

Herzfeld, Thomas; Akhmediyeva, Zarema

Article — Published Version

## Agricultural labour in transition: An update

Journal of New Economy

**Provided in Cooperation with:**

Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Halle (Saale)

*Suggested Citation:* Herzfeld, Thomas; Akhmediyeva, Zarema (2021) : Agricultural labour in transition: An update, Journal of New Economy, ISSN 2687-0002, Ural State University of Economics, Yekaterinburg, Vol. 22, Iss. 3, pp. 144-160, <https://doi.org/10.29141/2658-5081-2021-22-3-8> , <http://jne.usue.ru/en/issues-2021/1054>

This Version is available at:

<https://hdl.handle.net/10419/243350>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-nc/4.0/>

**Thomas Herzfeld**Leibniz Institute of Agricultural Development in Transition Economies,  
Martin-Luther-Universität Halle-Wittenberg, Halle (Saale), Germany**Zarema Akhmediyeva**Leibniz Institute of Agricultural Development in Transition Economies,  
Halle (Saale), Germany

## Agricultural labour in transition: An update

**Abstract.** The economic transformation process in Europe and Asia differed remarkably across countries, last but not least, with respect to agricultural labour use. While the structural change in some countries followed theoretical expectations and was characterised by a drastic reduction in agricultural employment, other countries experienced an increase in agricultural labour force. Against this background, the paper aims at analysing the determinants of the change of agricultural employment across a panel of formerly centrally planned economies with a particular focus on institutional factors. The analysis builds upon the theories of structural change and new institutional economics and relies on a set of econometric methods. To explain annual intersectoral labour flows, random-effects panel data models are used. Sectoral labour adjustment is measured by the difference between growth rates of agricultural and non-agricultural employment between 1990 and 2019 for a panel of 31 transition countries. The authors direct particular attention to the role of land ownership and transfer rights, which is operationalised by an updated and extended indicator of land relations. Similar to previous studies the classical determinants, such as the ratio of average income per worker in the non-agricultural sector over agriculture, the relative size of the agricultural sector or the development of relative prices, are positively correlated with a shift of labour out of agriculture. The findings suggest furthermore that occupational migration increased with a liberalisation of land transfer rights, in particular during the first two decades of transition. Land rental or sales agreements allow land owners to earn an income from their asset while working outside of the agricultural sector. Contrary to expectations based on economic theory, improved ownership rights seem to reduce labour outflow from agriculture. The results underline that institutional factors play a role in structural change. Deeper analyses of the incentives related to improved tenure rights for occupational change require individual level data.

**Keywords:** agricultural employment; labour allocation; intersectoral differential; occupational migration; land ownership right; land transfer right; transition economy.

**For citation:** Herzfeld T., Akhmediyeva Z. (2021). Agricultural labour in transition: An update. *Journal of New Economy*, vol. 22, no. 3, pp. 144–160. DOI: 10.29141/2658-5081-2021-22-3-8

*Received June, 13 2021.*

## Introduction

Experiences of the formerly centrally planned economies in terms of sectoral labour migration vary substantially. Generally, three different paths can be observed during the 1990s. While in some countries like the Baltics, Czech Republic or Slovakia employment in agriculture dropped very quickly after the first decollectivisation and privatization steps, agricultural employment even improved substantially in countries like Armenia, Georgia or Tajikistan. In countries like China, Poland or Vietnam, the structural change proceeded continuously but at a slower pace. However, recent figures suggest that pattern changed and almost all countries experience a shift of labour out of agriculture as expected from economic theory.

While some scholars extensively studied structural change with a focus on agricultural labour during the first decade of transition [e.g. Dries, Swinnen, 2002; Swinnen, Dries, Macours, 2005; Herzfeld et al., 2015], insights into post-reform period are lacking. Several countries, not only in Central Asia, have embarked on a new round of economic reforms including land codes recently. Additionally, economic business cycles and increasing trade integration either within the region, towards the European Union or into global markets continuously change the relative attractiveness of agricultural occupations. Against this background, this paper aims at providing an updated view on the structural change in agriculture from a labour economic perspective. More specifically, the paper's contribution to the literature is twofold. First, a recently introduced labour force dataset is compared with earlier data. Second, the empirical analysis clarifies the role land reforms play for the rate of migration out or into agriculture covering 31 formerly centrally planned economies of Europe and Asia.

The paper is organised as follows. Section 2 presents a brief overview of the existing data on agricultural employment. Section 3 provides a conceptual framework of sectoral labour adjustment and the role of land markets. Section 4 introduces the indicator of labour adjustment as well as the further data and econometric method applied. The results of the econometric analysis are presented in Section 5.

### Challenges in measuring agricultural employment

Employment in agriculture is a very heterogeneous construct. Commonly, it represents an aggregation of self-employed individual farmers, unpaid family labour within a farm as well as farm wage workers. In particular, recipients of rather small household plots in various transition countries are not able to rely exclusively on agricultural activities and have to engage in additional income earning activities [Rapsomanikis, 2015; Sabyrbekov, 2019].

Employment in agriculture belongs to the standard labour market statistics. Time series data are published by the International Labour Organisation (ILO), World Bank or United Nations Economic Commission for Europe often relying on information reported by national statistical agencies. Here, employment in agriculture refers to people who have their principle activity within agriculture, hunting, forestry and fishing. Based on these sources Herzfeld et al. [2015] compiled a dataset for 30 economies of Europe and

Asia. However, differences between sources, gaps or delayed reporting or differences in definitions imposed continuous challenges. Although most transition countries linked their national classifications to international standards during the early 1990s, the handling of self-employment or subsistence production in agriculture is not always clearly defined. Furthermore, employment figures during the early transitions phase might be affected by hidden unemployment, which was widespread before the reorganisation of kolkhozes and sovkhoses [Csaki, Lerman, 2002].

Nowadays, ILO publishes a series of modelled estimates of employment relying on national data and estimated values for years where a country did not report. These data allow covering 31 countries since 1990 including years where some of these countries did not exist as independent states.

Comparing the modelled ILO series to the data set used by Herzfeld et al. [2015] reveals an interesting pattern (Figure 1). Although most observations cluster along the diagonal line, striking differences appear for selected years. Bosnia and Hercegovina might be clearly a case where earlier data excluded self-employed farming population and, thus, underreported agriculture's importance in employment. A similar case is observed for Croatia before the statistical revision in 1995. Further deviations below the diagonal line can be observed for Armenia and Georgia during the early 1990s, Kazakhstan between 1991 and 1999 as well as Uzbekistan during 1994–1999.

