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# Was it really so high? Revisiting data and evidence on inequality in Finland, 1865–1959

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August 10, 2023

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### **Abstract**

Late-19th and early-20th century Finland was a poor and predominantly rural society. According to the theory of maximum feasible inequality (Milanovic, Lindert, and Williamson, 2011), this should have limited the scope of income inequality, as a great share of the population lived at or close to the level of subsistence. Yet, many recent studies have found that income inequality during this period was relatively high by contemporary standards. This discrepancy may seem striking at first. As this article shows, however, there are grounds to believe that some of these estimations, at least in the case of Finland, may have been somewhat off the mark. Instead, it is shown that there are not only theoretical but also empirical reasons to believe that income inequality was only ascendant during the said period. This, however, does not imply that income inequality (or social inequality at large) would have necessarily have been lesser than later in the 20th century. It is argued, although tentatively, that authors who have found historically high levels of income inequality during this period, may have been right in terms of its social impact, even if factually erred otherwise. The article builds upon new top income share and inequality series which seek to improve our knowledge on the level and trajectory of income inequality in an industrialising society and seeks to benefit from the availability of allegedly good-quality income data, sometimes unavailable to the same degree in other, more 'mature' capitalist societies.

**Keywords:** inequality, Finland, 19th and 20th centuries, maximum feasible inequality, immiseration, Kuznets curve, Piketty

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## I Introduction

Late-19th century Nordics were highly agrarian societies. The vast majority of their population engaged in agriculture. Although the countries had, one by one, began their transformation to modern, capitalist societies, this was still very much in the making. This applies particularly to Finland, where industrialisation and urbanisation happened relatively late *vis-à-vis* the other Nordics. For example, in 1865, the initial year of this study for reasons to which I will return to, around 6.7 percent of the Finnish population lived in towns and cities. By the turn of the century, the same figure had risen to 12.5 percent (Vattula, 1983, table 1.5. (pp. 25–27)). According to one figure, agriculture accounted for around 84.2 percent of total employment in 1865, this being perhaps a conservative estimate (Soininen, 1974, table 1. (p. 22)). The rural population was widely self-sufficient, although money was indispensable for certain goods, such as ironware and salt (Soininen, 1974, pp. 356, 357, 365). Industries were still in their infancy. In 1865, manufacturing accounted for around 9.7 percent of the total Finnish GDP. By 1900, its share had risen to 18.6 percent (Vattula, 1983, table 10.2.a (pp. 375–377)). Both the urban population share and manufacturing figures pale in comparison to the most advanced capitalist economies of the day. This is indirectly visible in the respective countries' GDP figures. In per capita terms, the Finnish GDP in 1865 was around 1,516 USD (in 2011 dollars), whereas the same figure for France and the U.K. were 3,067 and 5,333 USD, respectively (Maddison Project, 2022).

Although these figures themselves tell nothing about income distribution per se, they show the relative poverty of the Finnish population during the period. Although poor countries are not necessarily more equal than rich ones, there are grounds to believe that low income levels often correlate with a high population share at a subsistence level and a subsequently lower level of maximum feasible inequality (for example, Bengtsson, Missiaia, Nummela, and Olsson, 2019, p. 230 and Milanovic et al., 2011, pp. 256, 267, 268).<sup>1</sup> Indeed, much of the Finnish population at the time either owned or accessed relatively small plots of land and lived close to or at the level of subsistence (Soininen, 1974, p. 16). This is exemplified by the fact that the last major peace-time famine in Northern and Western Europe took place in Finland in 1867–8. Although this famine saw major regional variations in severity (Häkkinen, 1992/2004, p. 114), a low level of agricultural productivity coupled with a dependency on grain imports meant that the Finnish economy yielded relatively small surpluses which could be exchanged for grain either directly or via taxes and levies as state purchases. The majority of the late-19th century Finnish population comprised of smallholders, crofters and cotters, with artisans, merchants, public officials (both civilian and military), 'free' professionals and industrialists making a relatively small share of the total population.

Against this background, it may seem peculiar that recent studies have found that both Nordic income inequality in general and Finnish inequality in particular were quite high by contemporary standards in the late 19th and early 20th centuries (e.g. Aaberge and Atkinson, 2010; Anthony B. Atkinson and Søgård, 2016; Bengtsson and Waldenström, 2017; Roikonen, 2022; Roikonen and Heikkinen, 2020). For example, Roikonen (2022) shows that the top 1 percent's share of taxed income reached up to 20 or 25 percent during the period. These numbers are roughly comparable to countries like post-Soviet Russia, where the top 1 percent's share reached (officially) around 20.7 percent in 2000 and 24.9 percent in 2005 (Ghodsee and Orenstein, 2021, p. 40), figures which are considered high by contemporary standards. Figure 1 shows recent estimates of the top 1 percent's fiscal income share in the four Nordics, the earliest observations reaching back to 1875 in the case of Norway. These series show quite clearly that the increase in top incomes during the last three or four decades appears to have been quite modest in historical terms.

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<sup>1</sup>Although Milanovic (2013) shows that the space in which inequality can move may broaden as societies become wealthier (i.e. as the distance between the median and subsistence levels of income grows), this does not imply that inequality is bound to grow accordingly. Although this maximum can thus limit the level of inequality, it does not mean that inequality cannot diminish as societies become wealthier. Thus, the maximum does not sufficiently *explain* the change in inequality. At best, it is a necessary but insufficient condition for the growth in inequality, and fails to explain why inequality may diminish, as it most certainly has in the Nordics at least after WWII.

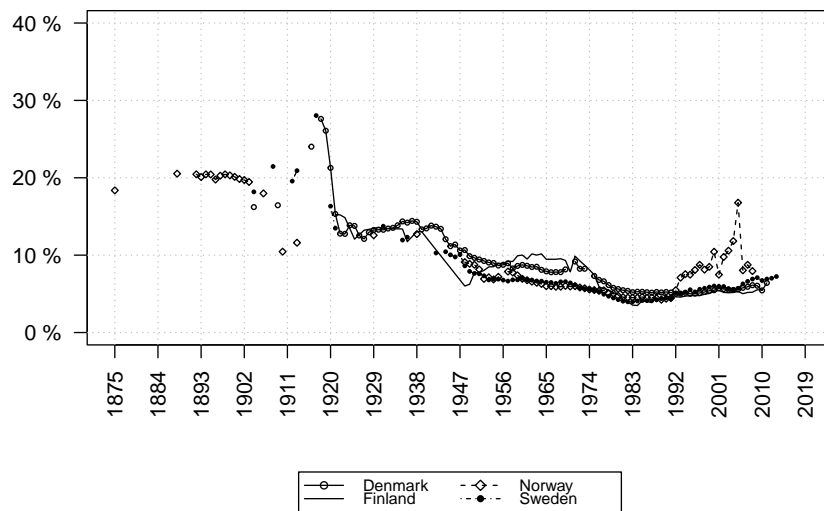


Figure 1: Top 1 percent fiscal income shares in the Nordics, 1875–2019. Source: Bengtsson and Waldenström, 2017. Note: the Finnish data begin in 1920.

If the societies were relatively poor and unable to yield significant surpluses, how come inequality, measured in the distribution of income, have been so high? The first, perhaps more apparent route would be to explain this discrepancy by factors such as the concentration of the ownership of land, growth in poverty, power relation differentials among the estates, monopoly price-setting rights of guilds, trade restrictions and arbitrage.<sup>2</sup> As in the other Nordic countries of the time, including Sweden, one could also investigate the impact of regional variations in crop yields and real wages (Jörberg, 1987, pp. 10–11). At first glance, this may seem a probable explanation. After all, it has been known for a long time that the share of landless agricultural labourers increased during the 19th century, which resulted in growing gaps in the social standing between landowners and the landless (Soininen, 1974, pp. 34, 39, 42 and Haatanen, 1968, pp. 46–47).<sup>3</sup> Indeed, a growing share of landless labourers and a dependency on a few staple crops (i.e. rye and barley) may have exacerbated mortality growth during the famine years of 1867–8, as a decreasing share of the population had direct access to good-quality land (Voutilainen, 2022, pp. 522–523).

There is, however, an alternative to this explanatory strategy. That is to question the validity of these observations in the first place. As this study proceeds to show, there are grounds to believe that the level of income inequality was not as high, at least in the case of Finland. This is in line with the question posed in the beginning: income inequality, perhaps, was not as high because of the way the data has been analysed thus far. Instead, it seems that inequality grew significantly from the late 19th to the early 20th century, with peak values having been reached in the late 1910s and early 1920s, that is, around the time of the Finnish independence.

19th-century trade restrictions restricted people's ability to grow their businesses and engage in new industries and fields of commerce. Although the restrictions had by the time of their abolishment in 1879 been far from perfect, they nonetheless limited the size of companies and the accumulation, concentration and centralisation of capital in Finland (Kekkonen, 1987, p. 12). They

<sup>2</sup>Rural wage labour increased in the Finnish countryside during the 19th and early 20th centuries as the share of the landless grew significantly (e.g. Heikkinen, Hjerpe, Kaukiainen, Markkanen, and Nummela, 1987, p. 71). Soininen (1974, p. 372) states that their conditions deteriorated relative to landowners during the 19th century. Thus, there may certainly have been 'endogenous' factors which have raised inequality in the 19th century. However, this may not have been sufficient to offset the effect of the conceptual and data-driven issues discussed in this article.

<sup>3</sup>As Heikkinen (1997, p. 37) has mentioned, however, the data on the landless is relatively unreliable due to changes in classification, among other reasons.

also hindered the artisans' and merchants' ability to expand their businesses, which limited the prospects of forming partnerships or corporations (Haatanen, 1968, p. 31). The restrictions were very much a contested field. Privileged artisans, merchants, industrialists and estate holders engaged in bitter struggles over their coverage and enforcement (Kuisma, 1989, p. 29).<sup>4</sup> Perhaps opportunistically, many tried to circumvent the restrictions by engaging in various businesses such as international trade, iron-works, sawmills and rural bartering (Kuisma, 1989, pp. 14–15). Still, the restrictions meant, at least in part, that if income inequality in late 19th century Finland was very high by historical standards, it cannot have flown from the concentration and scale of businesses and capital ownership, as Finnish companies were, for these and other reasons (e.g. seasonality of production due to the freezing of waters) quite small around 1865. The same may have applied to the relatively dispersed ownership of forests, which were in many ways the country's most important asset during the time (Bengtsson et al., 2019, pp. 232, 238–239, 244).<sup>5</sup>

A number of famous 'grand theories' and explanations on the development of inequality under capitalism point out to a period of initial growth, as industrialisation, trade and new relations of production are spread across the society. These include, among others, Karl Marx's (1976) theory of immiseration and the reserve army of labour, Simon Kuznets'  $\cap$ -curve hypothesis (1955) and Thomas Piketty's (2014) explanation of historical fluctuations in inequality over the long run.

From the viewpoint of the Kuznets hypothesis (Kuznets, 1955), one should witness an increase in inequality as urban industrialisation proceeds. The aforementioned studies, on the other hand, seem to purport that inequality actually diminished during this process. For example, in Roikonen and Heikkinen (2020), income inequality seems to have been at a historically high level in the mid-1860s and grown modestly towards the end of the century. This has been noted earlier by Hjerpe and Lefgren (1974, p. 115) and also by Voutilainen (2022, p. 506).<sup>6</sup> Since the early 1900s, inequality seems to have diminished, although urbanisation and industrialisation were only taking place at a quickening pace from the late 19th century onward. As such, diminishing inequality would seem to have gone hand-in-hand with a growth in industrial production and gradual urbanisation.

