

Demographic, Economic, Environmental, and Political Determinants of Irreversible Land Development in the U. S.: Abstract (81)

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Topic Area C: Socioeconomic, demographic, and other factors of land-use change
Approach or Method 3: Database-related and modeling

Land-use change is ubiquitous and accelerating in the U.S. In particular, the area of urban, built-up, and rural transportation land increased 47.4%, from 72.8 million acres to 107.3 million acres, during 1982-2002 in the 48 contiguous states. In these 48 states developed land area increased 18.8% during 1982-1992 but 24.0% during 1992-2002. Although land development often accompanies economic growth, urbanization of land use adversely impacts terrestrial and aquatic habitats and can induce changes in climate.

Models of this change for the entire U. S. have become important for managing watersheds, regulating land use, and forecasting climate change. In recent empirical models that conform to an individual's decision of whether or when to develop a parcel of land, the quantitative effects of factors that determine differences in financial returns to residential and agricultural uses of this parcel have been estimated. Examples of these factors are zoning restrictions and distance of the parcel to the nearest highway. In these models, however, the effects of population, real economic production per capita, associated growth rates, real gas prices, and other factors that federal or state policy makers can influence have not been estimated.

In the current version of my paper, six fixed-effects models of developed land areas have been estimated with data from the NRI and other government sources for 49 states during 1982-1997. The nonlinear-in-the exogenous-variables model of the log of the ratio of a state's developed land area to its non-developed land area is the best. Increases in a state's previous five-year average population, non-agricultural and non-mining output per capita, and annual growth rate of this output per capita induce increases in developed land area. Developed land area also increases as the average agricultural and mining output per capita, inflation rate, interest rate, and gas price during the previous five years decrease. Increases in the previous five-year average area enrolled in the Conservation Reserve Program, the payment per enrolled hectare, and the share of Democrats in a state's lower house inhibit land development.

The current results provide cautious guidance for policy making. Family-planning and other policies that reduce population growth are likely to reduce land development. Policies that improve the real returns to agriculture and mining are likely to prevent the conversion of some undeveloped land. Expansionary but non-inflationary monetary policies are likely to induce land

development. Increases in payments per enrolled hectare in the CRP up to \$600 per hectare or expanded enrollment of undeveloped land will strengthen the incentives for continued use of some undeveloped land. A permanent tax on the price of gas will make the conversion of some undeveloped land unprofitable.

In my paper for the conference, the model(s) will focus on causes of changes in a state's developed land area rather than determinants of the state's developed land area. Also, land development is rarely reversed in reality and never observed at the level of a state. Hence, the model(s) for the conference paper will be specified and estimated to incorporate this irreversibility.