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Ukraine's Agricultural Land Sales Market: First Outcomes and Monitoring Challenges

Vasyl Kvartiuk, Andrii Martyn

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About the Project "German-Ukrainian Agricultural Policy Dialogue" (APD)

The project "German-Ukrainian Agricultural Policy Dialogue (APD)" was implemented in 2006 with the support of the Federal Ministry of Food and Agriculture (BMEL). The beneficiary of the project is the Ministry of Agrarian Policy and Food of Ukraine, the current project phase will be operating until 2021. While the executor of BMEL's entire bilateral cooperation-program is *GFA Consulting Group LLC*, the APD-project in Ukraine is implemented by a consortium consisting of *IAK Agrar Consulting, Leibniz Institute for Agricultural Development in Transition Economies (IAMO)* and *AFC Consultants International.*

The project aims at supporting Ukraine in the areas of sustainable agriculture, efficient processing industry and international competitiveness in accordance with the principles of market and regulatory policies, taking into account the development potential resulting from the Association Agreement between the EU and Ukraine.

To meet this goal, the Project provides information on German, in particular Eastern German, experience and know-how, as well as on international European experience with regard to the development of an agrarian and forestry policy framework including the necessary set-up of agrarian and forestry institutions.

The APD consists of three thematic pillars, one of them – the land component – is managed by BVVG German AgriForest Privatization Agency, a state-owned enterprise that is responsible for the administration of state-owned agricultural and forestry land in (Eastern) Germany. Under the land component, the project offers an exchange of experience and know-how between Ukrainian and German land management experts from BVVG and additional German land management institutions. The land component focusses on political, legal and technical issues related to land management and accompanies the current discussions in Ukraine concerning land market development.

APD Deutsch-Ukrainischer Agrarpolitischer Dialog

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Disclaimer

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ACRONYMS

Territorial community	TC
Cabinet of Ministers of Ukraine	CMU
Consumer price index	CPI
Hectare	ha
Herfindahl-Hirschman Index	HHI
State Classification of Administrative-Territorial subjects of Ukraine	KOATUU
Normative Monetary Valuation	NMV
Land for individual farming	OSG
State Registry of Property Rights on Real Estate	SRPRRE
State Service for Geodesy, Cartography, and Cadaster	SGC
Ukrainian hryvnia	UAH

1. Introduction

Although Ukrainian land reforms are still ongoing, a major milestone was reached on July 1, 2021: the partial launch of the sales market of agricultural land for individuals. The reform process was thorny and involved active public debate of various stakeholders about the market design. Because of a lack of transparent evidence-based policy-making on this crucial subject, this debate was driven by several fundamental societal fears about the consequences of the sales market launch. Five months after the launch of the sales market, it is imperative to assess whether the public fears have any ground within the current market design. To accomplish this, a sound data-driven analysis of land transactions and ownership distribution is essential. With the help of this study, we aim not only to assess the first four months of agricultural land sales market functioning but also to contribute to the debate about how to organize data collection and market monitoring.

The two major public concerns (among others) about the sales market of agricultural land in Ukraine had been fraud during sales transactions and excessive land concentration (Kvartiuk & Herzfeld, 2019). The first fear can be addressed by monitoring land sales prices to detect possible bottlenecks and abnormalities in the land sales transactions. Unusually low or high land prices, as well as irregularities in the data reporting, may give us clues about potential speculation or misuse. To address the second concern on land concentration, we need to examine the dynamics of land ownership distribution among individuals and agricultural enterprises. Some of the largest farms in the world that Ukraine hosts have accumulated substantial agricultural areas via land rental which had been a predominant way to access agricultural land before the land reform. To prevent land concentration via sales markets, purchase of land that had previously been under the sales ban was limited to individuals starting from July 1, 2021, with subsequent inclusion of legal entities on July 1, 2024. In addition, an ownership cap of 100 ha is imposed for the individuals, and starting with July 1, 2024, both, individuals and legal entities will not be able to own more than 10,000 ha of agricultural land in addition to land that was acquired before July 1, 2021. Remarkably, legally acquired land before the reforms is not subject to these limits. So, despite the current exclusion from the sales market, agricultural enterprises may still be actively trading land that has not been subject to the sales moratorium. With the help of basic quantitative analysis, we may be able to understand the dynamics of land concentration by different stakeholders and thus obtain clues about the role of the land reform.

Because one of the central aspects of the land reform was introducing more transparency in the Ukrainian land relations, it may be important to assess whether these goals were achieved after the first important milestones. In particular, State Service for Geodesy, Cartography, and Cadaster (SGC) was internally reorganized in the last two years to focus on improving and maintaining a rigorous data infrastructure on Ukrainian land relations. As a result, substantial data has become publicly available. However, database harmonization and maintenance require resources as well as analytical capacity and may need to be constantly re-evaluated to ensure sufficiency for rigorous monitoring of the newly implemented reforms. Because this study primarily uses publicly available data from the SGC, we are able to point out the major challenges and gaps that impede analysis. Based on the gaps, we identify several recommendations for the generation and maintenance of publicly available data that could help monitor the land market and make forecasting.

2. Institutional background

2.1 Land reforms

Ukrainian land reforms started right after it obtained independence in 1991 and continue up until today. After the Resolution of the Supreme Council "On Land Reform" of the Ukrainian Soviet Republic from December 18, 1990, Ukraine set the course on land liberalization reforms and later the Cabinet of Ministers of Ukraine (CMU) launched the process of distribution of "land shares" – stakes in the former collective farms. Should the holders of the shares wish to leave a farm enterprise, they were entitled to a physical plot. An exit of individual shareholders was, however, problematic because related procedures were developed in detail a decade later (Lerman et al., 2007). Presidential Decree of 1999 gave a chance for the holders of "land shares" to convert them into physical plots subsequently creating ca. 7 million landowners (Deininger et al., 2018; Lerman et al., 2007). A new chapter of Ukrainian land relations was marked by the 2001 Land Code. A major breakthrough was that it clearly defined property rights related to agricultural land. However, the 2001 moratorium on land sales took away a basic right of the landowners reducing the value from holding land as an asset. First thought of as a temporary measure, the moratorium has been prolonged numerous times until the Law "On amendments to some bills of Ukraine on the conditions of agricultural land circulation" (further Law on Land Circulation) was passed on March 13, 2020.

During the time of the moratorium, sales transactions with the 31 million ha of land owned by ca. 7 million individuals were prohibited. However, agricultural land with the use purpose "for individual farming" (further OSG)[1] was not subject to the moratorium and was widely traded. The origin of this land roots in the rights of each Ukrainian to receive a 2-ha plot for individual farming out of the 10 million ha stock of state-owned land through privatization free of charge. The estimates of the volumes of the OSG-land market range from 2 to 5 million ha as there appears to be a lack of reliable statistical data. Up until the recent reforms, there had been a full-scale market for this type of land accessible for all types of stakeholders.

The Law on Land Circulation opened the market for the 31 million ha of land with the use purpose "for commercial agriculture". However, this market is now restricted only to individuals who cannot acquire more than 100 ha starting with July 1, 2021. Agricultural land acquired before that date is not counted towards the 100-ha cap. Starting with July 1, 2024, a more liberal version of the market is envisaged where all stakeholders, including legal entities, can purchase any type of land with a general ownership cap of 10 thousand ha. For individuals, this implies that on the one hand prospects of purchasing up to 100 ha of commercial agriculture land were opened but on the other hand from July 1, 2021, OSG-land started being subject to the same 100-ha restriction. In other words, even though before the reforms some individuals could have accumulated thousands of ha, now they are limited by a 100-ha cap for agricultural land acquisition until 2024. Another important provision in the Law on Land Circulation was that no land plot could be sold for a price below the so-called "normative monetary valuation" (NMV) of land. NMV is calculated by a pre-determined methodology and reflects soil quality and pre-set average monetary value generated by a given land area.[2]

The mandate of implementing the above-mentioned restrictions (among others) was given to the Ukraine-wide network of notaries. In particular, at the time of the transaction, they are supposed to check whether an individual will exceed the 100-ha limit and check whether the sales price is

[1] OSG abbreviation is widely used in Ukraine and stands in Ukrainian for "individual farming enterprise". For further details consult Appendix A for a list of the types of agricultural land in Ukraine.

[2] NMV has been used as the basis for calculation of minimal rental prices and it is not based on market signals but represents an artificial construct that served land valuation in the absence of functional land sales markets.

below the NMV. The rollout of notary services on land transaction registration has been challenging and uneven across the country. Importantly, the notaries are mandated with the input of the sales prices in the State Registry of Property Rights on Real Estate (SRPRRE).

2.2 Land monitoring system

A precondition for launching the sales market of the 31 million ha of land for commercial agriculture was providing a possibility of close monitoring of the situation on the market. In particular, this implied making basic data on land transactions and ownership publicly available regularly. Thus, apart from launching a land sales market, an important goal of the land reforms in Ukraine was to increase transparency in land relations. Finding media reports on land-related misuse was a common occurrence before the reforms. Moreover, the lack of reliable statistical data made meaningful analysis of the land relations in Ukraine nearly impossible. Such analysis is essential to develop evidence-based policies that could improve Ukrainian land relations (for instance, preventing speculation and market bottlenecks, defining and preventing excessive land concentration, etc.). To address these challenges several initiatives have been underway.

