Inequality in the Russian Agricultural Sector

On the unbalanced development of agricultural firms and the divergence of large agribusinesses from 2009-2018

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Abstract

This analysis seeks to find out whether state support measures have resulted in increased inequality in the Russian agricultural sector in the last 10 years. Based on firm-level data, several measures of inequality are constructed in section 4. All measures point to an increase in industry concentration, particularly in the livestock subsector. Several factors which may offer possible explanations for this increase are presented in section 3: stakeholders have a preference for larger farms, transaction costs for land and markets were higher for smaller farmers, and agricultural support measures give more support to larger farms. Lastly, the top 5 agroholdings in Russia were described. These holdings had particular advantages: special access to regular state support, excellent access to capital, and alternative state support in quasi-legal ways.

1 Introduction

Russian agricultural policy has been revived since the partial withdrawal of the state from agriculture in the 1990s (Sedik et al. 2017). Several agricultural policies and strategies have been developed since agricultural development was first identified as a “National Priority Project” in 2005. They worked: agricultural output has rapidly increased and productivity is gradually increasing (Rada, Liefert & Liefert 2017). Russian evaluations of the agricultural policy positively reflect on the decreased dependence on food imports, increased exports, and growth in agricultural land use (Ministry of Agriculture 2019).

There appears to be plenty of room for further growth. Whereas in most countries land has become scarce, Russia is one of the few countries which still has the potential to expand its agricultural land (Lambin & Meyfroidt 2011). As of 2016 almost half of agricultural land was not used for agriculture (Ministry of Agriculture 2018, 7-8). Large differences in agricultural land use exist between federal regions. In the Central (84% used), North-Caucasian (84%), Volga (89%), and Southern (90%) Federal Districts most farmland is used. The Siberian (51% used), Northwestern (18%), Ural (28%), and Far Eastern (8%) Federal Districts are relatively abandoned. With large fractions of unused potential agricultural land the supply of land is still far from being exhausted, although not all land may currently be economically viable.

At the same time, rural areas have become impoverished, particularly in comparison to urban areas (Wegeren 2014). In the Soviet Union large-scale collective farms (*kolkhoz*) provided support to smaller farms such as farming inputs (Amelina 2000) and provided much of the common infrastructure for farmers (Spoor & Visser 2001). However, rural infrastructure and social support networks around the Soviet *kolkhozy* gradually disappeared in the 1990s (Mamonova 2016, 116).

Agricultural development is an important driver of rural development.Farming activity is central to many rural economies, and consequently agricultural employment is one the most important drivers or rural employment (Kalugina 2014). Farm output has in many case caught up with or overtaken total outputs in from before the collapse of the Soviet Union (Rada, Liefert & Liefert 2017). This raises the question: where have these income gains from increased farm productivity gone?

This text analyzes several factors which may lead to different outcomes in revenues between large and small farms. In section 2 several explanations of unequal outcomes are presented. First, the effect of trade policy is considered. The Kuznets curve predicts trade having a clear effect on income inequality. However, due to the lack of empirical evidence this approach is rejected. Instead, an approach from new institutional economics is adopted. In this approach institutions are identified at several levels of analysis. These institutions can then be used to explain different outcomes between large and sophisticated organizations and smaller organizations with imperfect knowledge. Governments and other stakeholders in policy development can have embedded preferences for certain policies, such as a preference for bimodal over unimodal agricultural development. Lastly, section 2.3 shows the distributional effects of certain agricultural policies in other countries than Russia.

The next section describes and interprets Russian agricultural policies and institutions. Half of the federal budget for support measures to the agricultural sector is spent on subsidized loans, while a smaller share is spent on general infrastructure investments and agricultural development. Russian trade policy accounts for a larger amount of total support through market price support. This is partially achieved through specific import restrictions created in 2014, but has generally been present in Russia since before 2014.

Agricultural institutions offer another implicit support measure. Land trading has high transaction costs associated with it and requires a complicated legal procedure. Agricultural markets similarly have high transaction costs. Larger companies can overcome these costs through vertical integration and better knowledge of the relevant procedures. Further, they can perform some legal and illegal activities generally unavailable to small farmers, such as speculating on real estate developments, falsifying documents, or creating elaborate legal constructions to avoid restrictions.

Section 4 considers firm-level revenue data in the agricultural sector. Revenues are included for the total sector and by a grouping of OKVED classifiers. This exposes the different sectoral dynamics per income category. A similar approach was first applied to Russian agriculture by Wildnerova & Blöchliger (2020) to evaluate company productivity. They found that markets are very concentrated around a small group of firms. This analysis confirms that finding and expands on it by including additional measures and considering their development over a decade. The increase in inequality is consistent across different measures and different subsamples.

The development of market shares of small and large companies in several subsectors is then considered. It is found that inequality has increased across the

agricultural sector, but specifically in the lifestock industry. This sector was among the sectors receiveing the largest direct and indirect state support in 2009-2018. The increase in market share for very large businesses is due to just 16 companies.

These companies included subsidiaries of the top 5 agroholdings. These holdings have received a disproportionate share of subsidized loans and direct subsidies. Further, they engaged in some of the quasi-legal activities described in section 3. This indicates that agricultural policy and institutions is indeed biased to larger farms, and that this bias has led to increased inequality in revenues in the Russian agricultural sector

2 Literature review: inequality and agriculture

Economic policies often affect a wide variety of economic actors. Agricultural policies aimed at increasing agricultural production can affect agricultural producers ranging from hobby gardeners to agribusinesses with billions of dollars in revenue. Though these producers' individual responses to a policy can be affected by any number of individual factors, theoretical explanations can often be used for the aggregate effects of a policy. Inequality measures can be used to aggregate information on the differences between producers. Changes in inequality measures will then be due to relative changes between producers. For a sectoral analysis on agriculture, inequality measures can thus be used to see whether sector wide policies had an outsized effect on certain groups of companies.

This section aims to introduce some useful concepts for analyzing the link between inequality and the agricultural sector from trade theory, institutional economics, development economics, and policy analyses performed in other countries. The term "inequality" in an economic context is first described with a brief introduction of the issues that arise when studying this phenomenon. It will be shown that several assumptions must be made in any analysis of economic inequality, as each appropriate measure of inequality implies a preference in the relative changes needed to reduce inequality in the distribution of an economic quantity. Further, a preferred economic quantity for assessing inequality must be chosen. This can further complicate analysis due to the limited availability of data. Such restrictions will be revisited when establishing the methodology used to measure inequality in the Russian agricultural sector in section 4.1.1.

Next, macroeconomic predictions on the way policies affect inequality are described. Inequality is often studied in the contexts of trade and economic development. These contexts can be used to identify relevant ways through which agricultural policies may affect economic inequality. Traditional (i.e. Hecksher-Ohlin) trade theory makes general predictions about the effects that trade liberalization will have on the distribution of incomes from labor and capital. These predictions will be described in section 2.1.

In the context of economic development a framework is presented in which development strategies can be classified into restricted categories of bimodal and unimodal development. These strategies lead to different distributions of

farm size, and if a country is identified as focusing on one strategy in particular assumptions can be made about the expected farm size. The implicit or explicit choice for one strategy or the other in Russia will be discussed in section 3.3.

Further, new institutional economics is briefly introduced. This approach can be used to understand the way institutions shape economic actions, and how they are related to inequality. The predictions arising from these theories may thus be used to hypothesize the redistributing effects of agricultural policy in Russia, as will be done in section 3.

Lastly, several studies are highlighted on the distributional effects of agricultural policy between and within countries. These more empirical studies supplement the theoretical preceding sections. Support to agriculture keeps agricultural production split between a highly subsidized and capitalized agricultural sector in developed countries, and more labor-dependent farm production in developing countries. Though at a global level US and EU policies distort markets to the benefit of American and European producers, subsidies are used within the country to allow more equitable outcomes. There have been some policy developments in the last decades that have changed the redistributive characteristics of farm subsidies. In the US subsidies lead to more concentrated incomes due to extensive lobbying efforts, whereas in the EU direct payments have a slightly equalizing effect.

2.1 Trade and inequality

Income inequality has grown in nearly all countries since 1980 (Alvaredo et al. 2018). Russia is no exception as inequality rapidly grew in the 1990s before generally stabilizing in the 2000s (Novokmet, Piketty & Zucman 2018). In Russia's case this measurement period started in 1989, coinciding with a major economic transition away from a socialist planned economy. Russian income and wealth inequality appears to have grown faster than inequality in other countries transitioning to a market economy after the dissolution of the Soviet Union (Novokmet, Piketty & Zucman 2018, 217-221), though it should be noted that a comprehensive longitudinal analysis of this development has not yet been performed for all transition countries (Novokmet 2017). Globalization and trade liberalization have been proposed as possible causes of this growth in global inequality (Goldberg & Pavcnik 2007).

This does not seem to be in line with the expectations laid out by orthodox trade theory. The Hecksher-Ohlin general equilibrium trade model, the "backbone of traditional trade theory" (Leamer & Levinsohn 1995), predicts that trade reduces

global inequality. Under the Hecksher-Ohlin model international trade redistributes resources between countries where they are abundant to places where they are scarce. For simple resources this is quite straightforward, as it is likely that a country rich in coal will sell coal to a country with less coal.

The model gets more complicated when considering relative factor endowments in labor. The Stolper-Samuelson theorem (Stolper & Samuelson 1941) extends the Hecksher-Ohlin model to wages. Countries with high factor endowments in unskilled labor are assumed to specialize in production drawing on unskilled labor under Hecksher-Ohlin theory. If a country reduces trade restrictions in order to sell its produce at higher prices in other countries, the price increase for the product would increase the price for unskilled labor. Developing countries are expected to have higher labor factor endowments. This way, trade liberalization could increase wages for unskilled workers in developing countries. On the other hand, countries with a low labor factor endowment could see drops in wages for unskilled workers.

Empirically confirming any hypothesized causal link between globalization and inequality is tricky due to the broad and loosely-defined nature of both globalization and inequality, as well as data limitations for most countries. Globalization in an economic context here is taken to mean trade policy liberalization in a broad sense. Trade policy liberalizations can include reductions in tariff and non-tariff barriers, but also migration, offshoring, reducing monetary constraints or fiscal support to certain sectors through industrial policy. New issues may arise if one of these specific trade policy changes is chosen as a general proxy for trade policy liberalization. For example, if detailed sector-specific trade restrictions are considered, aggregation with (inaccurate) industry data will still be needed to construct a general proxy for trade restriction. This may lead to compounding errors (Goldberg & Pavcnik 2007, 41-45).

Inequality as an economic term is similarly hard to define (Atkinson & Brandolini 2001). First, inequality itself has to be assigned to a loosely defined quantity such as income, assets, or consumption. These measures then need to be specified. For example, income can come in many forms including income derived from wages, investments, or even gifts. The choice of income streams included in an income measure can differ between countries, making cross-country comparisons harder to achieve. This issue has recently been addressed by establishing standardized cross-country measures for several forms of income (Solt 2016). Cross-country longitudinal data based on these measures going back to 1960 has recently become available for some countries for several forms of income (Solt 2020).

Not only the economic quantity measured needs to be specified to measure inequality. Any measure of inequality is a summary statistic of the economic quantity considered. The choice of this summary statistic for inequality has implications for the assumed social welfare in a measure (Atkinson 1970). For example, an inequality measure could theoretically increase if poverty decreases in the lowest 20% of incomes. This likely would not reflect implicit assumptions about inequality, as an increase in the income of the poor would be expected to lead to lower inequality. The different behaviour of inequality measures under income changes determines the choice of measure.

Bergson-Samuelson social welfare functions (Bergson 1938) are used to summarize these assumptions about welfare. These social welfare functions can be interpreted as functions that relate individual welfare to societal welfare. For example, a utilitarian welfare function takes the sum of individual welfare as social welfare. A Rawlsian welfare function would set social welfare at the minimum of individual welfare (Stark, Jakubek & Falniowski 2014). When choosing the inequality measure one should take into account the restrictions the measure places on the Bergson-Samuelson social welfare function. Many measures are in use, such as the Gini coefficient, P90/P10, or the Theil coefficient. Each inequality measure has different implications for social welfare assumptions (Cowell 2011). In short, implicit assumptions on welfare have to be taken into account when choosing an inequality measure. Different inequality measures will be shown and reviewed in section 4.1.

The difficulty in connecting changes in trade policy to inequality have resulted in a wide variety of empirical studies attempting to establish this link. Early 21st-century analyses on this prediction did not conclusively show whether this general prediction holds (Banerjee & Newman 2003). Theories on the link between inequality and economic development offer another avenue to explore when looking for general explanations of inequality.

2.2 Economic development and inequality

No discussion of the link between inequality and economic development would be complete without discussing the Kuznets curve (Kuznets 1955). Kuznets compared some of the sparse data available on income distributions at the time and found that inequality was higher in developing countries than in developed countries. The hypothesized explanation for this was that development consisted of two stages. First, inequality increases as industrialization benefits a minority of the population. Later, as a larger share of the population moves from (low-wage) agriculture to more productive (high-wage) industrialized labor, the benefits of

productivity growth are spread more equally (Kuznets 1950, 5-32). The Kuznets curve refers to this inverted U-shaped change in inequality over time: an initial increase followed by a decrease.

More than sixty years after its initial statement, the Kuznets curve hypothesis has become one of the more controversial hypotheses in economics. The search for evidence of this curve has been compared to the “search for the Holy Grail” (Ray 1998, 177) of development economics as finding it would amount to finding a universal law of economic development. The Kuznets hypothesis was largely based on data from the United States from a period (1913-1948) in which large exogenous shocks occurred to its economy, which could have resulted in the observed pattern of decreasing inequality. However, there is limited to no further empirical evidence for the Kuznets curve; longitudinal data even suggests that the Kuznets curve may be inverted (Gallup 2012). The hypothesis may have been politically expedient as it could have been used to justify the spread of Cold War-era free market ideology to underdeveloped countries (Piketty 2017, 13-15).

The work of Thomas Piketty may be juxtaposed to the Kuznets hypothesis (Lyubimov 2017). Piketty used panel data starting in the early 20th century for several inequality measures to establish that no there was no spontaneous process through which economic development lowers inequality (Piketty 2017). Instead, the decrease in inequality from World War I to the 1970s was due to taxation and destruction of wealth. In this approach inequality is not intrinsically linked to economic development, but rather “shaped by the way economic, social, and political actors view what is just and what is not, as well as by the relative power of those actors and the collective choices that result.” (Piketty 2017, 20). The drivers of inequality then need to be studied while considering the motives and incentives of different actors. This approach will be taken here; some drivers of inequality in the Russian agricultural sector will be described in Section 3.

The particular economic circumstances of Russian agriculture would make not only the Kuznets curve approach difficult, but would complicate any general macro-level explanation. The sector contributed only 4% of Russian gross domestic product (GDP) in 2017 (USDA Foreign Agricultural Service 2018, 4), so it can hardly be taken as a proxy for the Russian economy as a whole. The sector accounted for 7.5% of total employment in 2017 while about a quarter of Russians live in rural areas. A sector-level Kuznets hypothesis on inequality within the sector would have to somehow take into account the other 96% of the economy, 92.5% of jobs, and three quarters of the population. Meso-level and micro-level theories, i.e. explanations applicable at respectively a sectoral or individual level, would instead be needed to explain distributional effects in the sector.