In terms of Marx's theory of immiseration, one should expect that the growth in surplus population (*Surplus-Bevölkerung*)—workers who are 'merely following capital', or in search of employment, agricultural labourers in the process of becoming industrial labourers, the 'stagnant' sub-population comprising of irregular, or casual, labourers, and, finally, paupers, such as children, orphans and those unable to work—to grow as industrialisation proceeds (Marx, 1867/1976, pp. 795–797). Although immiseration, or the growing gap between the 'active' and 'reserve' armies of labour, and workers and capitalists, may well explain a part of the growth in inequality in late-19th and early-20th century Finland, it should not explain the high levels of inequality observed by the aforementioned authors. In this sense, both Kuznets' and Marx's work point to a growth in inequality *during* this transition, not a prior high level of inequality. Although Kuznets and Marx give widely different explanations and predictions on the trajectory of inequality under industrialisation, they nonetheless agree on its trajectory during its early stages.<sup>7</sup> In a way, immiseration had by the early 20th century partially given away to the growth in the 'active' part of the working class, as both public efforts at alleviating

<sup>4</sup>Contrary to Marx and Engels' famous description in the *Manifesto of the Communist Party* (1978) [1848], members of the urban bourgeoisie were often opposed to the abolition of trade restrictions in Finland, as they often benefited from their continuance (Kekkonen, 1987, pp. 99, 134, 143). As Meiksins Wood (2016, p. 149) has noted, however, this notion of bourgeois initiative in the coming-about of industrial capitalism is already absent in the *Grundrisse* and particularly in *Capital*, Volume 1, in Marx's treatment of the so-called primitive accumulation. Meiksins Wood (1996, p. 218) also notes, following Robert Brenner, that this sort of bourgeois resistance to the abolishment of trade restrictions and the introduction of 'free trade' are not unique, but have been present, among others, in pre-Civil War era England.

<sup>5</sup>According to Bengtsson et al. (2019, p. 232), the relatively low concentration of forest ownership had to do with the general reparation (*storskiftet, isojako*) of lands in Sweden from the mid-18th century onward. The newly-independent Finnish state aimed to reinforce the peasants' ownership of the forests by curtailing companies' ability to acquire them at prices which had often been quite low, thus reproducing this dispersion, at least in part, well into the 20th century (Kuisma, 1992, p. 227).

<sup>6</sup>Voutilainen (2022, p. 508) acknowledges the fact that the distribution of money income does not directly translate to social inequality. This does not, unfortunately, apply to Gini coefficient estimates he reproduces in the article, which suffer from the same limitations mentioned elsewhere in this article. This does not imply, however, that the skewness of money income would be of no importance. One dimension of inequality is the distribution of risk, in this case, the risk of malnourishment or outright starvation during harvest failures. During times of famine, as in 1867–8, those with land, incomes and savings may be better shielded from hunger than those who received a bulk of their remuneration as wages in-kind, as many hired men, maids, cottagers and casual labourers did in the Finnish countryside back in the day. Thus, although the distribution of money income may not account for total societal inequality in the presence of other weighty variables, such as the ownership of land, crop failures may have certainly heightened the effects of this distribution.

<sup>7</sup>For Marx, real wages can grow and diminish during the accumulation cycle, though he nonetheless seems to hold the idea of their stagnation under capitalism. Immiseration, in this regard, concerns those below the employed workers in terms of living standards (Marx, 1867/1976, 68, 70, 71, Chapter 25).

it, mass emigration and growth in industries and services had reduced rural underemployment quite significantly (Ahvenainen, Pihkala, and Rasila, 1982, pp. 141–142, 144–145). Therefore, other factors than a decline in the share of the poorest segments of the population may have contributed to a rise in social inequality during the period.

In *Capital*, Volume I, Marx treats the question of immiseration and the reserve army of labour in conjunction with accumulation cycles and the fluctuation of real wages (Marx, 1867/1976, Chapter 25). As the accumulation of capital proceeds before the peak in this cycle, Marx saw a possibility for the rise in real wages, should the demand for labour-power outmatch its supply due to a decline in the reserve army of labour. Marx by no means claims that this could permanently alter the distribution of income between capitalists and workers, as a rise in these very same wages could also act as an impetus for a slackening pace of accumulation due to declining profitability. Nevertheless, Marx does not see this ‘functional’ distribution of income as a constant than a subject to temporary fluctuations, which may, again temporarily, alter the otherwise growing trend in inequality due to immiseration.

Piketty (2014, pp. 52, 166, 216) explains inequality under capitalism by means of two ‘fundamental laws’. The first one states that  $\alpha = r \times \beta$ , that is, the share of capital income equals the rate of return on capital  $r$  times the capital–income ratio  $\beta$ . The second law states that  $\beta = s/g$ , so that this ratio is the ratio of the rate of savings over the rate of growth. In other words, the share of capital—and, ostensibly, the share of wealthy capital owners—is the higher the greater the rate of return on capital is and the more the society saves of its income instead of consuming it outright. This would suggest, *prima facie*, a growth in inequality as the society’s, or the capitalists’, ability to save increases as the rate of return on capital (surplus) grows due to the adoption of new techniques of production. For Piketty, after all, ‘[e]verything depends on the vagaries of technology’, i.e. ‘on the range of technologies available to combine capital and labor’ in order to meet the society’s needs (Piketty, 2014, p. 216). Although this by no means renders Piketty a technological determinist, it does build pressure upon the society’s institutions, such as taxation, which otherwise regulate or smoothen the effects of capitalist development on social inequality. Nevertheless, in the absence of such (effective) buffers or institutions, industrialisation may lead to an increase in inequality in Piketty’s explication.<sup>8</sup>

The research period 1865–1959 has been chosen on grounds of data availability. Tax records data are available from 1865 onward, albeit at a sparse and uneven frequency. GDP sector-level data, which are necessary for the distributional national accounts (DINA) type estimations, are available from 1960 onward. As I have yet to produce these series, and because they deserve their own treatment, I have chosen to limit the research period in this article to 1959. As such, the article covers a 94-year time period during which Finland not only emerged as an independent nation, surviving two world wars and a civil war (1918), but also as an industrialised, capitalist economy.

This article is structured accordingly. Section 2 describes the data and methods used in the construction of new income share and inequality series. This section elaborates upon the issues with the data, some of which have perhaps not received due attention before. Section 3 proposes some early solutions for dealing with the issues raised in the previous sections. Section 4 shows new estimates of the top 1 percent’s income share and related inequality metrics for 1865–1959. Finally, Section 5 concludes by returning the discussion to the relative merits and drawbacks of the previously described ‘grand theories’.

## 2 Data and methods: issues and suggested solutions

This study draws primarily on tax records and historical national accounts data which are commonly used nowadays for the construction of income shares and inequality metrics (e.g. Alvaredo et al., 2021; Moriguchi and Saez, 2008; Piketty and Saez, 2003). Among many recent contributions, the study relies on a so-called generalised Pareto curve based interpolation technique for the estimation of these shares and metrics (among others, Blanchet, Fournier, and Piketty, 2017; Blanchet, Garbinti, Goupille-Lebret, and Martínez-Toledano, 2018). Generalized Pareto curve interpolations have been lauded for their ability to produce relatively pre-

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<sup>8</sup>Some major criticisms of Piketty’s theory have been addressed in Heino (2021) and are thus not repeated here for the sake of brevity.



cise estimates even in the presence of relatively sparse data (Blanchet et al., 2017, p. 3).<sup>9</sup> An **R**-based `gpinter` package written by Thomas Blanchet has been used on the published tax record tabulations available in Finland for country-level income share and inequality estimations. The specific data inputs and requirements have been discussed in the Appendix. This method has been also used by Roikonen and Heikkinen (2020) in their recent estimations of long-run historical income inequality in Finland since 1865. As such, this study offers a point of comparison within a partially similar methodological framework.

The income data used in this study comes from a number of sources. For the years 1865, 1871, 1876 and 1880, the study relies on tabulated tax returns data published by the Statistical (Main) Office of Finland (*Tilastollinen (pää)toimisto*) on grounds of a nation-wide income, or consent, tax (*bevillning, suostuntavero*) carried at the estates' consent originally in 1865–7 and finally until 1885 (Wikström, 1985, pp. 21, 41–43). The nation-wide consent tax can be considered as a relatively early attempt at income taxation by European standards. It concerned every resident household with a minimum annual income of 500 markkas (FIM) and was moderately progressive with marginal tax rates ranging from 0.8 to 1.2 percent. The tax was carried by local tax boards whose members included prominent and well-reputed individuals with supposedly intricate knowledge of the tax subjects' whereabouts. Although taxpayers could choose to file in tax returns, the majority contented with these boards' assessment. Some historians, such as Kauko Wikström (1985, pp. 29–30) have been sceptical about the tax, considering it a voluntary payment (i.e. 'a tax on conscience'). Others, such as Roikonen (2022, p. 236), take a more positive view, emphasising the reliability of the consent tax data. They argue that the local tax boards' expertise (e.g. the fact that the boards could reject the tax returns if the income figures were considered too low) and the fact that most taxpayers agreed with the boards' decisions, make the data reliable by international standards. For example, in 1865, around 26 percent of the 81,556 taxpayers filed in a tax return. The tax boards assessed that around 7,535 taxpayers, or approximately 9 percent, had filed in figures that were deemed implausibly low (Statistical Office of Finland, 1869, pp. 9–10). Thus, although contemporaries, such as politicians did not always hold the consent tax in high regard due to its unexpectedly low yield, the tax remains an all-important data source on incomes in late-19th century Finland.<sup>10</sup>

After the abolishment, or the failed renewal, of the consent tax by the estates in 1885, the main source of income data are municipal tax records. Municipalities were granted taxation rights in 1865, and tax eligibility concerned, at least in principle, all inhabitants regardless of their ownership of land (Hjelt and Broms, 1905, p. 1). State-wide, municipal-level studies on municipal taxation in rural and urban municipalities for the years 1899 and 1900 were carried by August Hjelt and O. A. Broms (1904; 1905). These studies offer detailed insights into the distribution of taxes and taxed incomes among different social groups, such as public officials, estate owners, merchants and artisans, workers, industrialists and corporations. Unfortunately, due to the laborious nature of these studies, they are only available for these given years.

Although the data here described is quite sparse with only six annual observations for the period 1865–1919, they allow a glimpse into the levels and overall trends in income shares and inequality during a time of rapid socioeconomic transition. At the time of writing, I have yet to visit a few additional sources, such as the surtax records of 1916, which offer insight into top incomes during WWI. Nevertheless, these sources are in many ways the best data there is on incomes in Finland at the time, given the absence of representative, state-level surveys and other studies on income distribution.<sup>11</sup>

A state-wide income tax was reintroduced in Finland in 1920. Statistical Main Office of Finland has compiled and published annual tabulations on this tax for the years 1920–2, 1924, 1926, 1939, 1931, 1934–5, 1938, 1942 and 1945 (OSF IV:B). From 1947 onward the tabulations have been published on an annual basis. Prior to 1945 the data comprised of the tax units' taxed income.

<sup>9</sup>By definition, a generalised Pareto curve is a curve of inverted Pareto coefficients  $b(p)$  which follow a rank  $0 \leq p \leq 1$ . These coefficients mark the ratio between the average income above the rank  $p$  and the  $p$ -th quantile  $Q(p)$ , so that  $b(p) = E(X|X > Q(p))/Q(p)$ . If  $X$ , or income, wealth or some similar continuous variable follows a Pareto distribution, then  $b(p) = \alpha/(\alpha - 1)$ , where  $\alpha$  is the Pareto coefficient, is constant. Otherwise, according to Blanchet et al. (2017, p. 5),  $b(p)$  will vary.

<sup>10</sup>According to Wikström (1985, pp. 29–39, 33), one issue with the tax was the relative evenness of income distribution which meant that the top marginal rates did not bring in the anticipated tax yield. In addition, although the vast majority of the Finnish population was rural, they accounted for less than a half of the tax yield.

<sup>11</sup>There are, however, micro-level studies on the distribution of income. These include Ilkka Nummela's and Erkki K. Karonen's study on the distribution of income in the town of Kuopio in 1880–1910. This study shows a decreasing level of pauperisation and an increasing population share of workers during the period (Nummela and Laitinen, 1987, p. 239).

From 1945 onward the tabulations have included columns on the tax units' taxable income. The tax unit has varied over time. In 1920–34, married couples and their children were jointly taxed, alongside self-employed couples, such as farmers and shopkeepers. In 1935–42 the tax unit was the individual. A new income and wealth tax act (888/1943) re-introduced the married couples' joint taxation during WWII, primarily in order to distribute the tax burden more evenly. This joint taxation persisted until 1975 for earned income (e.g. wages and salaries) and until 1992 for wealth income (dividends, interest and rent). From 1949 onward, the tabulations treat married couples as separate tax units (Jäntti, Riihelä, Sullström, and Tuomala, 2010, Table 8A.9 (p. 432)). These changes in the tax code and the subsequent alterations to the published tax statistics may affect the share and inequality estimates to an unknown degree. For example, the shift from joint to individual taxation in 1934–5 results in a 41.2-percent rise in the number of tax units (from 1,601,895 to 2,261,100), hardly a result of an increase in the tax unit population. Be that as it may, this data is the best and practically only reliable source of income data in Finland during the period.

