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Factors Influencing Support for Rural Land Use Control: A Comment

B. James Deaton and Patricia E. Norris

Land ownership characteristics such as the quantity of land owned, quality of land parcels, and location of land describe important dimensions of landed wealth. Landed wealth is expected to be an important factor influencing support for rural land use control. This factor was not discussed in the April (1999) article by McLeod, Woithaye, and Menkhaus (1999). We suggest that this factor contributes to understanding variation in support for rural land use control.

In the April 1999 edition of *Agricultural and Resource Economics Review*, D.M. McLeod, J. Woithaye, and D.J. Menkhaus (hereafter MWM) set out to identify respondent characteristics that contribute to the support of rural land use controls among the population of Sublette County, Wyoming. However, the MWM theoretical and empirical models did not account for variation in support for land use controls that might be attributed to variation in respondents' ownership (endowment) of land. Theory suggests that changes in land use policy are likely to affect the value of land and subsequently influence the value of a landowner's property. In studies, such as MWM, where the majority of respondents are landowners, this endowment/wealth effect may be an important variable in describing a respondent's willingness to support a land use policy.

MWM estimated dichotomous choice models to explain respondents' support for three types of rural land use controls: zoning, purchase of development rights, and cluster development. MWM distinguished between public attributes (scenic amenities, wildlife corridors, etc.) of land and private attributes (agricultural production, residential or commercial development) of land. MWM assumed that support for land use regulation would

vary across respondents depending on respondents' relative preference for private versus public attributes of land. MWM surveyed resident and non-resident landowners, as well as non-land-owning residents, about land use preferences, but they did not include ownership as an explanatory variable in their choice models. The resulting models of respondents' support for the three types of land use controls predicted 58.5 to 69.9% of responses correctly. However, the hypothesized relationships between the explanatory variables and the willingness to support land use controls were not widely supported by the results.

In this comment, the potential impact of excluding the land ownership variable is described. First, the theoretical basis for including a land ownership variable is reviewed. Second, the potential omitted variable bias in MWM's empirical results is discussed. For brevity, this comment will focus primarily on MWM's results relative to zoning. However, implications for results for the purchase of development rights and cluster development examples will be discussed briefly.

Review of the MWM Theoretical Model

The MWM maximization problem is described by the following indirect utility function (p. 45):

$$1) \quad V(P_j^i, Y)$$

Where:

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- P_a = price of all other goods indexed to 1;
 P_j^i = composite prices that are good (j) and state (i) dependent;
 Y = income;
 i = 0 as the initial state of pre-regulation and; 1 as the new state or post-regulation;
 j = p as a composite of public goods attributes of private land; m as a composite of private goods attributes of private land.

MWM assume that a zoning policy reduces the supply of private land attributes (for example, land for development) relative to the supply of land for public attributes (for example, scenic amenities or wildlife corridors). As a result, the relative price of private attributes of land increases relative to the price of public attributes of land. MWM suggest that a respondent's decision of whether to support a zoning policy is expected to depend on the respondent's preferences as a 'citizen-consumer.' They argue that a citizen's support for a zoning policy will depend on the citizen's sense of what is best for society. As a consumer, the respondent is expected to support land use control if the resulting change in the relative prices of public and private attributes will allow for changes in consumption patterns that result in a higher level of utility.

Assuming well-behaved preferences, the respondent-consumer's support for zoning will depend on whether he or she will achieve a higher level of utility by substituting away from the relatively dearer private attribute to the relatively cheaper public attribute (substitution effect). This substitution, depending on the magnitude of change in relative prices, will be conditioned by the change in purchasing power (income effect). These two effects are developed in the MWM theoretical model of the consumer. Moreover, the MWM model recognizes the theoretical importance of wealth, via the inclusion of an income variable, as a factor influencing support for zoning. However, the MWM model does not adequately account for changes in the value of one's land holdings (i.e. the endowment effect or, more intuitively, the 'wealth effect') that may accompany land use policy. This wealth effect may be an important influence on landowner support for zoning policy.

Expanding the MWM Model

Intuition and economic theory suggest that a landowner will consider how a change in land use policy would affect the value of his or her land holdings. Hence, the MWM respondent-consumer would consider how a zoning policy would affect the value of his or her property. For example, an

agricultural landowner who expects zoning to decrease the value of his or her land may be unwilling to support zoning if the expected loss in land value offsets any potential gains in utility associated with the relative price decline in public attributes. In contrast, an owner of developed land or land available for development (residential, commercial, or industrial) may expect agricultural zoning that restricts development elsewhere to result in greater demand and, thus, higher value for his or her land holdings.

