"Russian Inequality on the Eve of Revolution"*

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ABSTRACT

Just how unequal were the incomes of different classes of Russians on the eve of Revolution, relative to other countries, to Russia's earlier history, and to Russia's income distribution today? Careful weighing of an eclectic data set provides provisional answers. In 1904, on the eve of military defeat and the 1905 Revolution, Russian income inequality was middling by the standards of that era, and less severe than inequality has become today in such countries as China, the United States, and Russia itself. We enrich this emerging story by noting some distinctive fiscal and relative-price features of Imperial Russia.

JEL codes: N30, N33, O15

Keywords: Russia, inequality, economic history

* This paper presents results from an open-source research project. Given the uncertainties of any inferences from still fragmentary historical data, we invite others to add additional data, procedural revisions, and alternative interpretations. As much as possible, the data are being posted on http://gpih.ucdavis.edu (click on European Russia, either on the world map, on the Europe map, or in the data list folder). This study forms part of a larger project on long-run Russian inequality, with contributions from Tracy Dennison, Igor Fedukin, Peter H. Lindert, Andrei Markevich, and Steven Nafziger. We thank the US National Science Foundation for support under grant 0922531, and acknowledge the helpful comments of anonymous referees and participants in the March 2010 conference on "Quantifying Long-run Economic Development" at The University of Warwick in Venice.

"RUSSIAN INEQUALITY ON THE EVE OF REVOLUTION"

I. ISSUES AND OVERVIEW

For all the debate over class differentiation in Russia before the world's first successful Marxist Revolution, scholars have still not been able to develop a clear picture of the country's overall inequality. This has not been due to a lack of attempts, as a number of writers have endeavored to describe how income and wealth were allocated in Tsarist society.[1] For some, the old feudal distribution of wealth and power was under pressure from the emergence of an urban working class, the decline of the landed gentry, and the rise of middle-class professions. Other commentators argued that the Russian peasantry – comprising roughly 85 percent of the population – experienced growing polarization into wealthy and powerful *kulaki* elite and a large, poor landless proletariat, despite the presence of the seemingly equalizing land commune. To many contemporaries and later scholars, the perception that there was growing rural and national inequality could be directly linked to the revolutions of 1905 and 1917.

Russian and Western scholars have long drawn on simple measures of asset ownership to document inequality through the lens of "class differentiation." However, indicators such as the number of horses, the amount of land, or the number of wage earners cover only a subset of all assets, are only indirect measures of income, often relate to a just a part of the population, and were typically drawn from limited empirical sources for a specific geographic area. Therefore, studies that relied on such measures did not necessarily approximate the true distribution of income or wealth in Tsarist Russia. As a result, although Paul Gregory (1982), Peter Gatrell (1986), and others have identified a fairly high rate of economic growth in the last decades of the Tsarist regime, we know very little about how such gains were distributed among the population. The lack of a clear depiction of the level of Russian inequality not only limits our understanding of the roots of the 1905 and 1917 revolutions, but it also impairs our accounting of the evolution of the Russian economy over the period.

[1] We discuss many of these in Section III below.

The explosion of recent empirical work on long-run economic growth and living standards in peripheral areas, such as Latin America, Africa, and East Asia, has mostly bypassed Russia.[2] The few recent works on Russian living standards by Boris Mironov (2010) and others have brought to bear new data on heights, wages, and consumption patterns in the 19th and early 20th centuries, but many of these studies are often limited in focus, suffer from methodological concerns, or fail to adequately investigate distributional issues (Dennison and Nafziger, 2013).[3] To better understand Imperial Russia's economic record during the Great Divergence, we need to expand our aggregate empirical picture beyond that provided by Gregory's (1982) national income series for the period 1885 to 1913.[4]

This paper helps to fill this gap by drawing on newly compiled provincial data on high income earners (those earning more than 1000 rubles), wages in a variety of occupations, and both communal and private land holdings for a small window around the year 1904. We use this information to derive estimates of income inequality in the late-Tsarist period at the provincial level and for European Russia as a whole.

Our findings – which we subject to a variety of robustness exercises – suggest that just prior to the revolutions of the early 20th century, Russian incomes were not exceptionally unequal, either in comparison to contemporary societies or when stacked up against estimates for the post-Soviet period, despite the inequality of land ownership and the clear regressivity of the Imperial fiscal system. We suggest that the overall moderation of income inequality was a net result of the tension between Russia's labor scarcity, or land abundance, and its regressive and repressive institutions. At the same time, inequality was higher in the capital city provinces, the Baltics, and the Black sea region – i.e. some of the more dynamic and urban parts of the Empire. As the revolutions of 1905 and 1917 were urban in origin, the geography of Russian inequality would suggest some support for economic factors as underlying causes. However, our picture is

[2] See Arroyo Abad (2009) on Latin America; Fenske (2012) and Nunn (2008) on Africa; and Allen *et al.* (2011) on East Asia. The best studies of Imperial Russian growth and living standards are those of Gregory (1982), Mironov (2005, 2010), and Markevich and Harrison (2012).

[3] Indeed, the recent English-language version of Mironov's opus (2012) on Russian living standards contains only one reference to inequality in the index, and that brief mention refers to anthropometric data. Mironov does consider regional differences in some indicators of living standards (especially heights), but otherwise, little attention is paid to distributional issues.

[4] Gregory (1982, 146), himself, notes the lack of adequate research on inequality in Tsarist Russia.

just a snapshot. Additional research on the dynamics of inequality is necessary before more definitive accounts of the role played by economic processes in the two revolutionary surges can be drawn.

II. RUSSIAN GROWTH AND DEVELOPMENT FROM EMANCIPATION TO REVOLUTION

At the time of serf emancipation in 1861, Russia had just lost the expensive Crimean War, the economy was perhaps the least developed in Europe, and the country was facing a complicated and uncertain rural reform process. Current best estimates suggest that per capita income in Imperial Russia was around 70 constant 1913 rubles in 1861, rising to approximately 120 by World War I. The 1861 level was less than ¼ the per capita incomes of the United Kingdom and the United States and less than ½ of France's or Germany's. By 1913, despite Russia's modest growth in income per capita, these ratios had worsened: Russian per capita income was less than 20% of the UK's, just over 10% of the US's, and between 30 and 40% of France's and Germany's levels (Gregory, 1982, 155-7).[5]

As Allen (2003) notes, much of Imperial Russia's agricultural growth was of the extensive type, as production shifted into Ukrainian and southern provinces where agro-climatic conditions were more favorable. The expansion of the railroad network into these and peripheral regions deepened domestic grain market integration and linked Russian producers to international markets (Metzger, 1974). The flipside was that agriculture experienced relative decline in the central and northern provinces of the Russian heartland.[6] These areas – especially in provinces around Moscow and St. Petersburg – had long possessed significant handicraft, proto-industrial, and factory-based sectors, and these activities only increased in relative importance in the last decades of the Imperial period. Therefore, by the early 20th century, European Russia exhibited significant regional differences in economic activity, differences that may have contributed towards the overall level of income inequality.

[5] The per capita income gap with Western Europe may have been roughly constant or even closing slightly after the onset of Russian industrial growth in the mid-1880s (Gregory, 1982, 154-165). These estimates refer to the entire Empire, although the general pattern for European Russia was likely little different.

[6] Some northern and central districts did experience growth in specialized agricultural production, such as dairying or truck farming.

In the classic formulation of Gerschenkron (1965), the institutional structure of the Russian peasant commune limited agricultural productivity, intersectoral labor mobility, and, ultimately, economic growth. In addition, property and indirect consumption taxes were seen as siphoning resources away from the peasantry to support the state-sponsored industrial effort centered on the larger cities (Robinson, 1972 [1932]). At the same time, commentators across the political spectrum perceived a growing gulf between a disaffected rural poor, on the one hand, and a modernizing landowner class and growing urban bourgeoisie, on the other. These factors were viewed as fueling an "agrarian crisis" among the peasantry (a phrase evoked by both contemporaries and subsequent generations of scholars) and fostering rural unrest in the Revolution of 1905.[7]

While the dislocations created by the processes of regional specialization, industrialization, and migration / urbanization provided the social context in which the first Russian Revolution occurred, direct evidence on a relationship between economic conditions and unrest is lacking.[8] Indeed, although conditions of economic "crisis" have been blamed for growing political radicalization, rural unrest, and labor strife, the pace of agricultural and industrial growth (and the relatively limited tax burdens) suggests that living conditions were broadly improving in the 1890s and 1900s (Gregory, 1982; Mironov, 2010 and 2012). Scholars of the Revolution of 1905 have generally concluded that the government and military failures surrounding the Russo-Japanese War and the Bloody Sunday massacre of January 1905 were the more proximate causes of the social unrest that gripped the urban and then rural areas of the country (e.g. Ascher, 1988).

What is missing from the literature on this period is a sense of the distributive consequences of the structural changes the Russian economy was experiencing. Lenin and other observers concluded that rural "differentiation" and urban "proletarianization" were unleashing social unrest across Russia by the 1890s, but, as we discuss below, their evidence was limited in critical ways. Therefore, a clearer understanding of the level and

[7] Most Populists, Marxists, and Liberal intellectuals perceived a developing rural crisis in the last decades of the Tsarist regime (i.e. Ianson, 1881; summarized in Mironov, 2012, Ch. 1). The crisis view was given particular voice in the district and provincial meetings of the Special Conference on the Needs of Agriculture in 1902-4. Delegates to these meetings typically viewed Russian, and especially peasant, agriculture as facing the institutional and fiscal constraints that Gerschenkron, Robinson, Von Laue, and others later focused on.

[8] Finkel *et al.* (2013) provides evidence that serf emancipation led to considerable rural unrest in the 1860s.

regional variation in Russian inequality just prior to 1905 may shed light on whether economic conditions helped fuel the Revolution.

Our calculations of income inequality draw on new estimates of the distribution of agricultural property (including communal holdings) and incomes for c. 1904, just before the reforms took hold. Although we do not connect these findings directly to the impact of the subsequent Stolypin land reforms (1906-1915) in this paper, our new facts provide insights into the initial conditions that may inform future analyses of the distributional effects of these measures. By reducing the costs of exiting communal land tenure, improving the liquidity of land markets, and increasing the supply of agricultural credit and inputs, these reforms likely raised incomes at the lower end of the (rural) distribution, although the general equilibrium effects from migration are less clear (Chernina *et al*., forthcoming).

By providing quantitative evidence on the nature of inequality in early 20th century Russia, our study may also speak to the forces behind the Revolution of 1917. Although the downfall of the monarchy and the Bolshevik seizure of power are rarely interpreted as specific reactions to long-run structural conditions in the Russian economy (except, perhaps, through possible roots of military collapse during World War I), our evidence suggests that the unrest in the capital provinces may have had roots in the relatively high levels of inequality they exhibited. On the other hand, if the unrest of the period 1905-1917 was unrelated to inequality, then, as is consistent with the thrust of the historical literature, the broader swell of events in 1917 were likely driven by other forces as well.