The first attempt to lay the institutional foundation for the land market monitoring was marked by the Law "On Land Valuation" from 11.12.2003. Article 25 of this Law mandated the executive authorities on land resources to summarize data on the results of expert monetary valuation and land prices, which were supposed to be published on a yearly basis. Since 2004, the State Committee of Ukraine for Land Resources (SGC's predecessor) required its territorial divisions to submit quarterly information on public land. The data on land plots' characteristics and their value were based on the expert monetary valuation reports which were mandatory in case a sales transaction occurred. This early version of the monitoring system still operates but the generated data are losing their reliability and completeness. This is due to the fact that the reports of expert monetary valuation were not required to be reported starting with 2008. As a result, the State Committee of Ukraine for Land Resources (and the SGC consequently) lost access to these data. With the exception of the data generated by expert monetary valuations, the information on land sales transactions was not recorded in any way. Ukrainian appraisers of land and real estate have always been forced to use indirect market data including advertisements in the press.

A crucial event for the creation of a new monitoring system was the adoption of the Law "On Amendments to Certain Legislative Acts of Ukraine to Combat Hostile Overtakes" from 05.12.2019. In particular, the price of each transaction was required to be recorded in the

SRPRRE. However, the law was formulated in a way that left leeway for the buyers to avoid recording the prices in the SRPRRE if they chose so. In addition, technical implementation of the price reporting system does not require the notaries to input this crucial information. As we will see within our analysis, these circumstances give rise to considerable problems in the statistical analysis of the land market.

Despite the formal ban on the disclosure of the real estate prices by the SRPRRE, in early 2021, a legal discussion began on the possibility of partial publication of these data via the SGC. The advantage of disclosing data via the SGC was that all the data it possessed was subject to public disclosure and the abovementioned law stipulated sharing the data on land prices between the SGC and the SRPRRE. Thus, price disclosure via the SGC would not violate any laws.

Another milestone in creating a more comprehensive land monitoring system is marked by the law "On Amendments to Certain Legislative Acts of Ukraine to Improve the Management System and Deregulation in Land Relations" from 28.04.2021. This law explicitly stipulates an establishment of a monitoring system maintained by the SGC based on the data from the SRPRRE. Reports on land market monitoring are to be published at least once every three months. The exact monitoring procedure was to be developed by the CMU.

As a result, before the launch of the agricultural land sales market on July 1, 2021, there were some institutional preconditions for public monitoring of all land sales transactions. In fact, in one month (June 2021) the SGC in cooperation with the state enterprise "Center of the State Land Cadaster" developed managerial and technical solutions for publishing datasets on transactions with agricultural land as well as lists of landowners owning more than 100 hectares of agricultural land. Initially, the datasets were updated weekly, and starting in September 2021, the publication of updates began on a daily basis.

The SGC has recently developed a draft resolution of the CMU "On ensuring the monitoring of land relations" that aims to introduce a single system for monitoring and disclosing information on land ownership, use, and disposal as well as income related to the land use. Full deployment of such a system will provide constant monitoring of the land relations, their analysis, tracing the dynamics, and forecasting of major trends. This information will allow improving the quality of services in the field of land relations and the quality of land management at the state, regional

and local levels. Importantly, the system is expected to improve the control over compliance with the legal requirements of the Ukrainian land use and ownership.

3. Dynamics of land sales and prices

3.1 Transactions data description

Before proceeding with the analysis, we need to understand the nature of the data and conduct necessary cleaning procedures. By November 1, 2021, SGC made available the data with 135,055 transactions with the land of different use purposes. Figure 1 suggests that the vast majority of the land transactions that took place in the first four months after lifting the moratorium were inheritances (71.27% or 96,252 contracts). These transactions were allowed before the reforms as many of the landowners were getting old.[3] The next biggest category is of our particular interest as it represents sales contracts (24.01% or 32,431 contracts). Apart from gifting and exchange, we observe a very minor legally defined category of acquisition of land in exchange for lifetime financial support (only 16 cases). The transactions of our interest are naturally sales contracts and we will limit the discussion to this category henceforth.

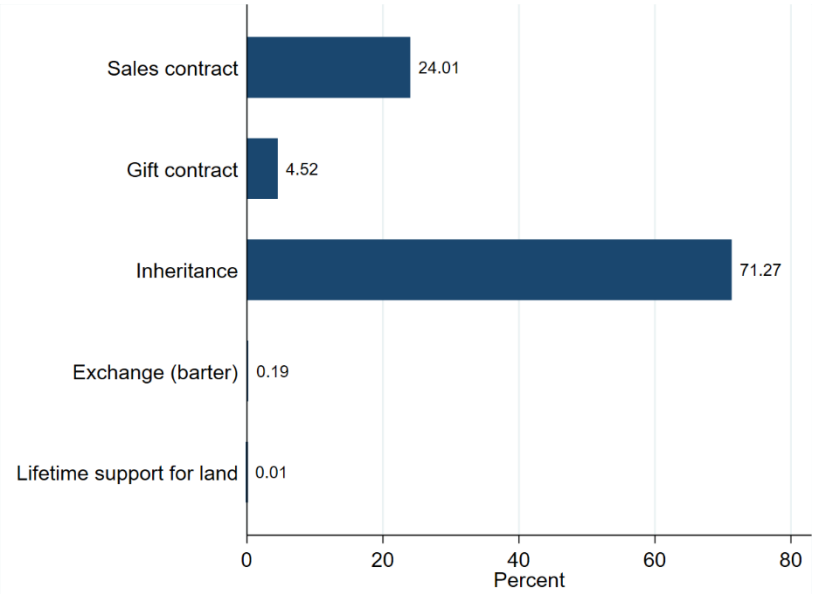

Figure 1. Distribution of the types of transactions.

[3] Gifting was prohibited whereas exchange of land plots subject to moratorium had been allowed under certain conditions.

We discover a number of duplicate entries among the sales contracts and we deal with them in two ways. First, we delete all the duplicates that have the same property rights registration number (1,152 observations) indicating input mistakes. Inspecting the observations with different registration numbers and registration dates, we find four cases when the same land plot was transacted twice within our four-month period. We keep only the latest transactions for our analysis.

A vast majority of land in our dataset is arable land (81.64%).[4] We observe similar shares of arable land for all types of contracts and land-use purposes. If we focus on the land that was under moratorium and was purchased, the respective percentage goes up to 90.74%. The other two substantial categories of the transactions were related to the plots for pastures (9.77%) and hayfields (8.05%). The rest was related to built-up areas, water bodies, and other types of lands.

After lifting the sales moratorium for private land, we observe increases in the sales volumes not only for the formerly banned land but also for the land that had been freely traded before July 1 (OSG-land). Figure 2 demonstrates the distribution of contracts and areas from July to October by land use purpose.[5] Although the number of contracts with the OSG-land is larger each month, the areas of land for commercial agriculture appear to be larger because of the difference in the average plot size. Despite the fact that the market for the OSG-land had existed before July 1, 2021, we observe an increase in the volumes of OSG-land transactions paralleling the land for commercial agriculture. A possible reason for this is that the market of the OSG-land was slowed down by the new requirements of checking the total ownership limit. Lack of notaries in some areas may have prevented some transactions from happening but as more notaries obtained access to the Cadaster database and learned how to register land property rights, the volumes of OSG-land turnover recovered. Although we observe an increase in transactions for this type of land as the sales market matures, there are signs of stabilization in September-October. The other types of transactions were relatively small in number and concerned farming enterprises (0.69%), subsistence farming (0.26%), and gardening (5.22%).[6] It is worth pointing out that we observe a substantial growth of the transactions with land plots for gardening from 283 transactions in July to 481 transactions in October. This could be considered a positive development

[4] Based on the "Classification of land types" adopted by the CMU Resolution No. 1051 from 17.10.2012.
[5] Based on the "Classification of types of land use purpose" adopted by the CMU Resolution No. 1051 from 17.10.2012. Excerpt of the classification could be found in Appendix A.
[6] For a more detailed overview of the land use purposes see Appendix A.

because it reflects the social trust in property rights associated with the land. Unlike annual crops cultivation, gardening typically requires higher land-related investments which are highly dependent on tenure security. Interestingly, plot sizes for gardening are typically smaller and consequently, the areas traded appear to be smaller on the right-hand side of the Figure 2.

