APPROACHES TO RESEARCH ON TRANSFERABLE DEVELOPMENT RIGHTS PROPOSALS: AN OVERVIEW
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COMMENTS AND NOTES
Present land use control mechanisms are seen as inadequate for the preservation of open space, agricultural land, and other "uneconomic" uses of land. Many proposals have been cited as possible solutions to the problems created by present land use control mechanisms. The transfer of development rights (hereafter known as TDR's) is one such proposal. This mechanism for land use control can be of several forms. There are severe theoretical and practical problems, to be discussed, which a transfer of development rights program must overcome if it is to function in practical application.

TDR is a program which utilizes the basic concepts of zoning and seeks to prevent the economic incentives to alter zoning by giving "just compensation" to the landowner who cannot develop his land to its highest market potential due to zoning for low density or nondeveloped purposes. In exchange for low density zoning and the forfeiting of the right to fully develop his land, the restricted landowner is given "development rights." The development rights are then purchased by land developers who must be in possession of a certain number of development rights to be allowed to develop the land in a specified development area over a pre-determined level of density. In this manner, development can take place, though only in specified areas, and restricted landowners may receive compensation for not being able to develop their land. In theory, society benefits from the preservation of open space, agricultural land, and myriad other "uneconomic" land uses.

In theory, TDR is a good planning tool. Desirable land uses are obtained with little public cost. Owners of controlled property are compensated in the form of cash or development rights and property tax reductions. Developers who buy development rights can exceed conventional zoning regulations and pay no more than they normally would for the purchase of additional lands. In short, ideally, all parties involved in the TDR program are economically better off while open space, agricultural land, and other "unprofitable" uses of land are maintained.

TDR MODELS
Little is actually known of the practical implications of the program due to the newness of the application of a TDR program. The overall economic and legal implications remain to be seen. Research into these implications has been attempted by the use of several techniques, including partial and general equilibrium models and benefit-cost analysis. It is the purpose of this comment to provide a general discussion of these techniques as applied to TDR's as well as to summarize some of the problems and caveats that decision makers must reconcile in evaluating TDR's.

Partial Equilibrium Model
The Partial Equilibrium Model has been the basic model upon which most economic analysis of TDR programs has been based. It is understandable that the initial focus of many economic studies looks at the demand for TDR's since the communities could create the quantity (supply) depending on the type of TDR program chosen. With adequate demand for TDR's the return to landowners from the sale of TDR's will compensate the owners for losses created by the development restrictions on their land. Hence, demand for TDR's is the crucial element in whether a TDR program will be feasible. Needless to say, in the determination of price, supply is as important as demand. However, emphasis on the demand side assumes that the amount of municipal property is fixed. Thus, the private individual and community preferences represent a point on a supply curve telling us a portion of the information when, what amounts, and how much property will be sold.

Several demand studies, exemplified by Field and Conrad (1975), Barrows and Prenguber (1976, pp. 1-23) and Ishee (1974), have been undertaken. The development of a recursive linear programming model by Small et al. (1978) to analyze the demand for development right certificates for a demonstration project in South Brunswick, New Jersey, was recently completed. This model maximizes the total residual value to developers given certain constraints (the number of homes and types of homes per year and gross densities). This analysis of the market lays the ground work for drafting the proposed TDR ordinance. The LP model used looks at eight future market conditions and public policies toward housing with the tradeoffs explicitly stated. This type of analysis is extremely sensitive to future market prices but it has the advantage of laying out the tradeoffs implicit in institutional rules (for the demand for TDR's) affecting the housing market.

A study by Smith (1977) attempted to derive and empirically estimate the demand for TDR's for two transfer districts. Three interesting caveats of Smith's study were found which would need to be incorporated into a general equilibrium model for TDR's to get an "optimal" solution:

- The market or demand estimates were for two towns rather than a metropolitan region, which overlooks the fact that there may be high cross elasticities of demand between housing units in neighboring and therefore TDR municipalities. Also, the demand elasticity for a metropolitan area may be quite different than for a municipality.

- Production schedules (of housing units) can be derived from supply functions of TDR's and land in the transfer district. With these two modifications the Smith model can calculate an optimal solution.

- Additional changes in variables such as local service, zoning change pressure, neighborhood income, etc. would be necessary for a dynamic model solution since these would directly affect production schedules.