There are a number of common and particular issues involved with the data we have on income in Finland from the late 19th century onward. These concern familiar issues such as tax unit heterogeneity, inclusion and exclusion of various income items, changes in the concept of income and the bottom income threshold in the statistics. Although these issues stem partially from the way the data has been compiled and presented by the statistical authorities, they have also to do, in part, with changes in the underlying tax legislation. Therefore, changes in the data have most likely correlated with behavioural changes, as shifts in different items' tax compliance have resulted in dynamic changes in taxpayers' incomes (i.e. in the elasticity of taxable income).<sup>12</sup> In the consent tax data, the income unit is the household and the concept of income is taxed income. The tax base was quite narrow at the time and relatively complete only for labour income, such as wages. A relatively high bottom threshold (500 FIM) resulted in the exclusion of the majority of households from the statistic.

A more particular issue with the data is the inclusion of corporations (*osake- ja pankki-yhtiöt*). Although these early statistics from 1865 to 1880 do not separate between corporations and other tax units, there are grounds to believe based on municipal tax data from 1899 and 1900 (Hjelt and Broms, 1904, 1905) that they may skew income share and inequality estimations if one aims to assess them at household level. For example, in 1899, corporations amounted to around 66.0 percent of all tax units in the top income bracket (above 200,000 FIM). Whereas the total average income for all tax units was 2,480 FIM, for corporations it was 44,551 FIM. Although corporations were taxed only for their distributed profits (i.e. dividends), it is easy to see that they can potentially dominate the top of the distribution in earlier times, as well (Hjelt and Broms, 1904, table IIIa (pp. 206–207)).<sup>13</sup> As mentioned, the said municipal tax statistics allow one to estimate the income distribution among households without the interference of corporations. Unfortunately, the same does not go for the earlier consent tax data. Therefore, we need data on the corporations' profits in order to approximate for their effect in these earlier years. Although the Finnish economy and society were going through rapid changes in the turn of the 20th century, with corporations growing in size, it is possible that they inflate the previous income share (e.g. the top 1 and 5 percent) estimates in 1865–80. After all, in a society as poor as the late 19th century Finland, it did not presumably take many corporations to have a profound impact on the society's income. Although even the largest of industrial corporations only employed a few hundred or slightly more than a thousand workers around 1865, it would be a mistake to overlook their significance.<sup>14</sup>

Why corporations feature so prominently in the municipal tax record data in 1899 and 1900? One reason may be the fact that dividends were probably an important form of profit pay-out *vis-à-vis* other items, such as interest. Figure 2 provides evidence for why this may have been so by means of an average equity share series from 1837 to 1938. From the 1830s until the early 1900s, largest industrial corporations operated mainly on equity, its share being consistently above 60 percent during this time. Although the share of equity of the companies' total capital has declined somewhat from the 1880s onward, with a noticeable dip in the turn of the 1920s, it seems clear that industrial companies, on average, have not relied extensively on debt even during these early decades

<sup>12</sup> As Saez et al. (2012, pp. 33–34) have noted, these effects have been most pronounced at the very top of the income distribution. Although they have reached this conclusion on the grounds of post-1960 U.S. tax returns data, the phenomenon is probably more general goes back further in time, as well.

<sup>13</sup> In rural municipalities, the corporations made around 37.0 percent of all tax units in the top bracket (above 50,000 FIM). Their average taxed income was 19,067 FIM, which is again much higher than the 837 FIM average for the entire tax unit population (Hjelt and Broms, 1905, table Va (pp. 214–215)). Although these figures are not directly commensurable due to the differences in bracket thresholds, they give an idea about the potential scale of the issue.

<sup>14</sup> In 1860–2, the largest industrial corporation by labour force was Finlayson with around 1,319 workers in Tampere. No other industrial corporation reached above 1,000 workers during the period (Hjerpe, 1979, pp. 166–167).

of industrialisation.

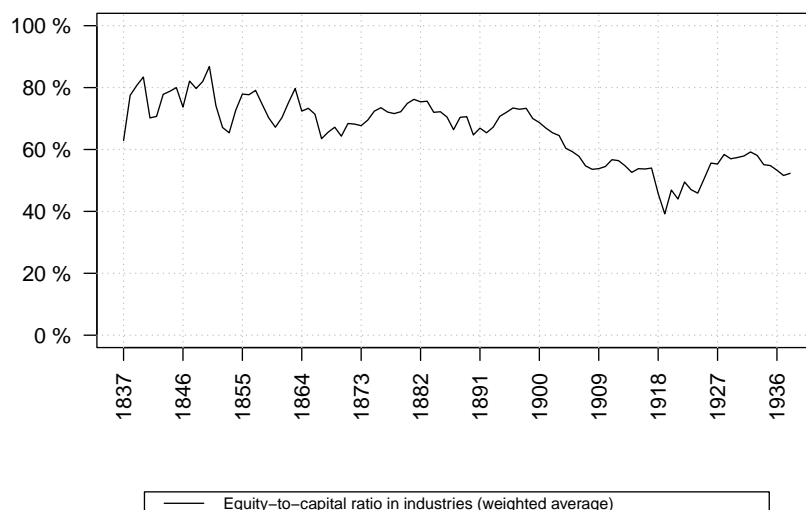


Figure 2: Industrial corporations' share of equity, weighted average, 1837–1938. Source: Bank of Finland archives. Note: the time-series uses different industries' shares of total capital as weights.

Thus, it may seem clearer why only a relatively small number of corporations may have dominated the top brackets in the tax data, and why their removal from the data is important for approaching the 'true' level of income inequality in Finland. This has presumably been particularly so in the 1890s and early 1900s, as industrial production expanded rapidly, but presumably so to a lesser degree in the 1860s–80s, as well.

Another, conceptual and in many ways more profound issue concerns the nature of inequality itself. To what extent can we use money incomes to measure inequality in times when the majority of the population did not rely on money as extensively as in contemporary times? Does the distribution of money income tell us much about the dispersion of access to the society's product, such as grain, cloth, fodder, fuel and domestic animals? After all, money is a means for accessing the social product resulting from labour. If this product can be accessed directly (e.g. grain reserved for domestic use, commodity wages or wages in-kind, gifts and customary donations), it contributes to individual and social reproduction without monetary transactions. As Meiksins Wood (2017) has pointed out, urban workers have relied on wages as they have lacked such an access. In other words, they have been compelled to work for a wage in order to secure their means of subsistence and reproduction. Although many authors, including Engels (1973, p. 271), Peltonen (1992, pp. 207–208) and Uljas (2012, pp. 61, 63) have noted that workers have still often had a garden plot or other means of self-subsistence, the differences between a more urbanised and industrialised society, such as late-19th century England and a predominantly rural society like Finland have been profound. For example, it has been estimated that in the 1870s, around 12.5 percent of the Finnish agricultural produce was sold in the market. By 1910, this figure had risen to around 25 percent. Hence, it is unsurprising that workers, such as day-labourers, were paid predominantly in grain (mostly rye and barley) especially in the southwestern parts of the country where crop surpluses were more common than in the north-east (Peltonen, 1992, p. 224).<sup>15</sup> This, in turn, has been the result of slow and difficult shipments, poor road networks, reliance

<sup>15</sup>This fact has repercussions on GDP estimates, as well. In 1870–9, the Finnish GDP was around 339.9 million FIM on average (Vattula, 1983, Table 10.2a. (pp. 375–377)). If one takes Peltonen's (1992) estimate of the marketed share of the agricultural produce (12.5 percent) as a decennial average for the 1870s, and given the fact that the share of agriculture in the Finnish GDP was around 48.9 percent, this would imply that around 6.1 percent of the GDP comprised of marketed

on waterways, which have frozen during the winter, as well as coverage for risk (e.g. spoilage). Had the non-marketed produce been actually sold as commodities in the market, the price multipliers would most likely have differed from the actual prices quite significantly. Therefore, one has to be careful when using historical price data as ‘as if’ multipliers for known output in volume terms. As Lundh and Olsson (2011, p. 304) have pointed out in their study of Scandian contract-workers in the late 19th and early 20th centuries, the wages in-kind were mainly a substitute for money wages and tended to equal the latter in (exchange) value. Although we cannot directly generalise on grounds of these observations, they speak of a society where monetary relations had not yet taken over other, non-pecuniary forms of remuneration.

Indeed, as both Heikkinen (1997) and Lundh (2012) have pointed out, accounting for these wages in-kind tend to offset the otherwise significant urban–rural wage differentials we observe in many countries at the time. Similar evidence exists also from other places and periods, such as the late-18th century Strasbourg (Geloso, 2018). According to Heikkinen et al. (1987, p. 68), rural wages in-kind have correlated with money wages in Finland during the period. Therefore, nominal and real wage series for the group of rural day-labourers may allow for proxying the money value of wages in-kind, insofar as those were substitutes to one another. Monetising the value of wages in-kind can increase the level of income especially in the aforementioned southwestern parts of Finland, where these wages were more prevalent than in the north-east.<sup>16</sup>

A third, equally conceptual issue is that of the relevance of income distribution as a measure of social inequity through time, as productivity has increased tremendously, the relative prices of many necessities has declined and societies have become much wealthier than before. For example, let us assume a society where the ratio of income between the lowest and highest income is 1 to 4, that is, the classic maximum desirable ratio Plato attributed to wealth between poor and wealthy citizens (Plato, 2001, p. 90). Let us further assume that the subsistence level of income is four fifths of the median. Let us then have a society where the same ratio is 1 to 32, but the subsistence level is only one tenth of the median. Is the latter society necessarily more unequal than the former? Does the societal relevance of the metric remain the same over time, as the material standard of living, on average, improved during the late 19th and 20th centuries? It may well be that a lower level of inequality had a more profound societal impact in the late 19th and early 20th centuries than since. If so, then authors who claim that (income) inequality was higher in the latter half of the 1800s than in recent times may be right, albeit for the wrong reasons. Although this question has been, at this stage, studied only in the case of Finland, it has arguably relevance in the case of the other Nordics, as well. That is, the aforementioned authors may be factually wrong but substantially correct in terms of the societal impact of this inequality.

A related question is the commensurability of inequality metrics, such as income shares and Gini coefficients, over long periods of time. In Finland, one is measuring inequality among households and companies from 1865 to 1920, unless the former are removed from the data. Even then there are well-known issues with the fact that the income unit shifts between households, individuals, married couples and the jointly self-employed having been reported together and separately in different periods. As the size of the income unit or unit of observation changes, so does their level and share of income, and the value of various inequality metrics.

An example of this issue is Lindert and Nafziger (2014), who study inequality in late imperial Russia in a comparative perspective. They perform a cross-country comparison of the share of the top 1 percent in 1904 to countries such as Sweden, Japan, the U.S. and England and Wales. Their key observation is that at 13.5 percent, the top 1 percent’s share in Russia seems to have been relatively low by the day’s standard (Lindert and Nafziger, 2014, p. 790). The issue here is the fact that they are comparing statistics with heterogeneous income units. In their case, their share estimates (and Gini coefficients) measure inequality between classes (i.e. the

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agricultural commodities. Subsequently, the decennial average GDP would contract to 184.3 million FIM, a 45.8-percent drop from the monetised estimate. There are other, related issues as well. Imposing known market or tax prices on non-marketed produce, such as rye, barley and linen, presumably inflates the GDP estimate, because market prices have often exceeded producer prices or production costs by a wide margin. The issue has been acknowledged historically from relatively early on. For example, Lindberg (1943, pp. 23, 31, 32) states that the then-emerging national income studies had not paid due attention to the question of prices, this problem being particularly pertinent in agriculture where a large portion of the produce was still allocated for direct consumption in the 1920s and 1930s.

<sup>16</sup>This method is, obviously, somewhat arbitrary, as nominal and real money wages per worker would have probably differed, had the society been more thoroughly permeated by monetary relations, namely, remuneration in money and the acquisition of subsistence and individual reproduction through the purchase of commodities in the market. Therefore, monetising these wages in-kind yields ‘as if’ kinds of wages, as does the monetising of volumes of output (e.g. grain, dairies and timber) by multiplying them with market or export prices in cases when this output was not sold for money or there were significant price differentials within the region of interest.

nobility, the clergy, soldiers, peasants, urban dwellers and others). Although their data comprises of more than 3,500 class-sector-province observations, thus mitigating for some of the aggregation issues with national-level data from other countries, they are nonetheless using class averages which mask a great deal of variance in the data. Thus, it is probable that their share estimates and Gini coefficients are lower than they would have been, had they calculated them with less aggregated data. Not only does this complicate the cross-country comparisons they make, but it also questions the comparison of inequality between the late-imperial and contemporary federal Russia.<sup>17</sup> The issues one faces using the Lindert and Nafziger (2014) data are in addition to the well-known decomposition issues one faces when decomposing the Gini coefficient into social groups or classes when there is overlap between them (i.e. some members of another group have incomes which are higher or lower than those in another group).<sup>18</sup> Although only a single example, this case highlights the necessity of careful comparisons between heterogeneous income units. In this case, it is very difficult to know whether inequality in late-imperial Russia was actually as low by early 20th century or by contemporary standards as the authors propose.