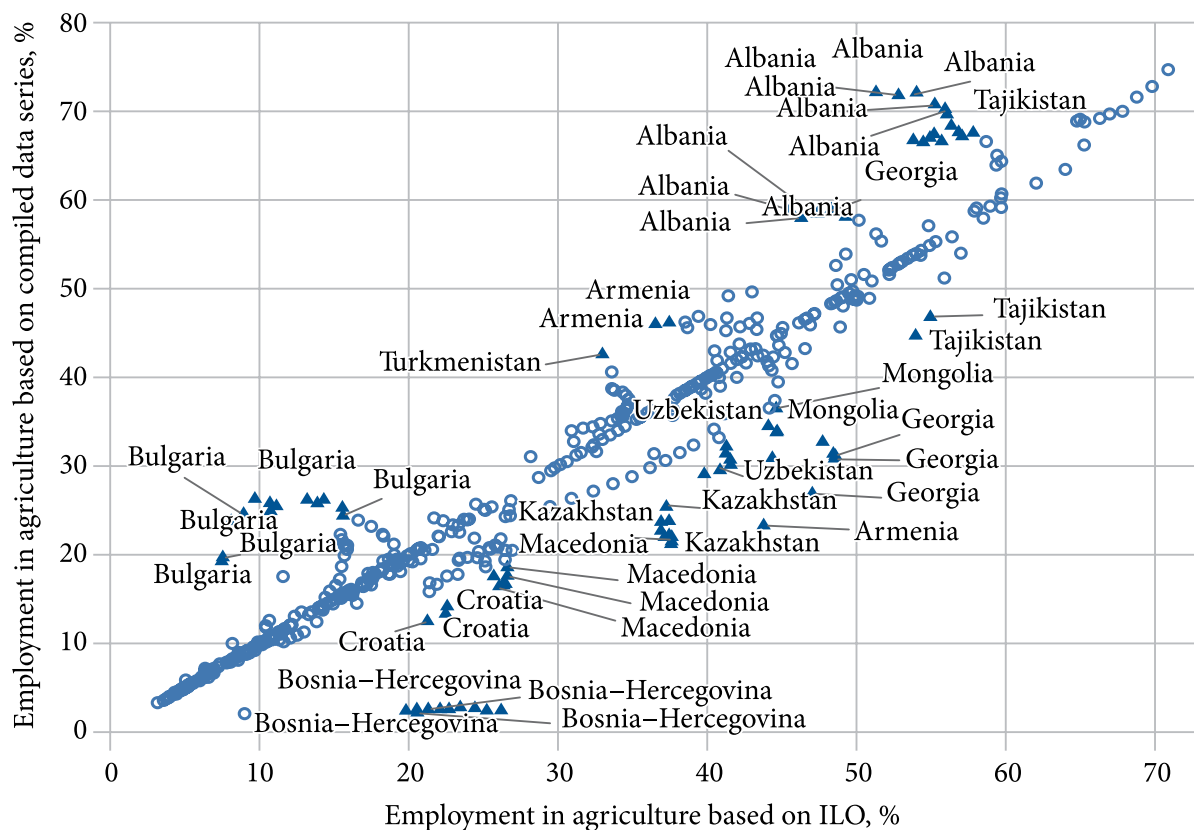


Fig. 1. Comparison of data series on employment in agriculture in transition economies<sup>1</sup>

<sup>1</sup> Source: own illustration based on the data obtained from ILO. (2021). ILOSTAT. <https://ilostat ilo.org/>; ILO. (2015). Key indicators of the labour market (KILM). 9th ed. Geneva: International Labour Organization.; World Bank. (2015). World Development Indicators.

In a number of other countries and years, ILO figures are below the values reported earlier (i.e. dots are above the diagonal line). Most striking examples are Albania, Bulgaria, and Tajikistan. For twelve countries, the differences between both series are below 5 % in absolute terms.

Which of the series represents a “true” picture of agriculture’s importance for employment and income generation cannot be answered at this stage. Micro-level data will be better suited to analyse time use and income sources for individual households. As the ILO modelled series provide the most consistent data set and the largest coverage, the following analysis proceeds with it.

### Conceptual framework of occupational adjustment

Several authors argued that after the removal of subsidies, central planning and mobility restrictions, an outflow of surplus agricultural labour should be expected due to hidden unemployment in agriculture and non-agricultural services charged upon farms during the period of central planning [Brada, 1989; Jackman, 1994]. However, high unemployment and economic uncertainty triggered an increase in subsistence farming and served as an insurance against poverty and hunger [Seeth et al., 1998; Sorm, Terrell, 2000; Bernabè, Stampini, 2009].

From a theoretical perspective, the motivation of labour force flows between economic sectors is often explained by traditional theories of migration such as the seminal work by Todaro [1969]. Larson and Mundlak [1997] point to the differences in (expected future) incomes as the driving force of intersectoral labour flows. Aggregated individual migration decisions depending on the sector of principal occupation results in an occupational migration flow. Assuming a constant-returns-to-scale production technology in both agriculture and outside agriculture, Mundlak [2000] claims that labour force growth will be higher in the sector with a relatively higher income. Depending on the costs of migration, the growth rates will tend to approach each other the closer the ratio of incomes between both sectors. In a costless environment, occupational migration will cease if the intersectoral income ratio approaches unity. An income ratio above one, indicating higher incomes per worker in the non-agricultural sector compared to average income in agriculture, together with a growth rate of non-agricultural labour force equal to or even below the growth rate of agricultural labour indicates the existence of costs of migration which would exceed the difference in average incomes.

Applying a more formalised theoretical framework to study the labour market in agriculture during the transition, Swinnen, Dries and Macours [2005] work out that an effective privatization with a shift from corporate farms to profit-maximizing individual farms generates a chain of effects. The introduction of a hard budget constraint and a strengthening bargaining power of farm management vis-à-vis farm workers is expected to result in a reduction of farm labour, an increase in efficiency of agricultural production due to restructuring, which, in turn, is expected to result in a higher value of

marginal product of labour subsequently followed by rising demand for labour in agriculture. Therefore, the total effect of decollectivisation and restructuring can either be a net outflow or a net inflow of labour.

