Land use taxation policy and agricultural land use
by Gary Thomas Pryputniewicz

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Applied Economics
Montana State University

Abstract:
Many people feel there are imperfections in the land market that result in a sub-optimal allocation of land to its various uses. Legislators seek to remedy this situation with assorted tax policies that may alter land use decisions. The Montana Legislature has passed an act known as the Montana Economic Land Development Act (MELDA) to influence land use in Montana. This paper evaluates MELDA from an economic viewpoint.

A spatial model of the land conversion process for agricultural land is developed. The imperfections and external costs that cause a socially sub-optimal allocation are identified, and the economically correct tax policy to mitigate the imperfections and internalize the external costs is presented. Comparing the policies of MELDA to the economically indicated policies, MELDA is found to be a deficient act likely to result in even greater inefficiency than the free market allocation. A policy alternative containing the proper elements to achieve the social welfare-maximizing allocation is then presented.

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Date May 21, 1976

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ABSTRACT

Many people feel there are imperfections in the land market that result in a sub-optimal allocation of land to its various uses. Legislators seek to remedy this situation with assorted tax policies that may alter land use decisions. The Montana Legislature has passed an act known as the Montana Economic Land Development Act (MELDA) to influence land use in Montana. This paper evaluates MELDA from an economic viewpoint.

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CHAPTER I

INTRODUCTION

In 1975 the legislature of Montana enacted a law known as "The Montana Economic Land Development Act." This act was introduced in the forty-fourth legislative session as House Bill 672 and will hereafter be referred to as "MELDA" or "the act." The portions of the act that affect agricultural land are listed in the appendix. The purpose of this paper is to develop a spatial model of the land market, evaluate MELDA from an economic viewpoint, and propose an alternative policy to achieve the desired goals. The analysis will concentrate on the transition of land from agricultural to residential use.

The first goal, stated in Section 84-7503.1 of the act, is the preservation of prime agricultural land. Presently there is an adequate supply of agricultural land to meet our food needs; however, as population increases in the future the need for more food producing land will arise. The food could be produced on a given amount of productive agricultural land or a larger amount of less productive land. Apparently the legislators feel it is in the social interest to delay or prohibit the transition of prime agricultural land to residential use so future food production can be maximized for any given quantity of land available.

The second goal, stated in Section 84-7503.2 of the act, is to curb urban sprawl. The cost of providing services to scattered developments in the urban fringe area is greater than the cost of providing the same services to a more dense development pattern on the urban periphery. The additional costs are typically borne by all taxpayers and not just the benefactors. The legislators feel that curbing sprawl will alleviate the social burden associated with scattered development.

The second sentence of Section 84-7503 states that the goals will be achieved ". . . by reducing the need for zoning and other land control measures and placing our future development under a free market system controlled not by land regulation, but by economics." The economist will recognize this as internalizing externalities so the market system can correctly allocate our land resource for the maximum social benefit.

If the land market was perfectly competitive and free of externalities, Pareto optimal land use would be dictated by the market and social welfare would be maximized. The first goal, prime agricultural land preservation, would be irrelevant because all land under perfect competition must be homogeneous. The second goal, curbing urban sprawl, would be attained because land on the urban periphery would be converted to residential use before more distant land in order to minimize service costs.

While legislators cannot legislate a perfectly competitive land market, they might, with a system of tax incentives and penalties, force a rational landowner to consider the external benefits and costs associated with his actions. A penalty imposed for converting distant agricultural land to residential use may force the landowner to consider the external cost, represented by the penalty, imposed on society as a result of the conversion. This is clearly a case where an externality may be internalized and economic efficiency improved.

The case for prime agricultural land preservation is not so clear and this goal may not be appropriate universally. If prime agricultural land lies in the path of the most efficient development pattern, the benefits from converting to residential use may be greater than the benefit from retaining the land in agricultural production. In this situation, the socially optimal allocation is to develop the prime land. Application of the conversion penalties of MELDA would hinder the proper allocation.

The charge that there is a social external cost associated with not retaining prime agricultural land for future production is questionable. Every potential agricultural land owner perceives the future need for food. The social cost of not having a parcel of land for future food production is the same as the private cost of not having that parcel of land available for food production in the future. It seems unlikely that there are any external costs to hinder the

efficient allocation of prime agricultural land.

The contradiction in the goals is evident. If prime agricultural land is to be preserved by developing the less productive land first, development will occur in the scattered areas of less productive land on the urban fringe. If sprawl is to be contained it may be necessary to develop prime agricultural land on the urban periphery.

PROVISIONS OF MELDA

The act requires the county government in each county to inventory the land in its jurisdiction and prepare a land use plan for the county. "Agricultural land" is one of the categories the county may designate in preparing the plan. After a series of public hearings, Department of Community Affairs approval, and Department of Revenue approval the plan may be implemented. This plan is the zoning provision of the act.

