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Inertia of Peasant Households in Russia at the Turn of the 19th-20th Centuries

1. Introduction

The inertia of peasant households as a phenomenon characteristic of the economies of various regions and eras has more than once become the subject of study by economists (Kondratiev 1922; Chayanov 1912; Mellor 1963; Sen 1966; Nacajima 1970; Galt 2013). In this work, we plan to prove the viability of this hypothesis based on statistical data for Russia from the end of the 19th – beginning of the 20th century.

But to start out, it is worth to mention what is meant by the concept of peasant households. According to T. Shanin, the Western literature point out this type of household as a separate category in the late 1960s and early 1970s, when, as a result of post-war decolonisation and the formation of support programmes for newly independent countries, economists were facing with a distinct household structure specific to these countries, where the dominant role is played by family households (Chaplygina 2008). From Shanin's point of view, this rediscovery of the "peasant world" is very significant, since its special organisation is the "determining factor" of the most acute social phenomena of the era: "the Vietnam War, Indian poverty, Latin American guerrilla, African stagnation and the Chinese 'Great Leap

Forward"' (Shanin 1992, p. 8).

Shanin identifies four key characteristics of the peasant households as a special economic phenomenon, in fact, a special type of economic agent or institution: 1) the family nature of labour, which does not lead to the autarky of the household and is quite actively included in the trade turnover, [1] but determines the family principle of division of labour, and also the primacy of family rather than individual needs; 2) agriculture as the main (only) sphere of production, which leads to low specialisation (peasants perform many different functions), low qualifications (education of children within the family), strong dependence on natural conditions, both the level of income and the choice of crops produced; 3) a special type of behaviour characterised by traditionalism (past experience),[2] conformity (community pressure), and normative control over each other; and 4) subordinate position in the general socio-political hierarchy and extreme distance from sources of power (Shanin 1992).

In Russian and Eastern European literature, peasant households as an independent phenomenon became the subject of economic analysis much earlier. The well-known works of the organisational-production school of Chayanov, Chelintsev and other Russian economists based on a detailed analysis of empirical data back in the beginning of the 20th century showed the specificity of the behaviour of peasants and the dynamics of their production. Chayanov introduces the concept of family-labour peasant household, which encompasses: 1) the family nature of labour, including that dictated by the lack of a developed labour market in rural areas; 2) the absence of other types of income other than labour (at the same time, agricultural labour is combined with the practice of seasonal works, which Chayanov considers an important characteristic); 3) dependence on climatic conditions; 4) dependence on the demographic cycle of the family (the ratio of the number of eaters and workers), as well as a permanent 5) problem of land shortage (Chayanov 1924).

Chayanov highlights the complexity of the target function of such households. He writes that the result of economic activity appears in the form of total labour income, which cannot be divided into the classical categories of wages, capital profit, rent, etc. (Chayanov 1924). We find a similar view in Galensky, who writes, ‘in many cases it is impossible to separate the production and consumer aspects of investments’ (Galensky 1992, p. 112). The same idea is important within the concept of “rural consumer household” by N.P. Makarov, where the worker, organiser, and owner are united and presented as one economic entity (a peasant, a family) (Makarov 1992).

If we turn to the work of Ellis, who tried to consider all the existing models of peasant behaviour at the end of the 20th century, he identifies three key characteristics: 1) family farming, 2) partially included in 3) an undeveloped and imperfect market (Ellis 1993, p. XIV).

2. Hypothesis of the inertia of peasant households

The hypothesis of the inertia of peasant households was put forward by Russian economists in the beginning of the 20th century. It was a response to the problem they identified – peasant households maintained low marketability of their production, namely: they did not strive to increase the volume of bread sold amid the improving market conditions, which contradicts the principles of rationality accepted in the economic science.

2.1. Version of N.D. Kondratiev

The problem of inertia of the grain market was put forward by a Russian economist N.D. Kondratiev in the early 20th century in connection with the analysis of the problems of grain procurements during the period of World War I and the revolution (Kondratiev 1922).

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[1] Unlike Shanin, B. Galenski underlines the autonomy of the labour of peasants (Galenski, 1992, p. 104), who are self-sufficient, unlike all other industries that cannot exist without farmers. This is an old idea that can easily be found in the works of 18th century French economists (F. Quene, A. Turgot), but which rather relates to the agricultural industry as a whole and does not exclude trade relations between farmers and other industries. This ides just does not consider such connections as inevitable, or specifically, considers them necessary only for the city and industry, but not for the rural areas.

[2] Ellis disputes this characterization, indicating that peasant households are adapting well to changing conditions, although perhaps not very quickly. (Ellis 1993, p. 5).

Kondratiev emphasises that the difficulties in achieving growth in marketable grain are largely associated with the high share of peasant households on the market (ca. 85-90% up to before World War I in the total amount of sown areas).[3] By inertia, Kondratiev means the tendency of the peasant grain market to reduce the grain marketability rate amid favourable conditions.

Kondratiev provides data (Table 1) demonstrating the marketability rate of grain[4] from landowner and peasant households in different regions and types of grain, from which it is clear that peasant households, in principle, are much less inclined to dump bread onto the market.

Table 1. Marketability standards in peasant and landlords households for different regions and types of grain

District	Wheat			Rye			Oats and barley		
	G	P	L	G	P	L	G	P	L
Central Agricultural	43.4	34.2	83,4	17,8	14.5	43.7	45.2	38.2	82.4
Middle Volga	62.6	61.6	80.0	29.7	27.8	52.7	34.5	31.3	63.8
Lower Volga	65.5	63.7	86.1	35.7	38,9	4.1	4.1	3,4	16,3
Novorossiysk (Kherson)	77.4	77.3	77.8	48.8	46,0	62.8	51.3	42.5	69.8
South-Western	45.5	16,2	85.8	14.4	13.8	20.3	7.3	—	63.0
Little Russian	45.1	36.0	78.5	16.7	14.4	38.1	22.3	16.0	52.7
Fore-Caucasus	47.7	45.8	79.4	29.6	31.0	—	39.1	39,8	27.5
Fore-Ural	—	—	—	11.3	11.4	—	15.1	15.1	—
Western Siberia	15.2	14.9	80.9	21.1	21.1	—	3.9	3.9	—
Average	55.7	51.3	81.1	23.3	21.5	42.0	33.8	28.8	65.8

Source: Kondratiev, 1922, Chapter 1, paragraph 5; G – the general marketability rate for all households, P – peasant households, L – landlord households.

