Impacts of agricultural policy on the regional adjustment in agriculture: A Hungarian-Slovenian comparison

The results of the research have been presented at several international and national conferences. Several publications are still under review. In the following, the main results are presented by research topic.

Farm growth

We have investigated different aspects of farm growth

Bojnec and Fertő (2021b) describes an investigation of the relationship between farm size and the growth of farms. Theories about the association between farm size and the growth of farms give mixed results by country and over time. The former relationship is tested by assessing the validity of Gibrat's Law for Hungarian and Slovenian farms in the period 2007–2015. The use of a sample of farms from Farm Accountancy Data Network datasets makes it necessary to avoid biases due to heterogeneous structures across farming systems.

Thus, we use quantile regressions to control for farm-size-related heterogeneity in the samples. In addition, we employ regional sector fixed effects to capture possible heterogeneity within agriculture. Results suggest rejection of the validity of Gibrat's Law for farms in Hungary and to a lesser extent for Slovenian farms when the growth of farms is measured by growth of output per farm (where smaller farms grew faster than the largest farms), but not in the case of an increase in farm inputs (i.e. land and labour per farm). We provide evidence for Hungarian farms that smaller, mostly individual farms grew faster than larger, mostly corporate farms throughout the period of analysis.

In a companion paper Bojnec and Fertő (2020) study the validity of Gibrat's law for the growth of Slovenian farms using four different groups of panel unit root tests. It revealed evidence of cross-sectional dependence in farm sizes. Both input (land and labour) and output (economic) sizes of variables as proxy for the measures of farm size are applied. The results suggest that Gibrat's law is valid for Slovenian farms independently from the measures of farm size and types of panel unit root tests. Slovenian smaller farms are not growing faster than larger ones and thus all farm sizes tend to contribute to an increase in average farm size in generally relatively small- to medium-size farm structures.

In two sequential papers we focus on the impacts of human capital on farm growths

Bojnec and Fertő (2021a) investigates the drivers of farm size and farm size growth in Slovenia during the period 2007-2017 using a farm-level Farm Accountancy Data Network dataset within a quantile regression framework. Farm size growth is measured by growth in utilized agricultural area per farm. The findings suggest that growth in farm land size is driven by initial farm land size and policy subsidy support. Contrary to expectations, human capital does not play an important role in either farm land size or farm land size growth according to quantile regressions. These findings from inter-quantile comparative analysis are important for farm-related structural and rural development policy.

Like in developed countries, during the last two decades the number of Hungarian family farms has declined with the increase in their average farm size. Bojnec and Fertő (2022b) investigates the importance of leadership skills in Hungarian family farms using Farm Accountancy Data Network dataset between 2007 and 2015. The application of quantile regression models and their findings suggest that leadership skills have a little effect on the growth of Hungarian family farms. In contrary to the skills, general characteristics of family farms, such as farm size, farm types, and state subsidies, determine the growth of Hungarian family farms. Consistently with the previous studies, smaller family farms grew faster than bigger family farms. The non-linear relationship between farm size growth and farm types as well as state subsidies is confirmed by different quantiles of farm size. The findings suggest the ongoing process of family farm restructuring depending on their size and pertained family farm characteristics and government policies. Farms market selection process and farms restructuring with the decline in the number of farms and their growth are likely to continue that can be caused by climate change, robotization and digitalization of farms, but depending on restructuring and resilience of different farm types.