According to Section 84-7510, owners of land in agricultural zones must subclassify their land into designated categories. Various tax breaks, penalties, and restrictions are assigned to each subclassification. The inducements and penalties for converting agricultural land to residential use are contained in Sections 84-7512.2 and 84-7512.3. These subsidies and penalties are the zoning enforcement provisions of the act.

The goal of prime agricultural land preservation is to be achieved

by zoning areas for agricultural use and imposing penalties upon conversion to residential use. If a landowner in an agricultural zone elects to forfeit his conversion right for a specified time he may subclassify his land into the appropriate category and receive a tax reduction.

The goal of sprawl reduction is to be achieved by increasing the conversion penalty with increased distance from the city. The distances for penalty increases are defined by three rings around each city and a predetermined percentage increase in the tax penalty is associated with each ring.

CHAPTER II

THE MODEL

The presence of laws such as MELDA indicate that society does not feel the market correctly allocates our land resource to maximize social welfare. It was previously mentioned that in the absence of externalities a perfectly competitive market would achieve the desired goals of MELDA with respect to agricultural land conversion. In the words of McMillan [6: 411]

> The conversion of land from rural to urban uses is the product of many developers and landholders' decisions and, as such, it should offer the advantages of the atomistic market. Since the competitive structure is generally considered a prerequisite of an optimal market allocation, one might expect that the timing of development and the allocation of land among alternative uses would be appropriate. If the market functioned properly, land would be allocated among alternative uses in a welfare-maximizing way -- the optimal mix occurring when the marginal value of land in each alternative use is equal and local property values are maximized.

The externalities associated with land use may be internalized and the misallocation problem from that standpoint solved. The questions that arise are how does the land market differ from a perfectly competitive market and what are the implications regarding efficiency of land use under this divergence?

The land market obviously differs from the homogeneity requirement of perfect competition. All land is not the same in agricultural productive quality, nor does all land have the qualities valued for

residential use. Does the varied productive ability of agricultural land result in an inefficient allocation?

The productive value of a parcel of agricultural land is the present value of the stream of economic rent derived from the agricultural use of that land. The capitalized value of farmland is thus determined by its productivity in agricultural use [Quenemoen and Thompson, 9]. A parcel of land suitable for growing two commodities will be used for the production of the socially desired commodity as indicated by the relative prices of the commodities and the productivity of the land for each commodity. The socially desired allocation coincides with the private allocation. This implies that non-homogeneous land does not preclude an efficient allocation among the competing agricultural uses. Agricultural land will be employed in its highest and best agricultural use and the price of the land will vary with its relative productivity in that use.

The justification for MELDA is that the conversion of agricultural land to another use will not result in the selection of the highest and best use of land from a social standpoint. This view deserves further analysis.

Land on the urban fringe which sells at a price higher than its agricultural value is clearly demanded for some other use. The alternative use of concern here is residential use. Increased economic activity and growth in the urban area, along with the desires of urban

dwellers to be suburban dwellers, results in bidding the price of land in the urban fringe up. The price of land with favorable residential characteristics will be bid higher than the price of land with less favorable characteristics. Some of the characteristics affecting residential use are distance from the service center, view, slope, drainage, access to highways, and neighborhood attributes.

Dunn [3] in describing agricultural land use patterns defines ring formations of land use around the market center. As this type of development is evident in the land conversion process on the urban fringe it would be appropriate to develop a spatial model of land conversion to analyze the efficiency of the market and effects of tax policy.

Residential demand viewed spatially, with value per acre on the vertical axis and distance from the service center on the horizontal plane, would appear as a cone centered on the central service location. Consideration of the other demand determining characteristics would have the effect of distorting the cone by broadening the base in the direction of favorable development characteristics and narrowing it in the direction of unfavorable characteristics. A horizontal slice of the cone at any particular value will result in an iso-development ring. Assume the city center is the central service location at which all land has the same development value. Figure 1