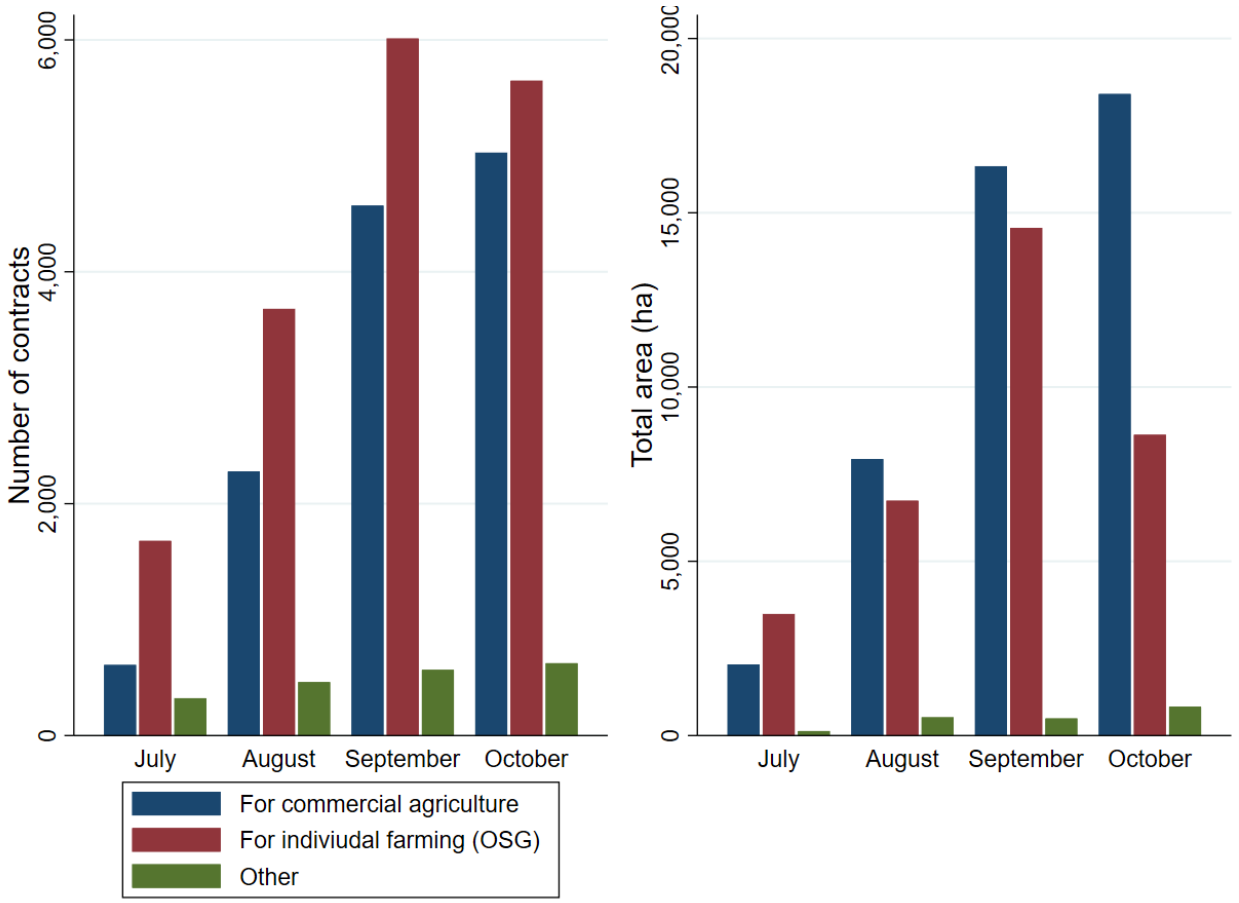

Figure 2. Distribution of sales contracts by number (left) and area (right).

It is important to point out that important information is missing in the datasets which prevents conducting a sound analysis. First, sales prices are reported only in 53.48% and NMV in 68.81% of the sales observations. These key variables need to be reported mandatorily to avoid biases in the analysis. Second, stylized categories of sellers and buyers are essential to understanding the flows of land. To preserve the anonymity of market actors, generalized categories could account for a seller/buyer being an individual, farm enterprise, agricultural enterprise, local government, cooperative, or other legal entity. Third, expert monetary valuation could provide a better clue about the expected market value of a given land plot. Finally, payment in installments should be reported as well because it may substantially affect the sales price.

3.2 Spatial distribution of transactions

The sales market of the land formerly under the moratorium appears to be more active in northern and central regions. According to Figure 3, Kharkiv, Poltava, and Sumy oblasts are the leaders in terms of the total number of transactions that took place between July 1 and October 31 with 1383, 1192, and 1033 contracts registered, respectively. On the other hand, the least sales of the land for commercial agriculture took place in Rivne (25), Volyn (63), and Ivano-Frankivsk (66) oblasts. At large, we see more interest in the land in the oblasts with traditional intensive agriculture. The demand appears to be weaker in the eastern oblasts, mountainous western regions as well as Polissia region.

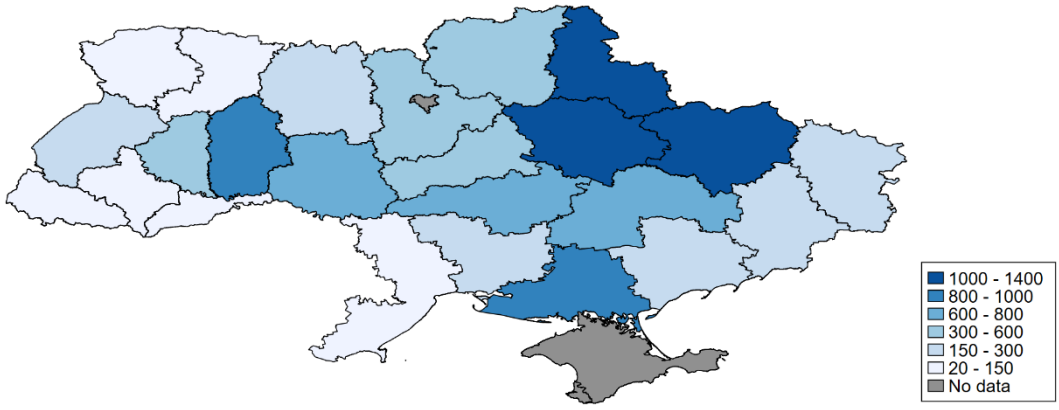

Figure 3. Number of plots transacted (commercial agricultural land only).

Considering the size of the plots transacted is an important aspect in understanding the volumes of land traded. Figure 4 suggests that there are structural differences in the transacted land plots across the country. Thus, the average plot size in the eastern and southern regions was strictly larger than 5 ha (with an exception of Donetsk oblast with an average plot size between 4 ha and 5 ha). This stands in contrast to the western oblasts with an average transacted plot size strictly below 2.5 ha. The reason we observe these differences relates to the patterns of the distribution of the collective farmlands during the 90s. In particular, in the southeast of Ukraine, the ratio of the area of collective farms to the number of employees was significantly higher (2-5 times) than in western Ukraine. This led to a correspondingly smaller size of land plots that were distributed to the people.

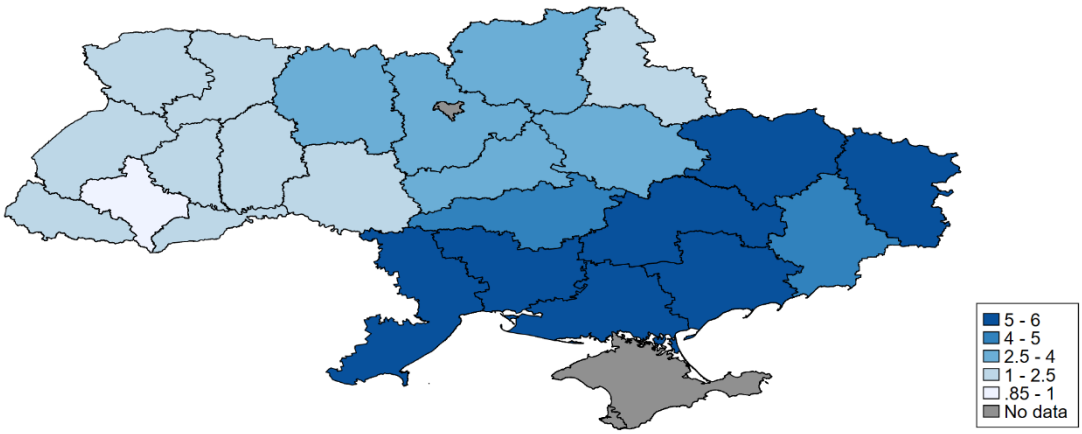

Figure 4. Spatial distribution of average transacted plot sizes in ha (commercial agricultural land only).

Total area transacted provides an idea about the most active oblasts in terms of volumes of trade with the land formerly under sales ban. Figure 5 suggests that Kharkiv oblast is a clear leader with 7117.9 ha registered as sales transactions, which is by far much more than in any other oblast. It is a surprising result because Kharkiv is not among the oblasts with the most intensive agricultural production. Thus, the reasons for such a land market activity should be investigated in more detail. One possible explanation is the increase in transactions for agricultural land for further development near large cities. The next oblasts ranked by trade volumes are Kherson (4298.9 ha), Dnipropetrovsk (3798 ha), Poltava (3643.5 ha), and Kirovohrad (3311.4 ha) oblasts. The latter three regions represent the oblasts with traditionally high agricultural production where we would expect a high demand for land. On the other hand, Kherson oblast is another unexpected leader in terms of land sales transactions. A need for irrigation-related investments in Kherson oblast may incentivize farmers to avoid tenure insecurities and purchase land at the early stages of market development.