III. PRE-REVOLUTIONARY INEQUALITY: SOURCES AND INTERPRETATIONS

As typically measured, inequality in Tsarist Russia has received remarkably little attention.[9] This has mainly been due to data constraints. No representative income or wealth surveys were undertaken across different sectors at any point in time. The

[9] Allen acknowledges this point (2004, 37, note 10). A search for the terms "income" or "wealth," "inequality" or "unequal," and "Russia" or "Soviet" in the database Historical Abstracts turned up practically no relevant entries and exactly none that pertained directly to the late-Tsarist period. On inequality in the Soviet Union, see Bergson (1984) and McAuley (1979).

preferred measures of inequality or differentiation frequently took the narrow form of livestock, land, or other asset distributions across exclusively peasant households, often only in small geographic areas.[10]

After 1861, academics and policymakers were increasingly aware of their limited knowledge of the countryside, and of economic conditions in the Empire more broadly. This led the Central Statistical Committee of the Ministry of the Interior and other ministerial bodies to engage in numerous statistical research projects, culminating in the first national census in 1897. This census not only documented the ethnic, religious, and geographic diversity of the Empire, but it also collected detailed data on the occupational structure of the population. This census and other similarly impressive statistical research efforts after 1900 (such as the 1905 Land Statistics) provide some of the necessary building blocks for estimating the level of inequality in European Russia around the turn of the century.[11] But few scholars have endeavored to evaluate just how unequal Russia was by 1900, and those that did so have generally relied on approaches that do not compare well to modern estimates.

Most central government research efforts focused on aggregate levels of information, either at the province or the district level. In contrast, a new institution of local self-government – the *zemstvo* – frequently engaged in village or household-level data collection efforts (Nafziger, 2010 and 2011). Founded in the wake of serf emancipation, these bodies were responsible for monitoring the taxable resources under their jurisdiction. In doing so, they utilized pioneering survey and sampling methodologies to collect information on household incomes, asset holdings, and the distribution of land. In presenting their findings, the *zemstvo* statisticians frequently classified the peasant population according to the size of landholding, the number of

[10] Harrison (1977) and Merl (1990) provide excellent accounts of these methods and of how later scholars continued to draw on populist and Leninist models in documenting peasant differentiation.

[11] Scholars have generally viewed the 1897 census as relatively well done for its time and context, but the published data likely do include some significant errors in the reported age structures and urban population totals (Rowney and Stockwell, 1978). Given our methodology, we feel that such errors probably have little impact on our findings, assuming they occurred randomly across the country. The 1905 land statistics have been widely used in aggregate form, although the present paper is one of the first to rely on data built up from the district (uezd) level. The Central Statistical Committee, with the help of provincial statistical bureaus and various local officials, collected these data from (property) tax registers and other sources (Russia, Tsentral'nyi, 1906, vol. 51, Intro).

livestock, or the number of adult workers in the household.[12] Although a number of scholars have been highly critical of the motivation and conclusions of *zemstvo* researchers (e.g. Darrow, 2002), arguing that they often misconstrued their results in an effort to portray a growing agrarian crisis, there is little evidence that the raw data they produced (and that we partly rely on) were biased in a particular direction. However, it is the case that these *zemstvo* research efforts tended to be limited to individual districts or provinces. Little was done to make more comparative inroads towards the study of inequality outside of the peasantry or across *zemstva*.

Two literatures emerging at the end of the 19th century indirectly spoke to the nature of inequality in late Tsarist society. The first was the rise of a school of populist peasant studies that built upon and extended *zemstvo* research by undertaking detailed budget studies of "representative" peasant households. Emerging first in the province of Voronezh under the leadership of Feodor Scherbina in the 1880s (e.g. Scherbina, 1897), this movement later came to be associated with the work of Alexander Chaianov, especially his influential *The Theory of the Peasant Economy* (1986). According to this line of scholarship, inequality of rural households was driven more by life-cycle events such as aging or household divisions than by broader social forces.

The focus on budget data and *zemstvo* studies of rural households also played a key part in Soviet interpretations of peasant *differentiation*, or *rassloenie* (or "polarization" – see Field, 1989). This scholarship expended considerable effort at classifying the pre-revolution peasantry according to the *zemstvo* asset categories. The ideological motivation behind these efforts was to link changes in the Russian countryside to social class divisions that were supposed to accompany the transition from feudalism to capitalism under the Marxist model of development. Rich peasants with slightly larger communal allotments or a few more horses became rural bourgeoisie (and, eventually, *kulaki*, whose property was subject to expropriation after 1917), while poor peasants were increasingly landless and "proletariatized".[13]

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[12] Almost every *zemstvo* study divided households in these ways – Field (1989) reports examples drawn from Poltava province that use land or livestock as the indicator of wealth. For summary statistics from the original data, see Svavitskaia and Svavitskii, eds. (1926).

[13] For example, see Rashin (1958). Research projects in the 1920s and 1930s tried to pin down the processes of social stratification among the peasantry by following a given stratum – defined by land or livestock holdings – over time in a particular area. In a sense, these dynamic household censuses were

Field's (1989) fascinating analysis of turn-of-the-century wealth polarization among the peasants of agricultural Poltava and other provinces echoes these literatures by estimating Gini coefficients (and their change over time) for different agricultural assets.[14] We present a number of these in the top part of Table 1 to illustrate the types of assets and range of geographies covered in *zemstvo*-based studies. According to these findings, agricultural assets were held relatively unequally, even among the supposedly homogenous peasantry. Similarly to contemporary observers who asserted that "differentiation" was growing over time, Field emphasizes the emergence of "rural capitalism" among the peasant population by 1900. However, he also acknowledges that such *zemstvo* data make it difficult to accurately estimate true income or wealth inequality, because the asset categories, definitions of a household, and types of peasant economic activity changed over time and across surveys.[15]

It is worth touching on two other areas of scholarship that relate to our method of calculating income inequality. The first is the literature on living standards in Tsarist Russia. Soviet scholars such as Kirianov (1979) tended to focus on *either* rural or urban (i.e. "worker") living standards by considering work conditions, diets, and some very limited information on wages and salaries. These studies were written through a Marxist filter and, therefore, did not pay much attention to the income generated from asset ownership.[16] In his recent impressive work on living standards from Peter the Great to the Revolution, Mironov (2010 and 2012) quickly sets aside direct calculations of incomes

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attempts to bring Chaianov's insights into a Marxist framework. Prominent Soviet scholars of rural stratification include A. M. Anfimov (e.g. 1984) and Ivan Koval'chenko (e.g. 1967), who incorporated a much wider set of evidence from archival materials and other quantitative sources and expanding the Leninist/Marxist analysis to consider changes within the landed nobility.

[14] Chapter 2 of Lenin (1974) – and subsequent Soviet works – provides a series of tables that classify peasant households into strata depending on land, livestock ownership, and some limited budgetary information for a small number of districts for which he had access to *zemstvo* surveys. In some cases, Lenin just took the classifications from the underlying zemstvo statistics, while in others he derived the grouping himself. Field (1989) uses similar data, but takes the existing *zemstvo* categorizations and derives Gini coefficients.

[15] In a more recent work, Johnson (1997) analyses income stratification by household size, as reported in a 1909 budget survey from Kostroma province. He emphasizes the existence of Chaianovian life-cycle differences in household wealth and inequality, but his study refers to a small sample and a limited geography.

[16] By adopting a "labor theory of value," these and other Marxist studies certainly missed a key part of income inequality, especially when it came to land. Moreover, this theoretical perspective might explain why there is a surprisingly small amount of business- or estate-level histories that employ modern accounting ideas to assign "corporate" incomes to individual owners.

(and their distribution) in favor of an anthropometric approach. His reliance on military and factory data on adult heights opens an important area of research into Russian living standards, especially over time, but it does not directly measure economic inequality.[17]

Second, many Soviet and post-Soviet studies of living standards, peasant stratification, the emergence of a working class, and household budgets have tended to be overly micro in their use of evidence. We argue elsewhere that micro studies of living standards are valuable for understanding the nature of heterogeneity in Russian living standards (Dennison and Nafziger, 2013). However, evaluating the level of inequality in a particular society requires taking a more aggregate approach. Gregory's (1982) important revision of Russian national income – which documents a relatively high growth rate from the 1880s to 1913 – provides a baseline measure of the size of the economic "pie" that was divided among agents in the economy. In the process of compiling these accounts, Gregory makes a rough calculation that the top one percent of earners received about 15 percent of national income around 1904 (Table 1).[18]

Our take-away message from this brief summary of the literature on inequality in pre-Soviet Russia is relatively simple – there has been little comprehensive work done to this point. After the Revolution, more extensive data on earnings do enable broader measures of the distribution of incomes, including 90 / 10 percentile ratios and Gini coefficients for the entire USSR (we report a sample of these in Table 1). Estimates of pre-1917 inequality focused on relatively small parts of total income and did so for small geographic areas. Assignment to income strata was generally done by asset ownership, although returns from owning these assets did not really enter into early calculations.[19] In what follows, we rely on a variety of sources and a new methodology that allow us to

[17] This is particularly true given the unknown nature of selection into such samples of heights, a criticism powerfully made by Bodenhorn et al. (2013).

[18] This calculation relies on the same source of high incomes that we employ below. In a related work, Gregory (1980) estimates aggregate peasant grain consumption but does not look into the consumption of foodstuffs of urban or non-peasant populations. Early Soviet studies of national income prior to 1913 – particularly Prokopovich's (1918) estimates for 1900 and 1913 – did emphasize some geographic inequality that Gregory does not explore. Markevich and Harrison's (2011) recent study of revolutionary era growth accepts Gregory's pre-1913 income estimates, while arguing for a sharper decline after 1917.

[19] That communal allotment land (*nadel'naia zemlia*) comprised the bulk of property held by most peasants has led many scholars to assume more homogeneity among peasant households than was likely true in practice. Soviet class-based analyses did not necessarily employ this simplification, but many did tend to assume that the possession of little property was equivalent to low incomes.

estimate overall inequality around 1904 in a way that is comparable to methods used for other societies at different points in time.

IV. PUTTING HOUSEHOLDS INTO SOCIO-ECONOMIC GROUPS

A. Choosing Households as the Population Unit

To determine just how unequally incomes are distributed, we must first clarify what units we have in mind. This paper will focus on the household as the relevant population unit for income distribution. We do so for two reasons, one theoretical and one practical.

The theoretical argument for focusing on households was emphasized by Simon Kuznets in his work in the 1960s and 1970s. Kuznets warned repeatedly that studies of inequality often fail to define the unit of population clearly.[20] The usual candidates are:

- inequality of total income among households
- inequality of income per household member (or per adult male equivalent)
- inequality of individual incomes per economically active person (e.g. taxpayer, or member of the labor force)

Kuznets emphasized the superiority of the household focus on theoretical grounds. Caring about economic inequality means caring about how unequally people consume resources over their lives. Even if data constraints force us to study annual inequality rather than life-cycle inequality, Kuznets pleaded for measuring annual household income per consumer in the household. The basic reason is that households do share their resources. The income numerator must capture the incomes of all economically active household members, and the population denominator should capture the number of adult-equivalent consumers. He warned against measuring inequality among individual earners.