One factor affecting the willingness to leave agriculture is represented by the alternatives to use assets that a rural household owns or uses. By definition, rural households engaged in agriculture either own land or enjoy some use rights if members are not engaged in wage work. Thus, opportunities or the lack thereof on the land market will indirectly affect labour market decisions. Previous studies did not account for the different ways of land privatisation and institutional quality as potential determinants of labour adjustment. However, they are important for several reasons. First, tenure security on land is likely to facilitate land market development and contribute to farms' specialisation. The effect of specialisation on agricultural labour depends on the elasticity of substitution among all production factors and cannot be determined a priori. Second, functioning land markets ease the exiting of farmers as they can lease their land to fellow farmers at rather low transaction costs. Hence, restrictions on land transactions such as sublease restrictions for land tenants in Kazakhstan or the moratorium on land sales in Ukraine will reduce migration out of agriculture.

Furthermore, a low quality of the institutional environment might hamper the general economic development. In particular, farming may take a role of a buffer during the times of economic crises and small farmers might stick to agricultural production to assure household's food supply. Lack of economic development might negatively affect demand for agricultural products and their price development. From the perspective of alternative employment opportunities, demand and wage growth outside of agriculture will be limited. All three relations suggest that occupational migration will be lower in a weak institutional environment. In addition, a low quality institutional environment creates various bureaucratic obstacles to land transactions and intersectional migration.

Looking at the empirical evidence, Swinnen, Dries and Macours [2005] identify three patterns of agricultural labour adjustment based on the organisational transformation of agriculture. In Estonia, Hungary and the Czech Republic, a fast decline in the share of agriculture in total employment together with a moderate increase in the share of individual farms in total agricultural land took place. On the other hand, agricultural employment decreased less rapidly or even increased in Poland, Romania, Lithuania, Latvia and Slovenia, all countries with a significantly higher prevalence of individual farms. Finally, individual farming in Russia and Ukraine still exhibits only a minor share in total landholdings and the change in agricultural employment is at the same time limited.

By separating 29 transition economies according to the existence of private land ownership, Herzfeld et al. [2015] show evidence of different patterns of occupational migration. The econometric results suggest that the ratio of agricultural income to non-agricultural income stimulates migration out of agriculture in countries that recognised private ownership under central planning. However, the effect cannot be observed for

the other group of countries where all agricultural land was owned by the state. For this second groups of countries unemployment could be identified as the most important variable reducing occupational migration out of agriculture. However, improved land transferability rights and access to land rental market increase the probability of migration even without ownership rights (e. g. China).

### Methodology and description of data

**Measuring occupational migration.** As indicated above, the measure of occupational migration was originally proposed by Mundlak [1978] and developed further in Mundlak [2000]. Assuming an economy with two sectors, agriculture and non-agriculture, and a mutually exclusive character of occupations, differences in the growth rate of employment between sectors are defined as sectoral labour adjustment<sup>1</sup>. We quantify this process by the difference of growth rates in total and agricultural employment and use this measure as dependent variable in our econometric analysis. More specifically, the labour adjustment rate  $m$  is calculated as the difference between growth rates of total labour  $n$  and agricultural labour  $L_A$ :

$$m = (n + 1) - L_{At} / L_{At} - 1. \quad (1)$$

The adjustment rate can be interpreted as relative to the size of the agricultural sector.

In the absence of migration, the natural growth rates of agricultural labour and total employment are assumed to be equal. Positive values indicate a larger growth of non-agricultural employment, thus, a move out of agriculture. Values of  $m$  below zero indicate a comparatively larger growth of agricultural employment.

The measure suffers from one limitation that has to be kept in mind. Due to the assumption of equal growth rates of agricultural and total employment, a drop in total employment leads per definition to a hypothetical migration into agriculture as long as the absolute growth of labour force exceeds the absolute growth of agricultural labour. As almost every transition country has been characterised by over-industrialisation under central planning [Raiser, Schaffer, Schuchhardt, 2004], (virtual) immigration into agriculture will be caused by the downsizing of the industrial sector. However, we assume that results will be potentially affected in the same way across all countries.

An alternative measure used in previous studies would be the share of sectoral employment. Dries and Swinnen [2002] as well as Swinnen, Dries and Macours [2005] focus on the annual percentage change of labour employed in agriculture since the beginning of

<sup>1</sup> Any aggregated approach neglects part-time farming which forms a non-negligible part of agricultural households' activities also in transition countries [e.g. Chaplin, Davidova, Gorton, 2004; Buchenrieder, 2005]. That is, the measure applied in this paper will understate the 'true' sectoral labour allocation as long as off-farm occupations are not recorded as an individual's main economic activity in official statistics and overstate labour adjustment whenever households continue to engage on household plots besides any registered main non-agricultural employment. However, lack of individual employment data which are consistently comparable over all transition countries limits the use of other concepts.

economic reforms. For the reason that their measure is of cumulative nature it might create inconsistencies in a panel of countries with a different lengths of the reform period. The annual measure of occupational migration employed here allows differentiating a slowly progressing structural change over a long period from a short-run high labour outflow.

**Choice of an econometric approach.** Having data for 31 countries starting in 1990 allows utilising a time-series cross-sectional (TSCS) or panel data estimator. The number of panels versus years, often used as decision criterion for choosing an estimator, is roughly equal in the case at hand. Panel data estimator allows analysing variations in dependent and explanatory variables over time and controlling unobserved characteristics such as production technologies or omitted variables. The econometric literature offers a choice of different TSCS data estimators. Bell and Jones [2015] review some of them and suggest the use of a random effects model as this estimator will be more appropriate in capturing the effect of slowly changing explanatory variables. They suggest a so-called ‘within-between’ formulation of the estimator, which is not affected by a potential correlation between the explanatory variables and the unobserved error term.

In the following econometric analysis, the measure of labour adjustment  $m_{it}$  will be explained by a vector of explanatory variables  $X_{it}$ , and an unobserved country-specific error term  $\varepsilon_{it}$ :

$$m_{it} = X_{it-1} \beta + \varepsilon_{it} . \quad (2)$$

To take into account a possible delay in individual occupational decision following the changes in macroeconomic conditions, all explanatory variables enter equation (2) with their one-year lagged values ( $X_{it-1}$ ).