It would be erroneous to reduce inequality to just a few metrics. The Gini coefficient or the top 1 percent's share are not 'the' measures of inequality. It would be likewise wrong to claim that some income units would be correct and others unsuitable for capturing the phenomenon. In this regard, it is easy to agree with Krolage et al. (2022, p. 117) who believe in the merit of using complementary metrics in order to 'shed light on ... multi-faceted inequality patterns.' Both the metrics and the income units are highly dependent on the context and question at hand. When one pursues cross-country or longitudinal studies of inequality, the unit of income should obviously remain as constant as possible. Although this is a widely shared objective in long-run studies of socioeconomic inequality, this study shows how much work there still remains to be done in order to meet it. The same applies to the share estimates presented in this article. They are by no means 'the' correct shares of, say, the top 1 percent's share of taxed income. These and other researchers' estimates are not mutually exclusive, but rather complement each other. This does not mean that some of the issues raised in this article would not necessitate adjustments to previous estimates. What this rather means is that there is still plenty of room for additional research on long-run income and other forms in inequality. The question still remains: can the skewness of income distribution be used to represent social inequality at large consistently over time?

### 3 Adjusting the data

There are two methods for removing corporations from the tax data. The first one is more complicated. In this method, we first estimate the distribution using the generalized Pareto curve interpolation developed by Blanchet et al. (2017). In practice, this has been done using the `{gpinter}` package for **R** written by Thomas Blanchet. More particularly, I have used the `thresholds_fit` function, as the tabulated tax data features columns on bracket thresholds (e.g. 2,500 FIM to 2,999 FIM), tax units within these brackets, as well as sums of taxed income by taxpayer group (such as public officials, labourers, merchants and artisans, industrialists and 'free' professionals). Hjelt and Broms (1904; 1905) distinguish between different tax unit types. It is therefore possible to calculate distributions by the tax unit, including corporations. The second step is therefore to estimate the distribution of taxed income among corporations following the same method as for the entire tax unit population. In 1899 and 1900, the (unadjusted) taxed income distribution among corporations was much more unequal among corporations than the whole population. The third step is to estimate the concentration of corporations among the whole tax unit population (i.e. how many corporations of the total corporate tax unit population have been concentrated in each income bracket of the total population). For example, in 1899, around 7.1 percent of all corporations were concentrated within the top 1 percent of the total tax unit population in urban municipalities. The fourth step is to subtract the corporations' income from the bracket sums of the total tax unit population. In the case of the top 1 percent, this implies that the sum of taxed income of the top 7.1 percent (p92.9–100) of corporations is to be subtracted from the sum of this top 1 percent (p99–100). The fifth step is to re-rank the remaining tax

<sup>17</sup> As Ghodsee & Orenstein (2021, pp. 37–38) note, the present-day data from central and eastern Europe only picks up some of the income, as the role of the so-called informal economy has been quite prominent since the times of socialism. Thus, contemporary comparisons, too, suffer from major commensurability issues. These issues, as well as sampling errors and selection bias in survey data may actually be greater a problem than the issues that arise from comparing heterogeneous income units.

<sup>18</sup> The Gini can, of course, be decomposed into income classes, as they can be readily demarcated using income thresholds (e.g. Jenkins, 2017, p. 280)

units in order to obtain correct estimates of the now-adjusted bracket shares and sums.

The second method is simpler. As the data allows to estimate the percentiles with and without corporations and there is data on the average taxed incomes per each taxpayer group, one can simply subtract the corporations from the rest of the tax unit population, estimate the percentiles (i.e. how great a share of taxpayers are below the  $n$ -th bracket threshold) and use the generalized Pareto curve interpolation to obtain income share and inequality estimates. As with the first method, the ensuing income shares and metrics need to be adjusted for the missing tax units below the bottom threshold (Anthony. B. Atkinson, 2007, pp. 27–28).<sup>19</sup> As only a minority of households have been included in the data due to the high level of this bottom threshold (500 FIM in the late 19th century), the unadjusted income shares are those of much smaller income groups than in reality (for example, the top 1 percent in the tabulated data is much smaller a bracket in the scale of the entire population).<sup>20</sup> Unfortunately, there is to my knowledge no data on the total number of corporations in Finland during the time. Thus, it is difficult to say how many corporations have been excluded from the data by the use of this threshold. Fortunately, there are such estimations for households (Jäntti et al., 2010; Roikonen and Heikkinen, 2020). As corporations have ostensibly had much higher incomes than individual households—as exemplified by their much higher average income—it is likely that the data covers a much higher share of the corporations than that of the households. Still, this uncertainty needs to be kept in mind when assessing the accuracy of these estimates.

This second method has been used for the estimations presented in the article. Although they should yield almost identical results, the second method benefits from its relative simplicity and the lack of data on corporations at the time of writing.

Table 1 illustrates the issue brought about by the inclusion of corporations in the tax unit population in the consent tax records between 1865 and 1880. Although the corporations' weighted average dividend is, at this stage, not sufficient for subtracting the corporations from the data using the previously described methodology, they hint at the prominence of corporations at the very top of the distribution, in line with the results obtained using the Hjelt and Broms data (1904; 1905) for 1899 and 1900. For example, the industrial conglomerate Tampereen Pellava- ja Rautatehdas (later known as Tampella) paid a substantial dividend of 320,00 FIM in 1865, thus obtaining a position in the top bracket in the given year. The largest corporation in Finland at the time, the textile manufacturer Finlayson, paid 208,000 FIM in 1865 and 813,000 FIM in 1880. As corporations grew in popularity over other business entities, such as partnerships, it is likely that they have gained a greater prominence in the top brackets towards the end of the 19th century.

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<sup>19</sup> As the tax unit is the household in the consent and municipal tax data, estimates for the total number of households in the Finnish population are taken from Roikonen and Heikkinen (2020) and Jäntti et al. (2010). No attempt has been made to account for the household size. Although Roikonen and Heikkinen estimate the number of average number of individuals within households, it is difficult to say how representative this average is of the households in different income brackets. This does not mean that the question would be of no importance. As shown by Auten and Splinter (2022, pp. 9–10), differences in the number of dependent children and other variables affecting relative household sizes in different brackets can have a sizeable effect on income share estimates when using individuals as income units.

<sup>20</sup> The 500 FIM threshold may at first seem relatively low, as the GDP per tax unit was around 621 FIM in 1865 and higher thereafter (the GDP per capita was around 155 FIM and approximately 146 FIM for individuals within these tax units, Roikonen and Heikkinen, 2020, Appendix table A (p. 72)). However, as this article mentions on a number of occasions, this GDP per tax unit or per capita estimate can be quite misleading in terms of assessing the people's incomes, as a great share of the GDP has been monetised by multiplying non-marketed or non-commodity output volumes with existing price data. This means that the GDP estimates in production terms presumably do not add up to GDP in money income terms. The fact that a great share of the Finnish populace has lived in relative self-sufficiency implies that the 500 FIM threshold has been quite high in terms of income. Of course, the most important evidence for this is the fact that only a fairly small share of the household population was included in the consent tax statistics in particular. These issues need to be kept in mind when one assesses the level of inequality in terms of income shares.

	1865	1871	1876	1880
Total average	1,030	810	940	754
Top 1% average (unadjusted)	11,628	7,394	9,461	9,661
Top bracket threshold	100,000	100,000	100,000	100,000
Average in top bracket	343,333	270,000	313,333	228,084
Number of tax units in the top bracket	5	6	14	25
Number of corporations in the top bracket <sup>a</sup>	2	2	4	2
Total number of corporations <sup>b</sup>	14	45	10	
Corporations' weighted average <sup>a</sup>	107,875	225,760	171,544	158,473

Table 1: Corporations' and other tax units' average taxed incomes in 1865, 1871, 1876 and 1880 (FIM). Source: Hjerpe, 1979; Statistical Office of Finland, 1869, 1875, 1880, 1885; Bank of Finland archives. Note: the corporations' weighted average dividend uses their relative worker shares as weights (data from 1860–2 and 1890–1 from Hjerpe (1979)). The average income in the top brackets in 1865, 1871 and 1876 has been estimated using the ratio of the top bracket average to the total distribution average in 1880 (0.003) as a denominator of the observed total distribution average. Although the published concent tax records show the total number of corporations above the 500 FIM threshold in 1865, 1871 and 1877, they do not show them by tax brackets. In 1880, the corporations are included in the category of 'others'.

<sup>a</sup> As in Alho's data on industrial corporations (Bank of Finland archives). <sup>b</sup> As in Statistical Office of Finland, 1869, 1875, 1880.

The top bracket is not the only one concerned. Many corporations have 'made it' to other high-income brackets, as well. These include the then-paper manufacturer Nokia, which paid 19,000, 68,000 and 52,000 FIM in dividends in 1871, 1876 and 1880, respectively. This means that the company has easily been part of the top 1 percent of all tax units (for example, 896 units in 1871) included in the statistic. Although the obvious limitation of the industrial corporation data is the exclusion of other prominent corporations, such as banks, these can be later on included in the data from other sources. Although it is probably impossible to account for all corporations for the lack of financial statements or other relevant data, even this early exercise demonstrates the potential impact of corporations on income shares and inequality metrics, should they remain unaccounted for.

Table 2 shows the top 1 percent's taxed income share using three different definitions. The first row ('Top 1% share (total, unadjusted)') shows the group's share unadjusted for missing households below the 500 FIM threshold. The second row ('Top 1% share (*minus* corporations, unadjusted)') shows the income share without industrial corporations' dividends. Although these share estimates do not account for all corporations' dividends, they should be considered as a minimum adjustment, subject for revision, as data on additional corporations' (e.g. banks and trading rooms) dividends are covered in future research. The third row ('Top 1% share (total, adjusted) to GDP') divides this share with the historical current price GDP estimates, as in Vattula (1983). The fourth row ('Top 1% share (total, adjusted)') shows the group's share adjusted for missing tax units below the 500 FIM threshold. The fifth and sixth rows give these same estimates without the aforementioned corporations' interference. Finally, the seventh and eighth rows give the adjusted income averages within the top 1 percent, both with and without corporations.<sup>21</sup>

<sup>21</sup>In this method, the unadjusted share of a fractile (e.g. the top 1 percent) is multiplied by  $(1 + c)^{1-1/\alpha}$ , where  $c$  is the share of missing income units (here: households) and  $\alpha$  is the Pareto coefficient of the top 10 percent, estimated using the `powerLaw` package in **R**. The level of income in a fractile (that is, its lower threshold) is adjusted by a factor  $(1 + c)^{1/\alpha}$ .

	1865	1871	1876	1880	Note
Top 1% share (total, unadjusted)	11.3%	9.4%	10.1%	12.8%	
Top 1% share (total, adjusted)	17.0%	14.9%	15.3%	19.1%	Using Atkinson's (2007) method
Top 1% share (total, adjusted) to GDP	6.4%	4.2%	5.1%	6.7%	GDP figures from Vattula (1983)
Top 1% share ( <i>minus</i> corporations, unadjusted)	9.9%	7.4%	9.4%	10.9%	
Top 1% share ( <i>minus</i> corporations, adjusted)	14.9%	11.9%	14.3%	16.4%	Using Atkinson's (2007) method
Top 1% share ( <i>minus</i> corporations, adjusted) to GDP	6.3%	3.3%	4.7%	5.7%	GDP figures from Vattula (1983)
Top 1% average (total, adjusted)	21,059	13,571	16,225	16,301	Using Atkinson's (2007) method
Top 1% average ( <i>minus</i> corporations, adjusted)	20,867	10,669	15,065	13,744	Using Atkinson's (2007) method

Table 2: Top 1 percent's share and average taxed income (FIM), with and without corporations in 1865, 1871, 1876 and 1880. Source: Statistical Office of Finland, 1869, 1875, 1880, 1885, Bank of Finland archives. Note: the data are only adjusted for industrial corporations in Alho's data at the Bank of Finland archives. It should thus be considered only a partial adjustment, as many corporations, such as banks, are still left unaccounted for.