Finally, we analyse the relationships between financial constraint and farm growth. Bojnec and Fertő (2022c) investigate the impact of liquidity constraints on farm size growth in Hungary and Slovenia. We use data from the Farm Accountancy Data Network for Hungary and Slovenia during the period 2007-2015. We apply a dynamic panel model to assess the relationship between financial constraints and farm growth. Results show that, except for land in Slovenia and output in Hungary, liquidity constraints are less important for farm size growth than endogenous factors based on farm size growth expectations, and steady farm size restructuring. They also suggest that smaller farms are growing faster than larger ones, and the hypothesis that a higher level of subsidies would increase farm size is not supported for Hungary. Farm debts in Hungary are linked with land growth and in Slovenia with output growth. The

implication that farm size growth is dependent on initial size and that smaller farms are growing faster than bigger ones indicates that it is not necessary to favor the fastest growing smaller farms thus supports the application of a non-discriminatory farm size policy. The dynamic panel econometric model that incorporates cash flow as a measure of financial constraints provides insight into farm size growth in Hungary and Slovenia in relation to potential farm liquidity constraints, farm debt, and the nonlinearity of farm size, which information is of relevance to policy makers and practitioners.

Regional differentiation and farm exit

We had an opportunity to study the farm exit issu extending our sample with cooperation of Japanese college from Hitotsubashi university. Fertő et al. (2022) analyzed farm survival on a large sample of 16,990 farms covering 17 CEE countries during the period 2007 to 2017 by estimating an Accelerated Failure Time model. An extensive set of firm-specific characteristics were included in the models as control variables, accounting for country-specific differences in agricultural factor endowments. Robustness checks were undertaken. Overall, our results are robust with respect to assumptions about survival distributions. The market exit rate in all 17 CEE countries reached more than 35%. However, remarkable differences in the exit rates were observed between different country groups. Farm survival was the lowest in Russia and Ukraine, and highest in first-wave new EU countries.

We employed a standard set of firm-level characteristics, including legal forms, ownership structure, firm size, and age of farms. Our results suggest that joint-stock company and large shareholding company status increased the probability of farm survival. Positive standard corporate finance indicators (ROA, gross margin, and solvency ratio) play an important role in helping farms survive. Our estimations reveal the non-linear impact of farm size and age of farms on farm exit. We show that agricultural factor endowments and agricultural trade openness have statistically significant and economically meaningful impacts on the survival probability of the sample farms.

Migration of farm labour

Bojnec and Fertő (2022a) investigates the impact of Common Agricultural Policy (CAP) subsidies on farm employment in Hungary and Slovenia. Econometric models were estimated

separately for total farm labor, family labor, and hired labor. We find that total subsidies and, within these, Pillar I subsidies, have positive effect on farm employment of paid labor in Hungary and family labor in Slovenia. Irrespective of the country and type of employment, farm employment is significantly positively associated with farm size. Mixed results are found for Pillar II and investment subsidies. Rural development measures with agri-environmental and less favored area subsidies, and investment subsidies are particularly important for the family farm labor in Slovenia, but not for the paid labor, neither the family farm labor in Hungary. The impact of control regional labor market variables is mixed between the employment of family farm and paid labor within and between the analyzed countries. A strong link between main type of farm employment, different types of CAP subsidies and farm size suggests on the importance of CAP subsidies for maintaining of farm employment and job creation for young and unemployed, and land use policy. This might explain farmers political demand for status quo with only minor CAP subsidy changes, with raising society awareness on monitoring of effective and efficient use of subsidies.

Income inequality in agriculture

Bojnec and Fertő (2019a) investigate the structure and evolution of farm household income and examine the contribution of different sources of farm household income, particularly the impact of Common Agricultural Policy reform on farm household income inequality in Slovenia. A panel data set was compiled using Slovenian Farm Accountancy Data Network data at farm level for the period 2007-2013. Total farm household income was disaggregated into two different components: 1) income components, which can contain market income and off-farm income, and 2) subsidy components, which can contain subsidies from Pillars 1 and 2. Pillar 2 support included subsidies related to agri-environmental measures, less favoured areas and other rural development measures. The income distribution and decomposition were examined using the Gini decomposition method to determine the contribution of each income source and the policy shift from market to government support on farm household income and overall inequality. A shift in Common Agricultural Policy and related measures determined the structure and evolution of farm household incomes. Off-farm income had a lesser and rather stable impact on farm household income inequality, while the major change involved an increase in the importance of subsidies from Pillar 2 which is consistent with a policy of targeting farms in less favoured areas. Subsidies from Pillar 1 reduced, while market income

increased farm household income inequality. Subsidies in farm incomes increased. They could reduce farm household income inequality