**Selection of explanatory variables.** Previous literature provides a range of determinants that possibly impact occupational choice from a macroeconomic perspective. Starting from the theoretical framework proposed by Larson and Mundlak [1997] and as outlined above, labour flows are a function of the ratio of incomes in non-agriculture to that in agriculture and the size of the originating sector.

Lack of individual and internationally comparable wage rates as well as the high relevance of unpaid family work in agriculture requires us to approximate wages by an average productivity measure. Thus, the ratio of value-added per worker in non-agricultural sectors to value-added per worker in the agricultural sector is expected to be one of the main determinants of occupational migration in our empirical analysis. Relatively high earnings and / or faster growing earnings in non-agricultural sectors will foster the flow of labour out of agriculture. Thus, the variable  $IR$  is expected to have a positive impact on the dependent variable.

With respect to the size of the originating sector, a higher share of agricultural employment constitutes a larger pool of potential labour, which could potentially move to other sectors. Due to the different size of the countries, the variable  $LR$  will be operationalised as the ratio of agricultural labour force over non-agricultural labour force.



Among further macroeconomic determinants of occupational migration, theory suggests to allow for the unemployment and development of relative prices. On the one hand, a high unemployment rate might slow down structural change by lowering expectations with respect to potential earnings in non-agricultural sectors. On the other hand, high unemployment imposes a threat to new entrants into the labour market thus lowering the growth of total employment. Todaro's model emphasises the combination of wage differences and the probability of finding employment in urban areas [Todaro, 1969]. Given the different conditions of unemployment registration and benefits, here an approximate measure of unemployment *Unemp* is calculated as the employment-to-population ratio divided by the labour force participation rate and subtracted from one<sup>1</sup>. In order to measure the change of relative prices, the ratio between the GDP deflators for agriculture and for the aggregated non-agricultural sector is interpreted as terms of trade *ToT*.

The prime focus of this paper is, however, on investigating the impact of a country's land reform steps and institutional environment on labour flows. Initially introduced by Lerman, Csaki and Feder [2004], the index of land reform consists of the two components: private ownership *LOwn* and transferability of land *LTransf*. In the case of full absence of any right, the indicators are assigned a zero. If all types of farms can possess agricultural land, the indicator of private ownership is assigned a value of two. Ownership rights assigned to only one type of actor, often rural households, are represented by a value of one. Similarly, the land transferability index is assigned a value of two once owners have the full right to buy, sell or lease the land. A value of one indicates the absence of land sales rights. Both indicators have been updated for the recent decade and covering more countries by Akhmadiyeva [2021].

At the same time, the implementation of reforms and the improvement of markets is likely to lower transaction costs of exchanges [North, 1991]. Subsequently, lower transaction costs are expected to result in a higher employment of capital relative to labour and / or a higher prevalence of long-term agreements if, for instance, property rights are clearly defined and effective. This hypothesis is backed up by a variety of empirical studies highlighting the economic growth and investment promoting effect of a high-quality institutional environment<sup>2</sup>. Reform progress and institutional quality might vary from one year to the next. In the following analysis, institutional quality will be operationalised by the average of the World Governance Indicators published by Kaufmann, Kraay and Mastruzzi [2010] and latest updates. The resulting variable *WGI* ranges from 1 to 10 with higher values indicating a better institutional quality. Reforms of economic policies will be approximated by the economic dimension of the KOF Globalisation Index initially introduced by Dreher [2006]. In the current version, the revised index *KOFecon*

<sup>1</sup> The calculated unemployment rate is  $1 - \text{employment-to-population ratio} / \text{labour force participation rate}$ . Strictly speaking, this approximate measure also includes the voluntarily inactive labour force.

<sup>2</sup> For instance Aron [2000] provides a detailed critical survey.

by Gygli et al. [2019] will be used. In both cases, faster reforms and a high quality institutional environment are supposed to foster occupational change.

Chenery and Taylor [1968] as well as Raiser, Schaffer and Schuchhardt [2004] show that economic wealth of a country is a significant determinant of structural change. Therefore, GDP per capita is included as explanatory variable *GDPpc* and supposed to lead to a higher migration out of agriculture. Furthermore, this variable is thought to cover remaining unobserved characteristics that might affect labour adjustment.

In addition, historical conditions are believed to influence the choice of land privatisation strategies and the speed of reforms. Swinnen [1999] postulates that ownership status under central planning, the time under communist legacy and ethnic issues determined the way of decollectivization as well as privatization of the state-owned land. Summing up, the countries in our sample share some common historical and geographical characteristics. Those characteristics probably cause endogeneity in the econometric analysis. Therefore, estimator should allow for heteroscedasticity across panels (i. e. countries).

All explanatory variables are presented with their descriptive statistics and respective sources in Table 1. The average migration rate of 2.3 % of the agricultural labour force masks the large heterogeneity between an outflow of labour of 37 % up to an inflow of 30 % of the agricultural labour force. In particular, the (temporary) migration into agriculture is quite unique from a global perspective. It has to be noted that within-variation (i. e. for each country over time) is higher than between-variation (i. e. variation across countries) for such variables as migration rate, terms of trade, GDP per capita, and the KOF Economic Globalisation index which means that changes for each country are comparatively large. The between-variation is comparatively large for such variables as income ratio, labour ratio, institutional land indicators, and the quality of institutions indicator *KKM* which highlights greater differences across countries than over time within one country.

**Table 1. Definition and source of variables and descriptive statistics**

Variable	Definition	Mean (standard deviation)	Source
<i>m</i>	Migration rate	0.023 (0.061)	ILO
<i>IR</i>	Ratio between non-agricultural and agricultural GDP per worker	3.265 (1.901)	UN
<i>LR</i>	Ratio between agricultural and non-agricultural labour force	0.438 (0.400)	ILO
<i>ToT</i>	Terms of trade	1.279 (0.650)	UN
<i>Unemp</i>	Ratio of employment-to-population ratio and labour force participation rate	0.108 (0.072)	ILO
<i>GDPpc</i>	GDP per capita [in thousand US dollars]	6.349 (9.040)	World Bank a
<i>WGI</i>	World Governance Indicator (1 – low quality, 10 – high quality)	4.699 (1.399)	World Bank b

**Table 1 (concluded)**

Variable	Definition	Mean (standard deviation)	Source
<i>LOwn</i>	Land ownership (0 – no rights; 2 – full rights)	1.698 (0.727)	Akhmadiyeva [2021]
<i>LTransf</i>	Land transfer (0 – no rights; 2 – full rights)	1.501 (0.695)	Akhmadiyeva [2021]
<i>KOFEcon</i>	KOF Index of Globalisation – economic dimension	55.392 (15.753)	Gygli et al. [2009]

Note: ILO, UN, World Bank a,b refer to ILO. (2021). ILOSTAT. <https://ilostat ilo.org/>; UN. (2021). National Accounts – Analysis of Main Aggregates (AMA). <https://unstats.un.org/unsd/snaama/>; World Bank. (2021a). World Development Indicators. <https://databank.worldbank.org/>; World Bank. (2021b). Worldwide Governance Indicators. <https://info.worldbank.org/governance/wgi/>.