Theories of agricultural development may offer a frame for thinking about rural and agricultural development in Russia, despite the limited explanatory power of such theories by themselves. Two such theories are presented here. The first theory concerns the implicit choice between broad-based development and developing highly productive farms. This simple classification can be used to explain different income distributions. Secondly, the role of institutions is described. Works from the field of new institutional economics can be used to explain how the design of institutions leads to a convergence or divergence between incomes.

2.2.1 Bimodal and unimodal development of agricultural production

When setting an agricultural development strategy in developing countries a choice must implicitly or explicitly be made between two broad strategies: a 'unimodal' or 'bimodal' strategy (Johnston & Kilby 1975). A unimodal strategy aims to spur a broadly carried increase in productivity throughout the sector, whereas a bimodal strategy focuses on developing a smaller amount of productive large agribusinesses to drive growth. Bimodal policies may inhibit unimodal development by allocating limited resources to innovation in large enterprises rather than to sector-wide productivity growth. Fixing a development path to only two modes of large and small producers may appear arbitrary as many different distributions could exist. However, global agriculture appears to be increasingly bifurcated between competitive agroindustries integrated into global markets and poorer local farmers with no exposure to global or even local markets (Von Braun 2005). Building globally competitive agroindustries means operating on global markets, and bimodal development aims to achieve just that: creating businesses that compete with imports and even export goods.

Bimodal and unimodal agricultural development bring different benefits. There is no generally optimal farm size for economic development (Koester 2007, 15-16). Neither is there an immediate link between bimodal or unimodal agricultural policy spurring growth as for both policies some countries experienced growth while others did not (Anríquez & Bonomi 2007, 5).

Smaller farms respond better to random production shocks caused by unexpected circumstances and have limited opportunities for specialization (Allen & Lueck 1998). If constant or even diminishing returns to scale can be assumed, smaller farms can compete with larger farms. Defenders of unimodal ("small-farm-first") development assume that small farmers help provide inputs to other sectors including raw materials, foreign currency, labour, capital, and consumption (Ellis & Biggs 2001, 441-442). These inputs would enable the growth of non-farming sectors leading to general productivity growth. Small farm

growth was found to lead to higher growth multipliers in Guatemala due to higher employment generation despite the small farms being slightly less productive per hectare than larger farms (Dürr 2016).

However, larger farms may have economies of scale which stand to benefit from technological improvement. Several Russian academics argue for larger farms. Kryachkov et al. (2013) note that economies of scale in inputs (such as wage costs, fertilizer costs or fuel) optimize costs for farms of 10.000-14.000 ha. Based on this they called for further consolidation of smaller farms. Ivanikhina & Ivanikhin (2019) found that the 5 largest agricultural producers in Yaroslavl were on average more effective than 20 smaller producers. Zabutov (2010) similarly found in the Leningrad region that local agricultural companies had some economies of scale for staff and material resources. Khramova (2011) identified possible positive effects that may occur if agribusinesses merge and stated that mergers are the best way to increase competitiveness and ensure stability. Existing distributions of land and capital may affect the choice between these two forms of development (Anríquez & Bonomi 2007, 4-5). If lands are unequally distributed large landholders can have an outsized effect on agricultural policy leading to a focus on larger businesses.

Economies with more unequal land distributions generally grow less fast than economies with more equal land distributions (Deininger & Squire 1998). Of 15 countries with land distributed with a Gini coefficient higher than .7, indicating a highly unequal distribution, only in Israel, Brazil and Puerto Rico GDP grew faster than the world economy from 1960 to 1992. Note that these countries may each have particular traits that might explain their additional economic growth better than their land distribution. Deininger and Squire (1998) further found that the initial distribution of land had a much stronger correlation with growth than income did; indicating that the Kuznets curve is absent or weak in this case. Particularly for the lowest earners a more equal initial land distribution was associated with higher income growth. Only for the top quintile of incomes a lower Gini for initial land distribution was not associated with a significant increase in income growth.

The above discussion indicates that a single and general optimal size range for a farm cannot be set, and that the choice between highly capitalized large farms and investments in smaller farms is not straightforward. Bimodal and unimodal development paths do have different effects. Smaller farms lead to higher employment and can thus drive up wages, whereas larger farms could bring more investment into technological improvement. This implies that a bimodal development policy focusing on larger farms would lead to more concentrated gains and thus greater inequality.

2.2.2 New institutional economics

A government can shape the agricultural sector not only through agricultural policies, but more broadly by reshaping many institutions in agriculture. 'Institutions' is here a broad term to describe any "written and unwritten rules, norms and constraints that humans devise to reduce uncertainty and control their environment" (Menard & Shirley 2005, 1). An institution could include policies such as trade restrictions, phytosanitary policy, or subsidies. However, the broad scope of the definition allows for additional institutions to be included which could fall out of the scope of more conventional definitions. By this definition property rights are also an institution. But even informal institutions could be studied as a market institution. For example, the informal barter system of *blat* (Ledeneva 1998) which works by exchanging favors could act as a market institution.

The study of such institutions is called new institutional economics (Menard & Shirley 2005, 1-18). The way an economic actor interprets the institutions affecting them will drive their actions. An economic actor interprets their environment with uncertainty about the future and limited time to spend on any activity. In this sense, new institutionalism departs from the neoclassical approach by rejecting perfect knowledge. However, it does not reject the core of neoclassical economics and could be seen as an expansion of it.

In particular, new institutional economics expands on neoclassical economics by looking at different levels of analysis. Williamson (2000) described 4 levels of analysis that economists may look at. (1) First, there are social institutions which change every 100 to 1000 years. These first-level institutions may include embedded institutions, customs, traditions, or religion. (2) Next, there are institutions which change every 10 to 100 years, including the "rules of the game" at the level of a polity such as property rights or legal systems. (3) One step down at 1 to 10 years are general governance structures including laws or state policies. (4) Lastly, resource allocation and employment continuously affect actors. This last category is studied by neoclassical economics, whereas the second and third categories are in the domain of new institutional economics.

This admittedly abstract and high-level approach to institutions becomes useful when considering institutional reform. First-level reform would be particularly difficult to achieve as embedded institutions can cause actors to behave in ways that appear to be opposed to their interests (Granovetter 1985). In the transition away from communism in Russia, the country joined an international economic order with "embedded liberalism" (Ruggie 1982). There is an obvious incongruence when institutions with embedded liberalism are shaping policy in

countries where communist ideology was embedded in all economic institutions. Different existing embedded institutions can help explain the different outcomes in transition countries (Raiser 1997). The mismatch between the first-level institutions of (post-)Soviet Russia and the assumed first-level institutions of reformers will be revisited in section 3.2, in part based on Koester & Petrick's (2010) study of embedded institutions in Russian farms.

The main results of the new institutional approach are at the second and third level of social analysis. A core question that applies at these levels in new institutional economics is the role of institutions in reducing the cost of making a transaction. Transaction costs can be used to explain why companies exist at all (Coase (1937) 1995). Under perfect free market assumptions a large firm would not be needed as products and services would just be sold directly at market prices. However, if economic actors have to incur a transaction cost, an economic actor with lower transaction costs will have a permanent competitive advantage. A relatively large decrease in transaction costs for larger firms then will lead to a larger share of the market being captured by large firms.

Institutions may be the strongest driver of economic development, although it should be noted that there are some difficulties with testing this hypothesis. Institutions are endogenous to economic development, that is, higher economic development may also lead to better institutions. Further, institutional quality is hard to measure. Acemoglu, Johnson & Robinson (2001) notably found a correlation to economic development by using the mortality rates of colonial settlers as a proxy for future institutional quality in colonial nations. They assumed that colonies with high mortality rates were less likely to develop or have strong institutions and colonizers would set up extractive institutions. Centuries later, this effect may still be present. Rodrik, Subramanian & Trebbi (2004) used a standardized measure for the rule of law and property rights to indicate institutions and found persistently high correlations with a country's nominal GDP per capita. Though both indicators may be flawed, the development of institutions and economic development appear to go hand in hand as both studies reveal correlations between institutions and economic development.

Inequality and institutions are also related. High inequality leads to poorer institutions, and poor institutions lead to high inequality (Chong & Gradstein 2007). The causal effect of inequality on institutions is stronger than its reverse. In the Colonial Americas early differences in inequality between countries may have led to permanent differences in economic performance due to the difference in quality of institutions (Sokoloff & Engerman 2002). Concentrated corporate ownership may similarly lead to poorer business performance (Morck, Wolfenzon & Yeung 2005). The above theories of new institutional economics

will be used to help evaluate how the institutions of land ownership and land trade may affect inequality in the Russian agricultural sector in section 3.2.

2.3 Distributional effects of agricultural policy in other countries

Russia is hardly the only country with stimulation measures in place for its agricultural sector. In fact, total support to agricultural producers (Total Support Estimate, TSE) in the Russian Federation is average compared to other countries (OECD 2019, 68). It ranked slightly higher than the EU28, India, Brazil, and South Africa in TSE as a percentage of GDP but below Turkey and China. When compared to the total size of the agricultural sector (TSE as a percentage of total value added by the agricultural sector) in Russia is below average, though it has been increasing.

Most developed countries have very large agricultural subsidies in place. Japan, Norway, the EU28, the United States, Korea and Israel all had TSE between 50% and 100% of total value added (OECD 2019, 68). Swiss producers are a positive outlier; they receive 167% of total value added in support. The average European cow receives more than $2 per day in subsidies - more than the income of those living under the international poverty line (Wise 2004). The large scale of subsidies as a percentage of the total agricultural sector in more economically developed countries is called the “development paradox” (De Gorter & Swinnen 2002). Conversely, agriculture is more likely to be taxed in developing countries. Argentinian producers are taxed the most at 15%. Ukrainian farmers were effectively taxed for 5% of total agricultural added value.

Several explanations of the high degree of agricultural support in developed economies have been explored in political economy literature (Swinnen 2010). First, increases in wages may decrease the share of expenses for food consumption, decreasing pressure from consumers against market price support driving up food prices. Secondly, a decreasing share of agricultural production lowers the total cost required to increase farm incomes. A smaller group of farmers is further easier to organize politically and more likely to seek income support if farm incomes do not keep up with incomes in the rest of the economy. All these effects either reduce the political cost or increase the political incentives for subsidies, and thus make subsidies more likely. Other explanations of agricultural trade policies include the role of public goods (De Gorter & Swinnen 2002), imperfect markets (De Gorter & Swinnen 1994), mass media, corruption,

ideology, inequality (as described in section 2.2.2), and external shocks (Swinnen 2010).

Whatever the causes, extensive agricultural support is applied in most developed economies. Distributional effects for this support can be studied in several ways. First, the different levels of support between countries may lead to disruption of the global market in agricultural produce such that subsidies have effects on the global distribution of agricultural production. Second, production support could affect small and large farms differently within a country. Lastly, production support may end up benefiting different consumers outside the agricultural sector by lowering prices for food or other inputs. Each support policy may have different distributional effects at these three levels.

The first and last effects are significant for developing countries and the poor. There are different downsides in the case of market distortions. Subsidies in developed countries drove global food prices down (Gonzalez 2002). EU export subsidies in particular led to price drops and stronger market distortion than US domestic subsidies (Koo & Kennedy 2006). Low global food prices reduce incomes in countries where agriculture makes up a large share of the total economy (Johnson 2016), whereas high food prices increase expenses in countries where food makes up a large share of consumer expenses (Brinkman et al. 2010). Conversely, agricultural support policies with a global impact can also be beneficial to producers and consumers in developing countries (Swinnen 2011). Though depressed food prices through high subsidies in developed countries may benefit consumers in developing countries, they also ensure that production remains in the subsidizing countries.

This leads to an apparent conflict of interest between developing and developed countries. Disagreement between major subsidizers and developing countries on agricultural support was one of the main contributors to the failure of the Doha round of World Trade Organization (WTO) trading negotiations (Hanrahan & Schnepf 2006). If farms themselves are taken as the unit of analysis instead of national production levels, the contrast becomes even larger. The benefits of protectionist agricultural trade policy in the United States accrue mostly to wealthier farmers in the US, and removing some of the support measures in place in 2006 would have benefited mostly poorer farmers in developing countries (Hertel et al. 2007).

At the global level redistribution from developed to developing countries may be limited. However, within countries the relative distribution of subsidies is also an important policy consideration. Concerns for incomes of farmers were historically a major driver of US farm policy. Consequently, by 1985 medium-income farmers received relatively high subsidies, although total earnings from farming remained

quite unequally divided (Ahearn, Johnson & Strickland 1985). A broad reform to farm policy in 1996 - the FAIR Act - was followed by a decrease in total income inequality among farmers (Mishra, El-Osta & Gillespie 2009). In this case, off-farm wages and government payments led to some income redistribution, although income inequality from farming activities still did not improve. Off-farm wages are wages earned in non-farming activities, which could indicate that poorer farmers were reducing income disparity by simply moving away from the sector. Support measures are not very effective at redistributing income to the poorest farmers: government payments are concentrated in the top 20% earners, who take in over 80% of total subsidies (Bekkerman, Belasco & Smith 2018). Federal agricultural support programs in the US have been so skewed to larger businesses that they have been described as “rent-seeking” (Smith 2019) and “really all about transferring income from taxpayers to wealthy farmers” (Babcock 2015).

In the European Union distributional effects between farmers have led to several changes in the Common Agricultural Policy (CAP). Originally the CAP used artificially inflated prices as an instrument to support farms (Von Witzke & Noleppa 2007). Farmers would be subsidized by getting higher prices for their produce. This production-dependent subsidy disproportionately benefited larger farmers (Von Witzke 1979). In the “new CAP” of 2003 subsidies were decoupled from production. That is, subsidies were not based on crop production anymore but were set by an independent standard. In practice, larger farms received more subsidies and thus decoupled payments did not redistribute incomes (Von Witzke & Noleppa 2007). However, for Italian farms it was found that the direct payments of the CAP were less concentrated than farm income (Severini & Tantari 2013). Despite direct payments being concentrated in the top earners, this distribution was less concentrated than general farm income. As such, the Gini measure of inequality fell for Italian farms between 2003 and 2007, mainly due to CAP subsidies. This suggests that decoupled subsidies may either increase inequality, as in the United States, or decrease it, as with Italian farms between 2003 and 2007. The distribution of subsidies matters.

Overall, agricultural subsidies in developed countries appear to lead to increased global inequality in agricultural production. Within the United States farm support mostly benefits larger farms, whereas the European Union has made some efforts to focus on smaller farms. In this subsection only agricultural support policies were considered. However, to understand the “forces of divergence” and “forces of convergence” (Piketty 2017, 22) in inequality all the above concepts will be needed. Section 3 will continue by describing Russian agricultural and trade policy, its institution of land ownership, and implicit preferences in agricultural development.

3 Russia's agricultural sector

Agriculture in the Russian Federation has gone through several stages of development. Support to the sector collapsed in the early 1990s, along with the sector itself. In the mid-2000s the first large program for developing agriculture was launched. This program developed into a permanent support program which over the course of a decade grew to the maximum allowed size under WTO rules. In 2014 Russia imposed import restrictions to most developed countries. Together these support measures amount to an average or below average degree of support, certainly lower than in most developed countries. A large part of financial support is used by larger agribusinesses, though there are some initiatives to support smaller farms.