But the problem of inertia is that amid high prices for bread the marketability rate of peasant households is decreasing. Kondratiev illustrates his hypothesis with the following data:

- peasant budgets for the Simbirsk province (grain-producing) and Volokolamsk *uezd* (hereinafter county) (grain-consuming) demonstrating the growth of the revenue side of the budget of peasant households over the expenditure side in 1914-1916;
- the growth of the consumption rate of peasant households in the period from 1911 to 1915 for 5 producing provinces (14.9 *poods* [a unit of mass] per capita in 1915 compared to 13 *poods* in 1911-1913); and
- a sharp fall in the marketability rate of bread from 1909 to 1915 (from 12.4 to 7.4 for all bread)[5] (Kondratiev 1922, Chapter 2, paragraph 6).

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[3] According to the Central Statistical Committee, the share of peasant areas in the total volume of sown areas for the four main crops in 63 provinces of Russia was 66.8% in the period 1896-1900 and 65.3% in 1906-1910. But Kondratiev considers these data to be underestimated, because they take into account only allotment lands. According to the 1916 census, the share of peasant sown areas ranged from 90 to 94%, depending on the crop. At the same time, the share of peasant grain in the total harvest, according to the Central Statistical Committee, was 65-73.7% (depending on the crop) in 1893-1897, and 57.5-67 in 1909-1913. Kondratiev gives his assessment based on all these figures (Kondratiev 1922, Chapter 1, paragraph 2).

[4] The ratio of the volumes of transported bread to the gross harvest.

[5] Of note, Kondratiev gives data on the growth of rye consumption, while his data show that, in general, for rye

Kondratiev attributes this dynamics by the peculiarities of the motivation of peasant households. He writes that with an increase in the positive balance of the family budget, peasants are losing the incentive to launch grain onto the market and prefer to increase the internal consumption rate. This process is facilitated by the fact that in pre-revolutionary Russia, bread consumption standards were quite low in comparison with European countries (England, France, Belgium, and Germany). Thus Kondratiev explains the main reason for the decline in marketable bread by the fact that peasants themselves are consumers of their products and reduce the share of sold bread by increasing their own consumption amid an advance in profitability of their households. Another Kondratyev's reason is the underdevelopment of industrial goods markets in rural areas. A poor variety of goods provides little incentive for peasants to use their grain for barter.

2.2. Model of the 'drudgery-averse'[6] peasant by A.V. Chayanov

A similar observation was made by the organisational and production school and described, in particular, in the works of A.V. Chayanov (Chayanov 1924). But they give a different explanation for this phenomenon. Chayanov's key characteristic is the labour nature of the peasant household, which forces him to interpret the motivation of such an economy differently. Chayanov draws a diagram of the equilibrium of the peasant household, illustrating the behaviour of such households; close in its idea to the diagram once drawn by W. Jevons for an economic agent (Jevons 1871, p.125). Chayanov writes that in the labour economy, an increase in well-being is inextricably interconnected with an increase in labour costs, '...but the expenditure of physical energy for the human body is far from unlimited. After a relatively very small energy consumption required by the body, further expenditure of energy already requires willpower' (Chayanov 1912, p. 70). Taking into account that the utility of the product that each subsequent unit of labour delivers tends to decrease, Chayanov concludes that such a labour economy will achieve its optimal production size at the point where the curve of decreasing utility CD intersects the curve of increasing burden of labour AB (Fig. 1.a).

Figure 1.a

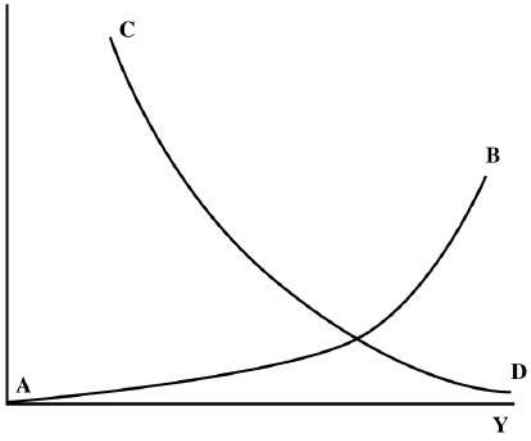
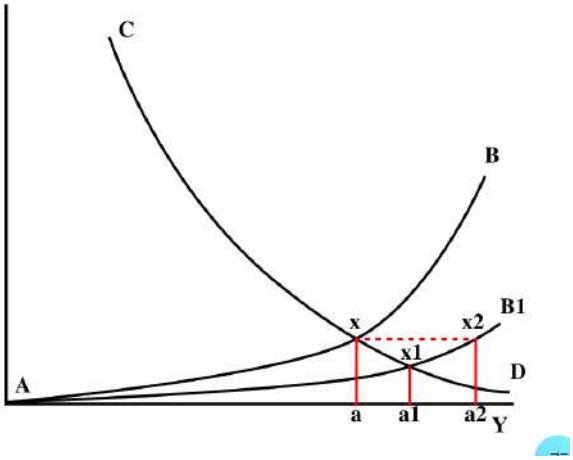


Figure 1.b



Source: Chayanov, A.V., Essays on the Theory of Labour Economy // Chayanov, A.V. Peasant Household. Selected Works. M., Economy, 1989, pp. 71, 73.

Chayanov is interested in how such a labour economy will behave with an increase in labour productivity. Of note, this growth appears as an increase in the value of the product produced by one unit of labour, thus Chayanov's reasoning is also applicable when the value of the produced product increases due to improved market conditions, which formed the problem of the inertia of peasant households in Kondratiev's language. Using data from the

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the marketability rate although falling (from 6.6 to 4.3) but not significantly as, for example, compared to wheat. Rye in general appears as a low-market bread.

[6] Chayanov's theory assumes this name in the work of F. Ellis (Ellis 1993).

budgets of small and medium-sized peasant households in Switzerland for 1910, Chayanov shows that households with a higher value of labour have a higher income per eater, but this difference is not as significant as it should be. Further, he mathematically proves that with an increase in labour productivity, the rate of income growth caused by the households' transition to a new equilibrium point will be relatively lower. Although the increase in labour productivity leads to the fact that at the previous equilibrium point the severity of labour is now lower than the value of the product it brings, and this will force the peasant to increase the volume of applied labour, nevertheless, since with the growth of these volumes the value of additional benefits will decrease each time, then this growth in volumes will not be proportional to the growth in productivity. It will be smaller. Chayanov's conclusions are depicted graphically in Figure 1.b.