### Results of the empirical analysis

**Descriptive analysis.** Figure 2 presents the development of occupational migration over the period from 1990 to 2019 for all countries aggregated in four regions. As indicated by a median above zero in almost all years, the three Asian economies China, Mongolia, and Vietnam, are characterised by a continuous labour flow out of agriculture, which seems to have accelerated since the mid-2000s. With respect to the (Western) Balkan countries, the median points to outmigration during the first half of the period covered in this research. Since the mid-2000s the standard deviation increased substantially which points to a larger heterogeneity among the six countries. The ten new EU members show a less obvious development as the median fluctuates around zero and interquartile ranges are rather wide across the whole period. Finally, countries of the former USSR (excluding the Baltic states) demonstrate almost no occupational migration during the first decade. Starting around the year 2000, the median labour adjustment rate starts to indicate a labour flow out of agriculture. Variation across countries is comparatively low as indicated by the width of the boxes.

Observations outside of the interquartile range are observed for all regions except for Asia. The Appendix presents time series of the labour adjustment rate by individual countries. Unfortunately, we cannot rule out that statistical revisions might be the underlying cause of substantial shifts above 20 % of agricultural labour force in selected years. Comparing our annual estimates with averages over the second half of the 20<sup>th</sup> century by Mundlak [2000] for a large cross-country sample revealed a comparatively high adjustment rate for Estonia, Hungary, Czech Republic, and Slovak Republic after the beginning of economic reforms. Annual rates above 5 % of agricultural employment are quite uncommon at a global scale. However, labour flow into agriculture as observed in several of the countries (e. g. Romania, Kyrgyzstan, Tajikistan, or Uzbekistan) is even more exceptional compared to classical developing countries' experience.

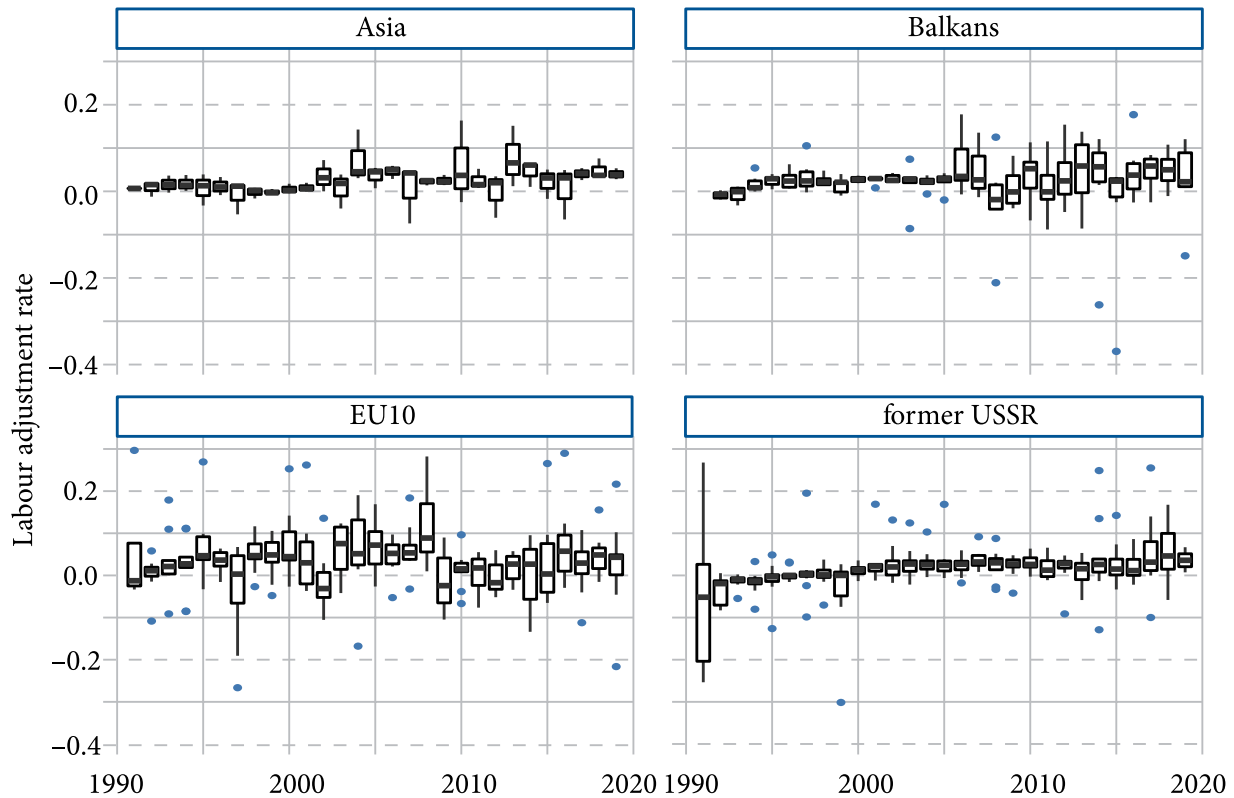


Fig. 2. Occupational migration over time by regions<sup>1</sup>

Generally, countries with a comparatively quick decollectivisation during the early 1990s such as Czech Republic, Estonia or Hungary are characterised by a rather high out-flow of labour over a short period. In just five years the share of agricultural employment halved in Estonia and Hungary, both starting from more than 20 % of labour force in agriculture. On the contrary, Romania, Georgia but also many Central Asian countries experienced a flow from non-agricultural occupation to agriculture after 1989 amounting up to 10 % of agricultural employment. A sustained period of migration from agriculture to non-agriculture just emerged after 2001. Belarus and Ukraine represented two cases where the labour adjustment rate was almost zero over several years, indicating no substantial structural shifts in employment.