For the purpose of mapping Russian inequality, Kuznets's theoretical argument is reinforced by practical empirical considerations. We must focus on households (*dvory* or *khoziaistva*) as income recipient units in order to conform to the practices of those who

[20] See especially Kuznets (1976).

generated our data.[21] Our Imperial Russian sources favored studying the household as a unit, especially for the peasantry. So did those who investigated the income structure of other countries in centuries past, since they too confronted the simple fact that taxable property, such as real estate, is used by all household members, even if only one is the owner and taxpayer. Their thirst for measuring nations' potential for paying taxes and supplying soldiers has proven enormously helpful to social science historians.

B. Estates and Sectors

Imperial Russian laws and social inquiries helpfully classified households into groupings useful for our pursuit of income differences. First, across the four centuries leading up to the 1917 Revolution, Imperial officials defined classes in a way that differentiated them relatively clearly by legally distinct social estates (*soslovia*). Our reading and analysis suggest that these categories tended to correspond to income levels, with modifications for urban/rural residence and occupation. This makes it relatively straightforward for us to divide national income along the same class lines that others have considered important. True, the classes overlapped in their income distributions to some extent, but there is considerable evidence that the social tables based on socio-occupational classes come close to approximating size distributions of income.[22]

Mironov (2010) has already reaped the rich harvest of data on membership in estate classes since 1678. Some of his findings are summarized in Table 2. Despite signs of urbanization and churning at the top, with the replacement of old aristocracies with new, changes were slow. The shares of the aristocracy, defined by hereditary or granted title (including attainment via promotions up the famous Table of Ranks), were not high,

[21] Both *khoziaistvo* and *dvor* are terms used to refer to households in our time period. Information on the variation in household size across European Russia is very limited. The method of reporting of the 1897 census makes it difficult to document differences between provinces without additional assumptions. Rynziudskii (1983, pp. 22-23) reports somewhat larger households in the Ukrainian and Southern provinces, while Worobec (1995, p. 104) argues that household size was relatively constant at around 6 in the central region. For our purposes, the underlying assumption is that the number of earners was relatively constant across European Russia. We have experimented with relaxing this assumption, but our aggregate inequality estimates are little affected.

[22] Milanovic, Lindert, and Williamson (2011) note how historical tables of class average incomes seem to approximate size distributions in many countries. Wirtschafter (1997) provides a valuable discussion of *sosloviia*, including how their characteristics overlapped by the end of the 19th century.

hovering at less than two percent of the population of recognized households.[23] That was perhaps comparable with the early modern share in France and England. *Ancien regime* France in 1780 had a similar share of its population distinguished by nobility or clergy: 1.93 percent. For England and Wales, the share distinguished by landowner status was similar, but a bit higher: 2.11 percent around the year 1290, 3.15 percent in 1688, and 3.47 percent in 1801-03.[24] While these are only rough counts, it is noteworthy that a far more rural Russia had such a small share of its population in the landed elite. Also noteworthy is the thinness of Russia's government bureaucracy. In 1750, for example, Russia had only one official per 10,000 of population, similar to China's thin bureaucracy of one official per 11,350 in the same year. By contrast, in sixteenth-century England each official covered only 4,000 persons on the average, and in France under Louis XIV each corresponded to only 7,700 of population.[25] As Table 2 indicates, the share of the population in the nobility, in the merchant estate, and in other upper classes (such as "Honored, titled") remained fairly constant through 1900. Overall, Russia's top social ranks – the nobility and higher government officials – looked thin in our period, in relative terms.

To this relatively stable and skewed social structure we can add household counts by economic sector for 1897 and for years that followed. It is easier to attach data on earnings to different parts of the population if we know which sector the household head worked in, since wage and other data are often specific to an output sector, as well as to an occupation. We count households in the main output sectors by starting with the 1897 census estimates of sectoral occupations (*zanyatie*) and inflating the counts to 1904 using population data from the 1904 statistical yearbook of the Ministry of the Interior.[26]

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[23] From Peter the Great until the end of the regime, the social structure of the elite in Imperial Russia was distinguished by its Table of Ranks, which translated civil and military service into noble status. For the traditional landed elite families, noble social status was passed down as part of the estate. Above a certain achieved rank for others in the civil or military services, any granted noble status also became hereditable.

[24] See Morrisson and Snyder (2000) on France in 1780, Campbell (2007) on England 1290, and Lindert and Williamson (1982) on England 1688-1803. We should note one dip in the English landed share: Joseph Massie's table for England and Wales in 1759 had only 1.2% in the titled landowning classes.

[25] See Pintner (1980) and Sng (2011). The thinness of the bureaucracy had eased slightly by the 19th and early 20th centuries (Rowney, 1982), although probably not in relative terms.

[26] The 1904 population totals - taken from Russia, Tsentral'nyi (1905) - are not exact figures. Rather, they reflect rough counts (based on the 1897 census) that were maintained for fiscal purposes. Although the resulting numbers (and the population changes from 1897 that we derive) may slightly misallocate people

Combining the occupational-sectoral (*zanyatie*) household counts with the social estate (*soslovie*) household counts (all by province in European Russia) sharpens our view of the income distribution further. Knowing the sector helps, for example, to identify the greater earnings of peasants working in industry or local government than those in agriculture or domestic service. And knowing the estate helps, for example, to delineate those in "industry and commerce" who were peasants from those in "industry and commerce" who were of the merchant estate. Appendix A describes our assumptions about which estates tended to combine with which output sectors, with further separation by rural versus urban residence. In the end we are able to delineate 2,300 income-earning groups (23 estate-sector combinations by 50 provinces, and by urban versus rural), even before later stratifying by income level on the basis of additional data.

In output sectors as in social classes, Russia's distribution of households was quite skewed, with rural agriculture dominating the population. By itself, the dominance of agriculture and the peasantry might have obscured our view of overall differences in income. Fortunately, however, we can turn to sources that document high-income earners by sector and social class, the inequality of agricultural landownership, and detailed decompositions of peasant incomes. For our study, as for most other quantitative studies dealing with the pre-Revolutionary period, data constraints limit our measures to the 50 provinces of European Russia, omitting Finland, Poland, Transcaucasia, Central Asia, and Siberia.

V. FOLLOWING THE INCOME CLUES FOR 1890s-1905

A. Incomes from Landownership

Our best opportunity to take a snapshot of the Russian income structure comes from around the turn of the twentieth century, especially from a combination of large data sets stretching from 1897 to 1905. To work these data sets into a single estimate for "1904", we start with the generous data on land ownership as of 1905, courtesy of the same Central Statistical Committee that gave us Imperial Russia's superb 1897

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across rural and urban areas, we doubt that the scale of such error was large or that it would significantly bias our results, given the presumed accuracy of the 1897 population allocation across provinces.

population counts.[27] Their 1905 survey measured landownership by the size of area owned, by county and province, and by estate of owner. The estate-of-owner detail is also rich - as it needs to be, given the complexity of Russian land institutions. The data delineate individual household owners by six social estate classes – aristocracy, clergy, merchants and esteemed citizens (*kuptsy i pochetnye* – the latter was comprised mostly of urban titled elite), townsmen (*meshchane*), peasants, and miscellaneous estates including foreign individuals. There are separate returns for different types of collective landownership, including peasants' shared allotment (*nadel'nye*) land stemming from the 1861 emancipation, state lands, corporate lands, and other categories.

The rich detail of the 1905 land survey is subject to two drawbacks for our purposes, drawbacks that we can partly offset with other data. First, the survey consolidated the different holdings of each individual landowner only within each district, without connecting the properties of the same landowner in different districts (or provinces). Fortunately, the data impose enough information to demonstrate that the merging of individual landed properties across provinces cannot have affected income inequality very much. What might seem like a potentially huge understatement of landed inequality cannot be very large, given how certain totals by province and by top income class constrain the possibilities.[28]

A second drawback of the impressive 1905 land survey is that it presents data only on the land areas owned, and not their annual rental value. Fortunately, the Finance Ministry's 1906 study *Opyt' priblizitel'novo ischislenia narodnovo dokhoda po raslichnym evo istochnikam i po razmeram v Rossii* [hereafter *Opyt'*] provides average rents in rubles per *desiatina* (approximately 2.7 acres) per year for each province. We use their provincial rental rates, which assumed a six-percent return on purchase value and that all lands in each province had the same value. We thus capture only the differences in value per *desiatina* across provinces, not those within provinces.

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[27] The "land" surveyed in 1905 appears to exclude urban real estate as strictly defined, or so we gather from the juxtaposition of the two kinds of assets (urban and rural real estate) documented in Russia, Ministerstvo (1906). This exclusion might not be evident from the 1905 land survey by itself, since it included both the "urban" and "rural" divisions of each province in some categories. Yet, as other scholars have noted, the officially urban parts of each province contained agricultural lands. We compiled our data from the district-level up using the fifty provincial volumes of Russia, Tsentral'nyi (1906).

[28] See Appendix C.

The distribution of private landownership, as shown in Table 3, departs from any simple separation of landed from landless social estates. Only one-third of the nobility (*dvorianstvo*) consisted of landowners, and over a fifth of all merchants and esteemed citizens owned land outside the cities. Of course, of those closest to the land, the peasantry, fewer than four percent of household heads had individual privately owned land. This distribution of rural private landownership, by itself, makes Russia look very unequal in international perspective. Table 3's data show that only 4.7 percent of households owned private land other than the plots under urban buildings. This ownership share is smaller than that of other data-supplying countries in the late 19th and early 20th centuries, with the possible exception of Mexico.[29]

This high level of landed inequality – and its limited geographic variation – is indicated in Panel A of Figure 1. Not only is the overall Gini coefficient of purely individual holdings high (0.88), but the range is rather narrow across provinces: aside from Archangel' province's Gini of 0.05 (due to the small number of only peasant owners), the next highest coefficient was 0.55 in the Don Cossack Lands, and the remainder were above 0.63. Significantly, this level of land inequality is lower if we add peasants' communal land holdings per household (Panel B of Figure 1), but the overall Gini remains high at 0.60.[30] Yet, as we shall see, Russia's relatively high land inequality does not translate into internationally extreme levels of total income inequality.

B. Peasant Incomes

We are fortunate that pre-Revolutionary officials and scholars took seriously the task of learning not only the averages, but also the distribution, of peasant assets and, occasionally, incomes. *Zemstvo* researchers succeeded in surveying the structure of peasant assets and (less often) income levels for a large number of provinces between the 1880s and the early 1900s. Scholars such as Darrow (2002) and Khristoforov (2011) have been critical of the methods and perceived lack of objectivity among *zemstvo* statisticians, but their views generally refer to the researchers' conclusions rather than the raw data. Johnson (1982 and 1997) and Nafziger (2010) have pointed out that, in

[29] For the other countries, see Lindert (1987, p. 39, Table 1).
[30] Particularly high levels of land inequality are evident in St. Petersburg, right-bank Ukraine, the Urals, and the southern New Russian provinces.

practice, the asset and budget data collected by *zemstva* appear quite representative (when such a notion can be evaluated), and constitute one of the richest set of empirical information available for a relatively poor economy in the 19th and early 20th centuries. Therefore, to more fully document the income distribution of the roughly 80 percent of the population who were peasants, we make use of the results from several *zemstvo* surveys, supplemented by parts of the 1905 land returns (as outlined above) and by independent data on local wage rates.

