. Second, the amenity effect acts on the demand side. By freezing land use (even temporarily), zoning stabilises or generates land use externalities. These two external effects, which are comparable to local public goods, are then capitalised in land and property values. Zoning decisions produce localized amenities related to the presence of "open spaces", defined as unbuilt areas. Open space brings numerous benefits: views, recreational space, protection of wild species, and sensation of privacy... The majority of studies agree on the existence of an "open space premium" capitalised in land and property prices. The values estimated for the premium are, however, very heterogeneous, since they depend on the service provided by open spaces that are themselves heterogeneous by nature.

A major hypothesis of the paper is that the value of open spaces depends on both the type of service they currently provide and their anticipated future uses. It is well established that the price of housing has a significant anticipated component, because it represents the sum of the actualised expected benefits of its owner. It thus includes both the current and future amenities offered by neighbouring open spaces, the latter depending on a possible conversion to another use. It is thus appropriate to consider not only the current use of land, but also its anticipated use, as defined in planning restrictions such as zoning. The added value from permanent open spaces is assumed to be higher than that from temporary open spaces because the source of external effects is longer-lasting.

The originality of this paper is twofold. Firstly we estimate, using a spatial hedonic model, the premium associated with the combined effect of current land-use (recreational or productive) and zoning regulations of these different uses, reflected by constructability restrictions. The data are compiled from three different sources. The primary dataset is made up of individual sales transactions between 2000 and 2010, derived from the PERVAL and DVF real-estate lawyers' database. This includes extensive information on each property's characteristics, enabling geolocalization at the parcel level. Moreover, the variables of interest combining land uses and type of zoning are computed thanks to the superposition of the Coastal Land Use layer (identifying land uses in 2000 and 2009 along the south-west french coast) and the

digitalized zoning restrictions in 2000 and 2010 provided by local governments. Thanks to the French system of land-use zoning, we are able to take into account the type of future urbanisation (dispersed or dense) when the land is buildable, and the type of use (natural or exploited open space) when it is unbuildable. To better control for endogeneity issues, we also use a quasi-natural experiment framework in order to test the impact of changes in zoning regulations between 2000 and 2010 on land prices, using double differences and matching methods to address sources of bias in identifying impacts.

The results of both approaches confirm the strong diversity of premiums associated with the presence of open spaces, and the significant impact of changes in zoning in the valuation of open spaces on the land market.

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