Spatial Integration of Agricultural Land Markets

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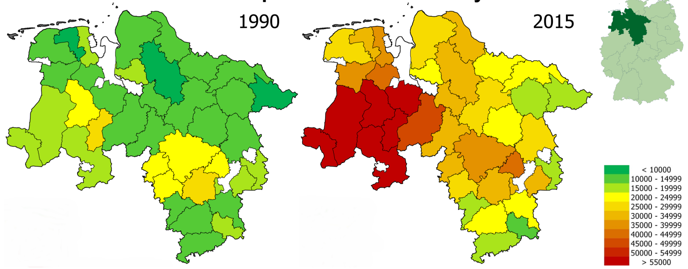
Background and objectives

- Agricultural land prices have experienced a steady increase worldwide in the last decade due to spikes in food prices and high liquidity on international financial markets.
- This led to an ongoing debate on the sufficiency of the existing market regulations.

Land prices in Lower Saxony



- From an economic viewpoint, market regulations are required if a potential market failure leads to economically or socially inferior market outcomes.
- One approach to empirically detect market failure is studying market efficiency using the concept of spatial market integration. If markets are integrated, the **law of one price (LOP)** holds, i.e., price differences of homogenous products in spatially separated markets should not exceed transportation costs and other transaction costs.
- The applications of the concept of spatial market integration to agricultural land markets are rare due to several peculiarities of the product “land”: Heterogeneity and immobility.
- Our study is one of the first attempts to examine spatial market integration of agricultural land markets empirically. Moreover, we test the applicability of statistical tools that were developed for commodity markets in the context of land markets.

Methodology

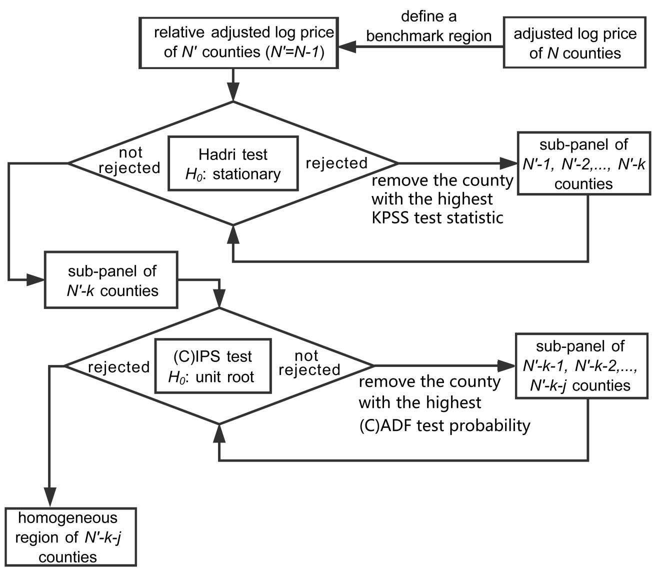
- The law of one price states that land prices in two regions should differ only by transaction costs τ_t and quality differences ξ_t in the long-run:

$$q_{ijt} = p_{it} - p_{jt} = \tau_t + \xi_t \qquad (1)$$

- If quality adjusted price differences exceed transaction costs, arbitrage processes will be triggered and pull back relative land prices to their long-run equilibrium relationship.
- This implies that the difference of (log) prices is stationary under the LOP given that transaction costs are stationary. Thus, the long-run equilibrium (1) can be tested by the following cross-sectionally augmented IPS (**CIPS**) panel unit root test:

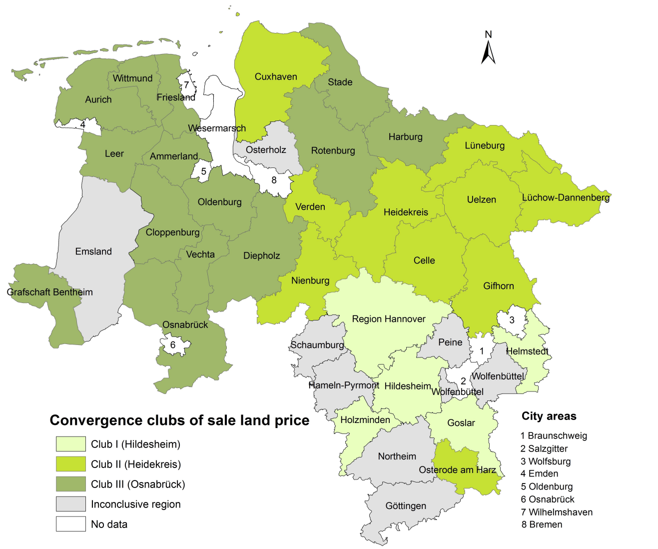
$$\Delta q_{ijt} = \alpha_i + \beta_i q_{ij,t-1} + \gamma_i \bar{q}_{t-1} + \sum_{l=0}^{p} c_{il} \Delta \bar{q}_{t-l} + \sum_{k=1}^{p} d_{ik} \Delta q_{ij,t-\mathrm{k}} + \varepsilon_{ijt}$$

- To increase the reliability of our testing procedure, we combine the CIPS test with a panel stationarity test, the **Hadri Lagrange Multiplier** (LM) test.
- Regions that share similar price dynamics and show diminishing price differences in the long-run are called **convergence clubs**. This concept has been introduced because one can rarely expect that the LOP holds for an entire country.
- To this end, we follow the Sequential Panel Selection Method (SPSM), which carries out a sequence of panel unit root tests on panels of decreasing size to detect convergence clubs.



Data

- The empirical analysis is based on sale prices of arable land on a county level in Lower Saxony, which is the second largest state in Germany and one of the leading states in terms of agricultural production. Those data are available for 25 years (1990 –2014) and 37 counties of Lower Saxony, provided by the Statistical Office of Lower Saxony. This results in a balanced panel data set of 925 annual observations.
- To increase the homogeneity, we run a hedonic price regression first and correct for differences in soil quality.
- Moreover, the price development is analyzed for stationarity relative to a benchmark. To decrease the sensitivity, we apply three different benchmarks, which reflect three different developments in Lower Saxony: Moderate (Hildesheim), intermediate (Heidekreis), and strong growth (Osnabrück).



Results

- The test procedures clearly reject the prevalence of the LOP for Lower Saxony as a whole, even after adjusting for soil quality differences.
- Nevertheless, we are able to identify regions that exhibit similar price dynamics in a sense that the relative prices of included counties are stationary and converge toward a constant. These convergence clubs are to some extent composed of neighboring counties with similar natural and socioeconomic conditions.
- Membership in a convergence club implies that land prices comove and do not drift apart; it does not mean that differences in absolute price levels vanish over time.

Discussion

- The finding that the LOP does not hold for agricultural land markets even on a state level should not instantaneously be interpreted as an indicator of land market inefficiency that calls for policy intervention and market regulation.
- Slow convergence of prices may simply reflect the immobility and heterogeneity of this production factor. Even temporal price divergence can be rationalized in a competitive market environment.
- The **new economic geography** asserts that clustering forces, such as economies of scale and knowledge spillovers, can foster the concentration of economic activities in space, which, in turn, can cause disparities of factor prices in different regions.

Reference

Yang, X., Ritter, M., Odening, M. (2017): Testing for Regional Convergence of Agricultural Land Prices. Land Use Policy 64: 64–75.

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