At the same time, most economic institutions in the country were reformed. Formal institutions of land ownership and land trading were developed between 1990 and 2002. Informal trading in land has continued to play a diminished role due to various issues with formal land trading, most notably the high transaction costs associated with it. In general, smaller Russian farmers face higher transaction costs. Local markets are less efficient than internal transfers in vertically integrated agribusinesses. Large agribusinesses can further lower transaction costs by building their own infrastructure such as ports or grain elevators. Capital is also cheaper for larger agribusinesses.

In part, the relatively good outlook for larger farms can be explained by many Russian stakeholders preferring highly capitalized and large-scale farms over smaller farms. It was assumed by reformers in the 1990s that small farms would come to dominate production, but this expectation did not materialize. This is due to economic and political circumstances which at the time were either unknown or ignored. Combined, the above signs point to a distinct advantage for larger farms due to institutional design, stakeholder preferences, and specific support measures.

3.1 Agricultural and trade policy developments

Directly following the collapse of the Soviet Union Russian agricultural trade policy aimed at creating markets through price liberalization, reduced subsidies, land reforms, and farm restructuring (Sedik et al. 2013). Although the "blueprint of reform" (Spoor & Visser 2001) for the agricultural sector suggested a gradual

transition away from subsidies (World Bank 1992, 137-153) support for farms abruptly ended in the 1990s (Ioffe 2005). Production output and investment rapidly decreased as the state withdrew from rural areas (Wegren 2000). Russia has had a large stock of abandoned agricultural land since the country transitioned from collective to private land ownership in the 1990s (Mamonova 2016, 91).

In the 2000s new measures were gradually introduced to steer activity in the agricultural sector. The average agricultural import tariff grew from 10% to 18% between 2003 and 2008 as tariff-rate quotas, ordinary quotas, and tariffs were introduced for imports of various meats to support the livestock sector (Liefert, Liefert & Serova 2009). At the launch of the National Priority Projects initiative in 2005 agricultural development was first included as a priority. This started the expansion of state support to agriculture through various subsequent policies, including the State Programs for the Development of Agriculture.

The National Priority Project and State Programs created specific support measures. These specific measures were based on strategic documents. The Russian government has enacted its Strategy for the Development of the Food and Processing Industry in 2012 (Deanna 2012; Government of the Russian Federation 2012a). The document outlines many strategic targets and production targets for the food and food processing industry. Strategic targets include: increasing production, modernizing facilities, increasing competitiveness, developing infrastructure, and addressing ecological problems in industrial zones. This is achieved through: vertical integration and market infrastructure improvements, quality control, import reduction and export supports, protecting geographical denominations of food products, innovation, and training personnel. There were also many particular annual production targets and investment targets specified per sector. As the strategy-level goals are generic targets, these investment targets give some more concrete guidance on which sectors are prioritized. In this document three sectors have the highest targeted investments: 300 billion rubles for the meat, dairy and fat industries; 217 billion rubles for sugar and confectionery; 117 billion rubles for flour and baking industries. No federal funding was reserved for attracting these investments. Thus, the Strategy gives only a minimal indication of what sectors and investments are prioritized.

The food security doctrine of 2010 is partially based on the Strategy for the Development of the Food and Processing Industry (Vassilieve & Smith 2010, Government of the Russian Federation 2010). It framed agricultural development as a national security issue and set out possible measures to achieve this, but the Doctrine did not indicate any specific measures that should be applied. The 2010 Doctrine’s concrete goals included a minimum percentage of domestically produced food in several categories. When the Doctrine was updated in 2020,

several new categories were added. The only other significant update to the Doctrine in 2020 was a ban on GMO imports.

Product	Minimum domestic production target 2010, %	Minimum domestic production target 2020, %	Actual level in 2019 (USDA 2020), %
Grains	95	95	170.8
Sugar	80	90	112.6
Vegetable oil	80	90	198.4
Meat and meat products	85	85	94.6
Dairy	90	90	81.7
Fish products	80	85	154.5
Potatoes	95	95	100
Edible salt	85	85	63.6
Vegetables, melson and gourds	N/A	90	95.8
Fruit and berries	N/A	60	33.9
Seeds of key crops	N/A	75	Varies

Tab. 3.1: Minimum domestic production set out by the Food Security Doctrines of 2010 and 2020

3.1.1 State Programs for the Development of Agriculture: 2008-2018

The National Priority Project “Development of the Agro-industrial Complex” ran until 2007. Its successor, the State Program for the Development of Agriculture ran from 2008-2012 (Government of the Russian Federation 2007) and was redeveloped with a new program for 2013-2020 (Government 2012b). These policies set out strategic priorities and targets for the sector at a federal level. Most importantly, they allocated significant federal funding for specific support measures. The funding allocation in the State Programs will be briefly reviewed from their inception in 2008 up the most recent publicly available spending report from 2018.

The 2008-2012 program reserved 1.1 trillion rubles ($41 billion in 2008 rates) for the duration of the program (Mustard 2007). Federal expenditures accounted for half of the aggregate cost of the program with provinces funding the other half, though for individual programs the division may differ. This doubled annual federal expenditures on agriculture at the time. Amongst its goals are stimulating rural development and rural employment as well as increasing the competitiveness of Russian agriculture.

Objective	**2007 Expected (bln. rub)**	**2008-2012 Realized (bln. rub)**	**Realized % of proposal**
Sustainable rural development	112,367	43,540	38,7
Creating general conditions for the functioning of agriculture	66,546	68,862	103,5
Priority agricultural subsector development	77,670	90,075	116,0
Financial sustainability of agriculture (investment credits)	287,700	419,604	145,8
Agricultural market regulation	7,014	31,087	443,2
TOTAL	551,294	653,168	118,47

Tab. 3.2: Realized federal spending State Program for the Development of Agriculture 2008-2012 (Ministry of Agriculture 2013)

For sustainable rural development, 92% of realized spending consisted of three items: improvements to rural residences (60%), gasification (16%), and water infrastructure (16%). Thus most spending under this category was used for general infrastructure improvements which would not have affected company revenues. Under the heading ‘Creating general conditions for the functioning of agriculture’ nearly all (83%) of the budget was reserved for soil improvements, including a small outlay for “Post-Chernobyl accident soil rehabilitation”. The program ‘Priority agricultural subsector development’ mostly included direct subsidies to various sectors for purchasing livestock and seeds. For ‘Agricultural market regulation’ most funding is reserved for commodity market interventions in the grain market.

Most federal funding was allocated to ‘Financial sustainability of agriculture’. This funding was reserved for subsidizing loans given out by commercial banks (Ministry of Agriculture 2013, 105-107). Subsidized loans were discounted with 80% of the central bank key rate by the federal government, with local governments providing an additional 20% discount. In 2012 the rate paid by farmers for subsidized loans was 4.6%, below the inflation rate (Ministry of

Agriculture 2013, 97). About two thirds of annual loan production consisted of short-term loans. The remaining loans consisted of investment credits with 8 to 10 year maturities. About 12% of subsidized credits were given to small farms (Ministry of Agriculture 2013, 110). Subsidized loans fall under the amber box in the WTO classification of support measures (see section 3.1.2). The loan program led to larger than expected expenses, which was partially compensated by a large cut in spending on rural development.

The 2013-2020 program set out 2.28 trillion rubles ($76 billion in 2012 rates) in total for developing agriculture and agricultural infrastructure (Vassilieva 2012). Whereas in the 2008-2012 costs were equally split, federal outlays were set at two-thirds of the total budget for the 2013-2020 program. About a third of the budget was reserved for the program “Development of Crops production, processing and marketing of products of plant origin”. Similarly, another third of the budget was reserved for “Development of Animal Production, [...]”, with a 5% add-on for the Beef Cattle industry. The remaining budget was set out for project management (9%), rural development (4%), small business support (4%), land reclamation (3%), and innovation (1%).

This budget is spent through many different forms of subsidies. In 2018 93 billion rubles were spent on investment support. Of this budget, 15% was spent on direct subsidies, whereas the rest was spent on subsidizing loans (Ministry of Agriculture 2019, 94-102). The total amount of outstanding subsidized investment loans is shown in tab 3.3. Particularly for livestock farming average loans were high at almost 2 billion rubles on average. Further, 11 billion was reserved for support leasing (Ministry of Agriculture 2019, 125).

Purpose of loan	**Total contracts**	**Outstanding loans (bln. Rub)**	**Average loan (mln. Rub)**
Crop growth	179	151.8	848
Livestock farming	258	471.2	1826
Food processing	157	57.6	366.9
Dairy cattle	291	233.6	802.7
Beef cattle	21	0.6	28.6
Technical purchases	2820	58.2	20.6

Tab 3.3: Total outstanding investment loans in 2018 (Ministry of Agriculture 2019, 99)

11 billion rubles were given out as grants to small farmers (Ministry of Agriculture 2019, 83). Almost 35 billion rubles were spent on sustainable rural development, most of it allocated to road construction and real estate projects (Ministry of Agriculture 2019, 201-203). Other support measures included 20 billion rubles for land reclamation, 10 billion for rural markets, disease control (3.6 billion), export infrastructure (1.4 billion). Over 64 billion rubles were spent on 'import substitution' (Ministry of Agriculture 2019, 37-39). Of this budget, 16 billion were spent on direct subsidies for crop production and 8 billion for output subsidies for dairy. The remaining 40 billion rubles were spent as federal support for regional programs.

The loan subsidy program took up a slightly smaller part of the total budget than in 2012. Instead, more spending was used on direct subsidies. However, the largest policy tools for directly supporting agriculture appear to have remained quite similar from 2008 to 2018: a large loan program, some infrastructure investment, and a bit of investment in rural development.

3.1.2 Russia in the WTO: accession and policy restrictions

Russia completed its lengthy WTO accession process in 2012, after 18 years of negotiations starting before the founding of the WTO in 1995 (Wegren 2012). Russia's commitments included reducing the average tariff rate for agricultural products from 13.2% to 10.8% with some specific reductions in particular product types, limiting trade disrupting support, and fixing export subsidies to zero. There were no export subsidies included in existing Russian support measures, so this requirement did not lead to any changes. To understand the commitments on trade distorting support, some concepts in trade policy first need to be introduced.

The World Trade Organization uses its own standards to describe domestic support to an industry. It classifies industry support activities into red, amber, green and blue "boxes" (Orden, Blandford & Josling 2011, 27-36). These buckets indicate whether a certain form of support is believed to be too market-disrupting. Activities in the red bucket are generally forbidden forms of support. There are no explicitly forbidden domestic support measures under the Agreement on Agriculture section (WTO 1994a) of the Marrakesh Agreement (WTO 1994b). Hence, the red box does not apply for agriculture. One step down is the amber box for market-disrupting support measures, also known as the Total Aggregate Measure of Support. WTO members each have a limit to permitted domestic support measures in the amber box. This limit can be avoided if the support measures can be put in the blue box, which allows for unlimited domestic support but requires farmers to limit production. These exceptions are included in Article

6.5 of the Agreement on Agriculture. Lastly, there is the green box for government-funded subsidies which cause minimal or no market distortions, defined under Annex 2 of the Agreement (WTO 1994a).

Given that it is the only box with a hard limit in place, countries are incentivized to avoid getting their support measures in the amber box. Members are allowed a "*de minimis*" percentage of domestic support measures. Any support under this percentage is not counted to the total AMS. For developed countries (including Russia) this percentage is set to 5% of total agricultural production, whereas developing country WTO members are allowed up to 10%. Article 6.2 stipulates additional exemptions. Input support to low-income producers and investment subsidies for all producers are exempted from the amber box for developing countries.

Russia had a $9 billion cap allocated for its amber box upon WTO accession in 2012, declining to $4.4 billion in 2018 (Kiselev & Romashkin 2012, 32). The most recent reported total AMS was just $55 million in 2017 (Delegation of the Russian Federation 2019). This low number is after discounting all support under the 5% *de minimis* rule; before applying this rule amber box support was $2.84 billion for non-specific product support and $730 million for specific product support. Green box support was $2.2 billion. At a total of $5.8 billion this reported figure roughly corresponds to the 290 billion rubles reserved for the State Program in 2017. Half of total amber box support was due to subsidized loans and investment loans.

3.1.3 OECD evaluation of support measures

The Organization for Economic Cooperation and Development tracks agricultural policies and publishes the support measures used by governments in a standardized format. Whereas WTO commitments are binding, OECD policy monitoring is only indicative of the total support provided to a sector. This monitoring also includes Russia and other non-members of the OECD. The policy monitoring report (OECD 2019) includes estimates of non-tariff barriers and consequent market price support.

Taxpayers paid only a part (39% in 2016-2018) of the total support to agricultural producers in Russia (OECD 2019, 375-390). Consumers provided the most support to producers (61%) by paying inflated prices for agricultural products. Agricultural prices were 10% above global prices in Russia in 2016-2018, up from 3% in 2000-2002. Price distortions are measured as Market Price Support (MPS). This is indicated by the percentage change from prices at the border to domestic prices (Melyukhina 2016, 98-105). Note that this MPS measure is different from WTO MPS (Effland 2011).

Wheat (-5%), barley (-8%), maize (-7%), oats (-16%), and sunflower products (-10%) each had a negative MPS; they were cheaper in Russia than at its borders. Sugar (31%), milk (28%), beef and veal (18%), pig meat (14%), rye (12%) and poultry (9%) had a positive MPS (OECD 2019, 377). For products with a negative MPS Russia is among the largest producers. All products with a positive MPS except rye were particularly emphasized in the policy documents described in sections 3.1 and 3.1.1.

The relatively large add-on for the extra costs to consumers ($7.2 billion) due to market price support indicates a much larger 'invisible' support than WTO estimates or federal budget outlays show. High consumer support to agriculture is not a new development. Since 2004 this support has consistently been around $6-8 billion (OECD 2020). The 2008-2010 period is an exception to this as support briefly rose to $20 billion in 2008 before dropping to $12.5 billion in 2009 and 2010. The hidden support from consumers has consistently been the largest contributor to support for agricultural production.

Non-MPS production support in 2017 included $2.2 billion in payments based on input use with $2 billion subsidies for capital, generally corresponding to WTO and Russian government estimates for subsidized loan expenses. Spending on general services was $1.9 billion. Total budgetary production support was $5.7 billion or 0.4% of GDP, whereas the total production support estimate for 2017 was $12.1 billion or 0.8% of GDP.

3.1.4 Sanctions and countersanctions in 2014

Russia's 2012 WTO accession may have significantly expanded its integration into global markets. However, less than two years after the WTO accession, Russian trade policy abruptly changed again due to events relating to the annexation of Crimea in March 2014. On March 16, 2014 Crimean separatists organized a controversial referendum on the question of whether Crimea should join the Russian Federation (Harding & Walker 2014). The referendum was used as a quasi-legal basis for annexing the Ukrainian territory, although the process was not in line with international law (Marxsen 2014).

After the annexation several 'Western' countries and organizations imposed two waves of "smart" sanctions targeting military and political staff as well as particular financial institutions (Crozet & Hinz 2016, 7-8). These smart sanctions limited access to particular technologies and financing. The list of organizations and countries includes but is not limited to the United States, the European

Union, the Council of Europe, Japan, and Australia. Altogether the sanctioning countries imported 63.8% of Russian exports in 2012 (Crozet & Hinz 2016, 2). In return, Russia issued travel bans on several American and European politicians.