On the other extreme, we observe a dramatically different situation in the western regions. Rivenska and Ivano-Frankivska oblasts demonstrate the lowest land sales activity with total areas transacted 55 ha and 57.5 ha, respectively. Further forest and mountainous regions demonstrate

low sales market activity as well. A surprisingly low level of transactions is observed in Cherkassy region with its intensive agricultural production.

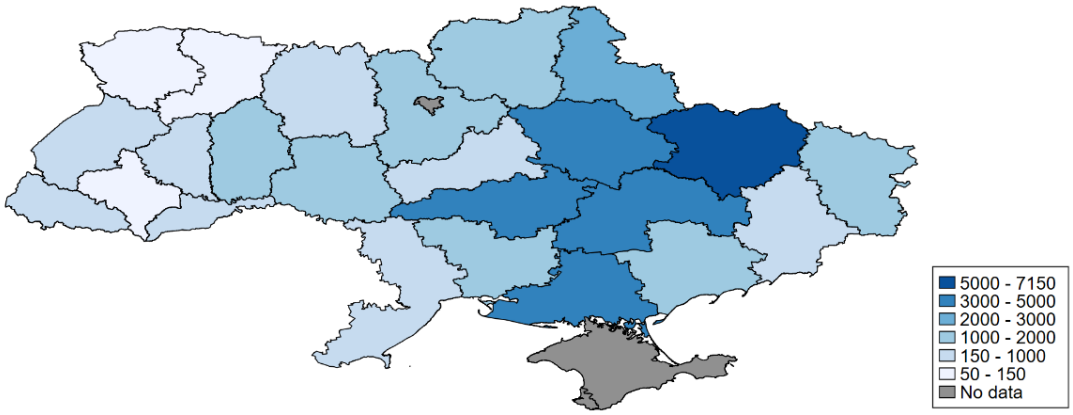

Figure 5. Spatial distribution of total land transacted (commercial agricultural land only).

When compared to the distribution of transactions of the land designated for individual farming (OSG), the distribution is very similar. In particular, the distributions of the number of transactions as well as land volumes parallel the ones for the land for commercial agriculture. These similarities suggest that the market for the OSG-land functioned during the moratorium period achieving a considerable trade volume. Consequently, the data on the ownership and transactions with the OSG-land before the reforms could provide us with valuable clues about what to expect from the land sales market as a whole. Our recommendation would be to make publicly available the data on the OSG-land transaction before July 1, 2021.

The volumes of land traded appear to be low in comparison to more liberal land markets around the world. We observe on average 1-2% of agricultural land yearly turnover in the countries with established land sales markets and minimum sales restrictions (Deininger, 2003; Seifert et al., 2021). Our data suggest that the contribution to the turnover of the commercial agricultural land that had formerly been under the sales ban is 0.1%. Adding the OSG-land produces a turnover of 0.17% in the first four months of the sales market functioning. Assuming the same pace of transactions for the next two four-month periods, we obtain a yearly turnover of 0.51%. Thus, even allowing for a possibility of transaction volume growth, we are unlikely to observe a boom in the sales market.

3.3 Land prices

Because analysts report different average land prices after the launch of the sales market, it may be confusing for the general public. The key is to clarify which land we want to analyze the prices for. The two important classifications mentioned above are the purpose of land use and the type of land. Both were adopted on 17.10.2012 by a CMU Resolution No. 1051 and were modified a number of times. The former has two important categories for our analysis: land that was subject to the moratorium before July 1, 2021 (for commercial agriculture) and land that was freely traded (for individual farming – OSG). Although the land designated for commercial agriculture is of our particular interest, it may be useful to compare the prices with the OSG-land as the market for this type exists for decades. The type of land reflects the functional properties of a land plot, i.e. arable land, hayfields, pastures, swamps, water bodies, etc. To facilitate comparability, we focus on arable land only.

The prices for arable OSG-land and commercial agriculture land appear to be very similar. Figure 6 illustrates the distributions of the respective prices. We see that a vast majority of prices range between 20,000 UAH/ha and 50,000 UAH/ha for both types of land although the distribution of the prices for OSG-land is slightly skewed to the left. The median prices for OSG-land (32,084 UAH/ha) and commercial agriculture land (32,395 UAH/ha) are very close. However, the variance of the OSG-land prices is ca. 120 times larger than the variance of the commercial agriculture land price (flatter density). The right tails of both Kernel densities are longer suggesting the existence of extremely large values. Thus, we find 18 commercial agriculture plots and 367 OSG-land plots with prices over a million UAH per ha. Prices that high suggest a possible non-agricultural use of land especially in the light of recently simplified procedures of changing the land use purpose by the Law No. 2280 from 17.06.2021.

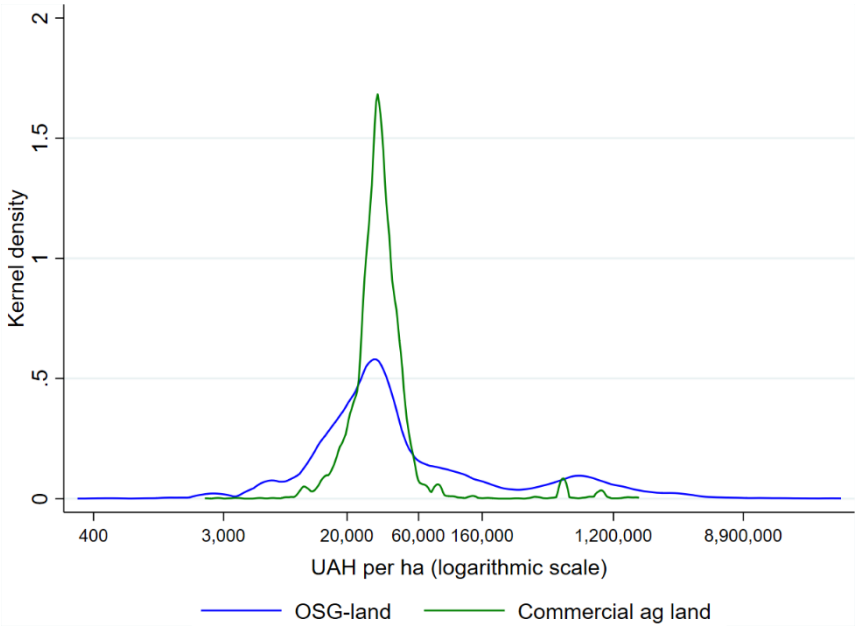

Figure 6. Distribution of prices for arable land.

With the help of Figure 7, we can locate the municipalities with extremely large price observations. We marked red those municipalities with average sales prices above 100,000 UAH/ha. Closer inspection reveals that these municipalities are in close proximity to large cities. In particular, we see clusters of high prices next to Kyiv, Kharkiv, Poltava, Cherkassy, Khmelnytskyy, and Vinnytsia. Proximity to the city infrastructure may incentivize the owners to change the purpose of particular land plots. A possibility of doing so in combination with prospects of non-agricultural activity with higher rates of return typically drives the prices up. It is important to note that the prospects of further use of agricultural land plots for development purposes (construction of residential and commercial real estate) remain out of direct monitoring. However, it is obvious that this factor significantly affects the value of land near large cities, coastal areas, and resorts. It should be noted that the long-standing ban on the sale of agricultural land also provided a ban on changing their purpose, and the lifting of such bans from July 1, 2021, significantly stimulated developers' interest in agricultural land, which has long been inaccessible for the construction industry.

Further inspection of the choropleth map with the municipality-wide average land prices (Figure 7) reveals the reasons behind different trade volumes across oblasts. Apart from the occupied

territories,[7] we see gaps in sales activity in the north-western Polissia and Carpathian mountainous regions. Moreover, Odessa appears to be lagging behind the rest of the neighboring oblasts.

It may be useful to observe the spatial patterns of the sales prices reporting as it may have implications for the representativeness of the pricing data. In particular, should we detect clear patterns in the missing data distribution, we may face biases because the prices for only certain land plots were reported. Figure 7 suggests that the municipalities where sales of commercial agricultural arable land took place but no price was reported are marked with white color. The municipalities with missing price data are spatially correlated because we clearly see clustering patterns. The three oblasts with the least reported prices are Zakarpatska (18.2%), Rivne (20%), and Luhanska (29.1%). However, these are the oblasts with the lowest number of transactions. What is worth pointing out is the low reporting rate in Kirovohrad oblast (35.7%) with its active land sales market. Whether this is due to a lack of notaries' experience or an intentional strategic action, localized targeted interventions may improve the situation with price reporting. On the other hand, mandatory price reporting would improve the situation dramatically.

Prices appear to also be spatially correlated because we observe clusters of higher and lower prices. As expected, we observe higher prices in Poltava, Cherkassy, Kyiv, Vinnytsia, and Khmelnytskyy oblasts. On the contrary, Polissia, mountainous regions, and south-eastern oblasts demonstrate on average lower land sales prices. These patterns correspond to the expected regional attractiveness of the arable land for commercial agriculture.

