Analysis of factors influencing standard farmland values with regard to stronger interventions in the German farmland market

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ABSTRACT

Considerable increases of farmland prices have led to discussions as to whether stronger interventions in farmland markets are necessary or not. However, altered or new interventions in farmland markets should be based on previous analyses of factors causing price differences. To give more insight in the German farmland market, a general spatial model of standard farmland values for arable land in the federal state North Rhine-Westphalia is estimated using municipal level cross-section data. Results indicate high competition for arable land. Urban sprawl and livestock production are the main price drivers. In Germany, a set of legal regulations exists that reinforce these price-increasing impacts and, hence, have counterproductive effects on interventions aiming to reduce price increases. Therefore, it should be more effective and efficient to alter existing regulations that reinforce the price-increasing impacts instead of creating new regulations.

1. Introduction

In many member states of the European Union (EU) (Eurostat, 2012), as well as worldwide (USDA 2016; Borchers et al., 2014), farmland prices have significantly increased over the last decade. One might argue that farmland owners view asset value appreciation as positive, because it would improve their financial health. However, related negative consequences might outweigh this. For active farmers, higher farmland prices increase production costs (Feichtinger and Salhofer, 2016). Furthermore, high farmland prices form a barrier for market entry of new farmers and for potentially expanding farms (Hüttel et al., 2013a). Both effects decrease sectoral efficiency (Kilian et al., 2012). Additionally, the rise in farmland prices is also linked to an increasing activity of non-agricultural investors due to low interest rates and expected high inflation risks (Forstner et al., 2011). Overall, farmland prices are currently higher than the ability to pay based on the earning capacity for numerous farms in many regions (BLAG, 2015). Many stakeholders evaluate this development critically. Hence, discussions arise in many regions as to whether a stronger regulation of farmland markets is necessary or not.

In Germany, transactions of agricultural land are regulated by federal law (“Grundstücksverkehrsgesetz”; GrdstVG). Three main objectives are pursued: first, farmland should remain in the hands of farmers to ensure the survival of agricultural farms. Second, preserving and improving the agricultural structure is vital, and third, food security must be ensured. According to § 9 (1) GrdstVG, there are three circumstances in which a farmland transaction can be prohibited or restricted by conditions: i) if the transaction has a negative effect on the agricultural structure; ii) if it leads to an uneconomical division of agricultural land; iii) if there is considerable disparity between the arranged price and the value of agricultural land (in terms of overprices). According to consistent case-law considerable disparity occurs if the arranged price is more than 50% above the reference. The latter condition in particular is widely debated with regard to the significant increase of farmland prices and many stakeholders advocate for stricter regulations.

Since 2006, legislative powers have been passed to federal state government. Some federal states in Germany have addressed the mentioned challenges by drawing up draft laws containing stronger interventions in the farmland market. A current example is the draft law (“Nds. Agrarstruktursicherungsgesetz”; NASG) of the federal state Lower Saxony. According to § 1 NASG, one of its objectives is to reduce the increase of farmland prices. This should be achieved by reducing the previous threshold of 50% difference between the arranged price and the reference to 30%. Additionally, the reduced threshold will also apply to transactions where a farmer acts as the buyer. Consequently, the price threshold is an independent reason of refusal, which was previously linked to the case where farmland was sold to non-farmers.

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1 So far, the calculation of the reference value is only insufficiently defined. The regional standard farmland value, whose determination is explained in Section 2, is often used as a reference.

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Many other federal states also consider similar regulations and reduced thresholds, respectively.

Previous studies already identified several factors showing a positive correlation with agricultural land values, e.g. government payments to farmers (Lence and Mishra, 2003; Breustedt and Habermann, 2011; Kilian et al., 2012; Feichtinger and Salhofer, 2016), biogas production (Habermann and Breustedt, 2011; Hennig and Latacz-Lohmann, 2016), urban sprawl (Livanis et al., 2006; Cavailhès and Thomas, 2013; Delbecq et al., 2014), environmental amenities (Bastian et al., 2002; Uematsu et al., 2013; Wasson et al., 2013) and specific tax regulations (Dillard et al., 2013). This complex set of price-increasing factors makes it difficult to accomplish the objective of reducing the increase of farmland prices.

However, when working on altered or new interventions in farmland markets, the effectiveness in accomplishing the objectives depends on the design of the proposed measures. For example, Vyn (2012) gives a comprehensive literature review of a wide range of unintended outcomes of urban containment and growth management policies that were inconsistent with policy goals. In an own empirical analysis, the author found evidence that strict agricultural zoning, which was implemented to reduce urban sprawl, only shifted it beyond the outer boundary of the zoning area and there, causes sprawl to extend further.

Eagle et al. (2014) concluded that agricultural zoning by itself is insufficient and, thus, needs to be complemented with other policies to protect farmland. A lack of empirical evaluations of these policy designs might be one source of the unintended effects, but specific details of implementation are also critical in determining effectiveness and related impacts (Bengston et al., 2004).