These estimations show quite clearly that corporations have exerted a meaningful impact on the top 1 percent's share even in these early years. Although corporations grew in popularity especially in the 1890s and early 1900s—a period poorly covered in the data—the few major corporations in Finland at the time (e.g. Finlayson, Tampereen Pellava- ja Rautatehdas, Forssan Puuvilla) have paid enough dividends to produce a marked decrease in the group's share estimates. In 1865, the estimates adjusted for both the missing tax units and the GDP falls by 0.1 percentage points. This difference grows to 0.9 percentage points in 1871, decreases again to 0.4 percentage points in 1876 and finally rises to 1.0 points in 1880. Although Table 3 shows that the difference becomes much greater by the turn of the century, most likely driven by the growing popularity of corporations (K. O. Alho, 1949, pp. 210–211), it is quite possible that the inclusion of additional corporations, such as banks, would decrease these share estimates even further. At these levels, it is easy to see that the top 1 percent's share does not appear to have been exceptionally high between 1865 and 1880. On the contrary, these estimations suggest that they have been quite low.<sup>22</sup>

Table 3 shows some of the effects of tax unit heterogeneity and lack of data coverage using the municipal tax records compiled by Hjelt & Broms (1904; 1905). The figures are weighted averages using the shares of rural and urban households of the their total (with or without corporations) as weights. It can be easily seen that the difference between the total and corporate average incomes is quite high, around 32 to 1. Therefore, once corporations are subtracted from the data, the average income decreases by around 200 FIM. Without Atkinson's (2007) adjustment for missing income units, the top 1 percent's taxed income share falls accordingly, from around 34.1 percent to 26.1 percent, once we subtract the corporations from the data. Dividing this with the GDP yields a 9.3 percent share, a 24.8-percentage point drop in its level. Including the corporations, the top 1 percent's share is quite high at around 42.7 percent. It falls to around 32.1 percent once corporations are again removed from the data. When the top 1 percent's share is finally compared to the Finnish GDP, it decreases further to 12.8 percent.<sup>23</sup> The Gini coefficients, unadjusted for missing income units (in this case, tax units), show a more modest decline from around 0.587 to 0.532, once corporations are removed from the data.

<sup>22</sup>The low number of dividend-paying corporations and cessations of annual dividend payments produce some fluctuation in these estimates. As a general rule, Finnish corporations became much more stable dividend payers after the turn of the century. In the late 19th century, it was not uncommon for them to initiate and cancel these payments in a seemingly abrupt manner.

<sup>23</sup>Some researchers, including Roikonen and Heikkinen (2020), are critical of using the GDP as a denominator or scalar for income shares. If one would be measuring inequality only in terms of the distribution of money income, this would indeed hold true. If one aims to estimate inequality in broader terms (i.e. as a potential access to the society's total produce), the GDP is more fitting. Still, the fact that historical GDP estimates 'impose' recorded prices on non-marketed volumes of output presumably inflates these estimates to a degree. This criticism has been voiced previously in this article.



Variable	Estimate	Note
Average (total)	1,077 FIM	
Average (corporations)	34,792 FIM	
Average ( <i>minus</i> corporations)	880 FIM	
Top 1% share (total, unadjusted)	34.1%	
Top 1% share ( <i>minus</i> corporations, unadjusted)	26.1%	
Top 1% share ( <i>minus</i> corporations, unadjusted) to GDP	9.3%	GDP figures from Vattula (1983)
Top 1% share (total, adjusted)	42.7%	Using Atkinson's (2007) method
Top 1% share ( <i>minus</i> corporations, adjusted)	32.1%	Using Atkinson's (2007) method
Top 1% share ( <i>minus</i> corporations, adjusted) to GDP	12.8%	GDP figures from Vattula (1983)
Gini (total)	0.587	
Gini ( <i>minus</i> corporations)	0.532	

Table 3: Example on the effects of adjustment: top 1 percent's income share and Gini coefficients in 1900. Source: Anthony. B. Atkinson, 2007; Hjelt and Broms, 1904, 1905; Vattula, 1983. Note: the figures are weighted averages using the relative tax unit populations in Hjelt & Broms (1904; 1905) as weights.

Dividing the income shares of all income brackets, such as percentiles, with the GDP would be pointless. After all, it would leave the relative income shares the same, simply lowering their levels. The use of the GDP as a denominator or scalar thus rests on the assumption that money incomes have been more dominant at the top of the distribution than towards the bottom. In other words, the top 1 percent's taxed income share is more representative of this group's access to the society's produce than that of lower brackets, such as the bottom 25 percent. Continuing this adjustment downward would thus necessitate estimations on the ratio of money income to the total produce accessible to the individuals in the given brackets. Hence, dividing the top 1 percent's share with the GDP ostensibly yields a more accurate picture of its share than in the case of lower brackets. Additional data is needed in order to assess the distribution of the GDP among the total population.

As tables 2 and 3 have shown, corporations' dividends have become much more prominent towards the end of the 19th century *vis-à-vis* households' taxed income, although they should be accounted for in the earlier years, as well. Figure 3 illustrates this by presenting industrial corporations' dividends in 1842–1938. From 1920 onward, the issue disappears due to the publication of the revised income and wealth statistics by the Statistical Main Office (OSF IV:B). Nonetheless, certain observations such as the data on the 1916 surtax on large incomes need to be adjusted for the presence of corporations, as their dividend pay-outs grew significantly during WWI and its aftermath. These dividends are partially captured by the income and wealth tax statistics from 1920 onward, as individuals have owned a major share of these dividend-paying corporations well into the 20th century. This may also partially explain the growth in the top 1 percent's taxed income share in the 1920s relative to the turn of the century.

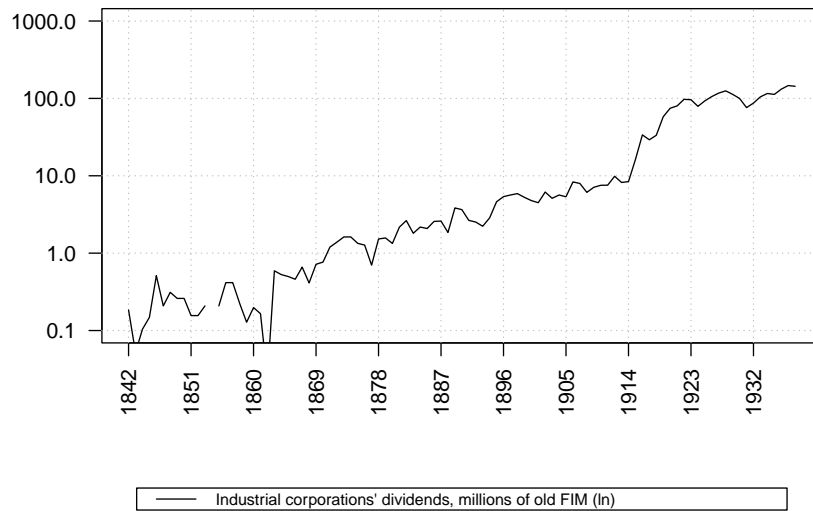


Figure 3: Industrial corporations' dividends in Finland, 1842–1938 (millions of old FIM). Source: Bank of Finland archives. Note: the data are in logs.

As in the case of distributional national accounts, or DINA (for example, Garbinti, Goupille-Lebret, and Piketty, 2018), the question of interest is, how representative is the observable distribution of income of missing income. For example, the guideline of DINA published by the World Inequality Database (WID) assumes that the observable distribution of, say, dividends, is representative of missing income items, such as undistributed profits (Alvaredo et al., 2021, pp. 54, 55). In many cases, this is probably a valid assumption. In the case of capital and property income (dividends, interest, rents, royalties, etc.), it is indeed reasonable to assume that the observed distribution of taxable or taxed items, such as the aforementioned dividends, is good enough a proxy for these missing items. In the case of these early consent and municipal tax records from the late-19th and early-20th century Finland, this could imply that the distribution of the corporations' distributed profits would match that of other items, were the data detailed enough for such an exercise. As the records do not separate between income items, the second best solution would be to assume that the distribution of the corporations' dividends matches that of the taxed income as a whole. Given the fact that foreign ownership accounted for only a modest share of the Finnish corporations' capital in the late 19th and early 20th century, the bias would ostensibly be small (Heikkinen and Hjerpe, 1986, p. 49). Another important question in the DINA framework is, can one use the share estimates obtained from tax record data when the GDP is for a large part a product of 'as if' pricing of output, particularly agricultural produce.<sup>24</sup> This issue is particularly important in the late 19th century, but remains a noteworthy issue well into the 20th century, as well. For example, top taxed income shares are likely more representative of high-income tax units' access to the social product than those towards the bottom due to previously mentioned factors such as wages in-kind. There is thus a need for estimations of a so-called commodity share of GDP, i.e. the share of the social product which has been sold in the market. Although the historical late-19th and early-20th century GDP estimates are well suited for gauging top tax units' share of the total produce (whether correctly monetised or not), they are hardly suitable for estimating the taxable or fiscal income shares of these units or brackets for the same reason. The total income of the Finnish population in money terms has probably been well below the partially monetised GDP in producer or market prices, that is, in production terms.

Although these adjustments could result in more precise estimates of the 'true' distribution of income among households, there

<sup>24</sup> According to Viita (1966, p. 22), on whose work the historical GDP time-series are partially founded upon in Finland, the use of producer and market prices for non-marketed outputs can have a detrimental effect on the meaningfulness of the estimates thus obtained.

are other, more profound issues at stake. These boil down to the aforementioned fact that only a minority of the households have been represented in the municipal tax records from 1899 and 1900, not to mention the consent tax data between 1865 and 1880. This is exemplified by the relatively low top 1 percent share figure one obtains in Table 3, when the adjusted share is divided by the GDP. If the observable distribution of taxed income could act as a proxy for missing income—either due to under-reporting, tax evasion or gaps in the tax base—this would mean that the local tax boards would have severely, and systematically, underestimated the taxable households' incomes also at the very top of the distribution. The data may certainly be subject to certain bias (e.g. the boards treating certain households in favourable terms). However, the fact that the tax rates during the time were quite low especially at the top, and the tax base was quite narrow for many items, such as dividends and interest, could imply that such systematic biases would be less of an issue than, for example, in the post-WWII years when statutory and effective tax rates were much higher. In addition, as the the households' taxes were mostly determined by the tax boards and self-reporting became increasingly unpopular over time (Statistical Office of Finland, 1875, p. 10), this could imply that the tax-paying households mainly consented with the tax boards' assessments. This could also suggest that the low tax rates meant that even cases of over-taxation, whether systematic, slightly biased or random, did not bring about significant discontent about the boards' decisions. Thus, as over-taxation cannot be excluded alongside the more probable case of a downward bias in the boards' assessments, it is unclear to what degree the observable distribution of taxed income is representative of the missing income items implied by the significant drop in the top 1 percent's share, as it is divided by the GDP. Furthermore, as the majority of the Finnish households have been less reliant on money incomes during the predominantly agrarian years of the late 19th and early 20th centuries, it is unlikely that a DINA-style readjustment of the share estimates and inequality metrics would necessarily bring us any closer to the 'true', underlying distribution. Instead, the significant differences in the top 1 percent's share in Table 3 is perhaps more a testimony to the fact that the GDP itself monetises volumes of output which have not been sold in the market for money. Therefore, the GDP itself, in a way, monetises and aggregates wages and other forms of income in-kind, as well as produce with has been subjected to direct consumption by the producers. It acts as a yardstick against which less aggregated, monetised income estimates can be measured. As only a part of the Finnish GDP has been actually sold in the market as commodities, estimating an actual 'commodity GDP' could be useful for estimating the limits of the tax brackets' income in both the consent and the municipal tax records. An additional obstacle is the fact that the historical national accounts in Finland (e.g. Hjerpe, 1988) have been constructed using the so-called production method which, for the reasons mentioned previously, do not account for the said monetisation.

