The assessment of land valuation in land consolidation schemes: The need for a new land valuation framework

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ABSTRACT

There are principally two ways for quantifying the land value of parcels in land consolidation schemes. The first approach involves assigning an agronomic value based on soil quality and land productivity represented by a score while the second method determines the market value signified in monetary terms. In Cyprus, the market value is employed, which is defined through an empirical process based on visual inspection of all parcels and hence it constitutes a type of mass land appraisal. This process presents weaknesses regarding time, costs, transparency, accuracy, reliability, consistency and fairness. In addition, the lack of adequate sales transactions in rural areas further complicates the whole process. Consequently, these deficiencies have adverse effects in the preparation of land consolidation plans and cause arguments between landowners and the authorities carrying out each scheme. Although experts are aware of this issue, there is a lack of research investigating land valuation factors and the quality of this traditional process. Therefore, this paper discusses, explores and assesses the land valuation undertaken by the Land Valuation Committee (LVC) in a case study area in Cyprus and proposes a new framework for carrying out this process. The assessment of the current process is undertaken by employing advanced spatial analysis techniques, including multiple regression analysis (MRA) and geographically weighted regression (GWR) within a GIS. Results show that eight out of fourteen land valuation factors related to parcel location characteristics, legal factors, physical attributes and economic conditions are the most significant. In addition, although the basic regression fits are quite good, some of the assumptions required for testing the hypothesis are not met, indicating unreliability and inconsistency in the relationships modelled. Furthermore, the presence of spatial autocorrelation reveals important regional variation in these factors suggesting significant inconsistencies in the valuation policy applied by the LVC. The latter two findings confirm experts' concerns and suggest the need for a new land valuation framework that is designed to overcome the problems of the current process. The application of this framework and the investigation of various critical relevant issues is the core of ongoing further research.

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1. Introduction

Land consolidation is considered as the most effective land management planning approach for solving land fragmentation, a problem that hinders rational agricultural development and rural sustainable development more generally (Demetriou et al., 2012). Land consolidation is applied in 26 out of 28 European Union (EU) countries and in several other places around the world, e.g. in China (Yana et al., 2015), India (Oldenburg, 1990), Thailand (Sakuma et al., 2001), Morocco (Semlali, 2001), Kenya (Greeu, 1987) and Australia

(GSA, 2013). It consists of two main components: the reallocation of land and the provision of rural infrastructure such as roads and irrigation networks. Land reallocation, which involves restructuring of the land tenure, is the most critical, complex and time-consuming part of the land consolidation process (Van Dijk, 2003; Thomas, 2006). Land reallocation either relies on land valuation when it constitutes an important factor that varies among land parcels or it is based on the area of holdings of each landowner when the project area concerned is homogenous in terms of land value and characteristics. In the former case, the fundamental principle behind the process ensures that each landowner shall be granted a property of an aggregate value that is the same (after deducting the landowners' land contribution for infrastructure) as the value of the property owned prior to consolidation after consolidation takes place. If the value of the holding is smaller after consolidation, equivalency can

be achieved by paying financial compensation. In other words, the land value is the crucial factor for the land reallocation process and hence for the success and acceptance of the final land consolidation plan (FAO, 2003).

Real estate valuation is the process of estimating the current market value of a home, business, office and land plot/parcel. There is a huge literature on the appraisal of real estate property (e.g. Longley et al., 1994; Schulz et al., 2013). Valuation is based on the economic theory of consumer behavior (Hamilton and Morgan, 2010) according to the supply and demand principle, involving buyers that are competing with each other to optimize their utility (the ability to satisfy a desire defined by human needs) in the context of finite market supply. Thus, theoretically, demand and supply equilibrium defines the price of a property together with the effective purchasing power of individuals (Weber, 2004) to participate in a market and several other objective and subjective factors (Kontrimas and Verikas, 2011). However, this market price is rarely identical to reality, i.e. the market value. Valuation is globally a very important (Johnstone, 2004) and risky process involving many aspects of socioeconomic life in both the developed and developing world, because it affects real estate properties valued each year at around 1000 billion euros (Weber, 2004).