Thus, the effectiveness of interventions also depends on their appropriate integration in the existing legal framework. This is particularly true for the farmland market as agricultural production is affected by several policies including the Common Agricultural Policy (CAP) of the EU, environmental policy, and tax law. With regard to farmland, three regulations particularly need to be considered for Germany. First, the Fertilizer Ordinance links livestock production to farmland as this regulation determines the needed amount of land for an environmentally friendly manure application. Second, the German tax distinguishes between agricultural and commercial activities depending on the ratio of livestock units to hectares of farmland. If activities are classified as non-commercial, several privileges can be used including specific agricultural tax regulations and tax exemptions as well as the entitlement of receiving subsidies from the CAP funds. Third, § 6b of the Income Tax Act provides the possibility of deferred taxation of financial gains from land sales which is particularly often used for high-priced farmland near metropolitan areas. The interaction of these multiple policy instruments needs to be complementary to ensure effectiveness of farmland market intervention and avoid unintended consequences (c.f. Bengston et al., 2004). Hence, the plan of stronger interventions in the German farmland market reveals the need for further research.

To our knowledge, studies deriving recommendations for political decision-makers in the context of the proposed stronger interventions are still lacking. To fill this research gap, we analyse the standard farmland values for arable land of the German federal state North Rhine-Westphalia. Our findings should be useful for all countries that are in the process of adjusting their legislation or may wish to do so at a later stage. For example, many member states of the EU have comparable national land laws and the protection of agricultural land ranks high on their political agenda in recent times (European Commission, 2017). These particularly include Eastern European states like Bulgaria, Hungary, and Poland, which have undergone comprehensive land reforms in recent years\(^2\) and experienced considerable increases of farmland prices (Ciaian et al., 2012). The need to regulate agricultural land markets could be particularly urgent in those countries (European Commission, 2017). Additionally, countries like Belgium and the Netherlands could also consider stronger interventions in the future, as their average level of farmland prices are even higher compared to Germany (Eurostat, 2012) while their regulations are currently focused on the rental market (Swinnen et al., 2016). Moreover, our findings should be also useful for all German federal states that are currently working on stronger farmland market interventions.

Hence, the purpose of the study is twofold: first, identifying the most important farmland price determinants using a unique and comprehensive empirical dataset. Second, examining the effectiveness of the proposed farmland market interventions by taking their interaction with the existing legal framework into account.

2. Data and methodology

2.1. Study area and data description

North Rhine-Westphalia (NRW) provides a favourable study area to empirically analyse various factors influencing farmland values as it is characterized by considerably heterogeneous manifestations of potential agricultural and non-agricultural explanatory variables (e.g. soil quality, livestock production and urban sprawl). Furthermore, NRW is very suitable to support political decisions with regard to the mentioned intervention objectives, as it is one of the federal states showing one of the highest absolute price increases during the last decade.

The dependent variable is the standard farmland value (SFV) for arable land in 2013. Due to missing data, grassland had to be excluded from the analysis. The SFV is an average value of nearly all farmland sales within the agricultural sector obtained from the data on purchasing prices of the real estate appraiser board in NRW. Only arm’s length transactions are considered. Unfortunately, the entire dataset on purchasing prices is not available to the public in general and for science institutions in particular. Thus, the SFV is usually the best available variable for research purposes in Germany. Fig. 1 illustrates the spatial distribution of the SFV for arable land at the municipal level. The mean SFV for arable land is 37,640 € per hectare, ranging from 9100 to 76,000 € per hectare. Visual inspection indicates a strong spatial effect for SFV within NRW. There is a cluster of the highest SFV for arable land in the northwest of NRW. To the south of this cluster, some high SFV for arable land occur in the western part of NRW. Despite these high values, there is a gradient from high values in the north and west to low values in the southern and eastern peripheral areas.

Farmland prices are influenced by many different, in part non-agricultural factors (Borchers et al., 2014; Nilsson and Johansson, 2013). The explanatory variables used in this study to account for such factors are defined in Table 1 and are divided into four categories.

**Land characteristics**

Land characteristics include factors that capture the productivity of land and, thus, indicate its ability to generate returns from agricultural production. Land characteristics are expected to be positively correlated with farmland values (Hüttel et al., 2013b; Huang et al., 2006).

Land use characteristics (e.g. share of arable land) at the municipal level are available from the statistical office in NRW (Federal Statistical Office NRW, 2017). The soil quality index is obtained from the Geological Service of NRW. The average slope of agricultural land (expressed as a percentage) was generated based on altitudes given by the digital terrain model of the German Federal Agency for Cartography and Geodesy (BKG) (GEOSBASIS-DE/BKG, 2015a). To obtain an average value for agricultural land, we first extracted agriculture land using a land use map of the German Federal Institute for Geosciences and Natural Resources (BGR, 2015).

**Farm characteristics**

Farm characteristics are used to describe the regional market in terms of agricultural structure and local competition (Feichtinger and...
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