Based on his reasoning, Chayanov states that the inertia of peasant households is an inevitable consequence of the labour nature of the household, within the framework of which the described behaviour corresponds to a rational strategy. Arguing that the burden of labour is extremely high in the Russian countryside due to its low productivity, Chayanov concludes that peasant households are quickly reaching a point at which the utility of a further increase in income does not compensate for the increasing anti-utility of additional labour effort.

2.3. Self-employed behaviour model

The modern economic theory has a model of the self-employed, which assumes that stationarity, the desire to give up work upon reaching a certain level of income, is generally characteristic of those economic agents who use their own labour – which means that an increase in production volumes is felt as an increase in the burden of labour. In this model, which practically repeats the already mentioned theory of W. Jevons, economic agents achieve maximum individual benefit by working only as long as the increase in income exceeds the increase in the burden of labour. In modern literature, this behaviour pattern is attributed to representatives of various professions, for example, taxi drivers (Camerer, Babcock, Loewenstein, Thaler 1997).

2.4. Non-economic motives for maintaining small-scale economy

A Polish economist B. Galenski (Galenski 1992), while recognising that the desire to expand one's household is traditional, draws attention to the fact that this is a motive 'rarely found in today's Poland' (Galenski 1992, p. 112). In explaining this phenomenon, he focuses not on the economic, but rather on the social factors that shape this behaviour. In his opinion, the growth of the scale of the household is associated for the peasant (he calls them farmers) with a change in the class and professional status of the family: 1) the peasant loses the opportunity to work in other production areas and he may not like such a narrow specialisation; 2) he is deprived of time to help his neighbours (which is important given the communal rural culture); 3) he is forced to move on to managing the labour of not only members of his family, but also employees, which requires new skills from him; 4) he himself loses the functions of a producer and becomes a pure entrepreneur; and 5) he is forced to enter larger markets and become a professional trader. Thus, the expansion of household is not a quantitative, but a serious qualitative change, which can slow down the process of consolidation of households. In general, Galensky associates the conservatism of the peasants with the fact that the production life of the peasant is almost inextricably linked with his personal way of life. Therefore, farmers perceive changes in production processes more painfully, since they lead to changes in one's family structure (Galensky 1992, p. 116).

3. Empirical analysis

One of the possible ways to confirm empirically the inertia of peasant households is to analyse the response of peasants to[7] changes in grain prices, that is, to analyse the

[7] According to N.P. Makarov, an increase in the price of bread does not yet mean an increase in the income of peasant households. Since their structure is very complex and economic indicators are mixed, the impact of price fluctuations in income levels should be the subject of separate study. In this regard, the approach that Kondratiev used when analysing the dynamics of peasant households budgets seems more competent. But

elasticity coefficient of changes in sown areas in response to changes in grain prices. At the first stage of the study, we tried to find this relationship at the macro-level, using data from fifty provinces of European Russia. At the second stage the same dependence was studied, but within a single province.

Indeed the volume of ploughing depends not only on price dynamics, but also, in the long term, on the development of transport routes, elevators, the development and nature of the trading framework, and climatic conditions. To smooth over these effects, we examined in parallel the dynamics of the sown areas of peasant and landowner households. Since households are in the same temporal and spatial conditions, it is assumed that the discovery of differences in the dynamics of their behaviour in response to prices can serve as evidence that the reason for these differences lies precisely in the households' structure – non-market of peasant or commercial of landowner. At the same time, we recognise that there is another important difference that may have an impact, i.e. a different access to information about prices for landowners and peasants (Lyashchenko 1912). Unfortunately, we were unable to find data on the prices of resellers, which the peasants were most likely guided by, so we accepted the assumption that their dynamics coincided with market prices. However, we understand that this factor may also have contributed to the formation of differences.

3.1. Data used

For empirical analysis, we used provincial data on sown areas, labour prices, level of urbanisation, prices and yields of three grain crops (wheat, rye and oats) for the period from 1881 to 1913. The main sources were collections of the Central Statistical Committee of the Ministry of Internal Affairs, the Statistical Division of the Department of Agriculture and Rural Industry,[8] and *zemstvo* statistics. These sources resulted in a database compilation.[9] More details on the data sources for each time period are given in Appendix A1.

As the scientific literature discuss the reliability of pre-revolutionary harvest statistics (Davydov 2012), prior to moving on to describing the specifications of the econometric models under consideration, we would like to discuss the reliability of the statistical data used.

In pre-revolutionary Russia, there were several data sources. Until 1880, details of sowing and grain harvests was recorded in governor's reports. Details was collected by the national food commissions through the county leaders of the nobility, the chamber of state property and specific offices. An advent of *zemstvo* institutions in 1864 abolished the national food commissions and their responsibilities were assigned to *zemstvo* bodies.[10] The data collected by these bodies was much more reliable, but, nevertheless, there is an opinion in the literature that data from this period should be used with great caution (Maress 1897; Ivantsov 1915).

We used data starting from 1881, since during this period the registration of harvests was entrusted to the Central Statistical Committee (CSK). To obtain the necessary details, questionnaire forms were sent to each *volost*. Some of the forms were intended for peasants, separately for those who had large, medium or small plots (six forms per *volost*), some for private owners, separately for large, medium and small households. The forms asked about the number of acres sown with each type of grain, the number of seeds sown and the amount of grain collected from this area. From the data obtained, the average figure for sowing and harvesting each type of grain (per one acre) for each county was derived. In addition, since 1870, a division into peasant lands and landowner lands was adopted, and also separate headings for each type of grain were assigned (prior they were divided only into "spring

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the study we propose nevertheless is also seemed correct.

[8] Since 1894 renamed the Department of Rural Economics and Agricultural Statistics of the Ministry of Agriculture and State Property, which since 1905 was reorganised into the Main Directorate of Land Management and Agriculture.

[9] A.S. Sorokin, N.A. Rozinskaya, I.G. Chaplygina. The Database of indicators of sown areas and yields of main grain crops for the provinces of the Russian Empire for the period from 1881 to 1913. Certificate of state registration of the database No 2023623372 dated 06.10.2023. Application No 2023623069 dated 22.09.23.

[10] A *volost* was the smallest territorial unit where a survey was carried out to obtain crop data.

crops" and "winter crops"). The result was fairly reliable figures (Maress 1897).

Each year, the CSK received information about approximately 150 thousand households, which were evenly distributed throughout the country. Therefore, the average conclusions obtained in relation to these households can rightfully be generalised and extended to all other economies (Maress 1897). Among peasant households, the choice of those typical for a given area was not difficult, and the choice of landowner households was often quite random, thus details relating to them is probably less reliable than details of crops from lands of peasants.