Concurrently, in the East of Ukraine, pro-Russian separatist movements started a military campaign. On July 17 Malaysia Airlines flight MH17, an airplane carrying almost 300 civilians, was shot down over separatist territory. Following the crash of flight MH17 both the EU and US imposed more severe sanctions. These included limited export restrictions as well as restrictions to financial institutions. Unlike in the first waves, Russia responded with sanctions targeting different sectors. The counter-sanctions imposed on August 6 2014 aimed at limiting imports of agricultural products from the EU and US (Crozet & Hinz 2016, 8-10). It should be noted that all sanctions and countersanctions relating to the annexation of Crimea are still in place in a comparable form as of 2020.

The countersanctions included most agricultural imports including: beef, poultry, pork, fish, dairy, vegetables, fruit, nuts, processed meat products, and processed dairy products such as cheese, including those on the basis of vegetable oils (President of the Russian Federation 2014). Notable exceptions include grains and legumes. The countersanctions have been amended several times to remove items (baby food, some fish species) or add them (live swine and meat byproducts). However, the list has not substantially changed since 2014 (USDA 2019).

The 2014 counter-sanctions could be considered a part of the general import-substitution policy in Russia. The rapid and detailed trade policy response to the wave of sanctions imposed following the MH17 disaster suggests that the list of products most easily substituted domestically was produced beforehand (Korhonen 2018, 6). WTO countries are greatly limited in the support measures they can take (Crowley 2003), but an exception exists for issues of national security (Article XXI(b)(iii) in WTO 1986). This exception had been rarely challenged (Pickett & Lux 2015), though the article has recently been used to justify significant changes in trade policy (Voon 2019). In 2019 a WTO panel ruled that the use of this security exception was justified for counter-sanctions from Russia to Japan imposed between 2014 and 2016 (Ioachimescu-Voinea 2019). As such, creating a security emergency with the Crimean annexation may have allowed Russia the opportunity to impose more protectionist trade policy than otherwise allowed under WTO rules.

3.1.5 Expected distributional effects of Russian agricultural policies

The federal Russian government applies many policies to stimulate agricultural development with the explicit goal of replacing imports and increasing exports. These measures include targeted restrictions of agricultural imports, phytosanitary and other non-tariff restrictions of agricultural imports, producer subsidies, and domestic market restrictions. Support measures cannot always be strictly classified under trade policy or domestic agricultural policy as they each affect both domestic and international competitiveness, but the WTO “boxes” can be used to connect international trade disruption to domestic support. Russia had a significant capacity for market-disrupting “amber box” policies and used a large part of this capacity. Additionally, the Crimea countersanctions have enabled extra protectionist measures against countries with the largest agricultural support policies.

Each of these particular support measures may lead to redistribution in some form. Analyzing the exact effect of each measure is not in the scope of this text, as this would require isolating each subsidy per company. In general, subsidies are more equally divided than market price support (Moreddu 1999). MPS may have problematic distributional effects because it increases support as production increases; it is linked to output.

What are then the distributional effects of the Russian subsidy program? In section 3.1.1 it was noted that no more than only 12% of credit subsidies were allocated to small farms and that there are only several thousand outstanding investment subsidies. Credit subsidies have since 2008 accounted for the lion’s share of federal spending on agricultural support. Alternative spending on other support measures including infrastructure and innovation could lead to more broadly spread revenue growth. Further, there are some specific subsidies available for small farmers. In 2018 these subsidies made up about 4% of total federal spending. Though these subsidies are only a minor share of the total agricultural support program, it may be that they are effective in supporting smaller farms.

Federal subsidy programs include many financial support measures, some of which are less accessible than others. However, most support is actually provided by the difference in prices for agriculture products, which in particular benefits firms with a high output.The next section will discuss some second- and third-level institutions which agricultural companies interact with. Here the focus will lie on the recently developed land market.

3.2 Agricultural institutions: an unequal playing field

Certain mechanisms enable large-scale agribusinesses and investors to expand through means which are less accessible for smaller-scale agribusinesses and subsistence farmers. In Russia, legal loopholes as well as illegal methods are used to appropriate and trade land. Mamonova (2016) described the practices in use to enable 'land-grabbing' based on interviews with stakeholders including government officials, agroholding executives, and individual farmers. These are described below along with other institutional arrangements for agribusinesses that have unequal effects on large and small businesses.

3.2.1 Agroholdings emerge from collective farms

From 1917 to 1990 trading in agricultural land as legal private ownership of land did not exist. Collective and state farms were assigned nearly all farm land through central planning. In 1990 private land ownership became possible, although a ten-year moratorium on trading in this land was imposed (Lerman & Shagaida 2007, 14-15).

The initial distribution of land was not straightforward. Assigning the pre-communist owner of the land was not possible as many descendants of these owners had either (forcibly) relocated from the land or passed away (Mamonova 2016, 77-78). Instead of solving a complex ownership question based on the historical distribution of land, shares in agricultural joint stock companies were awarded to former members of farming collectives. This change from membership of a farming collective to shareholder in an agricultural joint stock company could be minor. The farms only changed on paper; sometimes only the name plate at the farm's entrance had to be changed (Spoor 1999) . Shares in these new joint stock companies could legally be exchanged and converted into often small household plots. Collective farms were thus converted into large farm enterprises without any essential changes to the farm itself (Brooks et al.1996).

Large agribusinesses started emerging in the early 2000s when many of the converted farms were deeply indebted. In 2003 almost a quarter of commercial farms were in bankruptcy proceedings after a new bankruptcy law had been introduced the year before (Yastrebova 2005). Profitable companies from different sectors holding debt in farms often swapped debt for land or outright bought land at very low rates (Rylko & Jolly 2005). In 2003, only a quarter of new agrobusinesses with over 1000 ha under control started as agrobusinesses.

Instead, most of these businesses were started by common holders of farm debt such as food companies, banks, state organizations, and oil and gas companies. Foreign investors also started buying large amounts of Russian land in the early 2000s (Visser & Spoor 2011).

Large agribusinesses took on a particular form with the emergence of a group of companies dubbed “megafarms" or “agroholdings” which vertically integrate most of the agricultural supply chain (Gataulina et al. 2006). That is, agroholdings engage not just in cultivation, but also in processing, servicing, and even retail. At the time agriculture was in general not very profitable, but activities like food processing were. Authorities supported integrated agrobusinesses as they could be used to attract investments into agriculture, absorb indebted and loss-maing farms, and possibly produce more efficiently. These large agroholdings enterprises quickly grew into large companies with significant production capacity.

3.2.2 The Russian land market

The 10-year moratorium on land trade from 1990 remained in place throughout the 1990s, although shareholders could exchange their entitlements in agricultural joint stock companies. Trading in land itself was first made possible through a heavily regulated process following the adoption of the 2001 Land Code (Government 2001) and a 2002 law “on agricultural land turnover” (Government 2002) (Wegren 2002). Sellers need to first offer their plot to the local government for the desired price. The local government has a month to accept or reject this offer, and to check if it meets relevant criteria such as a minimum size criterion. In case of refusal the seller may find a third party to purchase the plot for a price at or above the price offered to the local government. This process allows land to exchange ownership, though with some additional steps required for each party involved.

Some risks exist with this system (Wegren 2002, 17-20). The first right of purchase may result in the plot being transferred to a local government where it is not put to productive use. The process makes price-setting difficult as the volume of transactions is limited to the intermediary’s throughput. Less innocently, it creates opportunities for abuse of power by local officials. A seller may offer land above its value to the local government and bribe local officials to accept the offer, or two parties seeking to transact a piece of land for a low price may convince local officials to reject this low price. Further, there are significant transaction costs (Dugina & Vasilchenko 2015). These costs add up to approximately 37000 rubles for a typical small plot. Transaction costs include land surveying costs and cadastral registration, but additional costs may also

need to be incurred to verify the owner of the land or if third parties seek to buy the land.

Larger (agri-)businesses are more likely to have the resources needed to comply with the complex legislation surrounding land transactions. This is reflected in the small share of landholders engaging in land trading. By 2009 only 400000 of 12 million land shareholders had gotten their shares in farming collectives converted to a private plot (Mamonova 2016, 80). One investor acquired land by registering shareholders' plots on behalf of the owner and subsequently buying the plot. Shareholders which either could not afford the registration costs or felt hindered by bureaucratic constraints could thus sell the land at a discount to parties better acquainted with the relevant legal procedures (Mamonova 2016, 95-96). Information asymmetry between parties thus can be used to the advantage of generally larger agribusinesses.

Another legal mechanism available to investors which may distort the land market is the possibility of rezoning agricultural land for real estate development. As land zoned for real estate development is usually much higher in value, speculators who expect the land to potentially be rezoned may buy up the land above market prices. In the Central Black Earth economic region this led to an increase in prices for land around urban centers or picturesque land near lakes (Nechaev et al 2019). Regulations requiring agricultural land being put to productive use were put in place to limit such speculation. These regulations may be circumvented as investors establish "virtual" agribusinesses to create the appearance of the land being used for agriculture (Mamonova 2016, 104-106).

Russia does have some limitations in place to limit the concentration of land ownership which theoretically may inhibit growth in larger enterprises. Foreign investors cannot purchase land, although they may lease plots for up to 49 years (Lerman & Shagaida 2005) or buy land through a Russian subsidiary (Mamonova 2016, 74). Further, administrative regions may set a maximum percentage of land of 10% or higher that a single legal entity may own. However, a person may own several legal entities which each individually have to comply with this limit (Lerman & Shagaida 2017, 11). As such, this limit can be easily avoided.

Lastly, land acquisitions may be done through illegal or quasi-legal means. Buyers can forge documents that appear to show their legal ownership of a plot of land. Another option is forging shareholder meeting decisions for former collective farms. Once land rights have been granted on the basis of forged documents, it is difficult for the dispossessed to reclaim their shares in court (Mamonova 2016, 97-102).

Legal transfer of ownership thus has high transaction costs associated with it. Control over farmland can be legally gained not only through ownership, but also through leasing. Leasing was the dominant method of exchanging use rights to a plot of land in 2003, as a survey found that 60% of total used agricultural land was leased (Lerman & Shagaida 2007). Leasing land shares is relatively straightforward and accessible; 1 in 6 respondents to the survey had been involved in a leasing transaction. Leasing allows productive users to access land owned by parties unable to use their land. The overall scale of the leasing market is not easily estimated. Some agricultural subsidies may be cancelled for officially leased land, such that lessors may choose to unofficially lease their land (Griewald 2018). This gray market gives some opportunities for reallocation of land.

There were high transaction costs associated with the land market in Russia. Agroholdings were able to overcome the large transaction costs in the agricultural sector (Deininger & Byerlee 2011). The above analysis shows that transaction costs consisted of not just financial costs (surveying costs, registration costs), but also regulatory constraints which could be overcome by larger firms. The different information positions of small and large farms can also make it easier for larger farms to operate.

3.3 Choosing between support to small or large farms

Not only agricultural businesses grow crops. Small privately held farms produce agricultural products on small plots often for personal use. Such farms are called ‘smallholders’. Smallholders may include any range of non-commercial agricultural production activity, ranging from subsistence farming to recreational farming. In Russia these farmers constitute a separate category - *lichnoe podsobnoe khozyaistvo* (personal supplemental agriculture). They are treated separately from other agricultural producers as their activities are not considered a commercial enterprise, and are thus not taxed (Wegren 2018, 913-916).

Smallholder production activity has historically accounted for a significant amount of total Russian agricultural production. In the Soviet Union, smallholders controlled only 2-3% of arable land, but produced 20% to 30% of agricultural production (Lerman 1998, 2). In 1965 65% of potatoes and about 40% of milk, meat and vegetables came from private plots (Caskie 2000, 1998). As restrictions on individual and commercial farming were released in 1990 the share of total production value due to individual private farming grew, up to 52% in 2000 (Rosstat 2017, p. 274). Since then the smallholders’ share has been gradually dropping to 38% of total agricultural production.

Reformers in the 1990s did not believe the bimodal system of production from the Soviet Union would continue. It was assumed that productive family farms would naturally become the dominant form of production following rapid privatization and liberalization (World Bank 1992). The reasoning for this was that private ownership incentivizes business restructuring and investment (World Bank 1992, 69-77). For the earliest years of the transition large corporate farms were found to indeed be the most inefficient producers in Russia during the period 1991-1995 (Sedik, Trueblood & Arnande 2000). Nevertheless, large-scale farming persisted as a form of production.

The high productivity of household plots in Soviet times and a recent successful transition experience in China (focused on smaller farms) suggested that a lot of unused productive potential could be put to use in small Russian farms (Lerman 1998). Both arguments were not necessarily valid: Soviet household plots used external inputs from collective farms and Chinese labor-intensive crops were not comparable to the capital-intensive crops in the Soviet Union (Spoor & Visser 2001). Whereas large collective farms may have been very inefficient, large-scale agriculture in contemporary Russia have been able to survive in a more competitive environment. Small farms did not immediately become significantly more efficient than large enterprises, though this may be partially due to the legally advantageous position of agroholdings discussed in the previous section.

The economies of scale of agroholdings discussed in section 2.2 do not necessarily explain why large farm enterprises grew more than smaller farms. If increased transaction costs are taken into account economies of scale explain only a minor amount of performance differentiation in agribusinesses around Moscow (Svetlov & Hockmann 2009). Transaction costs are expected to be higher for small businesses and may be a more important driver of scale increases. In the early 2000s many larger businesses had vertically integrated for better access to consumers and used informal social networks for access to credit (Spoor & Visser 2004). As such, these companies were able to decrease their external transaction costs. If a more extensive market infrastructure were to be developed to reduce transaction costs for smaller farms the competitive advantage of larger agribusinesses could diminish. Reducing transaction costs could even lead to higher productivity increases than subsidies (Petrick & Goetz 2019).

Support for large agroholdings may even have caused a decline in rural development despite increasing output, as most profits are extracted from the region (Uzun & Shagaida 2019). The highly centralized agroholdings in Russia may even be less efficient than other organizational forms of agribusiness

(Hockmann, Wandel & Nedoborovskyy 2005). Integrated agrobusinesses did lead to productivity growth, but it is not yet clear whether this form represents the best way of increasing productivity (Rada, Liefert & Liefert 2017). It then remains to be explained what may have caused Russian authorities to support agroholdings more than smaller-scale farming.

Russia's currently strong focus on developing agroholdings may be due to the expectations stakeholders have had of agricultural policy since the 1990s. Koester (2007) identified several policy expectations in CIS countries. First, large-scale agriculture is broadly perceived as superior to smaller-scale agriculture. This view was shared by Marxists and neoclassical economists (Mamonova 2016, 20). Large farms are still seen as modern and efficient, whereas smaller farmers are seen as a backward and obsolete form of production (Mamonova 2016, 216-217).

Further, the state is seen as responsible for food security and for the general economic situation (Koester 2007). Lastly, attitudes to job security and labour mobility did not rapidly adjust since the socialist period. Together these expectations led the state to support larger enterprises which allow more control over production and more stable employment. Without an efficient market mechanism in place allocating profits to more efficient producers, these expectations would continue pushing policy in favor of larger agribusinesses.

Many have drawn a parallel between the Soviet collective farm and the contemporary agroholding. In villages some still called the new farm enterprises *kolkhozy* or *sovkhozy* after the collective farms (Mamonova 2016, 186). One author even dubbed the agroholdings post-*kolkhozy* and *oligarkhozy* or 'oligarch farms' (Nikulin 2010). As Wegren (2018) points out, there is a certain irony in the finding that small farms were relatively strong under Soviet restrictions but are now having difficulty competing with large agribusinesses.