Another major issue is the tax base. As noted by the Statistical Office of Finland (1875, pp. 11, 12), the base was quite uneven both in terms of geography (i.e. some municipalities producing high tax yields relative to their estimated base, and vice versa) and income items. Wage labourers, in particular, seem to have covered more thoroughly by the consent tax than other social groups. Hjelt and Boms (1904, p. 7) note furthermore that the municipal tax boards may have been biased towards the poor, subjecting them to lower taxes than stated in the law. In terms of capital income, the base was quite narrow, apart from real estate and other fixed property. This phenomenon persisted in Finland well into the late 20th century, for it was not until major tax reforms in the late 1980s and early 1990s that the base expanded to cover almost all individuals' capital income. It is difficult to tell whether the relative narrowness of the tax base and the local tax boards' biases exaggerate or downplay income inequality during the late 19th and early 20th centuries. It is also hard to say whether this effect changed over time. The lack of sector-level GDP data, lack of detail in the consent and municipal tax records (i.e. no separation between wages, capital income and transfers) and the 'as if' character of the historical GDP estimates mean that DINA-style share estimations are, unfortunately, out of question at this stage. An important step forward would be to estimate the 'commodity share' of the GDP in order to scale the level of inequality in terms of income. This would act as a point of comparison to the current, social product type estimations which have used the GDP estimates to gauge the top 1 percent's potential access to the domestic product in a given year.

## 4 Results

This section shows new estimates of the top 1 percent's taxed and taxable income shares in 1865–1959. Although the analysis of the potential causes for the observed shifts is only at a very preliminary stage, some candidate variables are touched upon. Although the data are quite sparse as regards to the periods 1881–98 and 1901–19, some overall trends can nonetheless be discerned

and discussed in relation to previous findings and broad theories of changing inequality (e.g. the Kuznets hypothesis and Marx's immiseration thesis).

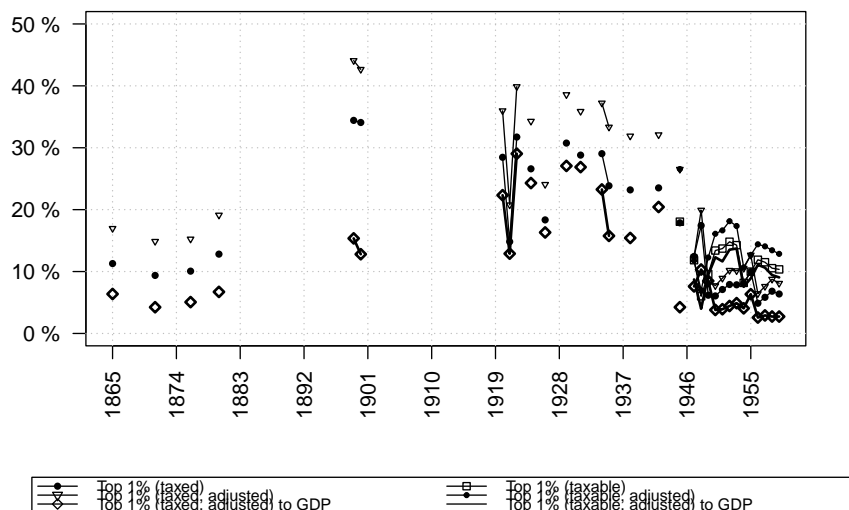


Figure 4: Top 1 percent's taxed and taxable income shares in Finland, 1865–1959. Source: Hjelt and Broms, 1904, 1905; Statistical Office of Finland, 1869, 1875, 1880, 1885; Vattula, 1983; Bank of Finland archives; OSF IV:B. Note: the 1865–80 observations do not account for the presence of all corporations with dividends above the 500 FIM threshold. The 1899 and 1900 observations are from Hjelt and Broms' (1904; 1905) municipal tax records and are presented as weighted averages of rural and urban tax units' shares using the number of tax units in rural and urban data (excluding corporations) as weights. The data from 1920 onward are from The Statistical Main Office's (Statistics Finland) income and wealth statistics (OSF IV:B).

Figure 4 presents time-series for the top 1 percent's taxed and taxable income shares in consent, municipal and income and wealth statistics in 1865–1959. The later data are available from 1945 onward in the published statistics (OSF IV:B). There are three series for each concept of income. The first series, 'Top 1% (taxed)' is the fractile's unadjusted share. That is, the majority of missing tax units (due to the 500 FIM threshold) are unaccounted for. The second series 'Top 1% (taxed, adjusted)' accounts for these missing units using Atkinson's (2007) method. The third series, 'Top 1% (taxed, adjusted) to GDP' takes this series and divides it with the historical GDP estimates in Vattula (1983). As mentioned, the 1899 and 1900 observations of this third series also account for corporations. The result of this adjustment is clearly visible in the level of these two observations *vis-à-vis* the former two. Given the difference, subtracting corporations from the consent tax data (1865, 1871, 1876 and 1880) would ostensibly leave their level even lower. The latter three series provide the same data for taxable income in 1945–59. As the income and wealth statistics distinguish between corporations and individual or household tax units from 1920 onward, the data are more representative of these latter two units than before. From 1952 onward, the tax unit in these published statistics has been the individual. Before this, tax units (i.e. individuals, jointly taxed married couples and their children, jointly self-employed couples) below the lowest threshold in state taxation have been included in 1949. This lessens the need for adjusting the income brackets' shares for excluded tax units (Jäntti et al., 2010, Table 8A.9 (p. 432)).

These early estimations show that the level of income inequality in late-19th century Finland has been relatively low in comparison to the 1920s and 1930s, when measured with the top 1 percent's taxed income share. Although these estimations do not fully ac-

count for heterogeneity in tax units and income, they are more in line with the Kuznets hypothesis (Kuznets, 1955) than previous studies (e.g. Hjerpe and Lefgren, 1974; Roikonen and Heikkinen, 2020). That is, relative income inequality appears to have grown alongside industrialisation and urbanisation. From the late 1920s onward, inequality seems to have diminished, albeit unevenly, towards the late 1950s. These results do not imply that the causes attributed by Kuznets would be correct as such. However, they do suggest that growth in industrial production, capital and proletariat would have been related to a growth in productivity, surpluses and top incomes. Whether this income has then been capitalised or consumed privately, is of secondary importance. What these tentative results show is the share of the domestic product accessible to households—and, unfortunately, at this stage also by many corporations between 1865 and 1880—has grown during industrialisation. There are obvious gaps in the time-series. Thus, we cannot say anything definite about long-term trends in inequality in the 1880s–90s and 1900s–10s. Still, a preliminary inspection of the level of inequality shows that it does not appear to have been particularly high *before* widespread industrialisation and urbanisation, rather on the contrary. Put differently, transition to capitalism did not bring about more equality, but initially resulted in growing income differentials. Transition to capitalism was not a ‘great leveller’—perhaps in part for the reasons described earlier in this article.

Why the top 1 percent’s share grew from the 1860s until the 1920s? Although the data is quite sparse at this point, some early assumptions can be made. From 1871 to 1899–1900, the growth appears to have been relatively gradual. Although the data is missing for the early 1900s and WWI in particular, it may well be that the growth in industrial production, productivity and prices (especially during the Great War) have contributed to the change. Unlike in WWII, the state did not engage in comprehensive price regulation, which enabled producer and market prices to climb rather rapidly *vis-à-vis* costs. A decline in these prices during the Great Depression, on the other hand, may have contributed to the decline in the late 1920s and 1930s, although some costs, such as wages, were relatively ‘flexible’ in Finland in comparison to other countries, like Sweden (Forssell, 1979, pp. 36–37; Viita, 1966, p. 29; Heikkinen and Lundh, 2020, pp. 157, 163, 167). Another factor may have been profitability. Although the data on is quite anecdotal at this stage, profitability may have been relatively high in many industries prior to WWI (e.g. K. Alho, 1968, pp. 30–31). There is also evidence of a simultaneous peak in merchant profits, much due to war-time price increases in 1915–7. During WWII, neither prices nor profits seem to have risen as significantly, which is probably a testimony of the effectiveness of price controls during this conflict (Forssell, 1979, p. 40). Indirect evidence on profitability is the fact that the demand for debt was relatively modest in Finland, as most companies were able to meet their capital requirements by means of retained profits or private loans arranged by wealthy merchants, industrialists and civil servants. Corporations, or joint stock companies, were legalised in 1864. They did not become popular, however, until the 1890s and early 1900s. By 1913, corporations had surpassed other business entities in popularity, although this does not tell much about their relative size (K. O. Alho, 1949, pp. 201, 210–211.) Indirect evidence of major industrial corporations’ reliance on equity, or self-funding, in the late 19th century has also been presented in Figure 2.

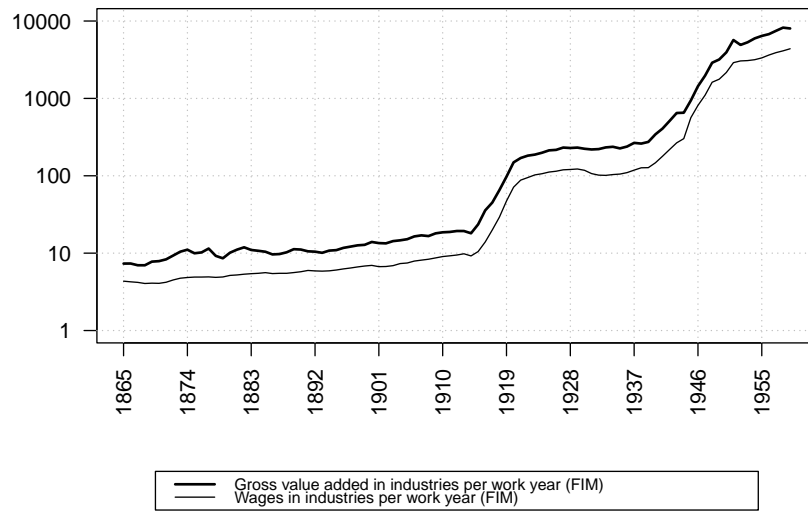


Figure 5: Gross value added and wages per work year in industries, 1865–1959 (FIM). Source: Hjerppe, 1988; Statistics Finland, 2021. Note: the series are in logs.

How does the top 1 percent's share relate to other measures of inequality? One obvious candidate is the Gini coefficient. Despite its well-known limitations (e.g. Chu and Wang, 2021, pp. 1, 2–3; Cowell, 2011, pp. 26–27; Uusitalo, 1989, p. 27), the coefficient remains popular and thus worth estimating. Figure 6 shows the Gini coefficients of taxed and taxable income in Finland between 1865 and 1959. Although the data are not wholly homogeneous—both tax units, coverage of units below a given threshold and the tax base have changed over time—the observations show a significant growth in inequality between 1880 and 1899, after which changes appear to have been relatively modest. These results are partially in conflict with the top 1 percent's share series in Figure 4 for the 1930s–50s. Although these differences may partially be explained by different methodologies and measures of inequality, they may also reflect certain changes in inequality not captured by the top 1 percent's share.<sup>25</sup>

<sup>25</sup>As Figure 4 shows, the different definitions for the top 1 percent's share do not alter the trend as much as they alter the level. This means that the definitions themselves do not seem to affect the observed trend.

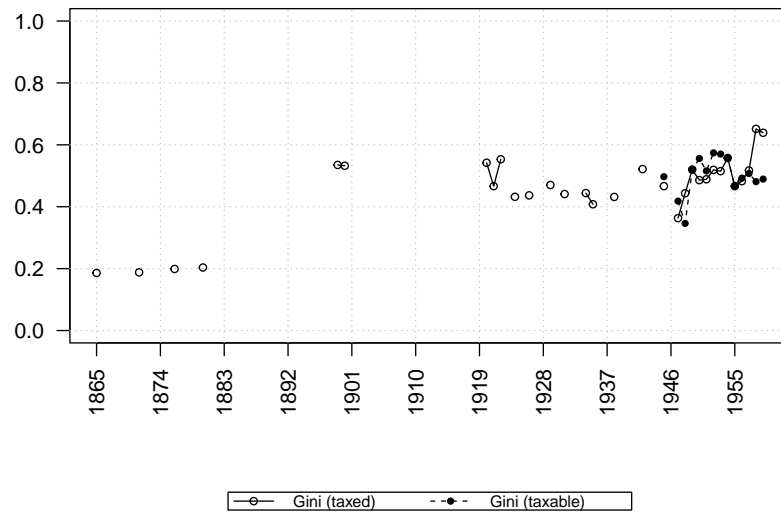


Figure 6: Gini coefficients, taxed and taxable income in Finland, 1865–1959. Source: Hjelt and Broms, 1904, 1905; Statistical Office of Finland, 1869, 1875, 1880, 1885; OSF IV:B. Note: the coefficients have not been adjusted for missing tax units below the bottom threshold, nor to GDP. Corporations have, however, been accounted for between 1865 and 1900.