In 1880, the Statistical Department of the Department of Agriculture and Rural Industry began to collect data and develop periodic crops reports simultaneously with the CSC. The department received details from volunteer respondents out of rural households. The information reported by the respondents itself has significant reliability, but since the Department's respondents themselves undoubtedly belonged to the best representatives, conclusions based on this information when extrapolated to all households within the country may not be representative.

The Department usually had more respondents from the landlord classes than from the peasants; therefore, obtaining details of the landowner households is comparatively better. Due to a lack of respondents, the Department, when developing its provincial figures starting from 1884, used the data of the CSK.

Some *zemstvos* were also involved in registering crops. They received information, like the Department of Agriculture, from voluntary respondents; but they had more of the latter than the Department, so their information is more reliable (Maress 1897).

Many researchers compared the data obtained by the CSK and the Department of Agriculture, and they all came to the conclusion that the difference between them is very small (Fortunatov 1893). And since conclusions about crops were made by the CSK and the Department of Agriculture based on data that they received from different sources and in different ways, the convergence of these conclusions to each other may indicate that they correctly reflected the existing reality (Maress 1897). In addition, Kovalchenko showed that the data of the CSK and the Department of Agriculture on crop areas were confirmed by materials from the 1916 agricultural census (Kovalchenko 2004, p. 48). From all that has been said, it follows that the materials of the Central Statistical Committee can be considered sufficiently reliable for the study.

To test the hypothesis at the regional level, we used regional data, which are less aggregated and, consequently, can give a clearer result. The Kherson province was deliberately chosen for the study as an example of one of the most export-oriented provinces, where market relations could presumably be more developed than in other regions. The discovery of "non-market" behaviour of peasant households in this province could serve as more reliable evidence that this behaviour was typical for all regions of Russia. Kondratiev, in his work "The Bread Market..." considered the Kherson province as an example of a region demonstrating the high marketability of bread. Accordingly, this province, due to its economic structure, should demonstrate a lesser tendency towards the inertia, and the hypothesis of a reduction in acreage in response to rising prices could be confirmed with the least probability. At the same time, since this is a grain-producing province, and it was a kind of province, which according to Kondratiev showed a significant increase in consumption rates in response to improving market conditions, the effect of inertia may well be detected. And if the inertia turns up this province, it will indicate the stability and prevalence of such behaviour in general among Russian peasants.

The literature highlights the following most important characteristics of this province: underdeveloped infrastructure (roads, elevators), underdeveloped financial market, presence of a large number of small resellers, and poor opportunities for consumption expansion or savings. As for the grain trade, the Kherson province represented a wheat-exporting region (Kondratiev gives 86.6% of exports in relation to all marketable grain) which was covered by a number of major ports. Proximity to ports ensured the smallest gap between local and exchange prices (Kondratiev 1922, Ch. 1, paragraph 11), which is also important for the study due to the mentioned possible asymmetry of information on prices

between peasant and landlord households. The bulk of the region's population was engaged exclusively in agriculture. The factory industry was developed only in the southeast of the province – in the Krivoy Rog region.

The agricultural sector had an extensive grain nature, which meant the inclination toward production as much grain as possible and possibly harvest it as quickly as possible. This contributed to the more active use of machines, but individual farms in the region was practically undeveloped. Most of the harvested crop was consumed within the household. The remainder and grain brought from other regions were exported to southern coastal cities (Nikolaev and Odessa) and from there sent abroad. Thanks to the proximity of its ports, the Kherson province was the largest collector of grain for further exporting.

Despite the export nature of the grain trade, the organisation of local trade, as in non-export regions, was poorly underdeveloped. Small-scale intermediary was quite widespread; a small-scale purchases of peasant grain led to the fact that the grain passed through the hands of a significant number of intermediaries. The purchase of grain from peasants prevailed mostly locally in villages, railway stations, piers, etc., where peasants brought grain. It was bought by both agents of larger companies and small buyers and resellers. Selling directly by export firms was difficult even for large landowners, because grain trading required a lot of hassle and many acquaintances among exporters (Lyaschenko 1912).

Peasants, unable to save grain until the next harvest, were forced to sell it in early autumn, while large producers sought to sell the harvest at the most profitable time of the year for them, sometimes in the fall, sometimes holding up the sale until spring.

The issuance of advances and loans was relatively underdeveloped. Most buyers worked for their own account, and most did not have large capital; some worked for companies on a commission basis. The demand of local buyers was for the most part completely dependent on the conditions of foreign markets and their requirements. Prices in the Kherson province were set mainly under the influence of southern ports, and flour millers had no less influence on wheat, especially in areas where mills were concentrated; for other types of grain prices were set solely by export demand (Lyaschenko 1912).

Of note, the above-described features of trade framework can be found in almost all export-oriented provinces. This gives us, to a certain extent, reason to assume that the results obtained can be applied to other similar regions.

3.2. Descriptive statistics of the data used

For macro-level models we took statistical data for 50 provinces over 33 years in panel data format. The panel was unbalanced, but considering the nature of omissions to be exogenous and given that their number as a percentage of the number of observations varied on average from 0 to 25%, we used the same parameter estimation methods as for balanced panel data. Table A2-1 in Appendix A2 gives a descriptive statistics for the original quantitative endogenous and exogenous variables. Of note, most variables have significant variation, the mean being very different from the median. This is due to the specifics of the data used, i.e. panel data for 50 provinces over 33 years. Within one province, the distributions of variables are close to normal, so we did not transform the data for the final models.[11]

For the micro-level model, we used data for six counties of the Kherson province over 20 years;[12] a total of 120 observations in panel data format.

Table A2.2 in Appendix A2 gives descriptive statistics for the original quantitative variables. The panel was also unbalanced as the macro-level model.

3.3. Specifications of models used

To test the hypothesis about the difference in the effect of changes in grain prices on the volume of ploughing between peasant households and landowner households for three grain crops (rye, wheat and barley), we built two panel data models for the macro and micro-

[11] But when calculating and searching for optimal models, the authors also used logarithmic values of variables that generally had an exponential or lognormal distribution over the entire time period.

[12] There are no data on crops and harvests for 1904 and 1908.

levels separately: for peasant's and landowners' households. We were guided by the fact that if in these models for peasants and landowners we had received statistically significant coefficients of the same sign for the exogenous price variable, then the research hypothesis was rejected, since this clearly meant that peasants and landowners had the same reaction to price changes. If the statistically significant coefficients had differed in sign, or the coefficient was statistically significant only in one of the models (for peasants or landowners), then the research hypothesis was confirmed, since this meant that peasants and landowners had different reactions to price changes.