The heterogeneity of our source materials calls for some elaborate procedures to differentiate peasant income experiences within one province, and then to extrapolate across provinces. These procedures are spelled out in Appendix B, with additional detailed calculations available in the online files cited there. Here we simply note the general procedural steps. Our starting point is the large budget survey of peasant households in Voronezh in 1897 (published in Shcherbina, 1900), which we extrapolated to 1904 ruble values using the general trend in nominal incomes (from Gregory, 1982).[31] Our extrapolation from Voronezh to other provinces then used relative wage rates in agriculture and industry, plus those detailed 1905 landownership returns for the small share of (private) landowning peasants. The resulting estimates, aggregated to the level of European Russia, appear in Table 4.

A feature of Russia's peasantry that stands in contrast to most other countries' agricultural or rural households before 1914 is that most of the Russian peasantry were effectively "tenant" farm operators and their dependents. Fewer than five percent of peasant households were laborers who lacked their own farm, just as fewer than five percent owned land *only* as individual households (i.e. non-*nadel'naia* land). What we call "tenants" were those peasants who received agricultural income primarily from the application of labor to production on their share of communal holdings.[32] This broad

[31] We started with the Voronezh survey due to its apparent completeness, timing, extensive use by other scholars (e.g. Wilbur, 1983), and comparability to studies in other provinces. Detailed budget studies are relatively few before 1905. Despite the agricultural focus of Voronezh, we allowed the amount of non-agricultural income to vary by province based on other data (Appendix B). We have explored using the budgetary data from other, lower quality, *zemstvo* peasant surveys, with little impact on our overall findings. As a recession in 1900 and 1901 set industrial development back, we feel that the occupational distribution in 1897 is a decent approximation for 1904.

[32] This is slightly non-standard nomenclature, but we feel that is reflects the way collective ownership and obligations functioned in practice.

group was also fairly compressed in its income levels, with the top 5 percent (the "top farmer operators, not private owners" in Table 4) having only a bit more than triple the average incomes among the bottom quarter ("lower farm operators"). Part of the reason, of course, is that collectively owned land, whose value is included in these measures, is believed to have been shared fairly evenly (e. g. Robinson, 1972 [1932]).[33] Thus far we have two opposing tendencies (suggested by comparing panels A and B of Figure 1): highly unequal ownership of land among individuals, and relatively equal incomes within the peasantry from access to collective land-holdings. To complete the picture of overall inequality, we need to add other types of income and then work out the implications of the gaps between the estate classes' average incomes. We leave many details of these calculations - especially regarding the assumptions made to combine different types of income for each social estate-occupation grouping - to the online appendices.

C. Top Incomes (The *Opyt'* Study)

As in many other states in the late 19th and early 20th centuries, officials in Tsarist Russia began to consider the installation of an income tax to generate revenue (Kotsonis, 2004). Using the census as a springboard, the Ministry of Finance launched a detailed inquiry into the structure of top incomes in order to estimate how much income tax revenue the state could potentially raise, and from whom. One fruit of this endeavor was the Ministry's detailed estimates of high incomes over the period 1900 to 1904 – *Opyt'* (Russia, Ministerstvo, 1906). Targeting only the top of society for potential income taxation, the Ministry's estimates covered those annual incomes exceeding 1,000 rubles. The corresponding total household count came to only 2.0 percent of all households. A follow-up study in 1910 gave further elaboration of the forecasted possible revenues. Yet in the end, the project for a comprehensive income tax was blocked and remained unimplemented before the 1917 Revolution.[34]

[33] As noted by Chaianov (1986), the size of Russian peasant communal allotments was often closely linked to the amount of household labor, and so land inequality within the commune was related to the distribution of household size. The 1905 data on allotment land does not provide within-commune information, but the aggregate distributions we derive across communes closely resemble the across-household variation reported in *zemstvo* studies such as Scherbina (1900). Also see Svavitskaia and Svavitskii, eds. (1926), for other land distributions from *zemstvo* research.

[34] Gorlin (1977) and Kotsonis (2004) summarize the fiscal struggle over tax reform in this period. The Ministry of Finance relied on a large number of published and unpublished data to identify top incomes.

To exploit this unique data source, we must immediately confront a large problem shared by all the income data from Imperial Russia: official fiscal authorities never measured total income, unlike those micro-level (*zemstvo* and Ministerial) budget surveys of worker and peasant households. What the *Opyt'* data offer are only counts of specific kinds of income and the numbers of people receiving more than a thousand rubles of any one of them. Some data in the source offer the distribution of land area or land value, with no attention to other incomes; others are confined to urban real estate rents; other data sets offer wage and servant income in narrow formal sectors; others cover just industrial or commercial profits; and so forth. The same problem often arises in other countries, e.g. in the separate-schedule income tax data of Victorian Britain, or in early America, where the data on property incomes are completely divorced from the data on a household's own human earnings.

The size of this top group and its different sources of income are summarized in Table 5. Such high incomes were especially concentrated in land ownership and commercial enterprises, but they were also evident in state service and from returns to financial investments. To understand the distribution of incomes at the very top, we utilize the fact that *Opyt'* breaks down these high-income categories into six different ranges, from the 1,000-2,000 range up to incomes above 50,000 rubles. Also useful are the breakdowns of all real estate and profits by individual province. Again, the original data treat each income source as separate, although it is very likely the case that the highest earning households received more than 1,000 rubles from multiple sources. The details in *Opyt'* illuminate the top of the income structure, once we have made plausible assumptions about how the different sources of income were combined into the same households.

VI. RUSSIAN INCOME INEQUALITY c. 1904: RESULTS

We combine information on the number of households by class and sector, the distribution of land, the sources of peasant incomes, wage data, and top incomes from the *Opyt'* study to map out the distribution of incomes in European Russia around 1904. The underlying sources provide these data at the provincial level, and we take advantage of

this to construct geographically disaggregate estimates. We estimate mean incomes accruing to each class/sector "cell," order the cells, and aggregate up to define the relevant income shares or Gini coefficients (this is done at the provincial level and for all of European Russia). Below, we focus on our intermediate, "preferred" inequality estimates, which assume that each household in a cell has the same mean income.[35]

Figure 2 reports an intermediate result of this exercise: the estimates of mean incomes across all types of households in each province.[36] The highest incomes are evident in the Baltic and northwestern provinces (including Petersburg, at 1317 rubles), in Moscow (1147 rubles), and in the Black Sea provinces (Kherson, with Odessa, at 829). The Eastern provinces had lower incomes, as did a number of central agricultural provinces. These estimates are consistent with existing studies of Russian living standards (i.e. Mironov, 2010 and 2012), especially those that emphasize the heterogeneity of economic development by the early 20th century (Dennison and Nafziger, 2013; Wheatcroft, 1991). The overall mean income of 612.5 rubles is very close to Gregory's (1982) aggregate per capita income of 100 rubles, with average household size hovering around six individuals.

We present our preferred estimates of household income inequality in 1904 in Table 6. Our estimate of the top income 1 percent income share (13.5 percent of total income) happens to be close to Gregory's calculation using the *Opyt´* data for inequality within the elite (Table 1).[37] The top 20 percent of households received slightly less than 50 percent of total income, and median incomes were 2/3 of the mean level. Based on over 4250 class/sector/province cells, we estimate the overall Gini coefficient to be approximately 0.36.

Figure 3 reports the geographic heterogeneity of income inequality within each province. These data rely on the same methods for calculating Gini coefficients as we employ in the aggregate in Table 6 but are executed separately using each province's data

[35] Our preferred estimates also make particular assumptions about the aggregation of incomes from particular sectors / activities for each social class. Additional details of these estimates are spelled out in the online appendices and in the "Russia" files of http://gpih.ucdavis.edu/.
[36] The underlying numbers are available in the "1904 inequality" file at http://gpih.ucdavis.edu/.
[37] When we aggregate over all households, we come to a total income for the fifty provinces of European Russia of 11.2 billion rubles. We feel that this is comparable to Gregory's (1982) estimate of roughly 16.2 billion for the entire Empire within the much larger USSR borders (therefore, excluding Poland and Finland).

from the various sources described in Section V. In general, the mean income levels reported in Figure 2 were positively correlated with the level of inequality (coefficient of 0.75). The two capital provinces saw high levels of inequality, as Moscow and Petersburg were the only two provinces with Ginis above 0.5. Other provinces with relatively high inequality included the Baltics, southern Ukrainian and Black Sea provinces, and Orenburg in the Urals. The lowest levels of income inequality were generally found in the northern provinces and the upper Volga region.

We place these findings on the Russian income distribution in 1904 into context in the next section. In the meanwhile, it is important to acknowledge four mechanical ways that these "preferred" estimates may under- or over-estimate the true level of inequality. In each case, we note the errors that may remain – yet find that the imperfect source materials do deliver enough information so that the true inequalities of income must have been close to our estimates.

A first possible bias relates to multiple land holdings. The available land statistics treat owners in each district as distinct, although we know that the largest landowners in Russia held numerous properties scattered across provinces. However, it turns out that the available data have imposed enough constraints so that their failure to merge properties across provinces is unlikely to lead us to underestimate inequality by very much.[38]

A second possible bias may arise from our assumption about the distribution of incomes within the class / sector cells. In our preferred estimates, all of the households in a cell are assigned its mean income, and, by default, we do not assume that incomes overlap across groups. Recent work by Modalsli (2011) suggests that this simplifying assumption may not lead to the underestimation of inequality when within-group dispersion takes particular (and relatively general) forms, even in studies with only a few dozen cells. Our use of 85 cells for each of 50 provinces suggests that there is little possible bias from aggregation.[39]

A third possible source of bias may arise from how we assign incomes from other sectors to households whose primary earnings are located in one particular sector.

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[38] For a demonstration of how this constraint was unlikely to generate biased estimates, supported by literature on the top estates, see Appendix C in the online supplementary materials.

[39] On the inequality effects of income overlap among groups, also see Milanovic *et al.* (2011). The relevant details of our preferred estimates related to this issue are available in the "Income Distribution" file, which is downloadable from http://gpih.ucdavis.edu.

Although peasant, noble, and other types of households tended to cluster in one sector (usually agriculture), these households also earned income from other sources – in Russia as in all other countries. We feel that our preferred estimates make a number of reasonable assumptions regarding this aggregation, especially for the peasantry and other lower income groups. Appendix A in the online supplementary materials spells out how one uses the mix of reported occupations to approximate the distribution of labor inputs across sectors.