The relative stability of the Gini coefficient(s) may be explained by an increase in the share of middle-class taxpayers *vis-à-vis* those at the top and bottom of the distribution. This is shown in Figure 7, which presents the shares of the bottom 50 percent, top quartile minus the top 1 percent (top 25–2%) and the top 1 percent. The data from 1865 to the late 1930s exhibits a sort of a convergence with the brackets' shares almost matching each other in level terms. From WWII onward, the middle class (understood here as the top quartile minus the top 1 percent's share) has seemingly gained at the expense of both those at the bottom half and those within the top 1 percent. These simultaneous shifts may help to explain the stationarity of the Gini coefficient.

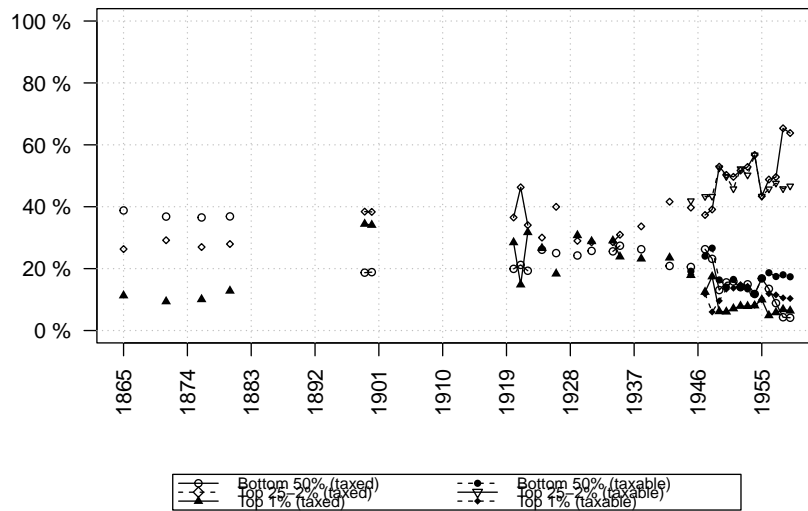


Figure 7: Taxed and taxable income shares, different brackets in Finland, 1865–1959. Source: Hjelt and Broms, 1904, 1905; Statistical Office of Finland, 1869, 1875, 1880, 1885; OSF IV:B. Note: the bracket shares have not been adjusted for missing tax units below the bottom threshold (e.g. 500 FIM), as this would increase the total distribution share above unity. What is shown instead are the relative shares of each bracket, not accounting for the missing tax units below the said thresholds.

Has the observed growth in income inequality been a Kuznetsian phenomenon? In other words, has a growing rural–urban income gap brought about an increase in overall inequality, either for reasons discussed by Kuznets (1955) himself, or for other reasons, such as the growth in top income shares? Table 4 compares the level and development of inequality in rural and urban municipalities between 1865 and 1900. The table presents the average incomes, top 1 percent’s shares and the Gini coefficients, as well as the number of tax units and the over-representation of urban *vis-à-vis* rural municipalities. Although the latter figures are not directly commensurable—the table compares tax units to individuals in the bottommost two rows—the relative poverty of rural Finland is quite apparent nonetheless. The Gini coefficient cannot be decomposed by population subgroup if there is overlap between them (e.g. some rural households have had a higher level of income than their urban compatriots). However, this is not an issue when one measures inequality within a given subpopulation, as is the case in Table 4.



	1865	1871	1876	1880	1899	1900
Total average <sup>a</sup>	1,030 FIM	810 FIM	940 FIM	754 FIM	1,152 FIM	1,114 FIM
Rural average	492 FIM	410 FIM	460 FIM	371 FIM	837 FIM	821 FIM
Urban average	4,101 FIM	2,871 FIM	3,001 FIM	1,661 FIM	2,480 FIM	2,537 FIM
Top 1%, total (unadjusted)	11.3%	9.4%	10.1%	12.9%	34.4%	34.1%
Top 1%, rural (unadjusted)	5.8%	6.5%	6.4%	6.8%	31.8%	31.7%
Top 1%, urban (unadjusted)	7.7%	7.1%	8.6%	19.2%	45.3%	46.4%
Gini, total	0.201	0.205	0.204	0.226	0.535	0.532
Gini, rural	0.378	0.432	0.423	0.476	0.568	0.568
Gini, urban	0.235	0.322	0.332	0.362	0.676	0.683
Tax units, total	80,517	89,579	126,039	141,749	434,612	465,284
Tax units, rural	68,938	75,260	102,634	111,699	363,301	389,567
Tax units, urban	11,579	14,319	23,405	30,050	71,370	75,717
Urban, share <sup>b</sup>	14.4%	16.0%	18.6%	21.2%	16.4%	16.3%
Urban population share <sup>c</sup>	6.7%	7.5%	7.9%	8.4%	12.2%	12.5%

Table 4: Rural and urban inequality in Finland, 1865–1900. Source: Hjelt and Broms, 1904, 1905; Statistical Office of Finland, 1869, 1875, 1880, 1885; Vattula, 1983. Note: there are slight methodological differences in estimating the rural and urban income shares and Gini coefficients. The bottom threshold (500 FIM) does not apply to the rural municipalities, as the estimated total average falls below this figure. See Appendix for methodological details. The top 1 percent's shares have not been adjusted to tax units below the 500 FIM threshold. <sup>a</sup> The 1899 and 1900 figures are weighted averages using the rural and urban tax unit shares as weights. <sup>b</sup> Share of tax units in towns and cities. <sup>c</sup> Share of population in 'urban communes', as in Vattula (1983).

Unsurprisingly, the average income in urban municipalities has exceeded the rural for each and every year. Although this does not directly translate to a higher standard of living due to cost and price differentials between urban and rural localities, it is clear that the level of income in towns and cities has been much higher than in the countryside. The top 1 percent's share seems to indicate a higher level of income inequality within urban municipalities than in rural regions. Interestingly, the Gini coefficients, although not directly commensurable, indicate a higher level of inequality within urban municipalities for the years 1865–80. In the Hjelt and Broms (1904; 1905) data for 1899 and 1900, this situation is reversed, although these figures, either, cannot be taken as direct evidence of a definite change in rural versus urban inequality. Nevertheless, income inequality seems to have risen in both rural and urban municipalities over the period.

## 5 Discussion

The rise of modern statistics have coincided with the emergence of the capitalist mode of production (Cook, 2017, p. 5). To project these methods and metrics back in time may miss the historical uniqueness of the capitalist transition which took a decisive turn in England during the 18th century and in many other countries during the 19th and 20th centuries. The same goes for income inequality—inasmuch as income has been much less significant a category for the vast majority of the populace throughout most of the Finnish history before the 1900s. This does not mean that the utilisation of inequality metrics, such as income shares and Gini coefficients would be erroneous. What they necessitate, however, is contextualisation. The Finnish society in the late 19th century cannot be directly compared to that of the 21st using the same metrics, although homogenising them as extensively as possible is necessary to draw at least some comparisons in time. This article has engaged in this very exercise in order to improve the usefulness of the current metrics social inequality in economic and social history.

Social inequality, measured by the top 1 percent's income share and the Gini coefficient, seems to have increased from the early 1870s to the 1920s. At this early stage, it is difficult to tell whether these changes have stemmed from immiseration à la Marx—i.e. the growth of the landless population, those dependent on poor relief and public works—or whether the growth and develop-

ment of industries have yielded growing surpluses to the benefit of the wealthiest.<sup>26</sup> Perhaps a realistic yet unexciting answer would be both.

In terms of the Kuznets hypothesis, it seems that the growth in inequality between 1880 and 1899–1900, as measured by the Gini coefficients depicted in Figure 6, was due to a growth in the share of the top 1 percent, not a growing rift between the urban and rural segments of the population, although the tax units in the top 1 percent have been predominantly urban. The few observations from the late 19th and early 20th century support the idea that inequality was ascendant during this period. However, the *level* of inequality appears to have been relatively low by 20th century standards, even if the trend was rising. Coupled with widespread poverty, malnourishment, hunger and disease, even these relatively low levels of inequality may have contributed to the emergence of the crofter movement, the labour movement and political organising among peasants and, subsequently, the bourgeoisie as well. Thus, although relative income inequality may have been fairly low especially in the 1860s–80s, it may have had a greater social impact due to the fact that a larger share of the population was closer to the subsistence level than since. One major issue with the Kuznets hypothesis is the fact that many industries in Finland emerged in the countryside. As these industries were predominantly owned by industrialists, merchants, artisans, public officials and soldiers who resided in towns and cities, a stark distinction between urban–rural productivity differentials may be out of question.

From Piketty's viewpoint, the 'vagaries of technology' have certainly been at play during the decades of rapid industrialisation in the late 19th and early 20th centuries. As in the case of the potential endogeneity of urban productivity *vis-à-vis* the countryside, it is difficult to say much about the inequality-preventing and promoting institutions and his 'fundamental laws' in this context. The consent and municipal tax data do not allow for an estimation of redistribution, as they lack information on pre- or after-tax income in different income brackets. Given the relatively low coverage of the tax base as well as the low marginal rates in the consent tax schedule in 1865–85, it is unlikely that either the consent tax or the municipal tax would have resulted in significant redistribution during the period (e.g. Wikström, 1985, p. 18). As in many other countries, the Great War of 1914–8 brought about a significant increase in statutory and effective tax rates in Finland. This resulted in a tremendous growth in the fiscal importance of the income tax, as well as an ostensible steepening in tax progression and a cut in top income shares in the late 1910s and early 1920s. A one-off wealth tax brought an additional shock on top incomes in 1918 (Wikström, 1985, pp. 92, 93, 97–98). Although war-time inflation brought about a phenomenon known as 'bracket creep' (i.e. a rise in nominal incomes resulting in an increase of tax rates in the absence of inflation checks to income thresholds) which ostensibly increased the taxation of poorer households, as well, it may well be that the 1920s peak in the top 1 percent's share (see Figure 4) and the levelling off of the Gini coefficient have been, to some degree, a result of income taxation. In this sense, there may be some truth to Roikonen and Heikkinen's (2020) depiction of the phenomenon as a 'Piketty fall', although an increase in the share of the 'middle class', defined here as the top quartile minus the top 1 percent, seems to have maintained a relatively stable level of inequality throughout the interwar years, WWII and the immediate post-war era.

This article's findings are but an early step toward understanding the change in societal inequality in Finland during the 19th and 20th century. Not only are there additional tax and corporate data to be analysed (e.g. the 1916 surtax records and banks' financial statements), but also conceptual work in terms of the social relevance of monetary income distribution as a measure of inequality especially in the late 19th and early 20th century Finland. It may well be that widespread poverty has limited the scope of inequality in this sense during the opening decades of the study period. At the same time, a lower level of income inequality may have had greater social consequences than, say, after WWI or WWII. The predominance of compensation in-kind, or non-pecuniary payments (for example, in rye, barley and linen), a widespread phenomenon around Europe in pre-capitalist centuries (for example, Humphries and Weisdorf, 2019, pp. 2870, 2871) are an important factor when weighing the relative impact of money income on

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<sup>26</sup> The mechanism here could be the growing concentration and centralisation of capital in fewer companies and the related concentration of their ownership in the hands of merchants, industrialists, public officials, members of the clergy and other representatives of the capitalist class—in other words, the fact that the ownership of the means of production has become more rare (e.g. Cohen, Nagel, and Scanlon, 1980). A growth in absolute and relative surplus value (i.e. the lengthening of the working day and the intensification of labour) may have been the mechanisms through which a growing share of the value added has been appropriated by the companies as surplus value and gained by their owners and creditors as dividends and interest. This process of appropriation may have been curtailed by changes in the average rate of profit, although this is quite tenuous at this stage. Some factors which may have influenced the trajectory of this rate of profit and the top 1 percent's income share in the 1920s and 1930s are the eight-hour workday introduced gradually after a law passed by the parliament 1917, a loss of the Russian markets after WWI and the Great Depression.

societal inequality in a country which is transforming to an industrial capitalism. Thus, although this article has shown that income inequality seems to have risen in the late 19th and early 20th centuries, it is too early to make much of its *social* consequences as a whole. Therefore, future studies need to engage both in an improvement of the accuracy of income (and wealth) share and inequality estimates, but also in thorough conceptual work about the nature of inequality as a multifaceted social phenomenon in history, something which recent contributions to the World Inequality Database (WID) have striven for.