For agricultural landowners, the impact of such a zoning policy is less straightforward than is often assumed. Previous research has shown that the impact of agricultural zoning on aggregate land values is difficult to predict (see Henneberry and Barrows for a review). Restrictions on development may be positively capitalized into agricultural land values if development opportunities are associated with higher property taxes or if development brings associated externalities that interfere with farm operations. However, where agricultural land has a positive development value, development restrictions may negatively impact land values. Henneberry and Barrows concluded that size and location of parcel were important determinants of whether land values were positively or negatively impacted by exclusive agricultural zoning. In particular, they found exclusive agricultural zoning positively capitalized into land prices for large parcels somewhat removed from urban areas. Zoning reduced prices of smaller agricultural parcels relatively close to an urban area.

The presence of a wealth effect complicates the theoretical model developed by MWM in at least two very important ways. First, the wealth effect suggests that support for land use control will vary among respondents depending, in part, on expected changes in the value of the respondents' land holdings. Second, the magnitude and direction of the wealth effect is not likely to be homogenous across respondents. Rather, the effect is likely to vary depending on a number of land ownership characteristics, including the quantity of land holdings, the location of the land holdings, permitted uses, and quality dimensions of the land holding.

The MWM theoretical model can be adapted by including a wealth variable that is state dependent. Specifically, the pre-regulation wealth of a landowner is expected to differ from post-regulation wealth. As an empirical matter, the influence of the wealth effect might be examined by including in the analysis factors that describe the land ownership characteristics of a respondent. MWM appear to have information on whether the respondent is a landowner or renter. From this information MWM

might be able to construct a dummy variable that examines the influence of land ownership on support for land use control. Better yet, future surveys might identify a host of land use characteristics, including the quantity, quality and location of land owned.

Reporting on a study of three Alabama counties, Buchanan presented a series of cross-tabulations that suggest a statistical relationship between the quantity of land owned by the respondent and various preferences regarding farmland preservation. He found that 35.2% of small landowners (less than 200 acres) supported exclusive agricultural zoning, in contrast to 21.9% of mid-sized landowners (200 to 800 acres) and 26.9% of large landowners (greater than 800 acres). This study suggests that at least one measure of wealth, the size of land ownership, may be an important indicator of support for agricultural zoning.

Implications for MWM's Purchase of Development Rights and Cluster Development Analysis

Alternative approaches, like purchase of development rights (PDR) or cluster development, have arisen in response to concerns about changes in land value (the wealth effect) associated with restrictive agricultural zoning. Because PDR programs limit the amount of land available for development, one would expect a similar impact on developable land values as would be observed with restrictive agricultural zoning. However, whether PDR programs would introduce a wealth effect for agricultural land owners is less obvious—the premise of such development rights purchase programs is that the landowner is compensated for the loss of wealth associated with use restrictions.

Cluster development alternatives, as described by MWM, are intended to afford agricultural landowners development opportunities while maintaining a substantial portion of the land in an undeveloped state. In this way, the development value of agricultural land is retained and can be extracted by the landowner. Because development can occur, there is less likely to be a significant wealth effect for owners of agricultural or non-agricultural land. In this case, land ownership characteristics may be less important in terms of public acceptance of such a program.

Omitted Variable Bias

The MWM empirical model seeks to explain variation in respondents' support for land use policy.

Table 1. Summary of Bias in B_1 when x_2 is Omitted in Estimating Equation

	Corr (x_1, x_2) > 0	Corr (x_1, x_2) < 0
$B_2 > 0$	Positive bias in B_1	Negative bias in B_1
$B_2 < 0$	Negative bias in B_1	Positive bias in B_1

Source: Woolridge, p 90

However, the expanded theoretical model suggests that the MWM empirical results might benefit from the inclusion of a variable that measures the wealth effect.

The extent to which the omission of explanatory variables, such as land ownership characteristics, influenced the MWM empirical results depends on the relative importance of omitted variables and the correlation of omitted variables with any explanatory variables included in the model. Woolridge developed a general guide for evaluating the direction of omitted variable bias. Presented in table 1, this guide can be used to discuss the potential role that omission of variables measuring land ownership characteristics may have had on the MWM results. For example, MWM were surprised to find that respondents with higher incomes (x_1) were less likely to support zoning policy ($B_1 < 0$). However, table 1 provides a possible explanation for the MWM results if, for example, quantity of land owned (x_2) is an omitted variable which, if included, would be statistically significant and negatively associated with support for zoning ($B_2 < 0$). Assuming a positive correlation between income and quantity of land owned (Corr (x_1, x_2) > 0), omitting the quantity of land owned variable would negatively bias the coefficient estimate for income.

Summary

Land use policies designed to influence land use patterns are likely to have an influence on a landowner's property value. Thus, land ownership characteristics (quantity of land owned, type of land owned, or location of land owned) are likely to be important determinants of individuals' support for different land use policies. This comment notes the absence of these variables in both the theoretical and empirical work of MWM and the potential impact of this absence on the MWM empirical results.

References

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