Finally, we see only a small bias in overall inequality coming out of the information on top incomes reported in Russia, Ministerstvo, *Opyt'* (1906). One might initially fear that the different kinds of incomes in Table 5, such as rural land or urban real estate or government salaries, all referred to different incomes of the same very rich households, causing an understatement of inequality. Yet here too, as with the land distribution, even flawed data have succeeded in putting bounds on the possible true distribution of income. Some common sense and simple algebra seem to confirm that the source materials' separations of different kinds of income do not seriously undermine our results.[40]

VII. RUSSIAN INEQUALITY IN COMPARATIVE PERSPECTIVE

In the degree of its household income inequality in the early twentieth century, Russia was not alone. So says Table 7's comparisons of two kinds of summary measures of inequality: the shares of all incomes received by the top ranks, and the Gini coefficient. Even though one might have expected that a country on the eve of a large Revolution and, subsequently, the first Communist Revolution would have provoked its fate with some of the world's widest gaps in income, Table 7 offers no confirmation of this hunch. The clearest contrast consists of a set of experiences where inequality was more severe than it was in Imperial Russia. One such bastion of inequality was Victorian

[40] See Appendix D in the online supplementary materials. It is worth noting that we do not assign an income to the Tsar's household. Essentially, we are including that income in the residual national income we assign to the state (this is for practical reasons, as the two are often hard to distinguish in the available government budgetary materials). See below for some implications of this approach.

England, as represented by Baxter's estimates for 1867 (two others were Peru and South Africa, as Table 7 suggests). The gaps were wider in England, both between top incomes and middle incomes and between middle incomes and the bottom.

The other intriguing comparison is with inequality in Russia today. Some very rough conclusions are possible, once one considers two data limitations. The first limitation is that the comparison may be affected by differences in geography: relative to our pre-revolutionary European Russia estimate, today's Russian Federation has lost the provinces that have become Belarus, Ukraine, and Moldova, but now includes the Siberian and northern Caucasian parts of the Federation. The other is that the post-Soviet measures of income distribution tell inconsistent stories because of changing definitions of income and population.[41] The most comparable with our estimates for Imperial Russia are the 1995-1998 measures of the distribution of households' gross (pre-tax and pre-transfer) money income by Goskomstat, the predecessor of today's RosStat. Taking the estimates at face value, gross income inequality was already a bit higher in 1997 than in 1904. We suspect that these numbers understate the rise in inequality in the Yeltsin decade by under-reporting top incomes.[42]

Clues about movements in Russia's gross income inequality since the mid-1990s can be gathered from other series, ones that are less directly comparable with our 1904 measure. These other measures suggest a rise in inequality to around the year 2000, followed by equalization since then, not only in Russia but also in Ukraine and Moldova. In Belarus, inequality had already peaked back in 1993, and has drifted down since

[41] As the cited numbers in Table 1 suggest, estimates of the distribution of earnings or income showed fluctuating but generally declining levels of inequality over the Soviet period.

[42] We suspect this, in part, because the 1995-1998 estimates implausibly imply a higher middle-class share at the expense of the top 20% and the bottom 40%, relative to Imperial Russia, as shown by these income shares:

	Eur. Russia	Russian Federation			
Income share of	1904	1995	1996	1997	1998
top 20% of households	47.7	47.1	45.1	46.3	47.0
41-79%	31.0	37.4	38.0	36.7	36.0
bottom 40% of households	21.3	15.5	16.9	17.0	17.0
Gini coefficient	0.362	0.412	0.385	0.393	0.398

These figures from 1995-1998 are from the Deininger-Squire WIID 2c dataset available at http://www.wider.unu.edu/research/Database/en_GB/wiid/. Our Table 7 cites the 1997 Gini to avoid overstating the contrast with 1904, and to avoid highlighting data from the crisis year 1998.

then.[43] Combining Table 7's direct comparison of 1904 and 1997 with the post-Soviet movements in other series suggests this tentative conclusion: relative to European Imperial Russia before the Revolutions, the income distribution in the Russian Federation started out less unequal at the time of the collapse of the Soviet Union, then became more unequal by the mid-1990s, reached one of the highest levels of inequality in all of post-1861 Russian history sometime around the year 2000.[44]

The other settings of extremely wide inequality, in which Gini coefficients often exceed 0.42, consist of countries in the late twentieth and early twenty-first centuries. Among the many countries where incomes are clearly more unequal today than they were at the sunset of Imperial Russia are Brazil, China, the United States – and probably Russia itself. All four of these countries have experienced a long-run rise in inequality, the United States since the nineteenth century and the other three during the twentieth. Yet for many other countries, such as Britain and Sweden, the gaps are now narrower – households are more equal – than they were in the nineteenth century and early twentieth.[45] This contrast in long-run movements is a puzzle worth pondering anew.

Such conventional comparisons of inequalities in nominal income need to be enriched in at least two dimensions, namely the redistributive role of the state in inequality, and the subtlety that class-specific differences in the cost of living might make relative "real inequality" quite different from the usual comparison of nominal inequalities like those in Tables 7. In both of these dimensions, we see signs that a fuller comparison of Russia with countries to the West reveals some intriguing twists.

The possibility of redistribution from poor to rich, alias "fiscal regressivity," lurks in the background here. It is hidden by the fact that for Tsarist Russia, as for other countries at the time, the data offer more information on "pre-fisc" income inequality

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[43] See the downloadable estimates from several sources in http://www.wider.unu.edu/research/Database/en_GB/wiid/ and the 1989-2009 annual TransmonEE measures in http://www.transmonee.org/.

[44] We cannot say much about pre-1904 inequality at this point, although it is certainly possible that the trend was downward following emancipation. We hope to investigate this earlier period in future work. Furthermore, the contrast between pre-revolutionary and post-Soviet inequalities may have looked quite different, however, if we were to consider the inequality of *disposable* income, after taking account of taxes and transfer payments. See below for tentative thoughts in this direction.

[45] By 1904 the share of income received by the top one percent of U.S. households was probably already as low as it was in Russia, as was the top one-percent share in Germany (Atkinson, Piketty, and Saez 2011, Figure 7B).

than on the "post-fisc" distribution after taxes and transfers. Relative to other European countries, Russia showed more signs of fiscal regressivity in declining to redistribute from rich to poor. One sign of regressivity in the government's policies is the fact that the net rental values on state and church lands could have been worth as much as 8.1 percent of national income.[46] If one views these as incomes that an elite withheld from the people who worked those lands, then top-income shares should be raised by this amount. Another sign of regressivity was that failure to pass an income tax when other governments were doing so in the early twentieth century. This was compounded by the central government's growing reliance on revenues from the indirect taxation of basic consumption goods. By the early 20th century, central government indirect taxes - generally on goods important to all classes such as salt, sugar, etc. - were more than three times direct property and corporate incomes taxes, and the budgetary numbers on the former did not include the state's control of the alcohol monopoly.[47] Regressive policies were also evident in the central government's unwillingness to spend on mass education, leaving primary school finance at the mercy of political debates within *zemstva* and other impoverished local governments until limited state-sponsored efforts after 1905.[48]

The other intriguing extension of the international inequality comparisons relates to subtleties about class-specific differences in the typical "cost of living" bundle of goods and services. Since different income classes consume different bundles of goods and services, it could matter a great deal if basic staples such as grains were cheaper relative to luxury goods in one country than in another, as Hoffman *et al.* (2002) have pointed out. Indeed, Imperial Russia stood out as a cheap-grain country (Dennison and Nafziger, 2013), raising the possibility that the gaps in class-specific purchasing power were narrower than the usual comparisons of nominal income inequality imply (although

[46] This applies the rental rates of Table 3 to the landholdings of the state and Church in 1905, as documented in Russia, Tsentral'nyi (1905). The original sources are not clear as to whether the Romanov family property is included in state lands or in private (noble) landholdings, but we view this as a distinct possibility that would likely generate higher overall inequality estimates.

[47] See the breakdown for 1900 and 1913 as summarized in Anfimov and Korelin, eds. (1995, p. 154). On the shift from direct towards indirect central taxation, see Gorlin (1977) and Kotsonis (2004). After 1906, the state did raise corporate income taxes to relatively high levels (more than ten percent of profits), thus *slightly* decreasing the regressivity of the fiscal structure (Bowman, 1993). Although the *zemstvo* did rely on local property taxation for revenues, rates were relatively high on peasant land compared to non-peasant property (Nafziger, 2011).

[48] See the discussions of early 20th century local school progress in Russia and other impoverished settings in Chaudhary *et al.* (2012).

possibly offset by various forms of consumption taxation). That does indeed appear to have been the case. As Mironov (2010 and 2012) has pointed out, anthropometric and other non-income indicators suggest that the lower ranks of the peasantry enjoyed living standards far enough above subsistence to fuel the well-documented rapid rate of natural increase.[49]

VIII. CONCLUSION

The intermediate level of inequality, and the slight skewness that left the middle-income ranks closer to the bottom than to the top, might be viewed as the net result of two fundamental influences on Russian economic fortunes prior to the Revolutions. The fundamental egalitarian force was geographic: Russia has always stood out as abundant in productive land and staple grains. The land/labor logic that other scholars have used to link the Black Death to the freedom and wellbeing of the English yeoman should theoretically have compressed the income structure – and probably continued to do so, other things equal, even on the eve of Revolution. Although the peasantry was not the homogenous group that is often assumed, the predominance of communal property among such a large part of the population likely held down inequality (even if only by providing a security net with which peasants could pursue non-agricultural pursuits).

Yet the inegalitarian force of the state also dominated the country's pre-Revolutionary history. The demise of serfdom did not necessarily end restrictions on peasant labor mobility, nor did it eliminate the economic and political power of the landed elite in the countryside. The Imperial autocracy's dependency on elites for its power continued to be reflected in the property, income, and political inequality among estates and classes. Even if extraordinary political inequality did not manage to create extraordinary income inequality by global standards, it did leave those signs of regressive redistribution we have already noted. Furthermore, income inequality in contemporary Russia likely matches or exceeds the pre-Revolutionary level, and the fiscal structure is perhaps equally skewed towards politically connected elite at the expense of those lower on the income distribution (Gelbach, 2008).

[49] See Mironov (2010, 655-659). On similar points, see Hoch (1994) and Simms (1977).