Fertő et al. (2022) investigates the impact of different sources of income on farm household income inequality in Hungary using Farm Accountancy Data Network dataset for the period 2007-2015. The decomposition of the Gini coefficients by income sources is applied to focus on the impact of the policy shift from market to government support on farm household income inequality. Off-farm income are rather stable with a slight increase impact on farm household income inequality. Pillar 1 for direct income support subsidies have remained more important than Pillar 2 for rural development subsidies for farm income due to the importance of direct payments or single area payments for crop production. A slight increase in the importance of subsidies from Pillar 2 can be linked to a policy shift towards targeting farms in less favoured areas, and a greater role of agri-environmental and other rural development payments. The most striking finding is regarding instabilities, declining pattern, and for a large majority of farms negative market income. Subsidies from Pillar 1 reduced, while market income increased farm household income inequality

Agglomeration

Csonka and Fertő (2020) analyzes agglomeration effects and spatial externalities in the Hungarian hog sector between 2000 and 2010. We apply a spatial lag – spatial error regression model to capture horizontal and vertical spillover effects and to understand the environmental restrictions that determine the location of pork production at the municipality level. Due to the dual nature of the structure of the Hungarian pork industry, we investigate agglomeration effects for individual and corporate farms separately. Results indicate that pork production by these farm groups is affected by different factors in different ways. We distinguish two different ‘worlds’ within the Hungarian pork industry. The ‘introvert world’ of individual farms is very sensitive to agglomeration effects and spatial externalities. The ‘extrovert world’ of corporate farms is more resistant to agglomeration economies and spatial externalities.

Csonka et al (2021) presents a comparative analysis of spatial transformation in the Hungarian and Slo-venian pig sector at the level of local administrative units (LAU). Concentration and inequality measures were applied in the empirical analyses along with Markov transition probability ma-trices to examine stability and/or mobility over time and the presence of

clustering effects. Both countries have experienced rapid decline in the pig population. This profound structural change has led to a smaller number of more concentrated pig farms and increased territorial concentra-tion. The degree of farm and territorial concentration and inequality in Hungary has been much higher than in Slovenia, and the concentration gap between the countries has increased. Between 2000 and 2010, the degree of concentration has been much higher in Hungary than in Slovenia: average herd size per holding increased by 68 percent in Hungary, and only 7 percent in Slovenia. In Hungary, clustering effects were particularly significant, with the pig sector moving towards large-scale concentration. The former effect is also confirmed in the Slovenian pig sector, but significantly weakened during the period under investigation. The exploitation and policy management of spatial externalities justifies these agricultural economic and agri-environmental practic-es.

Csonka et al (2022) describes a comparative analysis of the spatial transformation of two different farm-size cattle systems in Hungary and Slovenia. Concentration, mobility, and spatial autocorrelation measures are applied to study spatial cattle-stock distribution and their changes over time, as well as spatial cattle-stock clustering using data from two agricultural censuses. Results confirm the decline in cattle stock on large-size farms in Hungary and on small-size farms in Slovenia, with a relative increase in the importance of medium-size farms. The decline and spatial changes in cattle stock are greater in Hungary than in Slovenia. Hungarian cattle clusters are concentrated in flat areas with medium- and large-size largely commercial farms, whilst in Slovenia they predominate in mainly hilly grassland and partly corn-silage areas on small and some medium-size family farms. Such specific cattle clustering is linked to geographical and farm-size structural characteristics that can also be linked to agricultural-policy-measure-related support for cattle and dairy associated with less-favored-area (handicap) status with geographical and structural land and farm characteristics typical of Slovenian mountain and particularly hilly areas. These spatial changes in the cattle sector have socioeconomic, land use, and environmental implications.

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