

Inheritance tradition and farm land fragmentation: evidence from Austria

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Abstract – Farm inheritance traditions may have long-term impacts on farmland use and ownership fragmentation. However, empirical evidence on the existence and magnitude of such impacts is rare. We use matching methods and regression analysis to compare nine indicators of fragmentation between farms in regions with partible and impartible inheritance. We combine plot-level land use data, land ownership information and historical information on inheritance traditions. We find that 50 years after impartible inheritance became the default by law, farmland in areas with a historically partible inheritance tradition is significantly more fragmented than farmland in areas with an impartible inheritance tradition. However, land renting contributes to reducing these differences in land fragmentation.

INTRODUCTION

There is comprehensive empirical evidence that agricultural land fragmentation (LF) has a negative impact on farm performance. This is due to, among others, higher transport costs, lower field efficiency of machinery and harvest loss along field boundaries and corners (Latruffe & Piet, 2014).

LF can vary significantly between regions and there are numerous reasons for these variations. One commonly hypothesized cause of LF is partible inheritance, where farmland is split between several heirs (e.g., Thapa & Niroula 2008 for Nepal; Sklenicka et al. 2017 for Czechia). However, actual empirical evidence of the impact of different inheritance traditions of LF is scarce, in particular for European countries.

We address this lack of empirical evidence and investigate the impacts of inheritance traditions on LF in Austria. We focus on the North-Eastern Lowlands and Hills production area, where historically both partible and impartible inheritance prevailed in different municipalities. For the farms in this production area, we investigate whether the magnitudes of several indicators of farmland use fragmentation and farmland ownership fragmentation differ between different inheritance traditions.

INHERITANCE TRADITION IN AUSTRIA

In general, there are two common practices of how agricultural land is inherited. Impartible inheritance (*"Anerbenrecht"*) traditionally transfers the whole (or most of the) farm, including its land, to the oldest (primogeniture) or youngest (ultimogeniture) heir. In contrast, in partible inheritance (*"Realteilung"* or multiple succession), the farm and/or land is apportioned (equally) among heirs. In most parts of Austria, impartible inheritance traditionally was the norm (Khera, 1973); except some regions in Vorarlberg, Tyrol, Burgenland and Lower Austria,

where partible inheritance was applied. In 1959 (Vorarlberg: 1990), impartible inheritance was made mandatory by law to encourage larger farm sizes. However, with the exception of Tyrol, this legislation can be invalidated by a testator's last will or by an agreement of the coheirs (Bäck, 2012). Since most farms in Austria are handed over through a "farm transfer contract" and not via statutory inheritance (Bäck, 2012), the traditions of partible inheritance may still be echoed in actual behaviour (Khera, 1973). Moreover, given that a farm is usually only inherited about three times in a century, effects of partible inheritance may be relatively long-term and therefore still visible today.

DATA

We combine three different data sets for our analysis. First, we use plot-level data from the Austrian section of the EU's Integrated Administration and Control System (IACS) to calculate the following fragmentation descriptors for each farm: farm size, average plot size, average plot-farm distance, and normalized average nearest neighbor distance between plots. We calculate these fragmentation measures for the total utilized agricultural area (UAA) of a farm, and separately only for the land owned (and not rented) by the farm. We also use this data set to derive exogenous control variables for each farm, including average altitude, slope, and soil productivity. Second, we use land ownership information from the Austrian cadastre to calculate the number of landowners for each farm. Third, we take historical data on inheritance traditions from the Austrian Ethnological Atlas (Österreichischer Volkskundeatlas) to map the occurrence of different inheritance traditions to municipalities (Kretschmer and Pieglar, 1965) and to assign each farm to an inheritance tradition, based on its location.

METHODOLOGY

We use multiple regression analyses to estimate the impact of partible inheritance on each of the nine fragmentation descriptors. We specify each model as

$$\log LF_i = \alpha + \beta D_i + \gamma X_i + \varepsilon_i$$

where LF_i is one of the different measures of LF calculated for farm i , D_i is a dummy variable equal to 1 if the farm is located in a municipality with historically partible inheritance and 0 otherwise, X_i is a vector of control variables, ε_i is an error term and α, β and γ are coefficients to be estimated.

As inheritance traditions are not distributed randomly and LF may be influenced by factors not observable but correlated to the explanatory variables, estimated coefficients may be biased. To

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avoid this, we pre-process the dataset using coarsened exact matching (CEM). The main task of CEM is to eliminate all imbalances in control variables between treated (partible inheritance) and control (impartible inheritance) groups above an ex-ante chosen level (Iacus et al., 2012). We use average altitude, average slope, average soil productivity, and farming type as control variables. In a first step, control variables are coarsened. For example, instead of assigning a particular altitude to each farm, we group farms into four categories (<200, >200 but <300, >300 but <400, and >400 meters). Second, these coarsened variables are used to match farms that are equal in regard to the control variables, but different in regard to the inheritance tradition. We drop farms that have no counterpart. Last, each farm gets a weighting, based on the number observations in their assigned category. This procedure decreases the imbalances and helps to identify the causal effect of our treatment variable, the partible inheritance (Iacus et al., 2012).

RESULTS AND DISCUSSION

Table 1 presents regression results and shows that when considering total UAA, farms in municipalities with traditionally partible inheritance have a significantly smaller average plot size, a larger average plot-farm distance, and a higher number of landowners. Average farm size is larger, but not statistically significant. The normalized average nearest neighbor distance between plots is smaller (contrary to expectations) but statistically not significant. Considering only owned UAA, the impact of partible inheritance is generally stronger than for total UAA, with all coefficients having the expected sign: farm size and average plot sizes are smaller than for farms with impartible inheritance, and average plot-farm distances and the normalized average nearest neighbor distances are larger.

Table 1. Coefficients and significance levels of the inheritance tradition variable for all models. Each coefficient describes the difference in the logged fragmentation descriptor of farms with partible inheritance tradition compared to farms with impartible inheritance tradition.

Fragmentation descriptor	Total UAA	Owned UAA
log (farm size)	0,016	-0,181***
log (average plot size)	-0,140***	-0,160***
log (average plot-farm distance)	0,090***	0,152***
log (normalized average nearest neighbor distance)	-0,058	0,135**
log (number of landowners)	0,355***	-

***, **, or * denote statistical significance at 0.1%, 1% and 5% level, respectively.

CONCLUSIONS

After 50 years of impartible inheritance being the legal "default", farms in areas with a historically partible inheritance tradition are still significantly more fragmented than farms in areas with an impartible inheritance tradition. Thus, traditional inheritance customs are either still applied, at least to some extent, and/or it takes a lot of time to reverse the effects of past partible inheritance on LF. Hence, farms in partible inheritance areas still suffer some structural disadvantages. Smaller plots and longer distances increase production costs. However, renting land considerably helps to circumvent the differences in LF, stressing the importance of efficient land rental markets.

ACKNOWLEDGEMENTS

HL and KS are funded by the Research Group FORLAND (Deutsche Forschungsgemeinschaft DFG, German Research Foundation) - 317374551 and the Austrian Science Fund FWF (I 4987). We are grateful to the Austrian Ministry of Agriculture, Regions and Tourism for providing IACS data (DaFne project 101593/1); the BEV for providing cadastre data, and the Salzburger Landesinstitut für Volkskunde for providing the data of the Österreichischer Volkskundeatlas.

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