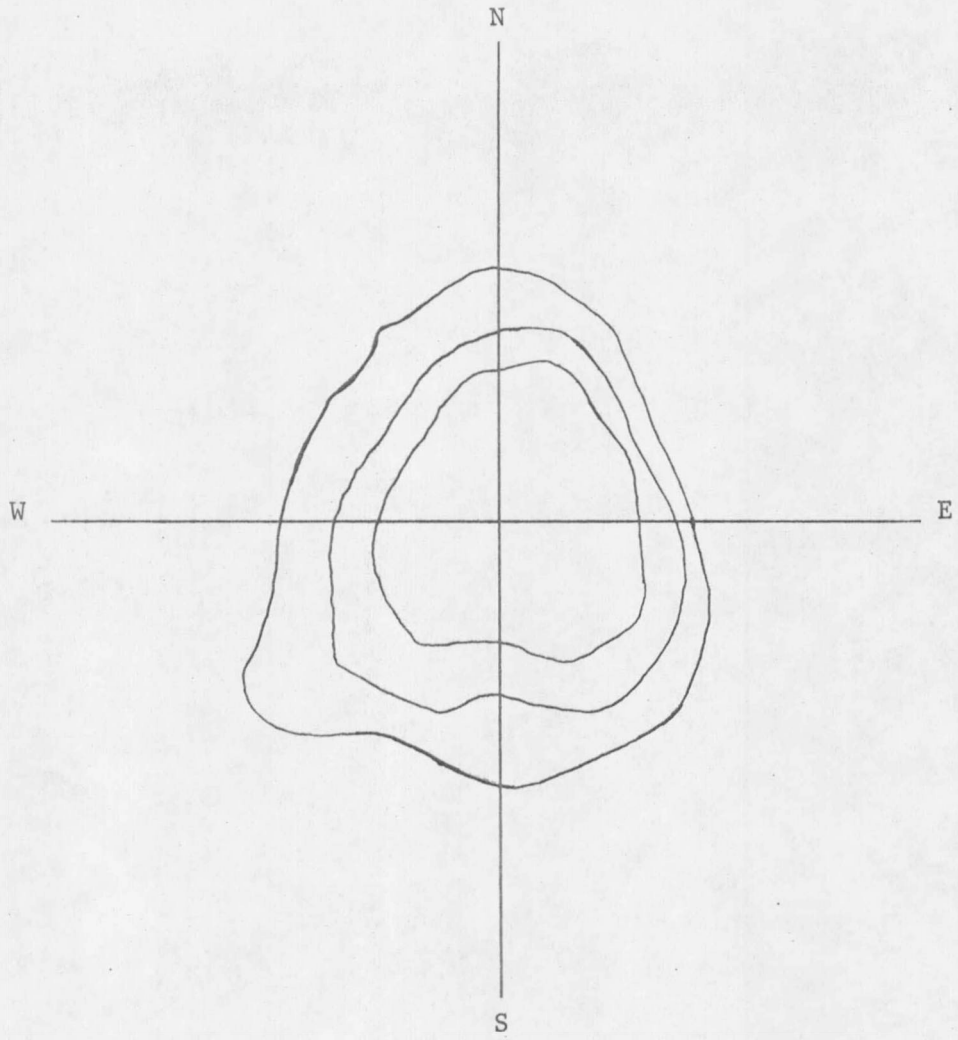

Figure 1

Iso-development rings

shows three hypothetical iso-development rings as they would appear by viewing the area from directly above. The farther from the city center the lower the value per acre on the rings.

To simplify the exposition, for the remainder of this paper the assumption is made that residential demand decreases with increasing distance from the service center to avoid the problem of divergence in an iso-development ring. It is possible for more distant land to have a higher residential value than land closer to the city center. This would result in a valley in the demand surface and two points at different distances from the city center with equal value.

A developer seeking to purchase land of a particular quality for residential use would be indifferent between which landowner along that ring he purchased from, so competition along the ring would be evident. Besides competing with other landowners on the iso-development ring, a landowner must compete with other landowners on other iso-development rings between which the developer is indifferent at the indicated prices. It is likely that there is enough competition so anyone who desired to buy or sell a parcel of land at any time could do so, and that the price would be close to the price indicated by the iso-development plateau on which the land was situated. This is the rationale behind the comparable sales method of land valuation. This does not imply that all land on an iso-development ring can be sold at the indicated price because each

sale is likely to alter the entire demand surface.

The demand for land for development can be depicted by vertically slicing the demand surface through the central service location. The resulting graph, Figure 2, shows land values as a function of distance for a slice along the east-west axis. The agricultural value of land is indicated. The development value of land is highest at the service center and value decreases as distance from the service center increases. Curve (1) represents the development demand for land lying east and west of the city at some given time.

Appreciating land prices are consistent with upward shifts in demand over time. The shifts need not be parallel and uniform throughout. In Figure 2, two hypothesized shifts are depicted for two time periods (years) for land lying due east of the city. Curve (2) shows the position of the development demand curve in year 2. Curve (3) depicts the position of the demand curve in year 3. The shifts being considered here are real shifts in demand and not price increases due to inflation.

The owner of land two miles from the service center (vertical line 2) finds his land appreciated (b-a)/(a-o) percent the first year and (c-b)/(b-o) percent the second year. The owner of land four miles from the city center (vertical line 4) experiences (e-d)/(d-o) percent appreciation the first year and (f-e)/(e-o) percent the second