One notable difference with collective farms is that agroholdings are much more industrialized and automated, which has led to a drop in employment (Mamonova 2016, 155). Collective farms contributed public goods to the rural economy by constructing social and rural infrastructure. They were often the center of village communities. Former collective farms continued to provide some of these services until at least into the late 1990s (Amelina 2000). This may have contributed to the persistent attitude for supporting large farms: support for these farms could be perceived as indirect support to rural infrastructure. However, most social functions of the collective farm were not taken over by new large farms (Mamonova 2016, 118).

The above discussion describes how large agroholdings are in an advantageous position in Russia. Larger companies have better knowledge about regulations which may even lead to significant information asymmetry with other parties, have better access to capital, and can generally avoid regulations aimed at restricting concentrations in ownership or constraining foreign ownership. Further, larger agribusinesses have better access to the market and thus pay lower transaction costs on their production. However, larger farms were not necessarily more productive. Policymakers may have in part been biased to larger farms due to their expectations of collective farms. Larger farmers were believed to be more efficient and had been used to

4 Analysis

Inequality in the Russian agricultural sector has been studied using various qualitative approaches. This revealed a distinct tendency to prefer large-scale farming and agribusinesses. This raises the question whether larger companies are indeed growing faster than smaller companies. In recent years firm-level financial data has become available which can be used to answer this question. In Russia's case the coverage of this data appears to be comparable to the data available to the national statistical service Rosstat.

This section consists of three parts. First, some measures of inequality are discussed. The choice of measure introduces implied preferences on the distribution (see section 2.1). Since the full distribution of revenues is directly available a couple measures of inequality are used. Next, the Orbis database is described. Some manual changes were made to the dataset and several observations were discarded. Lastly, the results are discussed. Inequality in revenues is found to have increased between 2009 and 2018. This is mostly due to very large (over $100 million in revenue) agribusinesses in two subsectors and to an increase in smaller agribusinesses with less than $100.000 in revenues. The latter result could be due to an increase in data quality over time. The finding that only a few (33) very large agribusinesses grew faster than other companies is further explored in section 4.4.

4.1 Quantifying inequality

Reports on import-substitution measures in Russia often list statistics on total output as a metric to indicate economic progress. For example, the Doctrine on Food Security described in section 3.1 included targets for food production as a percentage of demand. The progress on meeting these targets is reported in the regular reports on the state of the State Program for Agriculture, including the increases in production volumes or the total amount of farmland being put to use (Ministry of Agriculture 2019). Such raw production figures may not give a full picture of the development of the sector as production gains may be concentrated in just a few individual companies.

A couple clarifications should be made to quantitatively study this concentration. First, some hypotheses need to be defined. As discussed in section 3.1 and section 3.2, larger agribusinesses have had several advantages over smaller businesses since 2002. As such, revenues in the sector are expected to already be quite unequally divided between companies. For inequality to rise revenues must increase more rapidly for large enterprises than for smaller companies. The barriers of entry to the agricultural sector could be quite high as any challengers in the market would be expected to have access to a large amount of external capital or cash flows due to activities not related to agriculture. Together, this amounts to several hypotheses:

1. Revenues are divided unequally and this inequality is growing.
2. Revenues for large companies grow more rapidly than for small companies.
3. Large companies have some advantage that allows them to grow faster.

Though these hypotheses appear very similar, they must be answered by looking at different results. For the first hypothesis, some inequality measures will be applied to the distribution of company revenues. For the second, 'large' companies and 'small' companies will be defined and their relative growth will be considered. The last hypothesis has been discussed in section 3 and will be revisited in section 4.4 for several specific companies

To look at the first hypothesis the Gini inequality measure will be used. Aggregate measures on income inequality such as Gini can hide the many possible dimensions in which inequality can change (Piketty 2014, 266-270). Thus, besides the Gini some simple additional measurements of the revenue share held by the top 1%, top 10%, and top 10 companies will be included. These shares only indicate the relative growth in top incomes compared to all other incomes, but other income categories may also grow relatively faster or slower than average. Thus, for the second hypothesis companies will additionally be bucketed. This will be done by categorizing them by total revenue in multiplicative steps of 10. That is, a bucket for companies earning $1000-10.000, $10.000-$100.000, and so forth. The $10-100 and $100-1000 buckets will be combined due to the small amount of total revenue in them.

The Gini inequality coefficient is one of the most widely used measures of inequality. In its most basic formulation, the Gini coefficient is half of the mean absolute difference; it increases as the average difference between incomes grows. However, there are some caveats to using the measure. Atkinson (1970) showed that the Gini measure attaches more weight to middle incomes. That is, a transfer from a rich person to a poor person has a larger effect if it happens near the middle incomes. Consider a population with an average income of

$10.000. A person with $10.100 transferring $1 to a person with a $10.000 income would have a larger impact on Ginis than a person with $100.100 transferring $1 to a person earning $100.000, or a person with $1.100 transferring $1 to a person earning $1.000 (Cowell 2011, 23-24). A relatively large in Gini could thus be expected if the middle income group loses in income share.

For the Gini coefficient covariance matrices are not easily estimated (Mills & Zandvakili 1997). In cases where covariances are not easily found bootstrapping can be used to establish confidence intervals. This method draws random subsamples and finds the Gini coefficient for each subsample. The distribution of the Ginis found in these subsamples then can be used for statistical inference. In this case, the Gini function in the DescTools package (Signorell et al. 2016) for the R statistical software (R Team 2013) was used to compute 95% bootstrapped unadjusted confidence intervals.

4.2 The Orbis database

Recent advances in firm-level data have made it possible to directly study the ways in which company financials change over time. This can be particularly useful for studying industry concentration. In this analysis, Bureau van Dijk's Orbis database was used to get collated information on Russian agricultural companies. Orbis contains information on 365 million companies worldwide, though data quality varies significantly between countries (Kalemli-Ozcan et al. 2015). The database includes financial data on any company and organization registered at the Russian Federal State Statistics Service (Rosstat) including private companies, listed companies, and state-held enterprises. For these entities it registers information on their balance sheets, income statements, ownership information, and the entity's activities classified by local codes (OKVED), an internationally comparable classification (NACE), and a qualitative description added by Bureau van Dijk.

Orbis can be used to find the ultimate beneficial owner (UBO) in a company by allowing cross-country comparisons of company registries (Garcia-Bernardo, Fichtner, Takes & Heemskerk 2017). Russian UBOs of non-Russian holding companies could be using a holding company to engage in profit-shifting or to hide their ownership. This indicator will be used in section 4.4 in particular to identify agroholdings and foreign-held companies.

4.2.1 Scope of data

The Russian entries in Orbis are collected based on Rosstat data. However, only companies with one or more employees are required to file information; approximately 40% of companies do so (Bureau van Dijk 2007). Individual farms and entrepreneurs make up the other 60% of commercial parties. The Orbis data cannot be considered representative of the population of all agricultural producers as individual farmers (smallholders) are not included. Smallholders' activities are not taxed and thus it is more difficult to assess smallholders' production activity, particularly on an individual basis. Due to this exclusion estimates of the Gini coefficient will be skewed upward vis-à-vis the Gini statistic on a representative sample of the full population of agricultural producers. As such, the Orbis data used here should be seen as data on Russian agricultural businesses, not data on agricultural producers as a whole.

4.2.2 Choice of income measure

Company revenue was used as a proxy for income. Profits are a problematic metric for comparison between and even within companies. Accounting standards may vary over time as Russian companies are transitioning from the local Russian Accounting Standards (RAS) to IFRS with some companies using US GAAP for US exchange listings (McGee & Preobragenskaya 2006). Even if accounting standards were consistently upheld, profits remain a flawed indicator of income. Profits could reflect different preferences between salary and profit for small and medium enterprises where the company's owner may decide to change their salary. Further, deductions can be made for particular expenses such as amortizations or credit payments. Though only a limited amount of deductions are available, such deductions may lead to unexpected deviations in profits (McGee & Preobragenskaya 2006, 79-99).

Gross revenue as a measure of income also leads to issues, but these can be partially addressed. For gross revenues, by definition, no expenses may be deducted. Revenue is counted differently between RAS and IFRS which may lead to revenue being counted inconsistently between companies and between years (Shonzhigitova 2012). However, this is due to relatively minor changes such as not accounting for fair value. Another issue with revenues as an indicator of income is that high gross revenues do not necessarily indicate high income. For firms working with low gross margins such as commodity traders or financial services revenues per employee will generally be relatively large as large volumes need to be turned over to fund overheads and profit. Agribusinesses may also engage in activities with large differences in gross margins. For

subsectors (e.g. dairy) the differences in gross margins should be lower as the activities will be comparable, but between subsectors large variations may exist. Despite these downsides, revenues will be used as they are a quite standard indicator of total economics activity in a company.

4.2.3 Representativeness of data

Since Orbis uses Rosstat as a source its contents should be closely aligned with data available from Rosstat. For data from 2008 onwards this is indeed the case as the Orbis dataset provides “excellent, with close to a perfect coverage” when compared with Rosstat data (Wilnerkova & Blöchliger 2020, 32-36). However, for smaller companies coverage is lower than for larger companies. This could deflate the Gini statistic particularly for earlier years.

Some currency effects may lead to acceptable differences between Orbis figures and official figures. No inflation adjustment was applied to the revenue figures in Orbis. Adjusting Orbis for inflation is a cumbersome procedure which introduces some assumptions on the appropriate deflator to use (Kalemli-Ozcan et al. 2015, 37-39). Inflation adjustments are not needed to compare the relative distribution of company revenues, though they could be useful to interpret the growth in revenues in the Russian agricultural sector. Orbis further included a currency conversion from Russian rubles to US Dollars which, due fluctuations in currency rates and different conversion standards, could have distorted revenue figures (Kalemli-Ozcan et al. 2015, 29). This foreign currency adjustment makes it difficult to directly compare Orbis revenues with official figures in Russian rubles.

A rough check of the total revenues with data from the Russian Federal Tax Services on the tax base of agricultural companies confirms that Orbis is likely not far from official tax data (Federal Tax Service 2019). The total tax base on May 9 2017 was approximately $42 billion USD. On August 7 2016 the total tax base was approximately $35 billion. This figure may be compared to the Orbis end of year data: $46 billion in total revenues for 2017, $41 billion for 2016, and $31 billion for 2015. Though direct comparison of these figures is not possible due to a mismatch in reporting date and currency conversion, the figures are similar in size.

4.2.4 Data cleaning

Entries whose primary activity was classified with OKVED 2 (Ministry of Economic Development 2014) codes starting with A.01 (Agriculture, forestry, hunting, fishing and fish farming - 01 Crop and livestock production, hunting and related services in these areas) were selected. For the remaining entries the description of activities added by Bureau van Dijk was compared to the OKVED 2 classifier. Glaring misclassifications were removed, e.g. companies described in the BvD description as hairdressers or interior design companies.

In a similar analysis, Wildnerova & Blöchliger (2020) performed extensive data cleaning on the Orbis dataset, including removing firms with extreme changes in their revenues and employee count. This ensures that firms undergoing mergers and acquisitions or other financial shocks are excluded. Several firms reported a very high revenue for only 1 year. Such spurious growth is more likely due to data errors, nonproductive activities or fraud than due to business booming for one year. However, these entries were not removed in this analysis. Firstly, arbitrary removal of such firms would make it difficult to reproduce the analysis. Secondly, there were no extreme growth rates which could be clearly attributed to data errors (e.g. revenue of $123456,78).

Further, companies may be only indirectly engaged in agriculture such as trading companies or fertilizer factories. In these cases revenues may be driven by different dynamics than the revenues of other agribusinesses. Larger growth in high-turnover non-agri industries such as trading, construction, equipment manufacturing or chemicals could lead to heavily skewed data. Such companies were identified by BvD description and excluded.

A low quantitative limit was set to exclude some outliers. As a first filter all revenues below $10 annually were removed. While this $10 is arbitrarily set, the figure is aimed at excluding a large group of companies with next to no true activity without necessarily excluding all companies with very low revenues. Unlike private individuals in income distributions a private company cannot be expected to generally have a minimum income. An entrepreneur could hypothetically set up a number of legal entities to collect revenues. The resulting distribution of revenue data after data cleaning is shown in Fig. 4.1.

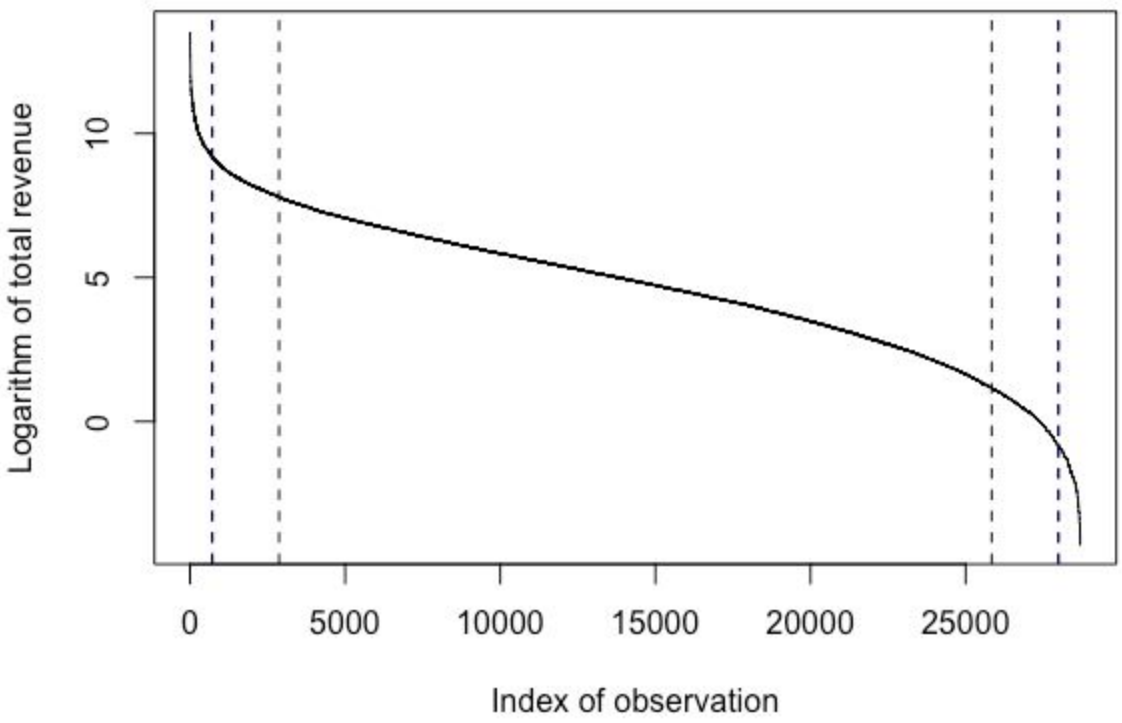

Fig. 4.1. Distribution of sorted natural logarithms of total revenues for 2018 data of companies classified with OKVED-2 industry classifier A.01. Vertical lines indicate 10% and 2.5% extremes.