According to the Law on Land Circulation from 31.03.2020, the sales price of agricultural land cannot be lower than the NMV. Checking whether this provision is implemented in practice is challenging because similar to the data on sales price, data on NMV is not always reported (only in 68.81% of the cases). In addition, patterns of reporting NMV often do not coincide with the sales price. However, considering only the observations with both variables present, we can come up with basic descriptive statistics. First, the sales price for the commercial agricultural land was on average 43.7% higher than the NMV. However, we do find 1.8% of the cases when the sales prices were lower than the NMV contradicting the provisions of the abovementioned law. This is a very conservative estimate of the number of such cases because of so many NMV and prices not reported. In the most extreme cases, landowners received only 10% of the NMV. Each of

[7] Rayons of Donetsk and Luhansk oblasts as well as Crimea occupied by the Russian Federation in 2014.

these cases should naturally be subject to a check by the SGC and the other authorities concerned.

Finally, it should be noted that because of the changes in the NMV methodology, we may observe an increase in minimum sales prices in 2022. Although the CMU Resolution from 03.11.2021 does not introduce the factors that could change NMV values substantially, the law "On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine to Ensure Balanced Budget Revenues" from 02.06.2021 (which is likely to be approved by the Parliament by the end of 2021) aims to adjust the NMV by the previous year's consumer price index (CPI). Thus, it is reasonable to expect a 7-8% increase in the NMV in 2022 which will lead to a corresponding increase in the minimum sales prices for agricultural land.

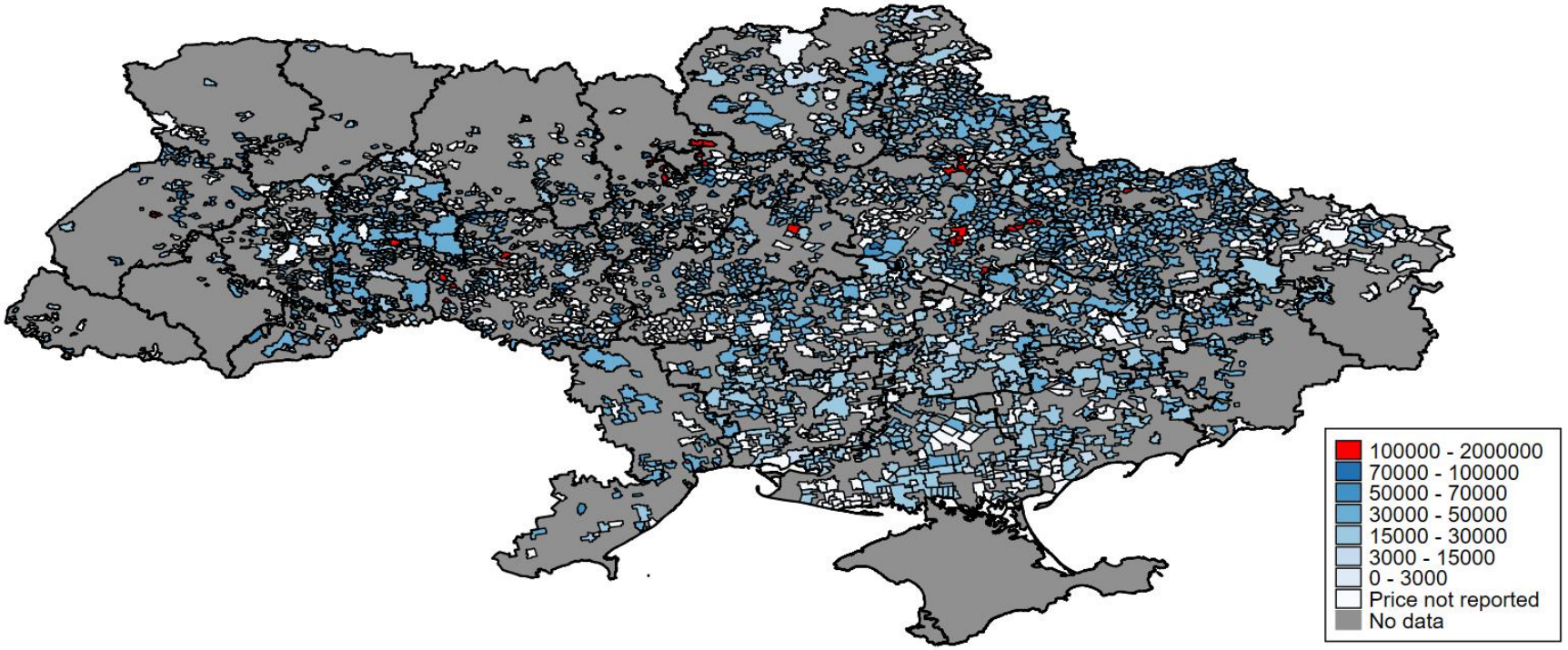

Figure 7. Average prices within municipalities (commercial ag arable land only).

Note: The base map uses the boundaries of the municipalities as of January 1, 2018, because the SGC-data was reported with outdated municipality identification codes (KOATUU).

4. Land concentration

4.1 Ownership data description

Although data on land ownership is indispensable in monitoring the trends in land concentration, the quality of the available data is insufficient. The SGC publishes weekly anonymized datasets about land ownership by individuals owning more than 20 ha of agricultural land (above 100 ha before August 16, 2021) and legal entities owning more than 100 ha. These could be thought of as weekly snapshots of the land ownership structure. The initial idea was to publish a baseline on June 30, 2021, as a reference point before the reforms. All the consequent weekly datasets would allow tracing the changes of land allocation after the land reform. SGC set the following criteria for the inclusion in the sample:[8] being in private property and being classified as "agricultural land" either by the "Categorization lands by the main purpose" (adopted by the CMU Resolution from October 17, 2012 No. 1051) or by the "Classification of the lands' purpose" (adopted by the SGC on November 1, 2010, by the Order No. 548). Following these criteria, we should obtain weekly updates about land ownership that should be traceable across the weekly datasets.

A major challenge we faced working with the data is that the criteria for selecting observations into the sample are not clear and appear to change over time. Although the rules for inclusion into the sample are stated publicly, the sample size among the waves changes dramatically. For instance, the sample with the natural persons starts with 4,523 individuals in the baseline sample on June 30th, then on July 1st it drops to 1,541 observations and stays stable until August 23 when it jumps to 15,782 observations, and, finally, on September 6th it doubles reaching 31,111 observations. According to the SGC, the first drop in the observations is due to the mistake of "including public lands in the sample" (no further explanation is given). The second change in the sample size is connected with lowering the minimal amount of land included in the sample to 20 ha. The latest doubling of the sample size is difficult to explain although it could be the inclusion of the OSG-land. Another challenge with the individuals' sample is related to anonymized IDs assignment which do not match across the weekly updates. In other words, no effort was made to preserve the unique identification of the landowners across the weekly samples. This obviously complicates tracing individual land ownership across time.

We also observe sample changes for the datasets with legal entities but tracing land ownership by legal entities is easier because of the unique business identifiers (ЄДРПОУ). Note that although legal entities are excluded from the market of the commercial agriculture land until July 1, 2024, they still can freely trade OSG- and some another agricultural land. However, we face the same

[8] Methodological note is available on the SGC's website here.

challenge with unclarity about the criteria of inclusion into the sample. On June 30, we have a large sample of 2,849 entities, and then immediately thereafter, on July 1, it drops to 124 observations. Similar to the data on individuals, we observe a doubling of observations on September 6th. Tracing the dynamics of land ownership within enterprises, we see an increase in land ownership on this date consistent with changing the criteria of sample formation. In line with the explanation of the SGC[9], we see that 80.52% of the entities could be attributed to local governments. Whereas thereafter, the share of local governments in the dataset drops to an average of ca. 7%. It is still not clear why this category is still found in the dataset and was not filtered out during the data cleaning.

In general, because of the deficiencies in land monitoring data listed above, it is highly advisable to reconsider the sample formation strategy. First, sample formation rules must be very clear and precise to exclude ambiguities. Second, the implementation of these rules should be improved. In particular, filtering the observations should be automatized to avoid sample contamination. Because the data manipulation may require additional resources, it may be more optimal to publish a full anonymized dataset which may open up the possibilities for the analysis.

Considering the challenges mentioned above, we work only with the datasets published for individuals and legal entities on November 1, 2021. In particular, the sample containing individuals with land ownership above 20 ha included 31,111 observations and the respective sample for the legal entities had a lower limit of 100 ha and contained 335 observations. Importantly, both of the samples represent small percentages of the total number of landowners because a vast majority of individuals own less than 20 ha of agricultural land and a vast majority of legal entities own less than 100 ha. Then, based on cadaster numbers of owned land plots, we merge these datasets with the data on land transactions. This allows us to trace the accumulation of land by individuals and legal entities. It is however important to note that we do not have the information about the reductions in owned land for the dataset with individuals.