## Appendix: Estimating income shares from tabulated data

This appendix presents a detailed description of the methodology behind the income share estimates presented in the article, with a particular focus on consent and municipal tax records from 1865, 1871, 1876, 1880 and 1899–1900. Although these estimates are far from perfect, this appendix delves into some of the reasons why it may be reasonable to assume that the top 1 percent's taxed income share was not at a historical apex around the turn of the 20th century, but only in ascendancy.

Maanviljelijöitä. <i>Agriculteurs.</i>										Kaikki muut. <i>Tous les autres.</i>										Summa. <i>Total.</i>										Osake- ja pankki- yhtiöiden tulo. <i>Revenus des sociétés par actions.</i>									
Joiden vuotinen tulo teki <i>Avec revenu annuel</i>										Joiden vuotinen tulo teki <i>Avec revenu annuel</i>										Joiden vuotinen tulo teki <i>Avec revenu annuel</i>										Joiden vuotinen tulo teki <i>Avec revenu annuel</i>									
Summa henkiä. <i>Total des personnes.</i>										Summa henkiä. <i>Total des personnes.</i>										Summa henkiä. <i>Total des personnes.</i>										Summa henkiä. <i>Total des personnes.</i>									
500–1,000 mkkaa. de 500 à 1,000 mrcs.	1,000–5,000 mkkaa. de 1,000 à 5,000 mrcs.	5,000–10,000 mkkaa. de 5,000 à 10,000 mrcs.	10,000–20,000 mkkaa. de 10,000 à 20,000 mrcs.	20,000–50,000 mkkaa. de 20,000 à 50,000 mrcs.	500–1,000 mkkaa. de 500 à 1,000 mrcs.	1,000–5,000 mkkaa. de 1,000 à 5,000 mrcs.	5,000–10,000 mkkaa. de 5,000 à 10,000 mrcs.	10,000–20,000 mkkaa. de 10,000 à 20,000 mrcs.	20,000–50,000 mkkaa. de 20,000 à 50,000 mrcs.	500–1,000 mkkaa. de 500 à 1,000 mrcs.	1,000–5,000 mkkaa. de 1,000 à 5,000 mrcs.	5,000–10,000 mkkaa. de 5,000 à 10,000 mrcs.	10,000–20,000 mkkaa. de 10,000 à 20,000 mrcs.	20,000–50,000 mkkaa. de 20,000 à 50,000 mrcs.	500–1,000 mkkaa. de 500 à 1,000 mrcs.	1,000–5,000 mkkaa. de 1,000 à 5,000 mrcs.	5,000–10,000 mkkaa. de 5,000 à 10,000 mrcs.	10,000–20,000 mkkaa. de 10,000 à 20,000 mrcs.	20,000–50,000 mkkaa. de 20,000 à 50,000 mrcs.	500–1,000 mkkaa. de 500 à 1,000 mrcs.	1,000–5,000 mkkaa. de 1,000 à 5,000 mrcs.	5,000–10,000 mkkaa. de 5,000 à 10,000 mrcs.	10,000–20,000 mkkaa. de 10,000 à 20,000 mrcs.	20,000–50,000 mkkaa. de 20,000 à 50,000 mrcs.															
2	1	11	19	383	4,262	4,675	—	1	14	23	339	1,298	1,675	2	11	151	331	2,071	9,560	12,126	216	544	91	10	5														
—	5	15	672	6,260	6,952	—	4	16	198	633	851	—	3	79	251	2,047	8,646	11,026	122	502	84	10	3	—	—														
—	1	3	12	518	7,202	7,736	—	1	3	74	582	660	—	3	28	82	1,116	8,869	10,098	88	363	4	2	—	—														
—	1	9	24	641	14,954	15,629	—	10	13	152	798	973	2	6	87	205	1,677	17,187	19,164	357	240	52	3	2	—														
—	3	18	439	6,464	6,924	—	—	—	24	216	240	—	—	11	52	721	7,176	7,960	5	185	25	2	—	—	—														
—	4	437	5,831	6,272	—	—	1	—	27	175	203	—	2	15	41	806	6,656	7,520	12	176	48	3	—	—	—														
—	2	399	11,127	11,528	—	—	2	2	56	714	774	—	1	23	81	1,103	13,006	14,214	14	440	62	3	—	—	—														
—	3	369	4,853	5,225	—	—	1	5	59	432	522	2	2	29	70	888	6,339	7,330	11	149	29	2	—	—	—														
2	3	31	97	3,858	60,953	64,944	—	2	37	62	929	4,868	5,898	6	28	423	1,113	10,429	77,439	89,438	825	2,599	395	35	10														
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	10	18	80	32	141	—	—	—	—	—	—														
2	3	31	97	3,858	60,953	64,944	—	2	37	62	929	4,868	5,898	6	29	433	1,131	10,509	77,471	89,579	825	2,599	395	35	10														
—	—	—	3	12	15	—	—	—	2	34	56	601	1,733	2,426	4	22	336	739	4,210	9,149	14,460	483	599	109	33	8													
2	3	31	97	3,855	60,941	64,929	—	—	3	6	328	3,135	3,472	2	7	97	392	6,299	68,322	75,119	342	2,000	286	2	2														
2	3	31	97	3,858	60,953	64,944	—	2	37	62	929	4,868	5,898	6	29	433	1,131	10,509	77,471	89,579	825	2,599	395	35	10														

Figure 8: An excerpt from a published consent tax tabulation for 1871. Source: Statistical Office of Finland, 1875, Table 1 (pp. 92–93). Note: the tax was levied in 1872 on the grounds of the taxpayers' assessed income in 1871.

A first nation-wide income tax (*suostuntavero, bevilling*) was levied in the Grand Duchy of Finland between 1865 and 1885. A direct translation for this tax is 'consent tax'. The name refers to the fact that the tax was levied on the estates' consent, enabled by the convocation of the estates by tsar Alexander II in 1863. The tax was somewhat progressive, with the statutory marginal tax rates ranging from 0.8 percent for incomes above 500 FIM to 1.2 percent for incomes above 10,000 FIM. The tax rates and thresholds were retained throughout the period, which has subjected the taxpayers to at least some degree of 'bracket creep', that is, an increase in the tax rates in the absence of inflation checks.<sup>27</sup> This is visible in the growth in the number of tax units in the data, as their incomes have risen. The consent tax had to be renewed by the estates on a yearly basis. Its abolition was thus a passive process. The estates declined to renew the tax in 1885. It was not until 1920 that a comparable income tax was reintroduced and renewed since on a yearly basis until a new tax law in 1993 abolished the need for a yearly renewal.

The consent tax of 1865–85 aimed at the taxation of households. However, as mentioned previously in the article, the tax concerned also corporations (*osake- ja pankki-yhtiöt*) with regards to their dividends. Although few in number, the article has shown that their impact should not be dismissed as such. Although the data analysed thus far covers only a small part of the taxed cor-

<sup>27</sup> This phenomenon became much more prominent in the 20th century, in particularly during WWI and WWII in most warring countries, including Finland and Sweden (e.g. Henrekson and Stenkula, 2015, p. 13).

porations (for example, there were 45 such corporations in the 1871 data), the estimations already show an impact on the top 1 percent's share. The tax concerned only a relatively small number of households. In 1865, this figure was approximately 18.8 percent. In 1880, the figure had risen to 31.2 percent of the estimated number of households, as in Roikonen and Heikkinen (2020). The exclusion of the vast majority of households has boiled down on the relatively high income threshold of 500 FIM per annum. This has necessitated the use of the adjustment method introduced by Atkinson (2007) in order to account for the missing tax units.

The concept of income in these early years was taxed income. As the tax law did not include deductions, exemptions or imputations, the concept of taxed income was relatively close to more modern concepts of pre-tax or taxable income, insofar as the local tax boards were able to carry out accurate assessments of the tax units' income. Some authors, including Roikonen and Heikkinen (2020) and Voutilainen (2022) have emphasised the accuracy of these assessments, given the fact that the boards comprised of individuals supposedly well versed in the tax subjects' circumstances. This does not imply that there would not have been heterogeneity in the assessments. At this stage, it is hard to find evidence of any systematic biases in favour or to the detriment of certain tax units, although it is probable that the tax base was more complete for wages than, say, for rents. Regional differences may also have affected the effective tax rates to a degree.

The Statistical (Main) Office of Finland produced annual consent tax statistics for the taxed incomes in 1865, 1871, 1876 and 1880. The tabulations contain data on bracket thresholds (e.g. 10,000 to 50,000 FIM), the number of tax units within these thresholds (for example, 905 in the given bracket in 1865) by social group (among others, state officials, merchants, industrialists and peasants) by their primary occupation and their tax sums. As the data include also the marginal tax rates in each bracket, it is possible to weight these rates with the number of tax units in each bracket in order to arrive at an estimate on the average weighted marginal tax rate. The total sum of taxes can then be divided by this weighted average in order to obtain an estimate of the total sum of taxed income in the given year. This can then be divided with the number of tax units (80,517 in 1865) in order to estimate the average taxed income. For the year 1880, the data include sums of taxes paid by each income bracket.

The top 1 percent's share estimates have been obtained using a so-called generalised Pareto curve interpolation developed by Blanchet et al. (2017). This method is known for its suitability for the assessment of top incomes. By definition, a generalised Pareto curve comprises of inverted Pareto coefficients  $b(p)$  following the rank  $0 \leq p \leq 1$ , where  $b(p)$  is ratio between the average income above  $p$  and the  $p$ -th quantile  $Q(p)$  so that  $b(p) = E(X|X > Q(p))/Q(p)$ . Blanchet et al. note the usefulness of this method for historical tax records because the interpolation requires only relatively little information in order to produce share estimates. They also applaud the accuracy of the method, noting that its precision 'is such that it is often preferable to use tabulations based on exhaustive data sets rather than individual data from a non-exhaustive subsample of the population, even for subsamples considered very large by statistical standards.' For example, in the case of a 100,000-observation subsample, the mean relative error for the top 5 percent's share can be in the range of 3 percent, whereas the same for the tabulated data using the generalised Pareto curve interpolation can be as low as 0.5 percent with the difference increasing rapidly as one moves up the distribution. For the top 0.1 percent, the mean relative error can be as high as 20 percent in a 100,000-observation subsample, but as low as 4 percent in tabulated data using the given method (Blanchet et al., 2017, pp. 2, 3). Paretian interpolation methods have become the staple in historical income inequality research across the globe (e.g. A. B. Atkinson and Piketty, 2007; Anthony B. Atkinson and Piketty, 2010; Piketty and Saez, 2003). Although other tail-heavy distributions, such as the log-normal or Weibull distributions can also be used for similar interpolation purposes, the generalised Pareto curve interpolation seems to suit the purpose quite well.

In practice, the share estimates presented in this article have been produced using the `gpinter` package written by Thomas Blanchet for **R**. In particular, the function `thresholds_fit` has been used. This function requires data on percentiles, bracket thresholds, the average income within the distribution (obtained using the method described previously in this appendix) and, preferably, data on the bottom distribution threshold (in this case, 500 FIM) and the top bracket average or income share (100,000 FIM or above). As this data cannot be obtained straight away for 1865, 1871 and 1876, it has been estimated using the ratio of the top bracket average to the total distribution average in 1880 (i.e. 0.003) by dividing this average with the ratio. For the towns and rural municipalities, respective average ratios have been used.

Table 5 shows the data needed for the generalised Pareto curve interpolation for the year 1865.

Thresholds (FIM)	Tax units	Percentile (%)	Marginal tax rate (%)
500	1,000	60,941	75.69
1,000	5,000	17,512	97.44
5,000	10,000	1,369	99.14
10,000	50,000	662	99.96
50,000	100,000	28	99.99
100,000		5	100.00
	<b>80,517</b>		<b>1.00</b>

Table 5: An example of tabulated tax data in 1865. Source: Statistical Office of Finland, 1869, Table 1 (pp. L–LI). Note: the bottom row of the fourth column gives the weighted average tax rate using the number of tax units in each bracket as weights.

The total tax yield in 1865 was 668,828 FIM. Using the 1.00 percent weighted tax rate average, this produces a total income of 82,893,448 FIM as these figures' quotient. Given the number of tax units (80,517 in the given year), this results in an average income of 1,030 FIM per tax unit. The ratio of the total average income to the average in the top bracket in 1880 was 228,084 FIM to 754 FIM, or 0.003. This figure has been used to divide the 1,030 FIM average in 1865, thus obtaining a top bracket average of 343,333. Given that the consent tax data has comprised of a relatively small number of high-income tax units (i.e. the right-hand tail of the distribution), it is unlikely that the distribution average would be relatively close to the total population average.

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