Besides the immediate effect of the decollectivisation, the occupational migration rate is influenced by the behaviour of potential new entrants into the labour market. If the younger generation prefers the non-agricultural to the agricultural sector to a large extent, employment growth in the first sector will be higher thus resulting in a further relative but rather continuous decline of agricultural employment. Such a demographic pattern is more likely to describe the development in Poland and China as highlighted by other authors [e.g. Pang, Brauw, Rozelle, 2004].

<sup>1</sup> Note: Asia (China, Mongolia, Vietnam), Balkans (Albania, Bosnia-Herzegovina, Croatia, North Macedonia, Montenegro, Serbia), EU10 (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia), former USSR (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan).

**Results of the econometric analysis.** A base specification including all macroeconomic determinants is estimated first, and then institutional variables are included stepwise in the specifications to quantify their impact. Relatively high correlation between some of the explanatory variables would reduce their usefulness in one single specification. Results of all specifications are reported in Table 2. As our sample covers all transition economies, it does not constitute a random sample. Thus, the concept of statistical significance does not apply here [Hirschauer et al., 2019].

**Table 2. Determinants of occupational migration**

Determinant	(1)	(2)	(3)	(4)
<i>Constant</i>	0.003 (0.008)	0.004 (0.008)	0.015 (0.009)	-0.008 (0.010)
$IR_{t-1}$	0.004 (0.001)	0.004 (0.001)	0.003 (0.001)	0.004 (0.001)
$LR_{t-1}$	0.027 (0.009)	0.022 (0.009)	0.009 (0.010)	0.029 (0.009)
$IR_{t-1} \times LR_{t-1}$	-0.006 (0.002)	-0.006 (0.002)	-0.004 (0.002)	-0.007 (0.002)
$ToT_{t-1} 1$	-0.009 (0.002)	-0.009 (0.002)	-0.005 (0.003)	-0.008 (0.002)
$Unemp_{t-1}$	0.024 (0.018)	0.029 (0.020)	-0.028 (0.022)	0.015 (0.018)
$GDP_{pct-1}$	0.003 (0.0005)	0.003 (0.0005)	0.001 (0.0007)	0.002 (0.0006)
<i>LOwn</i>	-	-0.004 (0.002)	-	-
<i>LTransf</i>	-	0.003 (0.002)	-	-
<i>KKM</i>	-	-	0.001 (0.001)	-
<i>KOFEcon</i>	-	-	-	0.0002 (0.0001)
$\chi^2$	133.799	133.965	87.209	124.292
N / Countries	868 / 31	868 / 31	741 / 31	836 / 31

Note: standard errors are in parentheses. Feasible generalised least squares regression using Stata's xtgls command. Estimator allows for heteroscedastic panels.

In general, the results are in line with the theoretical expectations and findings by Larson and Mundlak [1997]. Migration rates tend to be higher if the income ratio as well as the labour ratio are higher. However, the effect is not linear as demonstrated by the interaction effect between both variables. Evaluated at the sample means, an increase of the income ratio by one standard deviation results in an increase of the migration rate by 0.005. For countries with a larger share of the agricultural labour force, the effect of the income ratio is predicted to be smaller. Regarding the labour ratio, the marginal effect is predicted to be positive for countries with an income ratio close to one, but turns out to be negative once

average income per capita in non-agricultural occupations exceeds agricultural income per capita by a factor of 1.75 which applies to almost 75 % of the observations in the sample.

Improving terms of trade *ToT* from the perspective of agriculture appears to slow down occupational migration *ceteris paribus*. Somewhat more surprisingly, a higher unemployment rate *Unemp* is predicted to accelerate the labour adjustment process. With a marginal effect of 0.024 a one standard deviation increase in GDP per capita seems to contribute the most to occupational migration.

Turning to the two land tenure indicators, the findings of the econometric analysis suggest a somewhat contradictory effect of the two dimensions. While the ownership indicator points to a negative correlation with the labour adjustment rate, the land transfer indicator shows a positive correlation. One explanation could be that improved private ownership of land comes along with an increase in agricultural productivity, which improves the attractiveness of agricultural occupations *ceteris paribus*. Keeping all other variables constant, improved transferability of land will facilitate occupational migration out of agriculture.

The other institutional variables, the quality of institutions *KKM* and the economic dimension of the KOF Globalization Index, are expected to affect occupational migration positively, but the quantitative effect proves to be quite small.

Testing for a potentially changing relationship over the reform period reveals substantial differences for some variables. Table 3 presents the results of specific estimations for three decades including the institutional land indicators.

With the exception of GDP per capita, all variables display a change in signs pointing to changing relationships within the model during the reform period. For the macroeconomic variables, the second reform decade somewhat contradicts the theoretical expectations and results for the full sample. However, the opposite is true for the third decade. Although estimated coefficients are somewhat lower, occupational migration out of agriculture seems to grow with an increasing income ratio and labour ratio. Regarding the land indicators, the effect of improved transfer rights appears to be the largest in the first decade. The negative sign of the ownership indicator is confirmed for the first two decades with the largest marginal effect during the second decade.

**Table 3. Determinants of occupational migration by decades**

Determinant	1990–2000	2001–2010	2011–2019
<i>Constant</i>	-0.029 (0.007)	0.044 (0.011)	-0.007 (0.021)
$IR_{t-1}$	0.002 (0.001)	-0.002 (0.002)	0.011 (0.003)
$LR_{t-1}$	0.026 (0.008)	-0.022 (0.012)	0.060 (0.019)
$IR_{t-1} \times LR_{t-1}$	-0.005 (0.002)	0.001 (0.002)	-0.017 (0.005)

Table 3 (concluded)

Determinant	1990–2000	2001–2010	2011–2019
$ToT_{t-1}$ 1	–0.004 (0.001)	0.004 (0.005)	–0.009 (0.020)
$Unemp_{t-1}$	0.079 (0.015)	–0.047 (0.028)	–0.036 (0.042)
$GDP_{pct-1}$	0.005 (0.0007)	0.001 (0.0008)	0.001 (0.0008)
$LOwn$	–0.003 (0.002)	–0.007 (0.002)	0.004 (0.003)
$LTransf$	0.010 (0.002)	0.006 (0.002)	–0.002 (0.002)
$\chi^2$	281.913	48.330	59.193
N / Countries	280 / 31	310 / 31	278 / 31

Note: standard errors are in parentheses. Feasible generalised least squares regression using Stata's `xtgls` command. Estimator allows for heteroscedastic panels.