For the sample with legal entities, we identified major legal forms within the dataset (Figure 8). As we can see, local governments are still represented by 6.87%. Considering that these observations were supposed to be filtered out after the first baseline sample, we see that the sample was not cleaned properly. A vast majority of entities account for private enterprises (74.33%) that include joint-stock companies, limited liability partnerships, and individual enterprises. Interestingly, we also observe roughly 10% of farm enterprises and 5% cooperatives that own more than 100 ha of agricultural land. Importantly, one bank is listed as an owner of more than 100

[9] You can access it at https://land.gov.ua/zemmon-zneoosob/.

ha. Because banks can acquire agricultural land only in cases of the clients' defaulting on loans, it provides an early sign that agricultural land collateralizability is getting higher.

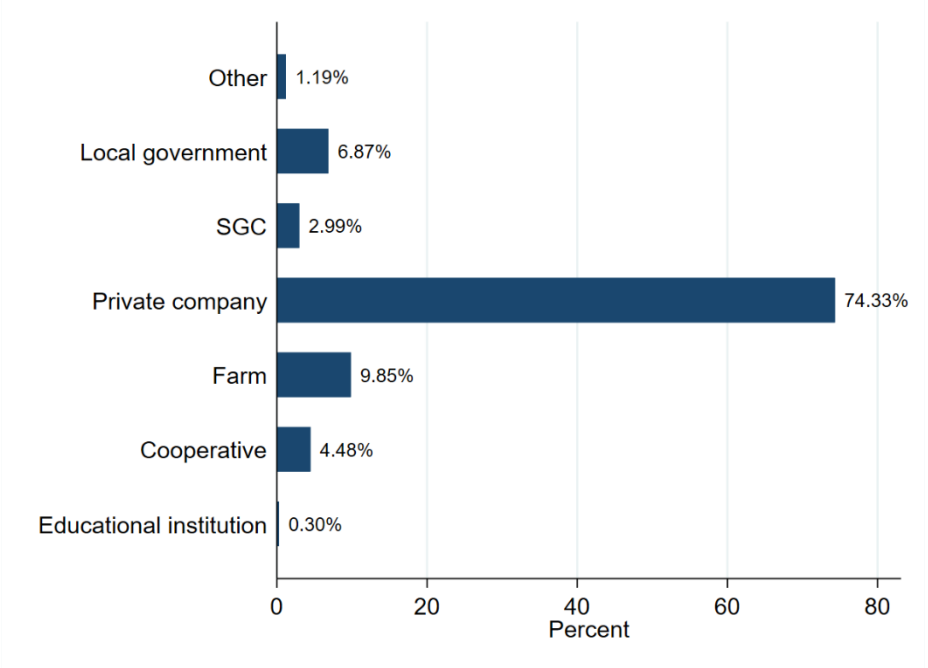

Figure 8. Entities found in the monitoring dataset as of November 1, 2021.

4.2 Land ownership and acquisition patterns

Figure 9 demonstrates the distribution of agricultural land ownership by individuals and non-public entities within our samples (we excluded 6.87% of observations relating to local governments). We see that the majority of owned land sizes for both types of landowners cluster around the lowest cutoff values: 20 ha for individuals and 100 ha for legal entities. The vast majority of the individuals within our sample own less than 100 ha. Interestingly, ca. 1% in our sample owns ca. 150 ha and 2% even 300-350ha. Those individuals most likely had accumulated land on the OSG-land market before the moratorium on land sales was lifted.[10] Most enterprises appear to own less than 1,000 ha with the largest land assets reaching 5,000 ha. These areas are likely to have been accumulated using exclusively OSG-land.

[10] Зазначимо, що обмеження в 100 га не поширюється на землю, придбану до реформ.

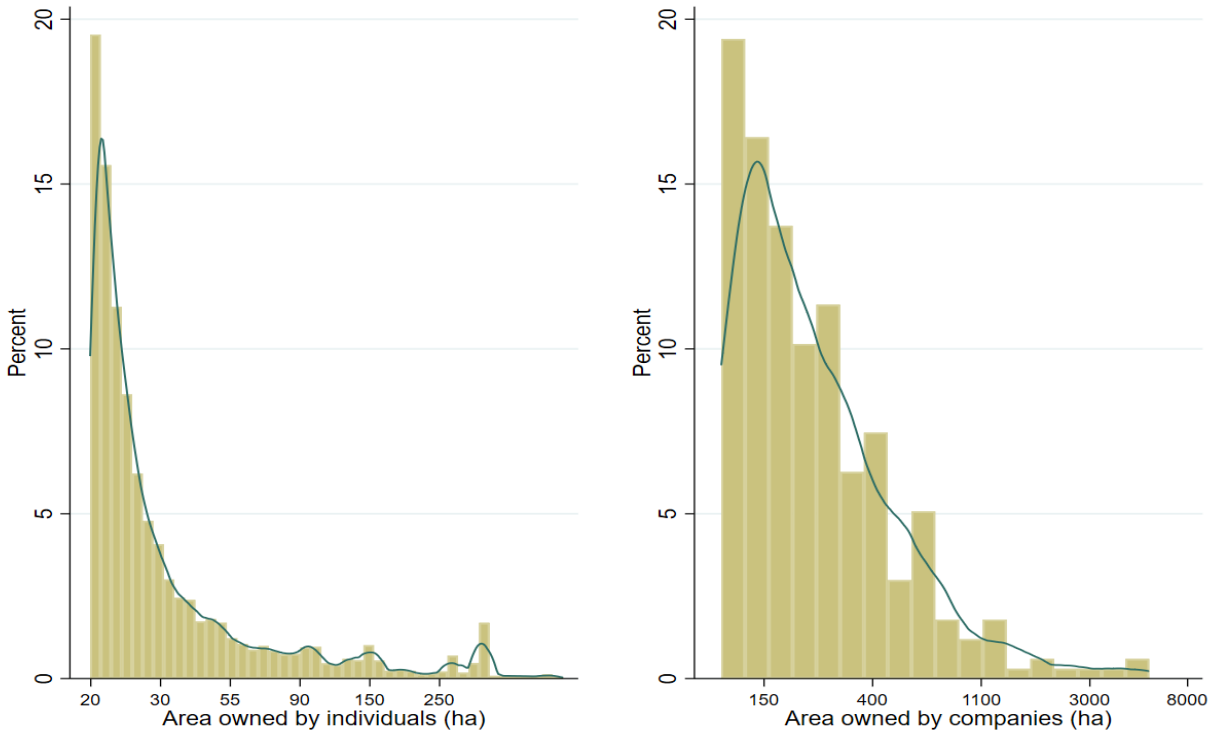

Figure 9. Land ownership distribution among individuals (left) and enterprises (right) as of November 1, 2021 (logarithmic scale).

Combining the land ownership data with the transactions that took place during the four months of our interest, we can analyze land accumulation trends to some extent. Among the individuals with over 20 ha of owned land, 7.15% appear to have purchased at least one plot of the land that was under sales moratorium before July 1, 2021. Figure 10 demonstrates the distribution of the total areas purchased[11] between July 1 and November 1 by the individuals with at least 20 ha of owned land. We see that the average area is larger for the commercial agriculture land than for the other types because the peak of the Kernel density is shifted to the right and the right tail is uniformly the highest. Interestingly, we see that purchased areas for all types of land do not exceed 100 ha suggesting that the 100-ha-restriction was adhered to. On average, individuals with over 20 ha of owned land purchased 16.63 ha of land for commercial agriculture and 9.54 ha of OSG-land during the period of our interest.

[11] Keep in mind that we exclude land that was inherited, gifted or exchanged. Thus, we consider land that was purchased only.

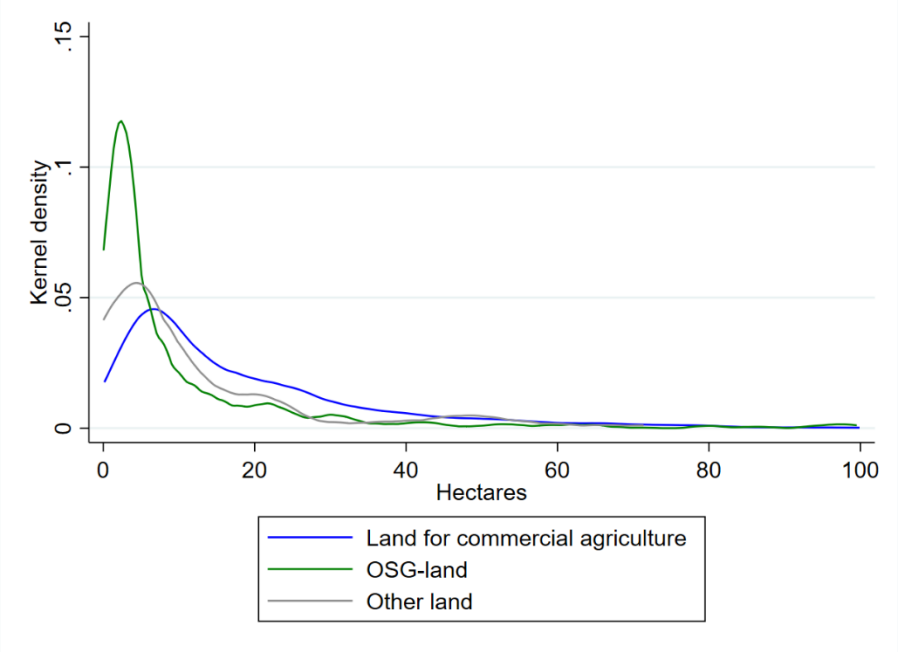

Figure 10. Distribution of the total area purchased by individuals between July 1 and November 1.