Similarly, in the case of land consolidation, land valuation is a mass appraisal process that is aimed either at assigning the agronomic value reflected by the soil quality and land productivity (using a relative dimensionless score) to all parcels of the consolidated area and to all of their contents (i.e. trees, wells, buildings, et cetera) or alternatively defining the market value in economic terms. In Cyprus, the second approach is employed. Irrespective of the approach utilized, land valuation is usually carried out by the committee implementing the project (e.g. in the Netherlands,), by an ad hoc Land Valuation Committee (LVC) in which landowners participate (e.g. in Cyprus and Denmark), by agricultural experts (e.g. in Germany), or by a surveying engineer and two trustees (e.g. in Finland and Sweden). Experience shows that land valuation in consolidated areas faces some problems. In particular in Cyprus, it is not based on recognized standards, it is time consuming (it may take some months on a non-regular work basis) and it is costly since at least five members of the LVC plus one or two technicians are involved in site visits. In addition, outcomes may present inconsistencies since the process is undertaken manually and empirically without employing systematic analytical tools for accurately measuring and comparing the land parcel attributes that define the land value. As a result, the process is not standardized or transparent and it is sometimes unfair (Sipan et al., 2012) due to these weaknesses. Consequently, it can cause biased land reallocation and therefore create objections by landowners who usually compare the land value assigned to their land parcels with other similar or neighbourhood parcels. Although the weaknesses of manual valuation methods have been identified by some researchers (e.g. Jahanshiri et al., 2011), in the case of land consolidation, research papers about land valuation are rare (Yomralioglu et al., 2007) and there is a lack of a relevant assessment studies that focus on land valuation based on the spatial statistical analysis of a real full-scale project.

In light of the above, this research aims to discuss, explore and assess the current land valuation process by providing scientific evidence regarding reliability and consistency and to set out the general framework for developing a new process based on automated valuation models (AVMs). For this purpose, multiple regression analysis (MRA) and geographically weighted regression (GWR) are combined with a GIS and applied in a case study area in Cyprus. The basic research questions are as follows: What are the current problems with the conventional land valuation process followed in land consolidation schemes? Which land valuation factors are taken into account in land consolidation schemes? What is the importance of each of these factors in the valuation process? What

is the quality in terms of consistency of the land valuation carried out by the LVC? How can the weaknesses inherent in the process be overcome?

The structure of the rest of the paper is as follows: Section 2 deals with the conventional land valuation process carried out in land consolidation schemes with a focus on Cyprus; Section 3 provides an outline of methods employed in this research, i.e. MRA and GWR; and Section 4 presents the land consolidation case study area, the available data and the land valuation factors that are considered here. Thereafter, Section 5 investigates the quality of work carried out by the LVC by employing the aforementioned methods for developing relevant models including a sales transaction model. Section 6 suggests a new framework for land valuation with a core based on automated valuation models (AVMs). Conclusions and recommendations for further research are contained in the last section (Section 7).

2. The conventional land valuation process in land consolidation areas

Land valuation in land consolidation areas in Cyprus is carried out according to land consolidation legislation (RoC, 1998) by the Land Valuation Committee (LVC) that consists of five members: a valuator who is nominated by the Head of the Land and Surveys Department and who chairs the Committee; an agriculturalist who is nominated by the Head of the Land Consolidation Department; an officer who is nominated by the District Administrative Office of the district area concerned; and two landowners who are directly elected by the entitled landowners of the particular consolidation project. After the completion of such a valuation, the LVC prepares and publishes a list showing the value of each property together with a cadastral thematic map showing the affected area subdivided into valuation categories classifying each parcel. Any landowner in the land consolidation area interested in any property may, within 21 days of the publication of the list, make a reasoned objection to the LVC. The LVC shall examine the objection made and shall notify its decision to the objector and republish any part of this list and plan. Any person aggrieved by a decision of the LVC may, within 21 days of the notification of the decision to her/him, appeal against it to the Court.

In carrying out any valuation, the LVC follows the rules set out in the Compulsory Acquisition Law (RoC, 1999) without taking into consideration any new roads constructed or planned to be constructed as part of the land consolidation measures. The basic principle of that legislation is that the value of the property should be estimated by taking into account the market value which the property, if sold on the open market on the date of the publication of the relative notice of acquisition by a willing seller, might be expected to realize. The fact that the market value is taken into account for land reallocation instead of the agronomic value (as happens in Germany, Netherlands, Greece and India) (Bullard, 2007) may sound questionable, particularly given the fact that the goal of land consolidation involves the promotion of rational agricultural development in agricultural zones. However, it is justified in Cyprus since the extent of the land area is small and hence the availability of land is limited, and most importantly, limited housing development in agricultural zones under some conditions is permitted (e.g. only one house can be built on a land parcel with a size of more than 4,000 square meters, if that parcel has adequate access to a registered road). Consequently, the housing prospects of agricultural land should be taken into account. It is remarkable that in Germany, a land valuation method was developed that combines both approaches, i.e. agronomic and market value in order to overcome the deficiencies of using each method separately, especially