3.3.1. Macro-level model

The basic model for estimating the parameters was a panel data model of the following form:

$$Y_{it}=\beta_0+\delta*t+\beta_1*p_{it}+\gamma*Z_i+\varepsilon_{it}, \quad (1)$$

where

Y_{it} – the sown area of the corresponding crop for peasants or landowners for the i-th province in the *t* year (state acres);

i = 1, ..., 50 – province index;

t = 1, … , 33 – time index;

p_{it} – price for the corresponding crop in the fall (*kopecks* [a coin] per *pood* for *i*-st province in *t* year or *t*-1 year;

Z_i – a variable characterizing the specific features of each i-th province;

β_0, δ, β_1, γ – coefficients;

ε_{it} - random error.

Of note, for rye – a winter crop – we took prices in the same year as the sown area. For spring wheat and barley, we took prices with a lag of 1, because sowing of these grains occurs in the spring, and peasants and landowners could only rely on last year's prices at this point.

To estimate the parameters of equation (1), we performed within-group regression, considering a fixed-effects model that explains the variation in the dependent variable around the mean for a group of observations related to a given object by the variation in the mean of the independent variable:

$$\tilde{y}_{it} = \beta_0+\beta_1 * \tilde{p}_{it} + \tilde{\varepsilon}_{it}, \quad (2)$$

where

$\tilde{y}_{it} = y_{it} - \bar{y}_i$; $\tilde{p}_{it} = p_{it} - \bar{p}_i$; $\tilde{\varepsilon}_{it} = \varepsilon_{it} - \bar{\varepsilon}_i$.

The choice of a panel data model with fixed effects regression versus a pooled regression model or a model with random effects was carried out based on appropriate statistical tests: Hausman test, Breusch-Pagan test, and linear restriction test. For each grain crop and for each type of households (landowner and peasant), the choice was made in favour of a model with fixed effects, which corresponded to our logical expectation: each province had an individual specific level of reaction.

Of note, the main problem we face when estimating the parameter with the exogenous crop price variable in equation (2) is the problem of endogeneity. Taking into account the discussion about the reliability of pre-revolutionary harvest statistics, detailed above, we can talk about the possible bias and inconsistency in estimating the coefficient due to errors in the measurement of the cause variable, including due to an unbalanced panel.

Of note, in the specifications of the equations for spring crops, we considered lagged values of the explanatory variable. This empirical strategy allows us to reflect the reactive behaviour of peasant households, as well as smooth out the problem of potential reverse causality between the dependent variable and the cause variable.

Another classic reason for endogeneity is the failure to include cause variables in the model that significantly influence the dependent variable. In our case, the task was not to accurately predict crop areas using multiple regression. The goal was to test the hypothesis of inertia of peasant households based on the sign of the significant regression coefficient of only the independent variable price. However, we understand that households decisions are influenced not only by crop prices, but also by many other factors, including, for example,

weather conditions. To solve this problem, we used control variables, when included in the regression equation (2) we analysed in detail the change in the sign of the coefficient and its significance with an exogenous price variable. Despite the strong limitation in the choice of variables due to the availability of data for the period under consideration, we built models with different combinations of control variables, the general form of the specifications of which is as follows:

$$\tilde{y}_{it} = \beta_0 + \beta_1 * \tilde{p}_{it} + \sum_{j=2}^{k} \theta_j * \tilde{x}_{it}^{(j)} + \tilde{\varepsilon}_{it}, \quad (3)$$

where

$\tilde{x}_{it}^{(j)}$ – values of the j-th control variable in deviations from the provincial average:

x_1 – productivity from one state acres of landowners or peasants of the corresponding crop (*poods*);

x_2 – population in the province in villages (thousand people);

x_3 – population in the province in cities (thousand people);

x_4 – binary variable whether the province was productive or not;

θ_j – coefficient for the *j*-th control variable.

Considering equations (1)-(3), we can assume that the price and volume output of agricultural households are endogenous variables determined as a result of the interaction of two equations: supply and demand. The current year's prices should be influenced by the volume of the crop harvested this year. To solve this problem, we introduced an instrumental variable x_5 - the cost of labour of a foot worker (on own resources) for sowing (in kopecks), through which we assessed the endogenous variable of crop price:

$$\tilde{y}_{it} = \beta_0 + \beta_1 * \tilde{p}_{it}^{IV} + \sum_{j=2}^{k} \theta_j * \tilde{x}_{it}^{(j)} + \tilde{\varepsilon}_{it}, \quad (4)$$

where

$\tilde{p}_{it}^{IV}$ – the price of the corresponding crop in deviations from the group average, obtained through the instrumental variable x_5.

We assume that the price of labour can be used as an instrumental variable for the price of grain, since during the period under study, unskilled workers spent more than 60-70% of their income on food, and along with this cereal products were the basis of the diet (Ovsyannikov 1925; Russia 1913 Statistical and documentary reference book 1995; Rozinskaya, Sorokin, Artamonov 2021; Fries 2016). And this regard, with an increase in prices for grain and, accordingly, for bread, the price of labour also had to increase.

The selected instrumental variable has no significant correlation with the dependent variables for spring crops, a weak correlation with the dependent variable for rye, and an average correlation with all independent price variables.

For peasant households, we also additionally tested the hypothesis about changes in peasant behaviour after 1906. We assumed that the Stolypin reform, associated with changes in land ownership rights and stimulating the withdrawal of peasants from the commune, could contribute to a change in the motivation of peasants, promote more rational behaviour, bringing their behaviour closer to a more market one, i.e. reorienting peasants from maximising income to maximising profit. In this case, the coefficient of elasticity of the acreage of a certain crop relative to the price of this crop should have been positive.

To test the hypothesis about changes in peasant behaviour after the Stolypin reform, we introduced a dummy variable into equation (4) to assess the structural shift and its interaction with price to assess a possible change in the sign of the coefficient of the cause variable:

$$\tilde{y}_{it} = \beta_0 + \beta_1 * \tilde{p}_{it}^{IV} + (\beta_2 + \beta_3 * \tilde{p}_{it}^{IV}) * s + \sum_{j=2}^{k} \theta_j * \tilde{x}_{it}^{(j)} + \tilde{\varepsilon}_{it}, \quad (5)$$

where

$s = \begin{cases} 1, t < 27 \\ 0, t \geq 27 \end{cases}$ – a dummy variable to reflect the period before and after the Stolypin reform.