Although agricultural enterprises cannot purchase land until 2024 that had been under moratorium, unlike individuals, they are not bound by the 100-ha-rule and can increase their owned land via OSG-land. Among the 297 enterprises owning over 100 ha in our dataset, only five purchased OSG-land. These land gains were insignificant with mean purchases of 6.14 ha and a maximum – of 15.5 ha. Interestingly, five enterprises inherited land which allowed them to gain an average of 17.54 ha, and one enterprise inherited 53.61 ha in the four-month period of our interest. Although land inheritance by enterprises is legal, these cases need to be examined to ensure no discrimination of rights was in place. As a result, participation of private enterprises in the land sales market was marginal during the first four months after lifting the sales moratorium.

In general, land acquisition trends suggest that individual demand for agricultural land has been the driver of the market turnover during the first four months after the reforms. However, we do not observe a boom in land accumulation as was speculated by some observers before the reforms. While we see some individuals purchasing as much land as it is allowed by the law, agricultural enterprises appear to be largely inactive on the sales market of the land for commercial agriculture. For both, individuals and enterprises, a substantial part of land accumulation had taken place before the reform via the market of the OSG-land.

4.3 Spatial land distribution patterns

Because one of the central policy questions has been excessive land concentration, it is informative to analyze the prevalence of large landowners in different parts of Ukraine. Because data on landowners is not reported fully, we cannot calculate meaningful Gini or Herfindahl-Hirschman (HHI) indices. Instead, we construct an alternative measure of land concentration in line with the upper ownership limits for individuals of 100 ha specified in the Law on Land Circulation from 31.03.2020. Figure 11 demonstrates the concentration of land in the hands of relatively large individual landowners owning more than 100 ha. We see that such landowners are still relatively rare in Ukraine. However, there are differences across the country. First, we do not find any large landowners in Sevastopol and Chernivtsi region. Second, landowners with more than 100 ha own less than 1% of agricultural land in all the western Ukrainian regions. This could be attributed to the fact that land plots are on average smaller in the western regions. In addition, we observe the same situation in Chernihiv, Sumy, Poltava, and Luhansk oblasts. On the other hand, Odesa and Cherkasy oblasts are clear outliers in terms of land concentration with 12% and 9% of agricultural land being held by large landowners, respectively. Interestingly, Odesa oblast hosts some of the largest landowners in the country. In particular, we identified 28 individuals with over 500 ha of owned land.

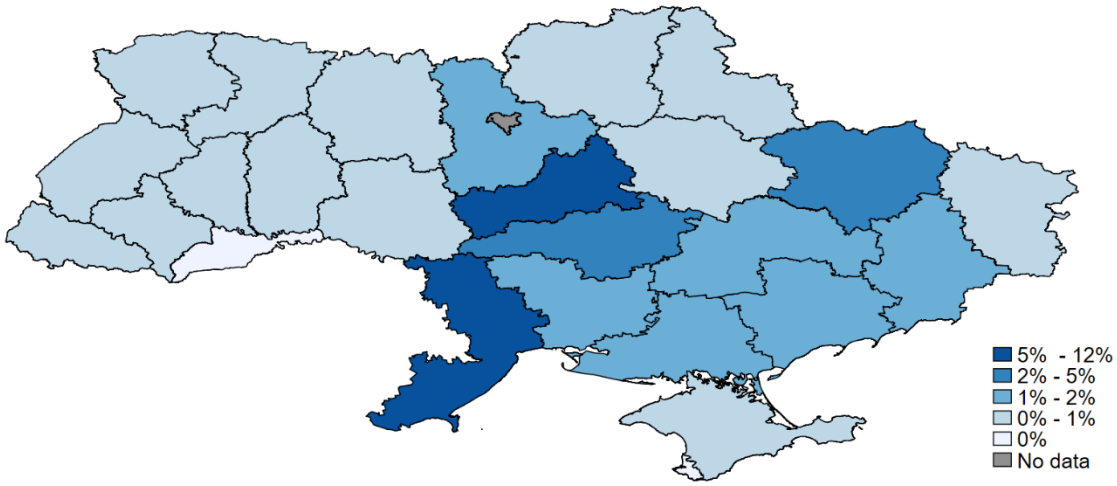

Figure 11. Share of agricultural land owned by individuals with at least 100 ha of owned land.

We observe lower levels of owned land concentration among enterprises. In particular, we identified only 297 enterprises with owned land above 100 ha (basically our full sample due to the larger cutoff value for enterprises). Figure 12 shows the analogous distribution of land concentration among enterprises fitting this criterion. The only two regions without registered enterprises with agricultural land are Autonomous Republic of Crimea and Chernivtsi. Interestingly, Sevastopol hosts a cooperative with 523.7 ha of owned land. We observe levels of concentration below

0.5% across the country except for a cluster around Kyiv, Zhytomyr, and Vynnytsia oblasts with over 0.5% of the total agricultural land owned by enterprises with over 100 ha. In Kyiv oblast, we observe many enterprises with owned land between 100 ha and 1000 ha. On the other hand, in Zhytomyr and Vynnytsia oblasts we find several enterprises with more than 2000 ha of owned land. Agricultural production in these regions typically demonstrates higher value-added in comparison to the central regions that focus on perennial crops cultivation with short-term business models. Higher investments associated with agricultural production with higher added value may generate demand for higher tenure security which translates into higher demand for owned land. Following the logic of this conjecture, we do not find comparable levels of owned land concentration in the regions with intensive agricultural production of central Ukraine. However, Poltava shows initial signs of concentration hosting two enterprises with over 1000 ha of owned land.

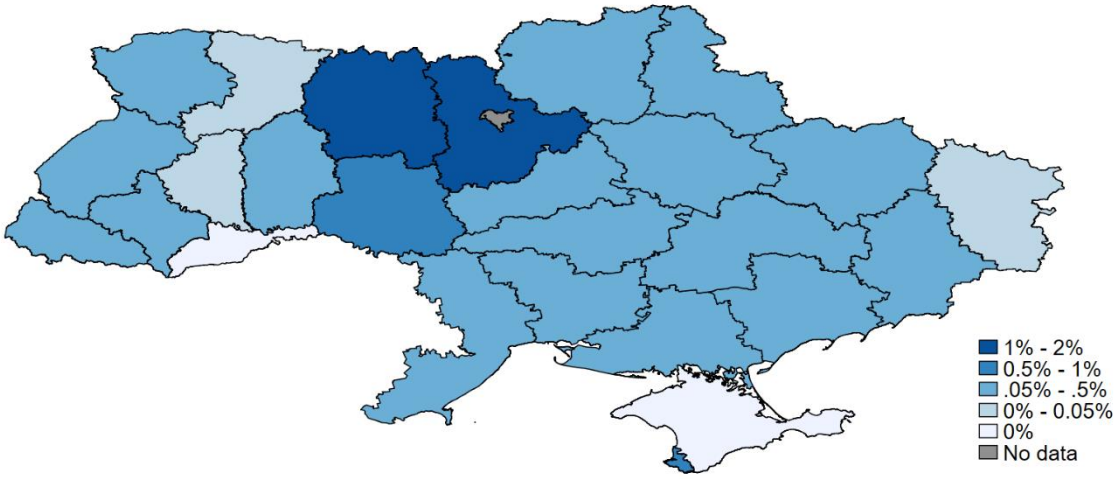

Figure 12. Share of agricultural land owned by enterprises with at least 100 ha of owned land.

5. Conclusion and discussion

Ukraine has entered into a new era and has made the first steps towards liberal reforms in land relations. After turbulent political and public debates, it is important to evaluate the results of the first trimester after lifting the sales moratorium. Throughout the reform process, transparency of land relations was put at the center of all the legal changes. Consequently, this study has a twofold task. First, we examine the dynamics of the newly established market and check whether the primary social fears about land sales fraud and increasing land concentration have had any ground. We generally find that the land market activity has still been below the expected level of 1% turnover with land concentration being still a relatively rare phenomenon. Although we do find an alarming 1.8% of the cases when land for commercial agriculture cost less than NMV, we

do not find further considerable violations of the institutional framework put in place by the reforms. This suggests that pre-reform fears have not materialized at this point. Second, dealing with the first task we inevitably face the limitations of the existing data and, as a result, we assess their availability and quality. Improving access to quality data can help with effective monitoring of the land relations and promote evidence-based policymaking.

5.1. First transactions after lifting the moratorium

Although volumes of trade with agricultural land went up after lifting the moratorium, we do not observe a boom in the agricultural land sales market activity because the market has been restricted to individuals only. Descriptive analysis suggests that transactions with the land for commercial agriculture largely parallel the market of the OSG-land that had existed before the reforms but they account for substantially larger areas. A projected yearly volume of land sales transactions is substantially below 1% of the Ukrainian agricultural land. An encouraging observation is that the share of contracts related to the land for gardening has increased similar to the other types of land. These trends suggest a certain degree of trust in property rights because gardening is typically associated with higher land-related investments.