Note that in Fig. 4.1 the natural logarithm of revenues is shown. This transformation or a base 10 logarithmic transformation will be used for all illustrations. Incomes can often be approximated by lognormal distributions (Lambert 2009) due to Gibrat's rule of proportional growth (Mansfield 1962). Fig. 4.1 shows that this could be appropriate for the distribution of company revenues as well. Fig. 4.2 shows a histogram of 2018 revenues indicating that incomes are not quite normally distributed. The Jarque-Bera test (Jarque & Bera 1980) rejects normality ($JB=506.13, p<0.001$), as the distribution is somewhat negatively skewed ($K=2.97$, $S=-0.32$). However, the lognormal approximation could be useful in analogy to explain how the Gini is affected by changes in the distribution.The Gini coefficient only depends on the distribution's standard deviation for lognormal distributions. An increase in a lognormal distribution's standard deviation is associated with an increase in the Gini coefficient (Lubrano 2013).

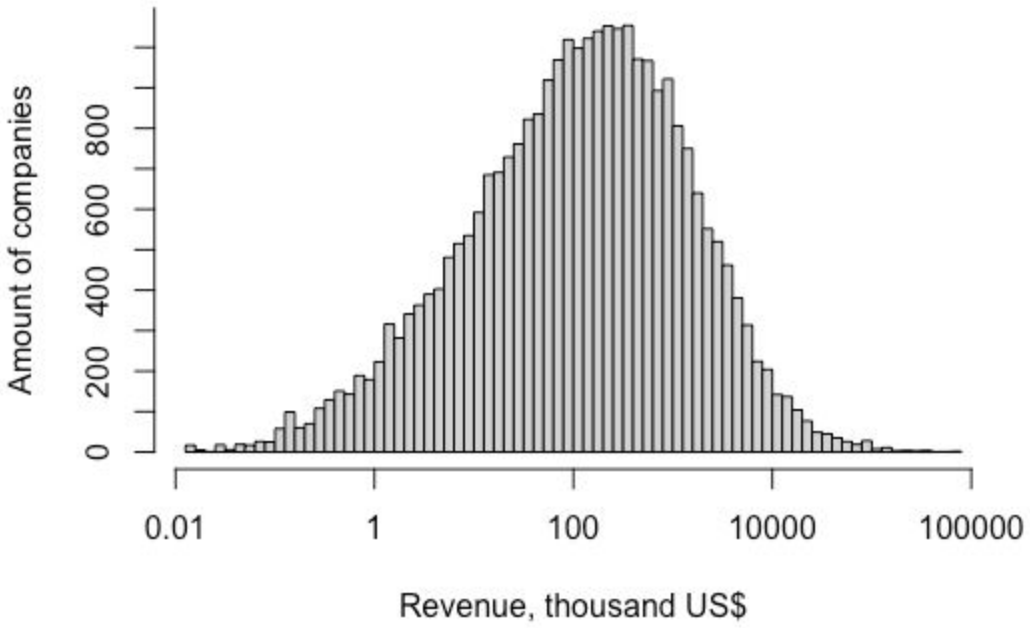

Fig. 4.2. Histogram of 2018 revenue data.

4.2.5 Subsectors

The full sample contains only companies classified under OKVED 01 as described in the previous subsection. A further split can be made per subsector by the OKVED classifier. However, there are several dozen codes describing activity. Here, five subsectors were constructed based on several classifiers. The mapping of each subsector to the relevant OKVED codes are listed in Tab. A1 in the appendix.

4.3 Results

This subsection presents multiple inequality measures for the full sample and subsectors. Several results are found. First, overall inequality as measured by the Gini coefficient has increased in every subsector. It is found in section 4.3.2 and 4.3.2 that this is largely due to market share increases for very large and small farms. The latter finding may be spurious. Companies with revenues below $100.000 accounted for less than 1% of total sectoral revenues, but had a large impact on the Gini coefficient.

Further, companies were split into several revenue categories. The relative share of each of these categories in total sectoral revenues was computed for 2018

and 2009. This revealed in which sectors very large agribusinesses are growing the fastest. Two subsectors stand out. The growth in very large companies in these subsectors will be investigated further in section 4.4.

4.3.1 Selected inequality measures over time

The development of the Gini coefficient from 2009 to 2018 is shown in fig. 4.3. The measure gradually increased from 2009 to 2015. From 2016 to 2018 the figure settled around 0.88. The 2018 estimate lies far above the upper bound of the 95% confidence interval. The percentile bootstrap confidence intervals used here are sometimes too narrow in small samples (Dixon 1993). However, given the large sample size of over 10.000 observations for each year and the large amount of bootstrap replications (20.000) the confidence intervals are assumed to be accurate. Hence, the Gini coefficient can be said to be significantly higher in 2018 than in 2009.

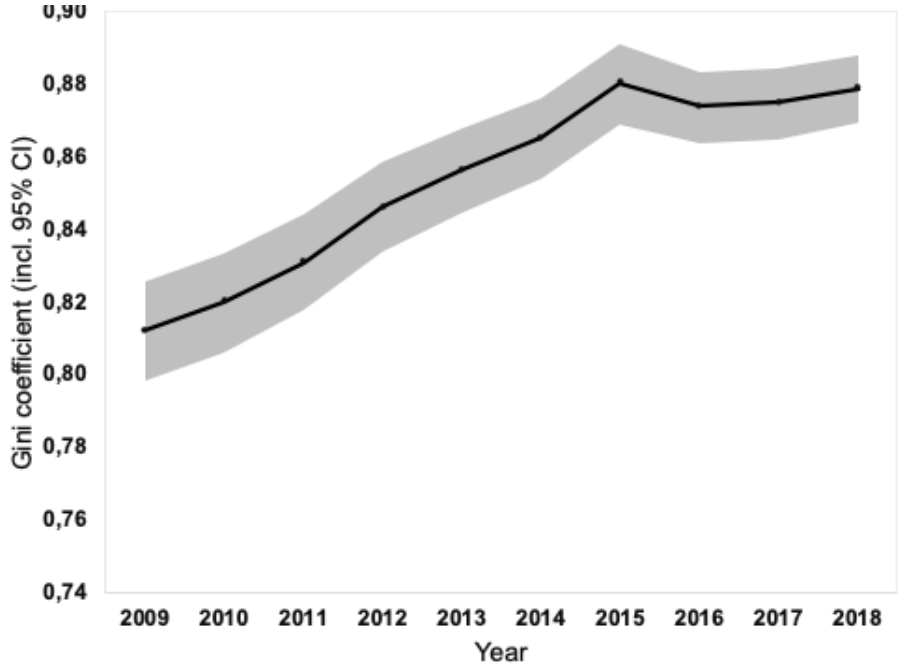

Fig. 4.3: Gini coefficient of full sample revenue with bootstrapped 95% confidence intervals

In fig. 4.4 the underlying distribution is shown with log-transformed revenues from 2009 to 2018. The black center indicates observations in 2009. For each following year the observations get lighter. The amount of companies with revenues between $100 and $100.000 appears to have grown the most. Consequently, the distribution has become more spread out. A higher standard

deviation in the logarithm is associated with an increase in the Gini coefficient if the data is assumed to be close to lognormal (Lubrano 2013, 20-24). The standard deviation appears to increase due to a relatively large increase in companies with revenues under $100.00.

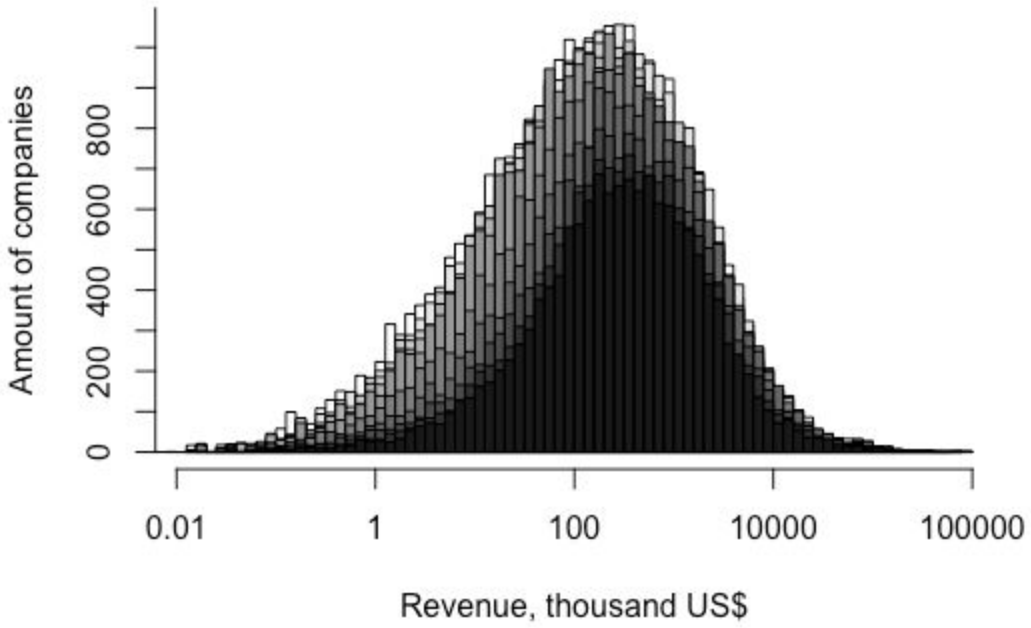

Fig. 4.4: Revenue growth over time, 2009-2018. Darker is earlier: 2018 is in white, 2009 in black.

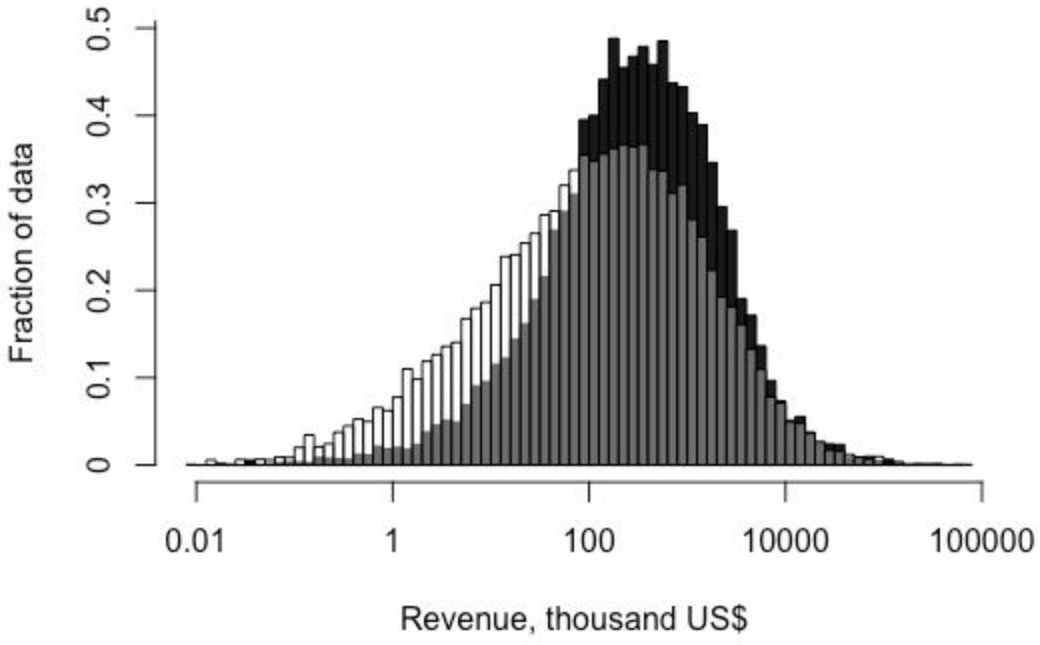

Fig. 4.5: Change in distribution, 2009-2018. Here 2009 is dark, 2018 is light.

Fig. 4.5 shows the same distribution normalized to 1 for 2009 and 2018. The concentration of middle incomes has decreased, mostly in favor of lower incomes. Many companies have been added to the dataset: 2018 had more than twice the amount of companies (28709) compared to the 2009 data set (14074). A large increase in low-income companies drove the normalized mean absolute difference up, and as a consequence the Gini coefficient went up.

Note that figs. 4.4 and 4.5 show the empirical distribution of companies by log-transformed revenue, not the distribution of untransformed revenues. The distribution of true revenues will have a heavy right tail as it looks like a lognormal distribution. For untransformed revenues several measures are shown in tab. 4.1. Here, it appears that the total revenue share of top earners has increased. The top 10 share is the least sensitive to many additional low-revenue companies being added as it is not dependent on sample size. This metric increased slightly over the years, but not as much as the measures with sample size dependence. The same holds for the income shares per subsector, see tables A2-A5 in the appendix.

Year	Gini	Top 10 share	Top 1% share	Top 10% share
2018	0.88	10.1%	44.6%	81.1%
2017	0.87	10.6%	44.3%	80.3%
2016	0.87	10.2%	43.8%	80.2%
2015	0.88	12.4%	47.0%	81.8%
2014	0.87	10.5%	41.2%	78.9%
2013	0.86	9.9%	40.4%	77.7%
2012	0.85	10.0%	39.3%	76.3%
2011	0.83	9.3%	36.5%	74.1%
2010	0.82	9.0%	35.2%	72.6%
2009	0.81	9.0%	34.5%	71.6%

Tab 4.1: Income inequality measures for full sample

4.3.2 Alternative subsamples

One explanation for the large increase in low-revenue companies is that the coverage of the ORBIS database is expanding. ORBIS information is originated

from the Federal State Statistics Service, which likely gets this data from the Federal Tax Service. Since 2014 the Federal Tax Service has significantly improved its tax collection (Chris Giles “Russia’s role in producing the taxman of the future”, *FT*, July 29 2019, accessed June 26, 2020). This may have given a better view of revenues in smaller companies, which could explain the up to sevenfold increase in total revenues under $10.000 and the up to 150% increase in total revenues under $100.000.

Year	**Gini** Excluding observations of $100M+	**Gini** Excluding observations of $100M+ and below $100K	**Gini** Excluding observations below $100K	**Gini** Excluding observations below $10K
2018	0.852	0.747	0.794	0.853
2017	0.844	0.742	0.792	0.851
2016	0.846	0.742	0.790	0.850
2015	0.851	0.751	0.800	0.857
2014	0.843	0.739	0.776	0.841
2013	0.827	0.739	0.783	0.838
2012	0.813	0.734	0.782	0.831
2011	0.804	0.729	0.766	0.817
2010	0.795	0.724	0.754	0.807
2009	0.789	0.721	0.751	0.800

Tab 4.4: Gini coefficients for various subsamples

Although the sum of revenues in small companies has grown rapidly, the total market share of these companies remains very small. However, these observations do have a quite large impact on the Gini coefficient. The Ginis for the restricted sample of observations over $10.000 grow from 0.80 to 0.85. For the full sample this change is from 0.81 to 0.88. Excluding revenues below $100K further narrows the growth in Gini from 0.75 to 0.79. Above the $100K revenue limit possible data quality issues are expected to be insignificant. This subsample covered over 99% of total revenues in 2009 and 2018. If observations above $100 million are additionally excluded, the subsample’s Gini appears to be rising much more gradually from 0.72 to 0.75. The upper limit of the bootstrapped 95% confidence interval for 2009 is 0.732. The lower limit of the 95% CI for 2018 is 0.739. Thus, the small increase in Ginis is still significant for the subsample with both very large and small revenues removed.

4.3.3 Changes in market share per revenue category

Although the changes in the Gini coefficient are significant, the histograms in section 4.3.1 show that a large part of this increase is likely due to many new low-revenue companies being added to the dataset. Companies were categorized by size in order to assess whether new small companies are also having a large impact on the distribution of untransformed revenues.