3.3.2. Model at the micro-level

As for the Kherson province, to test the hypothesis of our study, we also selected models of the dependence of the sown area of rye for peasants and models of the

dependence of the sown area of wheat for landowners. The econometric modeling methodology was similar; we considered panel data models with fixed effects of the form (2), as well as models with random effects of the form:

$$y_{it} = \beta_0 + \beta_1 * p_{it} + u_i + \varepsilon_{it}, \quad (6)$$

where

u_i – individual random effects.

Due to limitations in the available source data, we were unable to use control variables, but to neutralise the effect of coefficient bias due to the endogeneity problem, we used an instrumental yield variable through which we estimated crop prices, and also considered a dynamic panel data model with the introduction of a lagged values of the dependent variable.

3.4. Simulation results

Out of all the models given within the framework of the specifications indicated above, to test our hypothesis of the inertia of peasant households at the macro-level, we chose two families of models: models of dependence of rye-sown areas for peasants and models of dependence of wheat-sown areas for landowners. Our choice was driven by statistical tests of model quality and meaningful interpretation. For peasants, the main crop was rye. This was due to the fact that the main goal of the peasant household was to satisfy its own needs. Wheat was relatively expensive for peasants, so they consumed mainly products made from rye flour and, accordingly, the main crop for the peasants was rye. Landowners more often sowed wheat, since this grain was in greatest demand on the world grain market, and landowner households were primarily aimed at exporting grain (Rozinskaya, Arkhina 2021).

3.4.1. Inertia of peasant households in Russia as a whole

For peasants in the model using equation (2), we obtained a negative regression coefficient for price, but it turned out to be statistically insignificant (Table 2). After entering control variables and estimating the parameters of equation (3), the coefficient remained negative and insignificant. These results are quite expected due to possible endogeneity problems. After entering the price obtained through the instrumental variable into equation (4), we also obtained a negative regression coefficient, significant at the 0.05 level.

Table 2. Results of estimation of coefficients of models of dependence of rye sown area for peasants at the macro level

Variables	Model 1 basic	Model 2 with control variables	Model 3 with control variables and instrumental variable	Model 4 with control variables and instrumental variable, with period variable
Rye price	-76.68 [56.85]	-61.54 [59.00]	−340,78* [129.04]	−195.43 [209.51]
Harvest year		1671.38 [2,594.69]	3,077.62 [2,548.74]	2,918.00 [2,549.53]
Population in the province in villages		-0.97 [1.00]	−0.72 [1.02]	−0.62 [1.03]
Period				21,474.5 [13,156.2]
Period*Price				−296,18 [170.20]
p-value				

F-test for significance of equation	0.178	0.358	0.025	0.030
linear constraint test	<0.001	<0.001	<0.001	<0.001
Breusch-Pagan test	<0.001	<0.001	<0.001	<0.001
Hausman test	<0.001	<0.001	<0.001	<0.001

*regression coefficient is significant at p≤0.05 level

For all models, the results of statistical tests for linear constraints, the Breusch-Pagan test and the Hausman test, confirmed the appropriate choice of a fixed-effects model compared with a random-effects or full regression model. Of note once again, our main goal in constructing regression models is to estimate the sign of the price factor, and not to obtain a model with high predictive ability. Therefore, we do not present the coefficient of determination of the models and do not analyse it.

From the obtained estimates of the coefficients of the models under consideration for peasants, we can assume that with an increase in prices, peasants were most likely inclined to reduce the area under rye. As for landowners, we observe a positive significant regression coefficient for all models (Table 3): with an increase in price, landowners responded by increasing the area under wheat, hence acted as capitalist agents according to the principle of profit maximisation. Thus, we confirmed the research hypothesis about the difference in reaction to rising grain prices between peasant households and landowner households.

Table 3. Results of estimation of coefficients of models of dependence of wheat sown area for landlords at the macro level

Variables	Model 1 basic	Model 2 with control variables	Model 3 with control variables and instrumental variable
Wheat price with lag 1	336.14*** [336.14]	338.77*** [86.20]	2,725.20*** [262.76]
Harvest year		-21,101.60*** [6,233.54]	-16,390.8** [5,766.22]
Population in the province in villages		4.13 [2.60]	-0.69 [2.42]
p-value			
F-test for significance of equation	<0.001	<0.001	<0.001
linear constraint test	<0.001	<0.001	<0.001
Breusch-Pagan test	<0.001	<0.001	<0.001
Hausman test	<0.001	<0.001	<0.001

** regression coefficient is significant at p≤0.01 level
*** regression coefficient is significant at p≤0.001 level

3.4.2. Inertia of peasant households in the Kherson province

As for peasants in the first specification of the model, the model with random effects turned out to be the best, however, the regression coefficient for the price of rye turned out to be positive and not significant; we do not see the opposite effect of response to price changes among peasants (Table 4). After entering the lagged value of the endogenous variable into the model, we see a change in the sign of the regression coefficient, but it turned out to be statistically insignificant based on the available data sample. And the final model for testing our hypothesis with an assessment of the price value through an instrumental variable showed a negative significant value of the regression coefficient.

Table 4. Results of estimation of coefficients of models of dependence of rye sown area for peasants in the Kherson province.

Variables	Model 1 basic (random effects)	Model 2 with lagged dependent variable (full regression)	Model 3 with instrumental variable (fixed effects)
Rye price	63.60 [121.16]	-80.24 [48.24]	−1,112.24** [494.25]
Rye-sown area for the last year		0.933*** [0.030]	
p-value			
F-test for significance of equation	0.286	<0.001	0.0277
linear constraint test	<0.001	0.217	<0.001
Breusch-Pagan test	0.001	0.480	<0.001
Hausman test	0.143	0.051	<0.001

** regression coefficient is significant at p≤0.01 level
*** regression coefficient is significant at p≤0.001 level

As for landowners (Table 5), in all calculated models of the dependence of the area under wheat on the price of this crop, we derived a positive regression coefficient (statistically significant in two models).

Table 5. Results of estimation of coefficients of models of dependence of wheat sown area for landlords in the Kherson province

Variables	Model 1 basic (random effects)	Model 2 with lagged dependent variable (fixed effects)	Model 3 with instrumental variable (fixed effects)
Wheat price for the last year	513.45*** [140.28]	230.83 [154.20]	8,943.87*** [129.04]
Wheat-sown area for the last year		0.33 [0.10]	

p-value			
F-test for significance of equation	<0.001	<0.001	<0.001
linear constraint test	<0.001	<0.001	<0.001
Breusch-Pagan test	<0.001	0.593	<0.001
Hausman test	0.148	<0.001	0.002

*** regression coefficient is significant at p≤0.001 level

Thus, based on fixed effects models with instrumental variables, we made a final conclusion about the difference in the response to rising grain prices between peasant households and landowner households at the micro-level using the example of the Kherson province.