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General Equilibrium Model

The essential components of a General Equilibrium Model are the supply and demand functions. A demand function generally is based on the assumption that consumers seek to maximize their utility, given income and the price of commodities; or, in the case of TDR’s, land owners maximizing their utility subject to given income and the price of development rights, land, and construction costs (if in fact owners pursue development). The supply function is premised on the assumption that under competitive market structure, the cost of production of each commodity (for example, housing) must equal its market price.

An inspection of the literature indicated that nothing has yet been published concerning TDR’s based upon a General Equilibrium Model. This can be due to the newness of the TDR concept and the difficulty of including all possible variables in the analysis. The cross-elasticity of demand for development rights between communities (the differing elasticities of demand for development rights between communities), the effect of changes in the broader macroeconomic trends of the economy as a whole, variations in intraregional construction costs and land prices, the future demands for transportation and social services, and the varying effects of state and local fiscal decisions are but a few of the variables that could be included in a General Equilibrium Model analysis of a TDR program.

The scope of a TDR program extends over a specified geographic area. The area of a TDR program probably will not be at the regional level to begin with and certainly a local initiative would bring benefits closer to costs in terms of geography. However, it has been noted by Conrad and also Smith that TDR planners will have difficulties with programs until a more regional approach is taken (Merriam, p. 123). The demand for dense development via the demand for development rights externalities of demand for development rights between communities, the effect of changes in the broader macroeconomic trends of the economy as a whole, variations in intraregional construction costs and land prices, the future demands for transportation and social services, and the varying effects of state and local fiscal decisions are but a few of the variables that could be included in a General Equilibrium Model analysis of a TDR program.

The goals of a TDR program are the preservation of specific lands and a minimization of the “windfall-wipeout” dilemma. However, many problems exist for TDR programs which have major impacts upon the success and net impact of a TDR program once it is removed from the abstract and applied in practice.

Much discussion exists over the definition of “just compensation” which should be given to restricted landowners. Most literature defines this compensation as the market value of the land without the particular restriction minus the value subject to the restriction of a TDR program. The concept of “just compensation” has not been precisely quantified. No TDR program can guarantee “fair” or “just compensation” to any person directly or indirectly involved.

The definition of a “development unit,” which in effect defines land acreage and development right requirements, is crucial to the smooth functioning of a TDR program. The definition of a “development unit,” which determines the number of development rights which must be purchased for various types of development, is crucial in determining the initial cost incidence of the TDR program.

The method by which development rights are distributed will affect the economic impact on restricted landowners. If de-
Development rights are distributed at a flat rate; that is, an equal number are given per unit of land, then those landowners with higher potential property value, relative to other restricted property owners, will lose out. If, however, development rights are distributed in such a manner as to reflect the differing development potential among land parcels, then the economic results to some restricted landowners will be favored.

CONCLUSIONS
TDR's involve a choice of conflicting rights for communities. It attempts to grapple with the problem of guiding community growth. Alternative community decision making rules will affect land values (the distribution of economic rents) and land patterns (types of land-use and their externalities). The type of TDR market and consequently the distribution of costs and benefits for a community is needed to evaluate whether net economic benefits exist. From an empirical perspective, this has been lacking for TDR's. To date, researchers have not focused on the “distribution of land value appreciation as the key element of the local political economy (Libby, p. 9).” What modeling has been done has largely been in estimating the demand for TDR, mostly using simulation techniques.

Ultimately, it is the interaction of supply and demand (alternative rules for access to TDR) that must be investigated given various types of institutional arrangements for TDR’s. In time, we should be directing our focus to rule changes such as:
- the master plan and the distribution of TDR’s,
- the base zone level,
- the type of TDR programs (government/private or a mix).
Policy economists should assess reasons for changing zoning regulations by various TDR programs. Some of the potential reasons have been mentioned earlier, such as externalities of growth that are neglected by the private market system and a partial solution to the windfall-wipeout problems of zoning. But other factors may be at work, such as curbing growth and boosting land values, and policy analysts should investigate this. And finally, some assessment is needed of government’s ability to implement a TDR program. It is essential that resources and materials are available and that acceptance by local decision makers and administrators of the program exists.

REFERENCES

FOOTNOTES
1There are two basic types of TDR programs—relying on the market mechanism for development rights transfer and governmental intervention in the buying and selling of development rights.
2One of the major difficulties associated with a regional approach to TDR is the transfer of real property (and thus tax base) across political boundaries.