Revenues	**2018**	**2009**
100M+	19.59%	11.69%
10M-100M	38.51%	37.23%
1M-10M	32.46%	39.70%
100K-1M	8.60%	10.71%
10K-100K	0.79%	0.65%
1K-10K	0.04%	0.02%
0-1k	0.00%	0.00%

Tab 4.2 Changes in share of company revenue per company size

	Fruit and Vegetables		**Others**		**Dairy**		**Lifestock**		**Cereals**	
Revenues	**2018**	**2009**	**2018**	**2009**	**2018**	**2009**	**2018**	**2009**	**2018**	**2009**
100M+	5,11%	7,02%	23,22%	12,13%	0,00%	0,00%	40,83%	26,40%	2,44%	0,00%
10M-100M	53,06%	47,42%	24,03%	19,15%	22,68%	16,91%	47,26%	59,50%	35,26%	23,33%
1M-10M	31,52%	37,77%	38,12%	51,73%	62,58%	64,12%	9,95%	12,07%	48,10%	58,63%
100K-1M	9,14%	7,32%	12,99%	16,04%	13,63%	18,05%	1,69%	1,85%	13,19%	16,97%
10K-100K	1,11%	0,46%	1,54%	0,92%	1,06%	0,91%	0,25%	0,16%	0,97%	1,05%
1K-10K	0,06%	0,01%	0,09%	0,02%	0,04%	0,01%	0,01%	0,01%	0,04%	0,02%
0-1k	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%

Tab. 4.3: Changes in market share by sector

Tables 4.2 and 4.3 show a clearer change in the distribution of incomes between companies. The sub-$100.000 companies responsible for a large part of Gini inequality only have a minor impact on total sectoral revenues. They are responsible for less than 2% of revenues in all subsectors, and for less than 1% of revenues overall. On the other hand, large companies with over $10 million in revenues appear to capture a larger share of revenues in all subsectors. In particular, the subsectors ‘Other’ and ‘Lifestock’ have a high share in revenues due to companies with over $10 million in revenue.

Since 2008 there has been a relatively large amount of federal funding reserved for increasing livestock. In the 2008-2012 program livestock growth made up a large section of the project for ‘Priority agricultural subsector development’. In the 2013-2020 program animal production subsidies made up over a third of the total budget (Vassilieva 2012). Further, this sector receives some of the highest Market Price Support, and it has been included in the agricultural countersanctions of 2014.

As several products fall under the ‘Other’ category, many support measures could apply. However, in this particular case the individual company activities can give some more insight. Only 4 companies in the ‘Other’ category earned more than $100 million in revenues in 2018, all of which were classified as having mixed activities (OKVED 01.15). Two of these companies were responsible for 78% of the total revenue and most of the total revenue growth in this category. These two companies, Miratorg subsidiary ‘Bryansk Meat Company’ and Agrokompleks, both mostly earned revenue from meat and dairy, as will be shown in section 4.4. Thus, nearly all companies with revenues over $100M were focused on the ‘Lifestock’ subsector.

The above results indicate that most inequality growth is due to a simultaneous increase in companies with very large revenues and in companies with very small revenues. If both are excluded the inequality increase is still significant. This suggests that, although industry concentration is mostly due to two extreme groups, inequality is generally increasing. The large increase in companies with lower revenues may be simply due to data quality improvements, but the few outliers on the upper end are not so easily explained. For two subsectors a particularly large amount of total revenues was concentrated in very large companies, although due to the misleading classification of two companies it could be argued that all of this growth was concentrated in the ‘Lifestock’ subsector. These very large companies will be discussed in the next section.

4.4 Cases: top growers in large agroholdings

The subgroup of companies earning over $100 million in revenue hardly gained any market share in the subsectors cereals, fruit and vegetables, and diary. The two remaining subsectors, ‘Lifestock’ and ‘Other’, were associated with the largest market share increases for the group of companies with over $100 million in revenues. Only 33 companies are in this subgroup. Just 16 companies remain if companies under the same holding are grouped together and companies with below average growth are removed. Due to the small amount of agrobusinesses in this remaining group, all companies can be briefly described. Some companies with peculiar characteristics are then investigated on a case-by-case basis.

All agroholdings in the Top 5 of largest landowners of Russia (BEFL 2020) appeared either directly or as holdings for companies in the list. The top companies in the are all

4.4.1 Very high-revenue, high-growth companies in the ‘Lifestock’ and ‘Other’ subsectors

In 2018 29 companies in the ‘Lifestock’ subsector earned over $100 million in revenues, compared to 13 in 2009. Of the 29 top earning companies, several were owned by the same legal entities. LLC Agro-Industrial Complex ‘Mikhailovsky’ owned 5 companies and recently became part of agroholding ‘Cherkivozo’ (Tatyana Kulisikova “Cherkivozo pokupayet ptitsefabriku v Belgorodskoy oblasti” *agroinvestor.ru,* August 21 2019), one of the top 20 agroholdings in 2020 (BEFL 2020). Chicken factory Belorechenskaya owned 3 companies. LLC ‘Miratorg Agribusiness Holding’ (henceforth: Miratorg) owned 4 companies. Miratorg is the largest agricultural landowner in Russia with over a million ha under control (BEFL 2020). Vladimir Abramovich Podvalnyi owned two companies serving ‘Velikolukskiy Myasokombinat’.

Of the remaining 15 companies, 9 had grown their revenues at a higher pace than average (91%) in the last 10 years. ‘Ptitsefabrika Akashevkaya’ and LLC ‘Agro-firm Ariant’ appear to be independent. Two companies are foreign-owned: ‘Alekseevsky Bacon’ AG is part of German holding, and JSC ‘Severnaya’ was owned by the Dutch Van den Brink family, but sold to a Thai company in 2015 (Katy Askew “Charoen Pokphand Foods buys Russian poultry group”, *just-food.com*, July 27, 2015).

Other companies are part of a larger agroholding. AO ‘Ptitsefabrika Chamzinskaya’ was registered in Orbis as a part of agroholding ‘Khoroshee delo’. ‘Penzamolinvest’ is a part of agroholding ‘Damate’("Damate Became Russia's Only Turkey Exporter to Saudi Arabia" ("Damate stala edinstvennym v Rossii eksporterom indejki v Saudovskuyu Araviyu"), *Penzainform*, 1 April 2020,). OAO ‘Tokarevskaya Ptitsefabrika’ is a part of agroholding ‘Resurs’ ("Tokarevskaya Poultry Farm – Poultry Development Driver" ("Tokarevskaya pticefabrika – drajver razvitiya pticevodstva") *Kommersant*, 22 September 2017). ‘Agropromkomplektatsiya Kursk’ is a part of agroholding ‘Agropromkomplektatsiya’ ("3 Large Pig Farms Will Be Built in Ryazan Region" ("V Ryazanskoj oblasti postroyat 3 krupnyh svinokompleksa"), *Ryazanskie Vedomosti,* 11 September 2019).‘Tambosky Bekon’ is a part of ‘Rusagro’ ("Rusagro's Investment in Increasing the Capacity of the Tambov Meat Processing Plant Will Amount to 2 Billion Rubles" ("Vlozheniya «Rusagro» v uvelichenie moshchnosti tambovskogo myasokombinata sostavyat 2 mlrd rublej"), *Kommersant*, 10 April 2020,).

Name	**ORBIS Name**	**2018 revenue, thousand US$**	**2009 revenue, thousand US$**	**Total Growth, multiple**
Tambosky Bekon	TAMBOVSKII BEKON	308.700	n.a. (0)	n.a.
JSC ‘Severnaya’	JOINT-STOCK COMPANY SEVERNAYA	288.600	133.270	2.2x
LLC ‘Agro-frim Ariant’	LIMITED LIABILITY COMPANY AGRO-FIRM ARIANT	249.098	87.880	2.8x
Ptitsefabrika Akashevskaya	PTITSEFABRIKA AKASHEVSKAYA	232.854	15.443	15x
Agropromkomplekt atsiya Kursk	AGROPROMKOMPLEKTATSIYA - KURSK	197.123	3.113	63x
OAO ‘Tokarevskaya Ptitsefabrika’	OTKRYTOE AKTSIONERNOE OBSHCHESTVO TOKAREVSKAYA PTITSEFABRIKA	165.293	n.a. (0)	n.a.
Penzamolinvest	PENZAMOLINVEST	164.085	1.167	141x
AO ‘Ptitsefabrika Chamzinskaya’	AKTSIONERNOE OBSHCHESTVO PTITSEFABRIKA CHAMZINSKAYA	138.324	17.357	8.0x
‘Alekseevsky Bacon’ AG	GESCHLOSSENE AKTIENGESELLSCHAFT ALEKSEEVSKY BACON	112.634	184	612x

Tab 4 Companies with higher than $100 million revenues under “Lifestock” category with 10-year growth above 91% and with owners not appearing more than once in the list

Four companies in the ‘Other’ subsector earned a revenue of $100 million or higher in 2018: Agrokompleks, Bryansk Meat Company, EkoNivaAgro, and TsCh APK. In 2009 only two companies earned over $100 million in revenue. Note that Bryansk Meat Company is a subsidiary of Miratorg.

Name	**ORBIS Name**	**2018 revenue, thousand US$**	**2009 revenue, thousand US$**	**Total Growth, multiple**	**Activities (ORBIS)**
Agrokompleks	AKTSIONERNOE OBSHCHESTVO FIRMA AGROKOMPLEKS IM.N.I.TKACHEVA	720.105	217.201	3.3x	Crop production, animal husbandry, poultry farming, milk and meat processing, trade, logistics.
Bryansk Meat Company	BRYANSKAYA MYASNAYA KOMPANIYA	315.723	1.449	218x	Production of meat products.
TsCh APK	TSENTRALNO-CHERNOZEMNAYA AGROPROMYSHLENNAYA KOMPANIYA	155.179	22.021	7.0x	Agriculture
EkoNivaAgro	LIMITED COMPANY EKONIVAAGRO	136.730	19.772	6.9x	Dairy farming, meat cattle breeding, production of grain, leguminous, fodder crops, highly profitable industrial crops and seed production.

Tab 4 Companies with higher than $100 million revenues under “Other” category

TsCh APK and EkoNivaAgro had similar growths in revenue between 2009 and 2018, but their growth paths are different. Ekonivaagro gradually increased its revenues over time, whereas TsCh APK had reached $110 million in revenues by 2010. EkoNivaAgro is part of EkoNiva Group, a wholly owned subsidiary of the German Ekosem-Agrar AG (Ekosem-Agrar AG 2019). EkoNiva was ranked as the fifth largest agricultural landowner in 2020 (BEFL 2020). TsCh APK is part of Prodimeks and Agrokultura (Bychutkin 2015), a large agroholding focusing on sugar production.

4.4.2 Explaining large revenue growth in selected companies

All of the five largest agroholdings by land in 2020 (BEFL 2020) appear as ultimate owners of the largest companies experiencing rapid growth. These companies are briefly described. News coverage of these companies is used to get an indication of how these large companies can continue to grow at a high rate. Several possible explanations for the relatively large increases in revenues in these agroholdings are presented, based on the results from section 3.

4.4.2.1 Miratorg

Miratorg, like Prodimeks+Agrikultura and Rusagro, does not appear directly in the dataset of Russian agricultural businesses. It does appear as the owner of several companies with a combined revenue of $1.365 billion, including Bryansk Meat Company. Holdings like Miratorg were not included in the database, likely to avoid double-counting and to enable a better split in activities per sector.

Miratorg is the only agroholding with over 1 million ha of land under control, making its total holdings about 10% larger than Cyprus. The company is owned through a Cypriotic holding by the brothers Viktor and Alexander Linnik. From 1995 to the early 2000s the company was a meat importer. In 2007, the company bough a pig farm started looking at developing an industrial cattle breeding facility (Alexander Levinsky “How Miratorg, with the help of the state, became a food giant” (“Kak Miratorg,s pomoshchyu gosudarstva, stal prodovolstvennym gigantom”), *Forbes*, August 4, 2019). Cattle breeding still forms the largest part of Miratorg’s activities.

In 2010 the State Development Bank Vneshekonombank gave Miratorg a 21 billion ruble loan, equivalent to approximately $700 million at the time (“VEB invests 21 billion rubles in Miratorg” (“VEB vlozhit v proyek Miratorga 21 mlrd rubley”), *Kommersant*, December 22 2010). The Bryansk meat company was founded in 2009 with this funding (Inna Gannenko “Miratorg has started Russia's first major industrial fattening project for cattle.” (“Miratorg nachal pervyi v Rossii krupnyi proyekt industrialonogo otkorma KRS ”), *AgroInvestor*, February 1, 2011). Miratorg received the loan with only 12-13% of co-funding, whereas normally 20% co-funding was required. Supposedly, chairman of the board of Vneshekonombank and prime minister Vladimir Putin had personally decided to support the company with the loan after a visit to the region (Levinsky, *Forbes,* 2019). Further, the project received 150 million rubles in outright subsidies for the Bryansk region.

With this funding, the company started buying 150.000 ha of land (Gannenko, *AgroInvestor*, 2011). Miratorg lawyers did this by buying up small plots for about

4000 rubles per ha (about $30 at the time) and by enclosing unregistered plots and parts of shared land (Levinsky, *Forbes*, 2019). A local law against concentration in land ownership was amended in 2012 when it became a possibility that Miratorg could end up controlling more than the maximum 35% of total farmland. The federal government allowed Miratorg to use some 7000 ha for free for 49 years.

The total amount of direct subsidies to the company are not disclosed. In 2014 the company received 1.4 billion rubles in subsidies of the 1.419 billion ruble budget for meat subsidies in Bryansk (AKKOR, “Will Miratorg again receive half of all Russian meat subsidies?” (“Bolshe poloviny vsey Rossiyskoy myasnoy subsidii vnov poluchit Miratorg”), *akkor.ru*, April 15, 2015). In 2015 Miratorg received another $742 million loan from Vneshekonombank.

Miratorg appears to have captured a very large part of the state support programs. It appears to have stretched rules for co-financing and to have been given ‘invisible’ subsidies like free use of federal land. Further, the land grabbing tactics described in section 3.2 return in news reporting on the land purchases used by Miratorg. This way the company was able to rapidly grow its revenues and landholdings.

4.4.2.2 Prodimeks+Agrokultura

Relatively little information can be found on the private company Prodimeks. This holding was the second largest landowner in Russia with control of over 850.000 ha of land. Prodimeks was founded by Igor Khudokormov. Agrokultura is also owned by Khudokormov. Prodimeks started trading in sugar in 1993 (Alexander Levinsky, “How a former officer became the sugar king” (“Kak byvshii ofitser stal saharnym korolem”), *Forbes*, December 19 2012). When import tariffs were introduced in 1997, Prodimeks started acquiring sugar factories. This grew to a 22% market share of sugar production by 2014 (Maitaih & Smutkah 2016).

Prodimeks started buying land in 2001 by buying shares in agricultural companies and leasing. The company was offered reduced taxes to stimulate them to buy up land. Khudokormov bought a large tract of land in 2004 with a shell company, transferred the land to Prodimeks, and let the shell company go bankrupt. During this time the company started also investing in land for real estate development (Levinsky, *Forbes,* 2012).