4. Conclusion

The goal of the work was to test the thesis put forward in the mid-20s of the 20th century by a Russian economists N. Kondratiev and A. Chayanov, that peasant households demonstrate non-commercial behaviour, namely, they do not strive to increase the volume of bread sold in response to rising prices. Both economists proved this thesis based on an analysis of data from peasant budgets, i.e. at the micro-micro level. This article tested, the hypothesis about the inertia of peasant households at two levels: the macro-level and the meso-level (the level of an individual province). Having analysed track records of peasants grain ploughing in response to grain fluctuations in specific provinces of Russia, the authors find a significant negative correlation. Upon a comparison of the results of the study on peasant households with the results of studies of similar data on landowner households, which did not find such a correlation, or found a positive correlation, the authors concluded that a negative correlation could be perceived as evidence of the specific behaviour of peasant households. Thus, the conducted study can serve as proof of the verifiable thesis about the inertia of peasant households.

Considering that the results of the first stage of analysis (at the macro-level) and the second stage (meso-level) give a similar result, and also that non-market behaviour was spotted in the province with the most developed market relations, it can be assumed that the inertia of peasant households was dominating in pre-revolutionary Russia. In addition, we tried to test the hypothesis about a possible change in the behaviour of peasants after the Stolypin agrarian reform. However, the coefficients for the period dummy variable and its product with the price turned out to be insignificant, i.e. in the six years that had passed since the reform, the behaviour of peasants regarding matter under inquiry did not undergone significant changes.

Appendix A1

Data sources for compiling the database:
Sorokin, A.S., Rozinskaya, N.A., Chaplygina I.G.*The Database of indicators of sown areas and yields of main grain crops for the provinces of the Russian Empire for the period from 1881 to 1913.* Certificate of state registration of the database No 2023623372 dated 06.10.2023. Application No 2023623069 dated 22.09.23.

Test items	Source	Period
1) Prices for rye (autumn) (in kopecks per *pood*); 2) Prices for spring wheat (autumn) (in kopecks per *pood*); 3) Prices for barley (autumn) (in kopecks per pound)	*A set of statistical data on Russian agriculture by the end of the 19th century (from 1881 to 1900).* Issue II. 1903. Fluctuations by year in the local autumn main bread (in kopecks per *pood*). Prices for rye p.22 and barley p.38.	1881-1900
	Collection of statistical and economic information on agriculture in Russia and foreign countries. Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1907. First year Fluctuations by year in the local autumn main bread (in kopecks per *pood*). Prices for rye and barley from 1902-1906. P.2-3.	1902-1906
	Collection of statistical and economic information on agriculture in Russia and foreign countries / [Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics]. – SPb., 1910-1916. Fifth year. 1912. Average prices for rye and barley (autumn) for 1906-1910. P.432-437.	1907-1910
	Collection of statistical and economic information on agriculture in Russia and foreign countries. 1917. Tenth year. Fluctuations by year in the local autumn main bread (in kopecks per pood). Prices for rye and barley from 1910 to 1913. P.476-481.	1911-1913
4) Cultivated areas of peasants in government acres (winter rye); 5) Cultivated areas of peasants in government acres (spring wheat); 6) Cultivated areas of peasants in government acres (spring barley)	*Sown areas adopted by the Central Statistical Committee when developing the harvests of 1881, 1887 and 1893-1899. For 50 provinces of European Russia.* Publication of the Central Statistical Committee of the Ministry of Internal Affairs. St. Petersburg. 1901. P.3-52.	1881, 1887, 1893-1899
	A set of harvest data for 1883-1915 (materials of the Central Statistical Committee on harvests on allotment lands). Published by the Central Statistical Office of USSR. M., 1928.	1883-1913

7) Cultivated areas of landlords in government acres (winter rye); 8) Cultivated areas of landlords in government acres (spring wheat); 9) Cultivated areas of peasants in landlords acres (spring barley)	*Collection of statistical and economic information on agriculture in Russia and foreign countries.* Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1907. First year	1902
	Collection of statistical and economic information on agriculture in Russia and foreign countries. Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1908. Second year.	1903-1906
	Collection of statistical and economic information on agriculture in Russia and foreign countries / [Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics].] – SPb., 1910-1916. Fifth year. 1912.	1907-1910
	Collection of statistical and economic information on agriculture in Russia and foreign countries. Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1917. Tenth year.	1911-1913
10) Productivity per one government acre (in poods) on peasant allotment lands (winter rye); 11) Productivity per one government acre (in poods) on peasant lands (spring wheat); 12) Productivity per one government acre (in poods) on peasant lands (spring barley)	*A set of harvest data for 1883-1915 (materials of the Central Statistical Committee on harvests on allotment lands).* Published by the Central Statistical Office of USSR. M., 1928.	1883-1913
13) Productivity per one government acre (in poods) on landlord lands (winter rye); 14) Productivity per one government acre (in poods) on landlord lands (spring wheat); 15) Productivity per one government acre (in poods) on landlord lands (spring barley)	*Chronique of the Central Statistical Committee of the Ministry of Internal Affairs.* Issue 51. Average sowing and average harvest of grain bread and potatoes for the five-year period 1896-1900. S.-Pb. 1902. p.180	1896-1900
	Collection of statistical and economic information on agriculture in Russia and foreign countries. Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1907. First year Productivity per one government acre of rye and barley for 1901-1906. P. 38-43.	1901-1906
	Collection of statistical and economic information on agriculture in Russia and foreign countries / [Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics].] – SPb., 1910-1916. Fifth year. 1912. Productivity per one government acre of rye and barley for 1906-1910. P. 64-73.	1907-1910