We find large differences in land sales activity across Ukraine. We observe substantially more sales contracts in central and northern regions. Whereas sales markets are the least active in the eastern and mountainous western oblasts as well as in Polissia area. The fact that on average land plots are smaller in the western regions than in the East exacerbates the differences in the volumes of land transacted. An absolute leader in terms of the transacted area is Kharkiv oblast with over 7 thousand ha. Poltava, Sumy, and several central regions demonstrate relatively large land trade volumes as well. On the other hand, we have Rivne and Ivano-Frankivsk oblasts with only 55 ha and 57.5 ha transacted, respectively. These patterns are largely in line with regional climatic conditions and the geographical farming patterns that generate the demand for land.

The prices for the land newly cleared for the sales market are comparable with the OSG-land that had been traded before the reforms. During the period of our interest, we find the median prices for the arable land for commercial agriculture were 32,395 UAH per ha and for the arable OSG-land – 32,084 UAH per ha. For both types of land (but more so for the OSG-land), price distributions are skewed to the right suggesting a substantial number of plots with an extremely high price. These plots are typically found in municipalities close to large cities. In the light of a recent simplification of changing land use purpose, we suspect that those plots may find a non-agricultural use with higher value-added per ha. However, we also find clusters of municipalities with moderately high prices in rural areas reflecting the local high demand for land.

On the other hand, we identify areas with predominantly low and excessively low sales prices. The former could be driven by lower demand in a given region or market imperfections. With excessively low prices we mean that the sales price was below NMV contradicting the Law on Land Circulation from 31.03.2021. We found 1.8% of the cases with sales prices below NMV among the observations with both, sales price and NMV records present. Because of numerous missing values of the price and NMV, this is a very conservative estimate of excessively low sales prices. We recommend investigating how these sales were possible and how to prevent that from happening in the future.

In general, we are currently observing indications of a highly constrained land market. Prices appear to be on the lower sides of the expert pre-reform predictions reflecting a highly constrained demand for land. The exclusion of legal entities and ownership caps dampen the demand and land turnover substantially. There may be some bottlenecks on the supply side as well because some landowners may be expecting a more liquid market and plan to sell their plots at higher prices. In addition, the market infrastructure may still be in a formation stage giving rise to the costs of obtaining information by the market stakeholders. We expect prices and trade volumes to go up substantially after the restrictions are lifted on July 1, 2024, and once the market infrastructure is fully in place.

5.2. Land accumulation and concentration dynamics

We find that both individuals and agricultural enterprises have been actively accumulating land before the reform. Apart from natural persons, Ukrainian landowners appear to have a whole variety of legal forms according to the SGC dataset. Although the vast majority was represented by private enterprises, we also found individual farms and cooperatives. Importantly, on November 1, one bank was among the landowners with over 100 ha of land. This may be a sign of improving land collateralizability.

Although substantial land accumulation had been observed via OSG-land before July 1, 2021, individuals have been actively participating in the sales market of the land for commercial agriculture. Among the individuals with over 20 ha of land, 7.15% participated in the sales market of the land for commercial agriculture. On average, those individuals purchased 16.63 ha of land for commercial agriculture during the period of our interest. We did not find any instances when the 100-ha-cap rule was violated.[12] Interestingly, ca. 9% of individuals from our sample (lower cutoff of 20 ha) own more than 100 ha with the largest landowners reaching almost 10 thousand ha. These individuals, as well as enterprises, had been active on the market of OSG-land before the

[12] Although we did not consider inheritances in the total acquired land count.

reforms. It is noteworthy that they can increase their land assets even further as the land owned prior to the reform does not count towards the 10-thousand ownership cap. On the other, enterprises appear to have been much less active on the sales market during the period of our interest focusing exclusively on the OSG-land. Similar to individuals, legal entities possess substantial areas of OSG-land reaching over 5 thousand ha in some cases.

There are substantial differences in the patterns of land concentration between the individual landowners and agricultural enterprises. Large individual landowners with over 100 ha appear to control the largest shares of agricultural land in Odesa, Cherkasy, Kirovohrad, and Kharkiv oblasts. Odesa oblast appears to be the champion in terms of land concentration with 28 individuals owning over 500 ha. On the other hand, land concentration among the agricultural enterprises appears to be the highest in Kyiv and Zhytomyr oblasts. However, we observe several companies with substantially larger owned areas than the ones of the surrounding companies in Vinnytsia and Poltava oblasts. In sum, although we do not find signs of excessive land concentration, it is important to monitor the areas where it can potentially appear in the future.

5.3. Recommendations on land monitoring

Although publicly available data from the SGC has generated possibilities for analysis in comparison to the pre-reform times, we identified a number of challenges. The biggest challenge is the transparency of the sample construction procedures. We saw that for all the datasets we worked with, the criteria of observations inclusion changed at least three times in four months. These changes were not documented and can be only deducted from working with the data. Because of the changes in the sampling procedures, individual identifiers did not match across all the waves. This reduces the usefulness of weekly land ownership reporting for individuals dramatically. A related challenge is setting the lower ownership bound for the sample construction. Reporting only the observation above certain land-ownership sizes introduces serious biases in the analysis of owned land distribution. In particular, constructing meaningful land concentration metrics with consideration of spatial and structural differences in plot sizes is very difficult. These challenges can be easily overcome by investing more resources in data processing and preparation and/or simply by publishing the whole datasets, i.e. data on all landowners, and not only on those owning more than 20 ha for individuals or more than 100 ha for legal entities.[13]

As a result, a key recommendation refers to less restrictive data disclosure policies. In particular, publishing data on all landowners would minimize the need for sample formation and avoid the biases arising from inadequate sampling. To obtain a better understanding of the Ukrainian land

[13] There obviously has to be a lower cut off value but it has to be higher to allow meaningful analysis.

market as a whole, SGC should consider publishing the data on non-agricultural land as well. Our analysis suggests that data anonymization should be implemented in a way to preserve data comparability and traceability across the disclosed datasets. In particular, individual IDs should be preserved across the regularly published datasets. Moreover, the transactions data should include the information on stylized categories of sellers/buyers (individual, farm enterprise, agricultural enterprise, local government, cooperative, or other legal entity).

A more general structural challenge is related to data reporting. Because of the legal and technical possibility to avoid reporting land sales prices to the SRPRRE, we observe substantial gaps in the data. The spatial correlation of the non-reported prices suggests that we are likely to face biases in pricing data. For a representative and balanced pricing picture, it is essential that all prices are reported. Mandatory price reporting at the time of transaction registration should be an essential aspect of the reform. The same reporting system should be in place for the NMV. Having only 68.81% of the NMV entries in combination with almost half of missing price observations makes it almost impossible to properly check whether the sales price is at least as high as the NMV.

Several important information pieces are not reported within the existing monitoring system. In particular, the following data will allow conducting better market analysis and generate more precise forecasts:

- It is essential to include the **general categories of sellers and buyers** which would allow analyzing the flows of land towards/from producer groups and forecast land distributions outcomes.
- We recommend including both, **the actual price of the transaction and the expert monetary valuation** indicated in the mandatory report submitted to a notary. Similar to the NMV, **date of the expert monetary valuation** (indicated in the appraiser's report) needs to be included to provide a reference for specific market conditions.
- An important factor influencing the price of real estate is **the availability of installments** because it may change the price of a given land plot by a double-digit percentage range. Including a simple "yes/no" indicator for the installment payment scheme would prevent distortions in statistical modeling and improve land market forecasting possibilities.

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Appendix A. Classification of the use purposes of agricultural lands

Code	Name	Subject to moratorium (yes/no)
01.01	For commercial agriculture	Yes
01.02	For farming enterprise	Yes[14]
01.03	For individual farming (OSG)	No[15]
01.04	For subsistence farming	No
01.05	For individual gardening	No
01.06	For collective gardening	No
01.07	For amateur gardening	No
01.08	For hayfields and pastures	Yes
01.09	For scientific and educational purposes	Yes
01.10	For propagating modern agriculture	Yes
01.11	For providing services in agriculture	No
01.12	For hosting bulk markets of agricultural produce	No
01.13	For other agricultural purposes	No
01.14	For preservation and use of lands of the nature reserve fund	No

[14] There was no direct ban on the alienation of land for farming enterprise, but notaries have historically interpreted the norm of Article 1 of the Law of Ukraine "On Farming", according to which "farming is a form of entrepreneurial activity of citizens who want to produce commercial agricultural products, process and sell them." Therefore, it was widely considered that these land plots are subject to a ban on alienation as land for commercial agricultural production.

[15] As a general rule, these land plots were not restricted in economic circulation, but if a land plot with such purpose was obtained by allocating a land share in the distribution of lands of a collective agricultural enterprise, then it was prohibited from alienation. Land plots up to 2 hectares of size provided through privatization free of charge (but not land shares) were in free circulation.