The limited, albeit geographically varied, inequality we find is consistent with economic growth and a positive trend in living standards, especially in rural areas. Even if peasants were increasingly "differentiated," rising agricultural productivity and growing opportunities for non-agricultural earnings were likely improving conditions at the lower end of the income distribution. This process may have been accelerated by the subsequent Stolypin land reforms, which eased constraints on peasant mobility and may have led to improvements in agricultural productivity (Chernina *et al.*, forthcoming). However, the fact that inequality appears to have been particularly concentrated in the booming capital cities hints at a possible tenuous link to the Revolutions of 1905 and 1917, which both began in these urban settings. Whether the level of income inequality was related to amount and distribution of subsequent *rural* unrest in the two revolutions is a topic worth further exploration.[50]

The research task that now dominates our agenda is how the level of economic inequality reached in the early twentieth century emerged. Was it always that way? Or did the classes' relative fortunes change across the post-Emancipation era, say from 1877 to 1913, and across the Emancipation Era between the relatively well-documented benchmark years 1858 and 1877? What earlier movements were likely? Boris Mironov and others have led the way with important new work on real wages and other indicators of living standards, but significant empirical materials remain relatively untapped throughout the long 19th century. The task is not an easy one for the pre-Emancipation era, mainly because it is hard to capture the income effects of the ownership of serfs.[51] Further archival and original source research will hopefully allow us to make progress in identifying the dynamics of Russian income inequality, both before and after 1904.

[50] Another topic well worth further exploration is the relationship of rural *land* inequality and the incidence of peasant unrest, given that at least some of the apparent (eventual) rural support of the 1917 revolution revolved around the redistribution of large private properties. While overall land inequality was relatively low due to communal allotments, the potential market power held by private property holders over additional arable land and other complementary agricultural resources may have been associated with greater unrest in certain areas. For a related argument in the Chinese context, see Kung et al. (2012).

[51] Again see Mironov (2000, 2005, 2010, and his data series at http://gpih.ucdavis.edu). For the seventeenth century, see the materials collected in Richard Hellie's vast data set on the same web site. The issues regarding the incomes extracted from serfs are well framed and illuminated by Dennison (2006).

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Table 1: Previous Partial Estimates of Russian / Soviet Income or Wealth Distributions, 1880 - 1981

Data Year	Type of Inequality	Inequality of What?	Inequality Where?	Measure	Source
1894	Gini	Horse ownership, peasant households	Orel d., Orel province	0.497	Field (1989), from *zemstvo* studies
1897	Gini	Horse ownership, peasant households	Murom d., Vladimir province	0.572	Field (1989), from *zemstvo* studies
1900	Gini	Horse ownership, peasant households	Zadonsk d., Voronezh province	0.473	Field (1989), from *zemstvo* studies
1900	Gini	Arable land holdings, peasant households	Poltava province	0.608	Field (1989), from *zemstvo* studies
1888	Gini	Arable land holdings, peasant households	Konstantinograd d., Poltava p.	0.484	Field (1989), from *zemstvo* studies
1900	Gini	Arable land holdings, peasant households	Konstantinograd d., Poltava p.	0.576	Field (1989), from *zemstvo* studies
1910	Gini	Arable land holdings, peasant households	Konstantinograd d., Poltava p.	0.606	Field (1989), from *zemstvo* studies
1888	Gini	Draft animals, peasant households	Konstantinograd d., Poltava p.	0.434	Field (1989), from *zemstvo* studies
1900	Gini	Draft animals, peasant households	Konstantinograd d., Poltava p.	0.467	Field (1989), from *zemstvo* studies
1910	Gini	Draft animals, peasant households	Konstantinograd d., Poltava p.	0.39	Field (1989), from *zemstvo* studies
1967	Gini	Incomes, non-farm households, pre-tax	USSR	0.229	McAuley (1979)
1905	Top income	Income share of top 1% of households	Russian Empire	0.15	Gregory (1982)
1914	P90 / P10	Wages, industrial sectors	USSR	5.55	Bergson (1944)
1928	P90 / P10	Wages, industrial sectors	USSR	3.49	Bergson (1944)
1946	P90 / P10	Wage and salary earnings, all sectors	USSR	7.24	Bergson (1984, from Soviet source)
1956	P90 / P10	Wage and salary earnings, all sectors	USSR	4.44	Bergson (1984, from Soviet source)
1961	P90 / P10	Wage and salary earnings, all sectors	USSR	4	Bergson (1984, from Soviet source)
1981	P90 / P10	Wage and salary earnings, all sectors	USSR	3	Bergson (1984, from Soviet source)

Note: These measures represent a select sample of inequality indicators collected from the English-language secondary literature.

Table 2: Social Structure of Household Heads in European Russia, 1858-1913

Estate (Thousands of Persons)	1858	1870	1897	1913
Nobility	889	861	1,373	1,936
Hereditary	612	544	886	1,249
Non-hereditary	277	317	487	687
Clergy (Christian)	567	609	501	697
Military	3,767	3,981		
Army	927	704	1,095	1,320
Honored, titled	21		308	611
Merchants	400		240	
Urban	4,300	6,091	10,493	22,716
Peasantry	49,000	53,600	80,100	103,300
Raznochintsy ("different ranks")	730	383	738	258
Total population	59,300	65,500	93,200	128,900
	% Shares of Total Population			
Nobility	1.6	1.4	1.5	1.5
Clergy (Christian)	1.0	1.0	0.5	0.5
Army	1.6	1.1	1.2	1.0
Urban	7.6	9.8	11.1	17.4
Peasantry	86.9	86.1	84.9	79.3
Other	1.3	0.6	0.8	0.2
Totals	100.0	100.0	100.0	100.0

Note: These data are compiled in Mironov (2000, 254) and revised in Mironov (2010, 645). The number of households in 1913 is reconstructed from church administrative data (1895-1914) and the agricultural census of 1916. The totals for other years are from population censuses. The number of "Honored, Titled" (*pochetnye grazhdane*) households in 1870 are unavailable, while the number in 1913 includes the merchant class. In general, this estate included the higher strata of the urban population, along with upper-level clergy. The "Urban" estate, therefore, included the remaining urban population. Data on the full number of military households are incomplete for 1897 and 1913.

Table 3: Household Heads by Economic Sector in European Russia, c. 1904

	Thousands of Households			
	Urban	Rural	Total	%
Agriculture (*sel'skoe khoziaistvo*)	198.9	13,522.5	13,721.4	75.0
Mining	4.5	75.6	80.1	0.4
Manufacturing	572.9	868.5	1,441.4	7.9
Construction	97.8	184.6	282.4	1.5
Trade, transport, communications	504.6	492.1	996.8	5.5
Administration (government)	81.0	57.7	138.7	0.8
Clergy	30.9	95.1	126.0	0.7
Free professions	67.5	54.8	122.3	0.7
Private service, servants &c	321.2	453.1	774.3	4.2
Other	318.1	283.5	601.6	3.3
Total households	2,197.3	16,087.6	18,284.9	100.0

Note: These data are from Troinitskii, ed. (1905, vol. 8) and Russia, Tsentral'nyi (1905).

Table 4: Estimated Peasant Household Incomes in European Russia, c. 1904

	Households (1000s)	Total Incomes (1000 r)	Income per Household
Households with Shares of Communal or Other Collective Holdings			
Poor farmless laborers (land = 0)	687.9	152,096	221
Lower farm operators	3,770.8	1,199,049	318
Middle farm operators	7,117.8	2,894,742	407
Upper farm operators	2,569.3	1,442,951	562
Top farmers, not private owners	737.8	712,283	965
Households with Privately Owned Property			
0 <1k	543.2	591,033	1,088
1k-2k	4.6	11,186	2,413
2k-5k	2.6	10,840	4,135
5k-10k	0.7	6,017	8,087
10k-20k	0.3	4,053	14,794
20k-50k	0.1	2,445	29,939
50k-up	0.008	897	116,456
Totals	15,435.3	7,027,591	455

Notes: "Poor farmless peasant laborers" is our estimate of households residing in communal villages but without a share of allotment land. The 622.2 thousand individual peasant land owners of Table 3 included 551.7 thousand private land owners described here and the 70.5 thousand non-communal but collective land properties noted in Table 3. The source for the 1897 population and household counts by sector is Troinitskii, N.A.,

ed. (1905, vol. 8), with population adjustments according to growth rates calculated with the aid of Russia, Tsentral'nyi (1905, 40-53). Underlying data on wage incomes in the 1890s are from *zemstvo* budget studies reported in Russia, Departament (1903, 199 and 234-237). *Zemstvo* studies tended to average incomes per peasant household for particular areas. Such studies yielded usable average household incomes for six provinces from the 1890s and start of the twentieth century. See Appendix B, plus the derivations in the Excel File "Peasant incomes 1904 23mar12.xlsx" at http://gpih.ucdavis.edu, under the Russia files.

Table 5: *Opyt'* Estimates of Households with Incomes above 1,000 Rubles, c. 1904

	Totals for households with incomes above 1,000 rubles in the given category			
	Number of households	Total income (rubles, 1000s)	Income per household	
Land rents	52,764	318,442	6,035	(a)
Urban real estate	46,143	214,270	4,644	(b)
Commercial-industrial enterprise profits	67,170	531,335	7,910	(a)
From financial investments	55,235	239,066	4,328	(c)
State service salaries (1905)	91,204	180,745	1,982	(c)
Urban government	4,521	8,113	1,795	(c)
Zemstvo officials	7,830	12,576	1,606	(c)
Personal productive enterprises	30,144	86,994	2,886	(c)
"Professions"				
Doctors	8,237	30,954	3,758	(c)
Lawyers	4,705	17,564	3,733	(c)
Notaries	1,267	3,850	3,039	(c)
Writers	435	1,769	4,066	(c)
Totals [see notes]	369,655	1,645,680	4,452	

Note: These data were derived from Russia, Ministerstvo (1906). Each row's counts of persons and incomes refer only to its type of income source. As noted in the text, the officials were unable to combine the different types of incomes for any given household. The comments refer to: (a) = 50 provinces of European Russia, (b) = 49 provinces = European Russia minus Arkhangel'sk, and (c) = unclear geographic coverage, probably the 50 European provinces plus the returns from a few reporting provinces in the North Caucuses and Transcaucasia, but excluding Finland, Poland, Central Asia and Siberia. Russia, Ministerstvo (1906), itself, summarized the overall returns at the broader (c) geographic basis. The totals reported in its Table XXIII were thus larger: 404,703 households, with incomes totalling 1,723,779,477 rubles. For details, see the file "High incomes c1904, from the *Opyt'* (1906) study … ," under Russia in the main data list at http://gpih.ucdavis.edu.

Table 6: Preferred Income Inequality Estimates for European Russia, c. 1904

	Income Shares (% of total income)	Mean Incomes (rubles)
Top 1 % of households	13.5	8,241.7
Top 5 % of households	22.7	2,785.4
Top 10 % of households	31.9	1,953.7
Top 20 % of households	47.7	1,461.8
Next 40 % of households	31.0	473.8
Bottom 40% of households	21.3	326.2
Gini coefficient	0.362	
	Overall Mean	612.5
	Overall Median	408.5

Note: These numbers reflect our preferred estimate as described in the text. Data and further details may be found in the 1904 inequality file at http://gpih.ucdavis.edu.