	Collection of statistical and economic information on agriculture in Russia and foreign countries / [Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics].] – SPb., 1910-1916. Eighth year. - 1915. - XIV.	1911-1913
16) The cost of labour for a foot worker (on own resources) for sowing (in kopecks)	*A set of statistical data on Russian agriculture by the end of the 19th century.* Issue II. 1903. Fluctuation of prices for foot workers (on own resources) in sowing crops from 1882 to 1900. P. 106.	1882-1900
	Collection of statistical and economic information on agriculture in Russia and foreign countries. Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics. 1907. First year Fluctuation of prices for foot workers (on own resources) in sowing fields from 1902 to 1906. P. 2-7.	1902-1906
	Collection of statistical and economic information on agriculture in Russia and foreign countries / [Ministry of Agriculture. Division of Rural Economy and Agricultural Statistics].] – SPb., 1910-1916. Fifth year. 1912. Average prices for labour (daily wages) (on own resources) for sowing in 1906-1910. P. 476-482.	1907-1910
	Collection of statistical and economic information on agriculture in Russia and foreign countries. 1917. Tenth year. Fluctuation of prices for foot workers (on own resources) in sowing crops from 1910 to 1913. P. 522.	1911-1913
17) Number of population in the province in thous. (in villages); 18) Number of population in the province in thousands (in cities)	*The influence of crop failures on the national economy of Russia (under the general editorship of V.G. Groman).* Russian Association of Research Institutes of Social Sciences. M., 1927 (B. Zaitsev, On the Issue of the Population of European Russia). P.66 http://istmat.info/node/21611	1883-1913
19) Grain prices in the Kherson province by county (wheat, rye, barley in kopecks per pood)	*Kherson province. Compendium of digital data. Issue 1 Population and agriculture.* Publication of the Kherson Provincial Zemstvo Council - Kherson: Steam Typolytography, legacy of O.D. Khodushina, 1910.	1890-1909
20) Sown areas of peasants of the Kherson province by district: wheat, rye, barley in government acres	*Statistical and economic review of the Kherson province...* / Comp. Stat. detachment of Kherson provincial-zemstvo government – Kherson provincial-*zemstvo* government, 1877-1915. For 1890-1909.	1890-1909
21) Sown areas of landlords of the Kherson province by district: wheat, rye, barley in government acres		

Appendix A2

Table A2.1 – Descriptive statistics of quantitative variables for simulating within the macro-model*

Variable	N	(min; max)	Mean ± SD	Me [Q_1; Q_3]
Cultivated areas of peasants. Rye (acres)	1649	(13650; 1,462,100)	353650 ± 241,979	328900 [215,600; 442000]
Sown areas of landowners. Rye (acres)	1096	(651; 815980)	122534 ± 102988	98403 [37734; 196466]
Cultivated areas of peasants. Wheat (acres)	1574	(2; 18245500)	151394 ± 295663	7755 [1426; 181571]
Cultivated areas of landlords. Wheat (acres)	1093	(1; 1239712)	85942 ± 195159	2521 [532; 49442]
Cultivated areas of peasants. Barley (state acres)	1592	(4; 996000)	90808 ± 127131	44972 [18603; 102500]
Cultivated areas of landlords. Barley (acres)	1094	(1; 1017047)	49336 ± 108120	10326 [1743; 34448]
Price for rye. *kopecks* per *pood*	1634	(17; 157)	70 ± 23	68 [53; 84]
Wheat price. *kopecks* per *pood*	1215	(15; 700)	87.9 ± 29.4	85 [72; 100]
Barley price. *kopecks* per *pood*	1340	(18; 128)	64.2 ± 19.2	63 [50; 76]
Peasants' yield. Rye (*poods*)	1300	(3.1; 99.3)	43.8 ± 15.4	43.8 [33.6; 53]
Landlords' yield. Rye (*poods*)	894	(4; 108)	56.5 ± 17.5	56.0 [45.2; 68.4]
Peasants' yield. Wheat (*poods*)	1237	(4; 91)	41.4 ± 14.7	41.0 [32.0; 51.2]
Landlords' yield. Wheat (*poods*)	872	(6; 93)	49.5 ± 15.4	49.3 [39.0; 60.2]
Peasants' yield. Barley (*poods*)	1295	(2.2; 143.4)	44.3 ± 16.0	44.2 [34.8; 54.0]
Landlords' yield. Barley (*poods*)	887	(4; 98)	53.0 ± 17.7	54 [41.7; 65.0]
Cost of labour for a foot worker per sowing (*kopecks*)	1585	(25; 130)	51 ± 16	50 [40; 60]
Population in the province in villages (thous.)	1650	(253.2; 23814.0)	1718.8 ± 1302.6	1526.2 [1166.3; 2159.2]
Population in the province in cities (thous.)	1650	(22; 1615)	253 ± 254	184 [131; 270]

Table A2.2 – Descriptive statistics of quantitative variables for simulating within the macro-model*

Variable	N	(min; max)	Mean ± SD	Me [Q_1; Q_3]
Cultivated areas of peasants. Rye (acres)	82	(32; 133380)	38496.1±30667.3	35214 [14307; 59375]
Sown areas of landowners. Rye (acres)	82	(19; 106359)	30827.1±21536.9	27489 [21460; 40388]
Cultivated areas of peasants. Wheat (acres)	107	(43946; 294480)	123134±66663.9	101570 [67320.1; 171757]
Cultivated areas of landlords. Wheat (acres)	104	(5969; 312975)	102281.8±47004.8	89543.5 [72829; 127742]
Cultivated areas of peasants. Barley (acres)	106	(16584; 177890)	68914±40936.8	56547.4 [33330; 101981]
Cultivated areas of landlords. Barley (acres)	103	(9850; 188170)	50669±29065	47500 [27719; 65709]
Price for rye. *kopecks* per *pood*	120	(21; 125)	61.5±21.7	57.5 [46.6; 72.6]
Wheat price. *Kopecks* per pood	120	(28.8; 136)	78.1±22.7	75.7 [65; 93.5]
Barley price. kopecks per *pood*	120	(18.7; 85.2)	48.8±15	48.7 [38.5; 59]
Peasants' yield. Rye (*poods*)	75	(864; 3262963)	545093.4±757255.2	188955 [39182; 718890]
Landlords' yield. Rye (*poods*)	74	(744; 4530893)	687940.4±914823.2	191223.5 [45346; 1050696]
Peasants' yield. Wheat (*poods*)	94	(32583; 9228700)	2658194.2±2618597.8	2053731.5 [419302; 3734061]
Landlords' yield. Wheat (*poods*)	91	(27685; 11494786)	3042974.1±2764435.1	2654090 [508973; 4770030]
Peasants' yield. Barley (*poods*)	94	(22596; 10884767)	2026234.4±2322206.4	1160781.5 [346523; 2583712]
Landlords' yield. Barley (*poods*)	91	(31472; 9623903)	1887929.5±2062345.5	1209200 [327942; 2833668]

*Note: the results are given in the form: N – number of valid observations; (min; max) – minimum and maximum value; Mean ± SD – average and standard deviation; Me [Q_1; Q_3] – median. 1st and 3rd quartiles.

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