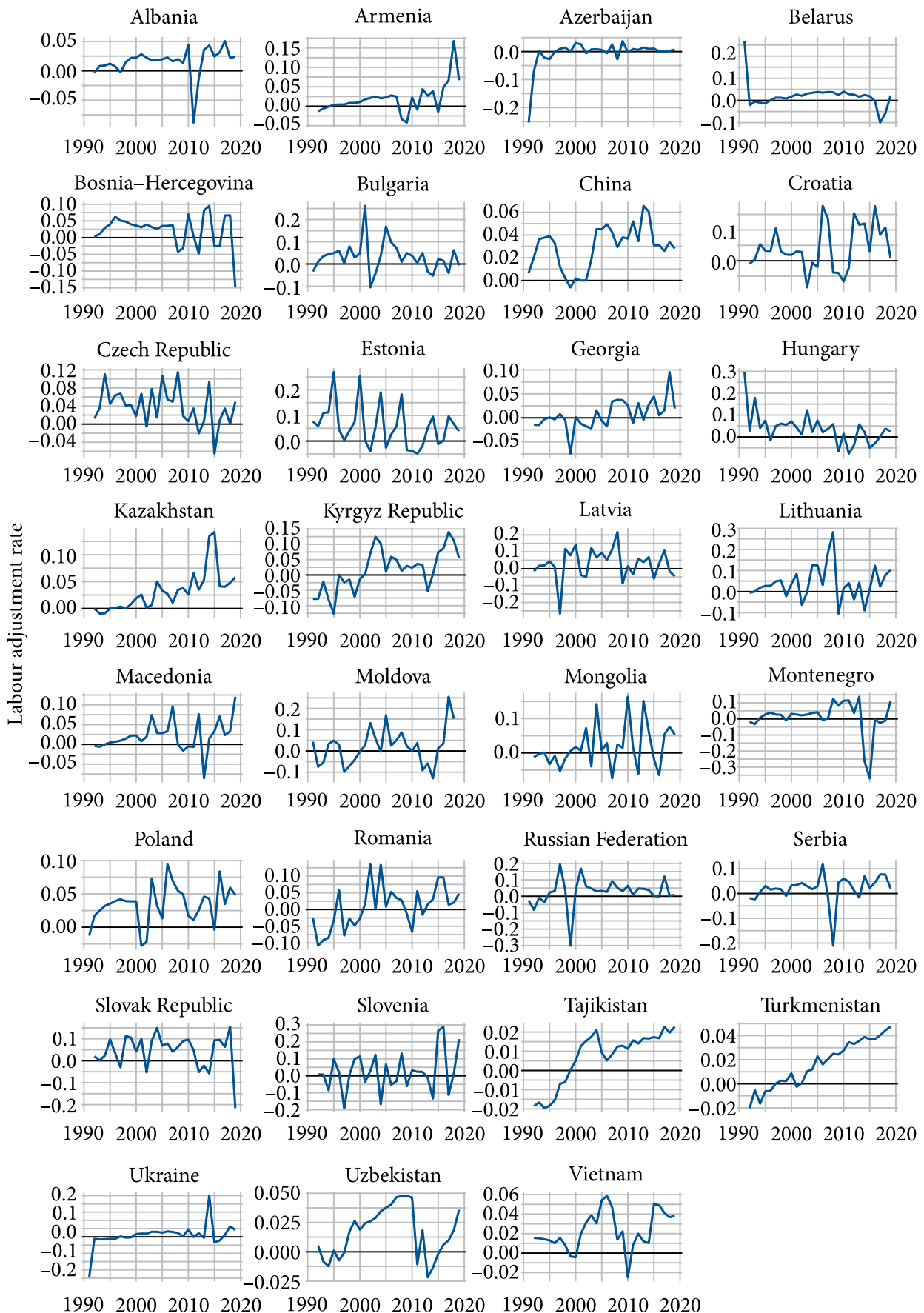
### Conclusion

Explaining the growth of agricultural employment relative to total employment growth shows that economic factors such as the ratio of average incomes between agricultural and non-agricultural sectors, the size of the labour pool in agriculture, the development of relative prices or the general economic development contribute to the explanation of the adjustment process. Institutional factors seem to play a subordinated role. While improved land ownership rights tend to reduce occupational migration, improved land transfer rights are predicted to foster structural change. However, their marginal contribution is rather small.

Newly available data sets allow a broader coverage of countries even with a limited publication of national statistics. However, the comparison with earlier time series reveals substantial deviations in selected cases. Additional data, in particular representative household level data, will be necessary to assess which data series is fitting best agricultural employment.

Although the macroeconomic perspective allows considering country-specific variables, which influence structural change directly and indirectly, a full understanding of the individual decisions behind the labour adjustment rate requires, obviously, a microeconomic approach. Specially, further analysis is required on how agricultural engagement is combined with non-agricultural income sources and whether improved tenure rights will increase labour productivity and reduce agricultural employment. Despite continuous efforts by some scholars, panel data of rural households and corporate farms across the transition economies are still scarce. Such type of data will be necessary in order to answer these open questions.