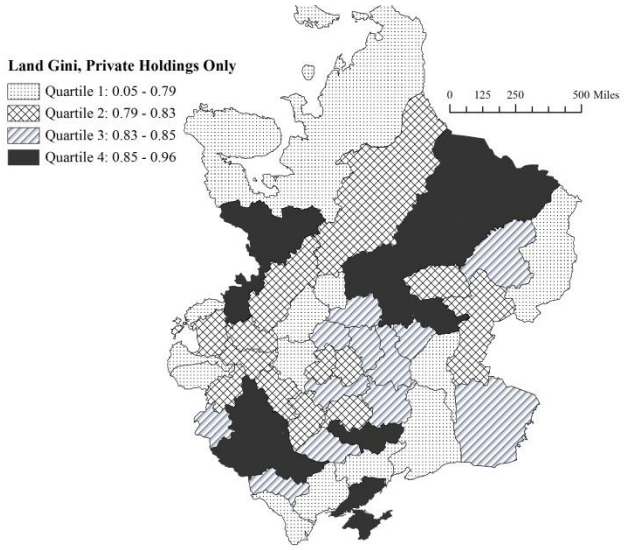
Table 7: Income Inequality in Imperial Russia and Select Other Settings

	Percent of all income received by		Gini
	Top 1%	Top 5 %	coefficients
European Russia 1904	13.5	22.7	0.362
European and Offshoot Societies			
England-Wales 1867	28.6	41.2	0.490
Sweden 1903	27.0	35.3	
Finland 1922	14.9	32.0	
USA 1917	17.6	30.3	
Non-Western Societies			
Japan 1907	18.3	32.3	
China 1880s	19.7		0.239
Brazil 1872	11.2		0.387
Peru 1876	20.8		0.413
South Africa 1914	20.5		
Colonial settings			
Maghreb 1880			0.570
Kenya 1914			0.331
Kenya 1927			0.416
India 1922	12.7		
Java 1880			0.389
Java 1924	14.4		0.318
More recently			
Russia 1997			0.393
USA 2003	14.9	29.9	0.464
China 2003			0.449
Brazil 2001			0.612

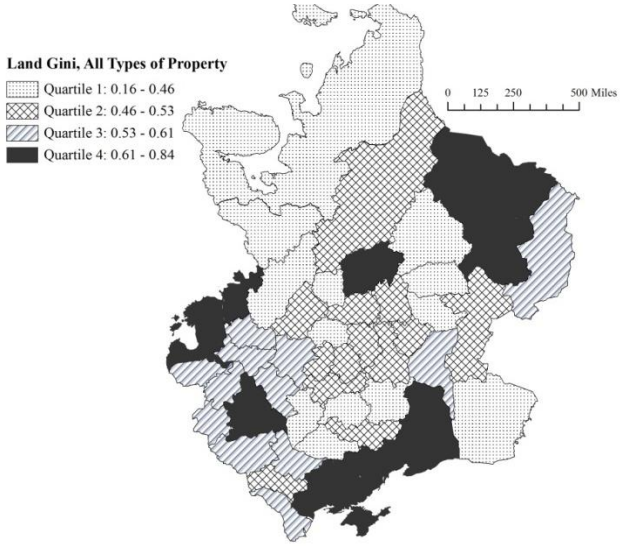
Note: The Russian estimates are the preferred estimates from Table 6. The main tertiary sources are Atkinson, Piketty, and Saez (2011); Milanovic, Lindert, and Williamson (2011); files available at the Global Price and Income History Group (http://gpih.ucdavis.edu, "early income distributions"); and the World Bank's Deininger-Squire inequality database at http://www.wider.unu.edu/research/Database/en_GB/wiid/.

Figure 1: The Geography of Landholding Inequality, c. 1905

Panel A.

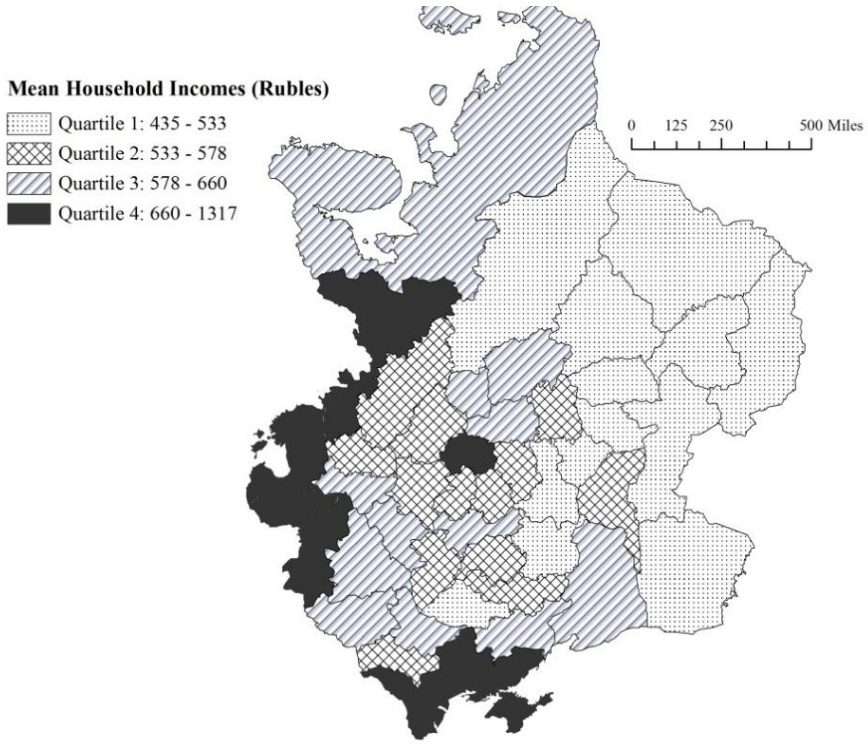


Panel B.



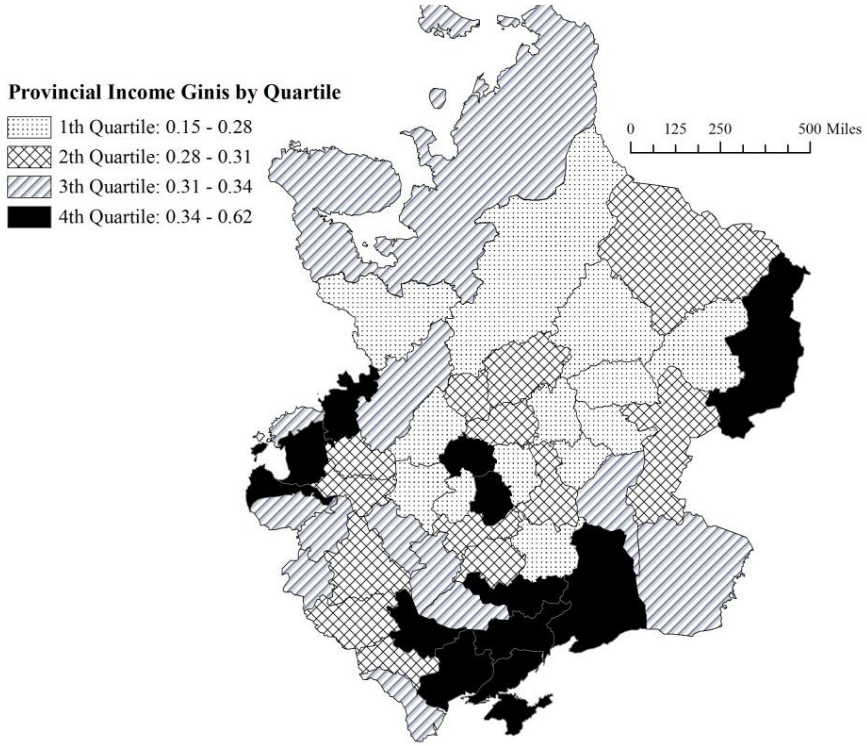
Note: The underlying land data are taken from Russia, Tsentral'nyi (1906). Panel A indicates inequality across only private holdings. In Panel B, the Gini are calculated across all types of land holdings, including peasant shares of communal land. "Ownership" in both measures is limited to the district – i.e. estates that spill across more than one district would be counted as separate properties for these province-level calculations.

Figure 2: The Geography of Household Income Levels, c. 1904



Note: For sources and the methodology behind the income calculations, see the text.

Figure 3: The Geography of Income Inequality, c. 1904



Note: The underlying sources and methodology for calculating income inequality are discussed in the text.

Appendix A: Assumed Combinations of Estates and Sectors

As noted in the text, the available clues can be combined more efficiently if we recognize that the output sectors (agriculture, mining, domestic service, government, etc.) yielding average wage or salary data tend to be interplay with a household's estate (*soslovie*) status, which shapes household non-human wealth. The likely combinations also differed between cities and the countryside.

This appendix lays out the assumptions we have made about these estate-sector combinations, so that other scholars can judge whether or not our assumptions need to be changed for a more accurate view of Imperial Russia's levels and distributions of income. We give a few illustrative assumptions here, and relegate the fuller details to the Excel file "Households by estate (*soslovie*), sector (*zanyatie*), and province 1904 … " in http://gpih.ucdavis.edu, under Russia in the main data list.

Table A.1 lays out the results of our assumptions, aggregated up to the 50-province level. Our accounting system proceeded through the output (economic) sectors, beginning with agriculture, and ending with industry-commerce as a residual. For each output sector in turn, we made our best guesses about the social estates whose households were employed in it. The residual numbers of households in each estate were then carried over to the next estate, where further assumptions were made, and so forth. What follow are a few of the main assumptions about the estate members that each sector employed.

Agriculture. It is not hard to figure out which estates responded that their professional was agricultural (in the 1897 census). They were overwhelmingly peasants, with some nobility and miscellaneous (e.g. military) estates sprinkled on the side. Luckily, the sum of households in these three estate groups exceeds the number of agricultural households by a margin that might not be bad for deriving a residual share of these estates that were devoted to the non-agricultural labor force. Granted, the allocation of time is not the same as the allocation of persons' responses to the "what do you do" question. But the shares should be similar. Assume that the shares of persons in these estates not declaring themselves as agriculturalists equal the respective shares of these estates' labor spent outside of agriculture.

Clergy. The census gives more clergy as an occupation than it gives clergy as a social estate. This is presumably because the occupational-sector question on the census allowed the non-Russian-orthodox more leeway to declare clergy as their profession than did the question on estate.

Free professions. These were presumably divided among households in many different social estates. We were guided by the inter-province correlations between estates percentage shares or all estates with free-profession shares of total household employment.

Government. The Russia, Ministerstvo Finantsov (1906) study offered a breakdown of the higher-paid strata of government between state, municipal-provincial, and *zemstvo* administrators.