4.4.2.3 Agrokompleks

Agrokompleks was founded in 1993 by Nikolay Tkachov. Nikolay Tkachov’s son, Alexander Tkachov, was governor of Krasnodar Krai from 2001 to 2014, and Minister of Agriculture from 2015 to 2018. Under the tenure of Tkachov total agricultural production and exports rapidly increased (Wegren, Nikulin & Trotsuk

2019). Agrokompleks revenues also grew rapidly. Between 2009 and 2018 revenues increased by $400 million. At the time, Tkachov denied that there was a conflict of interest between his work as Ministry of Agriculture and his family business (Vladislav Gordeyev, “Tkachov saw nothing reprehensible in the agribusiness of his relatives.” (“Tkachev ne uvidel nichego predosuditelnogo v agrobiznese ego rodstvennikov”), *RBC,* March 6, 2016). After leaving the government in 2018, Tkachov became chairman of the board at Agrokompleks in the same year.

Despite Tkachev’s objections, it does appear likely that Alexander Tkachev’s political position benefited Agrokompleks. As in Miratorg’s case, the regional government of Krasnodar Krai amended a law on concentrated ownership which could have inhibited the expansion of Agrokompleks (Pavel Sedakov and Igor Popov, “Brother, matchmaker and penal battalion: how the business of Alexander Tkachev's family works” (“Brat, svat i shtrafbat: kak ustroyen biznes semi Aleksandra Tkacheva”) *Forbes*, August 10 2015). In this case Tkachev enacted the amendment himself as Governor. In 2005 a competing company in Krasnodar Krai was shut when extensive inspections led to several administrative charges. The company was sold to Agrokompleks several months after (Sedakov & Popov, *Forbes,* 2015). These two situations suggest that administrative resources may have been used to help expand Agrokompleks.

4.4.2.4 Rusagro

Rusagro is a diversified agroholding owned by Vadim Moshkovich. Like Prodimeks, the company started as a sugar importer before becoming a sugar producer (Rusagrogroup “About the company (“O kompanii”), *rusagrogroup.ru*, accessed June 30, 2020). Rusagro controlled 12% of the Russian sugar market in 2014 (Maitaih & Smutkah 2016). Subsequently the company moved to vegetable oils in 2004-2005.

In 2006 the company started developing a pig farm in the Belgorod, for which it used 6.7 billion rubles in state-supported financing, approximately $200 million ((“Bekon vmesto betona”) *Forbes*). A large part of the company’s funding was acquired through an IPO and SPO on the London Stock Exchange which raised $450 million in total (Rusagrogroup 2020). The company could achieve this as it was highly profitable. This sets the company apart from other agroholdings, which often are not particularly profitable. For example, EkoNivaAgro made a net adjusted profit of about $16 million in 2019 (Ekosem-Agrar AG 2019), whereas Miratorg lost $200 million in 2019 (Yekaterina Dyatlovskaya “Miratorg's loss from beef production increased to 14 billion rubles” (“Ubytok Miratorga ot proizvodstva govyadiny vyros do 14 mlrd rubley”)*agroinvestor.ru* August 7, 2019).

4.4.2.5 EkoNivaAgro/Ekosem

Only three foreign holdings appear in the full list of companies with over $100 million in revenues in the ‘Lifestock’ and ‘Other’ subsectors. EkoNivaAgro is the largest by land volume and the only foreign agroholding in the top 5 Russian landholders. Almost of the company’s revenue is earned in the milk sector. Ekoniva held 4.7% of the Russian milk market (Ekosem-Agrar AG 2019, 89).

The parent company of EkoNiva, Ekosem, made about €564 million (approximately $630 million) in revenue in 2019, up from €376.5 million ($440 million) in 2018 (Ekosem-Agrar AG 2019). All of Ekosem’s activities were in the agricultural sector in Russia. The company received about $10 million in interest rate subsidies, down from $15 million in 2018. Additionally, Ekosem received $41.5 million in subsidies for the purchase of capital goods, down from $50 million in 2018 (Ekosem-Agrar AG 2019, 40). In 2018 Ekosem received half of the total subsidies in the milk sector (Yekaterina Dyatlovskaya and Tatyana Kulistovka, “Vladimir Putin: "The amount of support for the agricultural sector is measured in hundreds of billions of rubles"." (“Vladimir Putin: Razmery podderzhka APK izmeryayutsya sotnyami milliardov rubley” *AgroInvestor.ru,* December 20, 2018).

Foreign-held companies are often expected to have improved access to external foreign capital and technology, which could allow them to grow faster than Russian peers (Visser, Mamonova & Spoor 2012, 26). Despite these perceived benefits the performance of non-Russian firms making use of international best practices and foreign funding has in many cases been disappointing (Kuns, Visser & Waestfeld 2016). Ekosem, however, used mostly Russian funding. It held most of its debt (about $1.3 billion) in the form of subsidized Russian loans (Ekosem-Agrar AG 2019, 49). Ekosem, as a foreign company, could not use buy land outright. However, the daughter companies of Russian subsidiaries of foreign company (‘granddaughters’) were allowed to buy land (Irina Skrynnik, “Masters of Russian land: how foreigners bought up about 3 million hectares of agricultural land” (“Khozyaeva zemli Russkoi: Kak inostrantsy skupili okolo 3 mln ga selskokhozyai”), *Forbes* September 23 2013). Ekosem was thus able to easily avoid ownership restrictions for foreigners.

4.4.3 Commonalities between top agroholdings

Direct federal support played a very large role in expanding the top agroholdings. EkoNivaAgro and Miratorg were able to rapidly grow their revenue by taking on very large debts. This is not only enabled but even stimulated by the state; these loans were either subsidized or arranged through state-run financial institutions.

In the case of Miratorg an initial $700 million development loan may have been personally arranged by the prime minister. All top 5 agroholdings, including German-owned EkoNivaAgro, were included in the list of “systemically important organizations” in 2015 (Ministry of Economic Development 2020). This may have allowed a higher appetite for debt as this designation could be interpreted as an implicit guarantee.

Further, many other mechanisms identified in section 3 appear to have been used by the largest agroholdings. Miratorg’s rapid land acquisitions were likely achieved with the use of quasi-legal land-grabbing techniques. Prodimeks simultaneously invested in agricultural land and real estate, which may indicate that some agricultural land was used for real estate developments. The current chairman of Agrokompleks was able to abuse his political position to allow the company to grow faster. Ekosem used a certain legal construction which allowed it to avoid foreign ownership restrictions. For both Miratorg and Agrokompleks regulations restricting concentration in ownership in a region were amended as the companies grew close to the maximum allowed ownership.

Although most subsidies are not openly disclosed, the sparsely available information on subsidies indicated a remarkably high concentration of subsidies in just the top 5 companies. Miratorg received over 98% of the total available subsidies for meat production in a region. EkoNivaAgro received about 50% total available subsidies. With a total reported $65 million in subsidies in 2018 this single company may have captured 2% of total agricultural support.

5 Conclusion

Three approaches were taken to study inequality in the agricultural sector. First, the effect that Russian institutions have on inequality was considered. Large scale farming is perceived in Russia as being more efficient than smaller farming. To a certain extent the perceived superiority of larger farms may be a self-fulfilling prophecy as this expectation itself may have led to support measures being biased to larger farms. Most agricultural production support is either due to output-dependent market price support from inflated domestic prices or through subsidized loans. Output-dependent support is ipso facto higher to farms with larger revenues, and subsidized loans are indirectly tied to revenues as the loan is based on existing company finances. Further, support measures are not easily accessible to small farmers. Lastly, high fixed transaction costs and complicated legal procedures for land transfers in practice make land transfers cheaper per hectare for larger purchases.

Second, firm-level data was used to identify changes in the distribution of company revenues. Several inequality measures showed that inequality increased over the last ten years. The growth of the farming sector as a whole over the last 10 years has increased revenues in across all income categories, the distribution of these revenues has become more unequal. A part of this increase was due to an increase in the total amount of small companies. This increase could be caused by improvements in data quality. However, when small companies were excluded inequality still grew. In fact, inequality in the distribution of revenues grew even when very large companies were excluded. This indicates that the finding of growing industry concentration is robust.

An analysis where companies are grouped by revenues showed that the total income share due to companies with more than $10M in revenues grew for all subsectors. Companies with under $100.000 in revenues captured a negligible but growing share of total revenues. Most smaller farmers are not registered as farming businesses, so this negligible market share is not reflective of the true market share of small farmers. The revenue share of very large companies nearly doubled. Agribusinesses with very large revenues of over $100 million expanded their market share from 11.7% to 19.6%. The largest increases were in two subsectors. One, ‘Lifestock’, has received a lot of support from the state in recent years. At least a third of federal subsidies went to this sector and relatively high meat prices provided significant market price support. Two companies (Miratorg subsidiary ‘Bryansk Meat Company’ and Agrokompleks) in the ‘Other’

sector were also centered on the ‘Lifestock’ subsector, such that most of the concentration can be explained by the meat sector.

Lastly, some individual agroholdings with large growth rates were studied. The market share increase for very large companies is for a large part due to the rapid growth of just 33 companies. If ownership information is taken into account just 16 companies remain. The top 5 agroholdings by land all appear in this list. These companies share some similarities between them. Many captured a very large share of available subsidies. The activities of the largest agroholdings correspond with the distribution of support measures indicated in the 2012 Strategy for the Development of the Food and Processing Industry (Government 2012a). In section 3.2 several ways in which large agrobusiness are supported by unequal legal institutions. The top 5 agroholdings benefited from these institutions and were therefore able to grow faster.

Overall, income inequality in the Russian agricultural sector has grown significantly over the last 10 years. The meat industry stood out as the subsector where concentration was the highest. Here, very large companies also captured most of the revenue growth. The sector was particularly heavily supported by the federal government. However, the increase in inequality happened in the entire agricultural sector. This can be explained by Russian institutions, an embedded preference for larger farms, and unequally divided agricultural support.

5.1 Discussion and possible avenues for further inquiry

Russian agricultural support forms a complex system of formal and informal practices. Some formal support practices were not taken into account in this text. Regional subsidies were not discussed, even though these subsidies contributed about half of the budget for the 2008-2012 State Program and over a third of the budget for the 2013-2020 State Program. Although they account for a large share of the support budget, collated information on these subsidies is difficult to obtain. Another ignored support practice was trade policy through the EAEU. The recent removal of some trade and non-trade barriers within the EAEU (Vorontsova 2015) may have removed indirect support measures

Section 4.4.2 revealed some informal support practices in the top 5 agroholdings. The use of ‘administrative resources’, quasi-legal expropriation of farmers, condoned racketeering and violence against competitors, and many other forms of corruption appear to have been used by some larger farms. Qualitative studies of these behaviours (Mamonova 2016) showed some of the effects that informal institutions have on driving inequality between companies in section 3.2. Some

Lastly, some simple data improvements may greatly improve the analysis. ORBIS has some data going back further than 2009, although data quality is likely to diminish over time. Already in the 2009-2018 the amount of small companies in the database grew so rapidly this increase is more likely due to data quality improvements than to new joiners on the market.

Holding companies may further distort the revenue distribution. Several of the top companies in the case analysis in section 4.4 were subsidiaries of large agroholdings. None of the largest agroholdings appeared in the ORBIS agricultural database as an aggregated agricultural company. This suggests that the concentration of revenues in the Russian agricultural sector may be even higher than indicated in section 4. For example, the total revenue for companies listed in ORBIS as being owned by Miratorg was $1.365 billion in 2018. On the other hand, including ownership data would require significant additional work. It should be possible to get this information from ORBIS as ownership information is included. However, ownership information is not available for every entity. Second, ownership changes over time. Any M&A activity and corporate spinoffs would need to be incorporated for each year.

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7 Appendix

Subsector	OKVED 01 codes	Description
Lifestock	42, 43, 44, 45, 46, 47, 49	All animal husbandry except dairy
Dairy	41	Milk production and dairy cattle breeding
Fruit & Vegetables	13, 21, 22, 23, 24, 25	Leafy vegetables, roots, mushrooms, grapes, citrus, tropical and subtropical crops, fruit trees, shrubs, nuts, seed cultures
Cereals	11,12, 26	Includes grains, seed oils and rice
Other	3, 5, 6, 7, 14, 15, 16, 19, 27, 28, 29	Remaining categories including coffee, tea, sugar, beverages, tobacco, seedlings, mixed agriculture, agricultural services, hunting, sugar cane, fibre plants, flowers, fodder crops, spices, trees

Tab. A1: Mapping of subsectors to OKVED codes

Year	Fruit and Vegetables	Others	Dairy	Lifestock	Cereals
2018	0.89	0.88	0.78	0.93	0.81
2017	0.88	0.88	0.77	0.93	0.80
2016	0.89	0.88	0.77	0.92	0.80
2015	0.88	0.87	0.76	0.92	0.80
2014	0.87	0.85	0.75	0.92	0.79
2013	0.86	0.84	0.75	0.91	0.79
2012	0.85	0.83	0.73	0.90	0.78
2011	0.82	0.80	0.71	0.89	0.77
2010	0.81	0.78	0.70	0.87	0.74
2009	0.81	0.77	0.70	0.87	0.74

Tab. A2: Gini measure per subsector

Year	Fruit and Vegetables	Others	Dairy	Lifestock	Cereals
2018	85.4%	81.1%	63.7%	90.3%	69.8%
2017	83.5%	80.0%	62.3%	90.2%	68.6%
2016	83.8%	80.6%	61.7%	89.5%	68.8%
2015	81.9%	79.2%	60.9%	89.7%	68.3%
2014	80.1%	76.5%	59.5%	89.5%	67.5%
2013	78.5%	75.0%	59.1%	88.1%	66.5%
2012	76.1%	73.5%	56.9%	86.4%	65.5%
2011	71.8%	69.4%	55.6%	83.4%	64.1%
2010	69.3%	65.7%	54.2%	81.1%	62.5%
2009	70.4%	65.5%	54.9%	73.4%	60.0%

Tab. A3: Top 10% measure per subsector

Year	Fruit and Vegetables	Others	Dairy	Lifestock	Cereals
2018	37.0%	46.9%	21.1%	42.0%	27.6%
2017	36.7%	45.7%	20.3%	42.1%	25.8%
2016	37.6%	46.5%	19.9%	40.1%	25.9%
2015	35.4%	43.1%	19.5%	38.7%	25.1%
2014	33.0%	38.3%	18.0%	38.8%	24.3%
2013	31.5%	37.6%	18.2%	36.9%	23.1%
2012	30.5%	36.9%	17.2%	34.95	22.9%
2011	26.0%	32.6%	17.0%	31.0%	21.7%
2010	22.2%	28.4%	16.9%	29.0%	21.4%
2009	24.5%	28.4%	18.1%	27.6%	20.5%

Tab. A4: Top 1% measure per subsector

Year	Fruit and Vegetables	Others	Dairy	Lifestock	Cereals
2018	23.5%	29.8%	11.9%	23.8%	6.0%
2017	24.7%	30.0%	10.9%	24.2%	5.3%
2016	27.8%	31.2%	11.2%	23.3%	5.7%
2015	26.7%	28.0%	10.7%	22.9%	5.1%
2014	25.8%	22.8%	9.5%	23.8%	5.3%
2013	26.0%	22.4%	10.2%	23.1%	5.0%
2012	27.0%	23.5%	10.2%	24%	5.5%
2011	26.0%	22.3%	10.6%	22.8%	5.5%
2010	23.5%	19.7%	10.9%	22.6%	6.2%
2009	27.7%	20.3%	11.7%	22.8%	6.5%

Tab. A5: Top 10 measure per subsector