Appendix. Labour adjustment rate by countries





## References

- Akhmadiyeva Z. (2021). *Institutional change and agricultural land use in transition countries: Understanding institutional constraints of farmers' decision making*. Unpublished PhD thesis, Faculty of Natural Sciences III, Martin-Luther-Universität Halle-Wittenberg.
- Aron J. (2000). Growth and institutions: A review of the evidence. *World Bank Research Observer*, vol. 15, issue 1, pp. 99–135. <https://doi.org/10.1093/wbro/15.1.99>.
- Bell A., Jones K. (2015). Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data. *Political Science Research and Methods*, vol. 3, issue 1, pp. 133–153. <https://doi.org/10.1017/psrm.2014.7>.
- Bernabè S., Stampini M. (2009). Labour mobility during transition: Evidence from Georgia. *Economics of Transition*, vol. 17, issue 2, pp. 377–409. <https://doi.org/10.1111/j.1468-0351.2009.00345.x>.
- Brada J. C. (1989). Technological progress and factor utilization in Eastern European economic growth. *Economica*, vol. 56, pp. 433–448. <https://doi.org/10.2307/2554321>.
- Buchenrieder G. (2005). Non-farm rural employment: Review of issues, evidence and policies. *Quarterly Journal of International Agriculture*, vol. 44, issue 1, pp. 3–18.
- Chaplin H., Davidova S., Gorton M. (2004). Agricultural adjustment and the diversification of farm households and corporate farms in Central Europe. *Journal of Rural Studies*, vol. 20, pp. 61–77. DOI:10.1016/S0743-0167(03)00043-3.
- Chenery H. B., Taylor L. (1968). Development patterns: Among countries and over time. *Review of Economics and Statistics*, vol. 50, no. 4, pp. 391–416. <https://doi.org/10.2307/1926806>.
- Csaki C., Lerman Z. (2002). Land and farm structure in transition: The case of Poland. *Eurasian Geography and Economics*, vol. 43, issue 4, pp. 305–322. <https://doi.org/10.2747/1538-7216.43.4.305>.
- Dreher A. (2006). Does Globalization affect growth? Evidence from a new Index of Globalization. *Applied Economics*, vol. 38, issue 10, pp. 1091–1110. <https://doi.org/10.1080/00036840500392078>.
- Dries L., Swinnen J. F. M. (2002). Institutional reform and labor reallocation during transition: Theory and evidence from Polish agriculture. *World Development*, vol. 30, issue 3, pp. 457–474.
- Gygli S., Haelg F., Potrafke N., Sturm J.-E. (2019). The KOF Globalisation Index - Revisited. *Review of International Organizations*, vol. 14, pp. 543–574. <https://doi.org/10.1007/s11558-019-09344-2>.
- Herzfeld T., Glauben T., Dries L., Teuber R. (2015). Agricultural labor adjustment and the impact of institutions: Panel data analysis. In: Kimhi A., Lerman Z. (eds.) *Agricultural transition in post-soviet Europe and Central Asia after 25 years*. Halle: IAMO, pp. 53–73.
- Hirschauer N., Grüner S., Mußhoff O., Becker C. (2019). Twenty steps towards an adequate inferential interpretation of p-values in econometrics. *Journal of Economics and Statistics*, vol. 239, issue 4, pp. 703–721. DOI: 10.1515/jbnst-2018-0069.
- Jackman R. (1994). Economic policy and employment in the transition economies of Central and Eastern Europe: What have we learned? *International Labour Review*, vol. 133, no. 3, pp. 327–345.
- Kaufmann D., Kraay A., Mastruzzi M. (2010). *The worldwide governance indicators: Methodology and analytical issues (Policy Research Working Paper no. 5430)*. Washington D.C.: World Bank. <https://openknowledge.worldbank.org/bitstream/handle/10986/3913/WPS5430.pdf?sequence=1&isAllowed=y>.
- Lerman Z., Csaki C., Feder G. (2004). *Agriculture in transition: Land policies and evolving farm structures in post-soviet countries*. Lanham: Lexington Books.
- Larson D. F., Mundlak Y. (1997). On the intersectoral migration of agricultural labor. *Economic Development and Cultural Change*, vol. 45, issue 2, pp. 295–319. DOI: 10.1086/452275.

- Mundlak Y. (1978). Occupational migration out of agriculture: A cross-country analysis. *Review of Economics and Statistics*, vol. 60, pp. 392–398.
- Mundlak Y. (2000). *Agriculture and economic growth: Theory and measurement*. Cambridge, London: Harvard University Press. 504 p.
- North D. C. (1991). Institutions. *Journal of Economic Perspectives*, vol. 5, no. 1, pp. 97–112. DOI: 10.1257/jep.5.1.97.
- Pang L., Brauw A., de, Rozelle S. (2004). Working until you drop: The elderly of rural China. *China Journal*, vol. 52, pp. 73–96.
- Raiser M., Schaffer M., Schuchhardt J. (2004). Benchmarking structural change in transition. *Structural Change and Economic Dynamics*, vol. 15, issue 1, pp. 47–81.
- Rapsomanikis G. (2015). *The economic lives of smallholder farmers: An analysis based on household data from nine countries*. Rome: FAO. 40 p.
- Sabyrbekov R. (2019). Income diversification strategies among pastoralists in Central Asia: Findings from Kyrgyzstan. *Pastoralism*, vol. 9, 14. <https://doi.org/10.1186/s13570-019-0152-x>.
- Seeth H. T., Chachnov S., Surinov A., Braun J., von. (1998). Russian poverty: Muddling through economic transition with garden plots. *World Development*, vol. 26, issue 9, pp. 1611–1623.
- Sorm V., Terrell K. D. (2000). Sectoral restructuring and labor mobility: A comparative look at the Czech Republic. *Journal of Comparative Economics*, vol. 28, issue 2, pp. 431–455.
- Swinnen J. F. M. (1999). The political economy of land reform choices in Central and Eastern Europe. *Economics of Transition*, vol. 7, issue 3, pp. 637–664. DOI: 10.1111/1468-0351.00029.
- Swinnen J. F. M., Dries L., Macours K. (2005). Transition and agricultural labor. *Agricultural Economics*, vol. 32, issue 1, pp. 15–34.
- Todaro M. P. (1969). A model of labor migration and urban unemployment in less developed countries. *American Economic Review*, vol. 59, issue 1, pp. 138–148.

#### Information about the authors

**Thomas Herzfeld**, Dr., Prof., Director of Leibniz Institute of Agricultural Development in Transition Economies, Professor of Policy and Institutions in Agriculture at Martin-Luther-Universität Halle-Wittenberg, 2 Theodor-Lieser-Str., Halle (Saale), 06120, Germany  
Phone: +49 (345) 2928-100, e-mail: [herzfeld@iamo.de](mailto:herzfeld@iamo.de)

**Zarema Akhmadiyeva**, Research Associate at Leibniz Institute of Agricultural Development in Transition Economies, 2 Theodor-Lieser-Str., Halle (Saale), 06120, Germany  
Phone: +49 (345) 2928-101, e-mail: [akhmadiyeva@iamo.de](mailto:akhmadiyeva@iamo.de)

© Herzfeld T., Akhmadiyeva Z., 2021