Table A.1: Assumed Household Numbers by Output Sector and Social Estate, c. 1904

Output sector (*zanyatie*)	Social estate (*soslovie*)	Numbers of households		
		Urban	Rural	Total
Agriculture	Peasants	192,451	13,070,931	13,263,381
(")	Nobility	2,541	112,721	115,261
(")	Misc estates	1,663	330,235	331,899
(")	Meshchane	2,267	8,604	10,871
Servants	Peasants	300,077	399,159	699,236
(")	Misc estates	9,642	1,992	11,633
(")	Meshchane	11,473	51,957	63,430
Clergy zanyatie	Clergy	24,965	72,432	97,397
(")	Misc estates	5,033	5,331	10,364
(")	Meshchane	881	17,325	18,205
Free professions	Nobility	46,039	8,005	54,044
(")	Merchants	0	13,240	13,240
(")	Meshchane	21,429	33,581	55,010
Government admin.	Nobility	11,325	582	11,907
(")	Merchants	9,232	5,317	14,549
(")	Peasants	24,221	20,087	44,308
(")	Meshchane	36,179	31,758	67,937
Industry & commerce	Nobility	80,889	2,717	83,605
(")	Clergy	1,023	258	1,281
(")	Merchants	54,183	23,981	78,164
(")	Meshchane	909,016	825,911	1,734,926
(")	Peasants	403,940	1,024,381	1,428,321
(")	Misc estates	46,228	29,711	75,939
	Totals	2,194,696	16,090,213	18,284,909

Note: The main sources of these data are from the 1897 census as published in Troinitskii, ed. (1905), inflated to 1904 by population growth rates in from Russia, Tsentral'nyi (1905). For details of the assumptions and estimates, see the file "Households by estate and sector 1904" in http://gpih.ucdavis.edu, under Russia in the main data list.

Appendix B: Stratifying Peasant Incomes

Gregory's (1982) estimate of 15 percent of national income owned by the top one percent of households (Table 1) relies on the data on high earners collected in Russia, Ministerstvo (1906). A key contribution of our paper is to go beyond that source to include the vast majority of households making less than 1000 rubles in 1904. Since these were primarily peasants (roughly 85 percent of all households), constructing a plausible estimate of Russian inequality requires grappling with the distribution of incomes within this social estate. The result of this exercise is reported in Table 4 above.

Peasant households derived most of their income from land, which, by 1904, they accessed via their membership in rural societies (*sel'skie obshchestva* – with the associated "allotment land") or through private ownership (either individually or as members of quasi-corporate bodies). At the same time, peasant households also earned income from a variety of other sources, especially in the Central Industrial Region surrounding Moscow and St. Petersburg. We rely on a variety of *zemstvo* budget surveys (starting with Shcherbina, 1900; on Voronezh province; with other, lower quality, studies used as robustness checks) to document the contributions of these other types of earnings to overall household incomes by the type and amount of landownership. We vary the relative size of these contributions across provinces based on provincial level industrial and agricultural wage data. Based on their primary source of income, these peasant households can be allocated to different sectors as in Table A.1 (the sum of peasant households in this table equals the sum in Table 4).

To arrive at the distribution of peasant households in Table 4, we first draw on our decomposition of *private* land ownership by social class (summarized in Table 3), complemented by high agricultural earnings assigned to peasantry from Russia, Ministerstvo (1906), to allocate non-communal peasant households to different income strata. For households who receive land through their communal memberships, we take into account the provincial-level variation in the size of these allotments (and their rental values) in assigning households to different strata in the upper part of Table 4. This

assumes that land was allocated equally within a given commune. Chaianov (1986) and others have argued that Russian peasants communal allotment holdings were closely related to household size and structure – i.e. absolute equalization across households was rarely observed. Although this would suggest some additional within-commune inequality, our estimates of the distribution of allotment land across households closely resemble available (micro) *zemstvo* accounts. The amount of allotment and non-allotment land held by peasant households is taken from Russia, Tsentral'nyi (1906). Finally, based on *zemstvo* data, we assume that 4.5 percent of peasant households were landless.

A complete accounting of all the assumptions underlying the distribution of incomes among the peasantry may be found in the file "Peasant Incomes 1904" at http://gpih.ucdavis.edu. This file contains citations to the relevant sources on wage data, earnings by sector, and land holdings.

Appendix C: Constraining the Importance of Across-Province Land Ownership for Income Inequality

This appendix addresses the danger that the available data may have understated income inequality by counting as separate landowners the separately recorded properties of one landowner in different provinces.

To address this possibility, one should begin by making an assumption about how people answered the 1905 land census question about how much land they owned privately. Did they respond by stating the land area only of the one property on which they resided, or by stating the area they owned within their uezd or gubernia, or by stating the area they owned throughout European Russia (or even the whole Empire)? Our tentative assumption is that they answered by giving their holdings at the province (*gubernia*) level. That is, we assume that the data collectors managed to consolidate most of each owner's (non-urban-realty) land values *within* the same province into a single land total for him. We need to worry only about inter-province mergers.

One might easily imagine that adding multi-province lands at the top of the distribution might widen the inequality of income a great deal. Yet on close inspection, the 1905 land census data place severe limits on how much greater the land inequality could have been for the 50-province distribution of income as a whole. Here are some constraining facts about the data:

(a.) The amount of land rental income is already fixed by the data sources, so that giving more land to somebody at the top must take the same amount of land income from others who are already landowners.

(b.) We already know how many properties there were in each **rental value range** (e.g. those over 50,000 rubles, or 20,000-50,000, and so on down to landless), and their total value. So consolidating them across classes means that every ruble we give to a smaller number of owners has to be taken from other owners we have been putting in the same ownership value range. In the over-50,000 range, giving extra lands from other provinces to one owner reduces the other over-50,000 owners' properties down toward 50,000 rubles each near the top of the income spectrum. While such a merger will definitely raise inequality at the top, it does so only among rich landowners who are within the top 0.0036 percent of the overall distribution.

(c.) Further, for each province and each rental value range, we know the social estate of the owner. A merger of reported nobility-owned properties can only give extra land to nobility at the expense of other top-land-owning nobility in other provinces. For properties of nobles in the over-50,000-ruble range, concentrating lands from different provinces into the hands of a few super-wealthy nobles, and driving other nobles' landownership down toward 50,000 rubles would raise income inequality only among the top 0.0030 percent of households.

(d.) Within each rental value range (again, over 50,000 rubles, or 20,000-50,000, and so on down to landless), the fewest number of landowners there could be for European Russia is the number of reported owners in the province having the largest

number of separately identified landowning households in that rental value range and that social estate. The numbers of such **minimum landowners** (maximum separate owners in a single province, for this value range and social estate = minimum possible number of true owners for all 50 provinces) are as follows:

Rental value range	Numbers of minimum landowners	Hypothetically based in which province?	Merging how many total properties?
50k-up	51	Kherson	545
20k-50k	116	Podol'sk	1,411
10k-20k	222	Podol'sk	2,560
5k-10k	316	Podol'sk	4,978
2k-5k	545	Tula	11,283
1k-2k	1,383	Donskogo B. oblast'	12,011
under 1K, >0	3,911	Minsk	49,086

Consider this implausible exercise, one overstating the inequality effect of an imagined merger of lands across provinces. Suppose that, as much as possible, all rental properties owned by nobles in the over-50,000-ruble class in each province were merged into the hands of a single owner. Now the number of owners in any given class cannot be reduced to zero, since we know there are at least as many owners in any province as the data report. So for the over-50,000-ruble range there must have been at least as many as 51 owners of those 545 total properties, given that a maximum of 51 separate owners were recorded for a single province, here Kherson. Giving as much of European Russia's properties worth over 50,000 rubles to one great owner must still leave at least 50,000 rubles of rental value for each of the others. Thus the hypothetically richest noble landowner would have had 60.1 million rubles of land rents each year. If we did the same for each other rental-value class, we would again create outstandingly rich individuals receiving amounts of rents ranging from 15.3 million rubles (merging properties in the 1,000-2,000-ruble range) up to that value of 60.1million rubles.

Such a hypothetical merger of properties, however, would only redistribute 9.4 million rubles, or 0.084 percent of the 11,199 million rubles of national household income. It would raise the gini coefficient only negligibly, from 0.362 to 0.363.

Furthermore, these hypothetical top rental estates of up to 60.1 million for the most landed individual, would greatly exceed the total all-Russia incomes recorded in the literature for any extended family. For example, scholars have estimated ruble incomes of

1,302,000 for Prince Iusupov 1900, at 6% income return;
1,244,013 for Abamalek-Lazarev family 1904;
1,050,000 for Bobrinskii, Graf, 1897, at 6% income return;
954,000 for Orlov-Davydov, 1900, at 6% income return;
695,568 for Meklenburg-Stremlitskii, and
350,000 for N.D. Anushkin.

Thus even this clearly implausible extreme redistribution among landowners of the same social estates would have had only negligible impact on overall income inequality.

Appendix D: Constraining the Importance of Combined Ownership of All Types of Incomes Over 1,000 rubles

Using the same logic that Appendix C applied for landholdings, we can also put bounds on the amount of income inequality we might have missed by assuming that all over-1,000 ruble incomes listed in Ministersvo Finansov, *Opyt'* (1906) were incomes of separate households. Here again, as in Appendix C, we find that a data source, despite its not exactly fitting the purpose of mapping the size distribution of income, does constraint the possible shape of that distribution, leaving it close to our preferred estimates.

Among the 369,655 household incomes that were estimated to exceed 1,000 rubles (in Table 5), at least 148,343 were incomes of separate persons, namely those in state service, urban government officials, zemstvo officials, personal private entrepreneurs, and those in the free professions.

Suppose unrealistically that all of the non-human property incomes, or the 1,645.8 million rubles in Table 5, were concentrated into the hands of just these 148,343 households, instead of being spread over 369,655 separate households, as our main estimates assumed. These 148,343 would have an average income of 11,095 rubles instead of the 4,452 rubles reported in Table 5. That would be more than a doubling of

their average incomes, but by assumption it now applies to a smaller group, only 0.81 percent of all households.

For the rest of society, having none of this 1,645.8 million rubles would imply a limited percentage loss. The rest of society would be 18,136,628 households (the total 18,284,971 households minus those 148,343). Its average income would be 526.76 rubles per household, instead of the 597.62* it would have had if all the non-human property incomes over 1,000 rubles had been kept separate from those 148,343 top salaried persons. That is an average loss of 11.9 percent if it is spread over the whole bottom 99.19 percent (100 minus that 0.81 percent). This would raise the gini coefficient from .362 to about .400, still below England-Wales at the time, though now a bit over the Russian Federal gini of 0.393.

Yet even this limited upward adjustment would still overstate inequality. Even in the implausibly extreme case of our giving all over-1,000-ruble property incomes to a tiny 0.81 percent at the top, that concentration of incomes would not have cut incomes by 11.9 percent for everybody else, right down to the poorest peasant. The hypothetical concentration of top incomes took only from incomes that were individually over 1,000 in our preferred estimates. That is, the hypothetical gain for the top 0.81 percent could have come only from taking income away from others already known to be in the top 20 percent of households ranked by income (see the average incomes in Table 6). The result: Even an implausibly narrow concentration of incomes within the over-1,000 ruble group could only have been churning within the top 20 percent of households, with only more limited effect on overall inequality. Again, our preferred estimates are not too sensitive to any likely biases.

* This equals the national income of 11,199.453 million rubles minus the 342.566 million rubles already assigned to the 148,343 top officials, entrepreneurs, and professionals by the Opyt' estimates, now divided by 18,136,628 households.