



Income concentration in British India, 1885–1946



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ABSTRACT

We use a novel income tax data set to present evidence on the evolution of income concentration in the last 60 years of colonial rule in India. These data allow us to study the evolution of income concentration at the country level as well as the location of top income earners across provinces. We identify three key facts: (1) the evolution of income concentration in British India was nonlinear, following a U-shape, (2) the majority of top income earners were non-Europeans, and (3) the geographical location of top income earners changed over time with the province of Bombay gaining in importance in the early XXth century. We provide an interpretation of these results in the light of the economic and political changes in British India over the period.

[It is] no part of the functions of fiscal arrangements to equalize the conditions of men.

James Wilson, First Finance Minister of British India.¹

1. Introduction

Since Kuznets (1953), the evolution of income inequality in the process of economic development has attracted much attention in the economic literature. Recent studies have constructed series for shares of income accruing to upper income groups using income tax statistics (Atkinson and Piketty, 2007, 2010). However, most of these studies focus on developed countries. Some have analyzed income concentration in other settings, in particular in colonized countries, but their time horizons tend to be relatively short (Atkinson, 2011a,b, 2015a,b,c,d; Alvaredo et al., 2016). As a result, there has been little analysis of the evolution of income concentration under colonial rule over a long period, with the exception of Alvaredo and Atkinson (2010). However, the colonial administration of British India collected from very early on a vast array of statistics, and in particular income tax

statistics. In this study, we use the income tax reports published annually by the administration of each province to estimate the share of income accruing to upper income groups in colonial India between 1885 and 1946. Using income tax data we provide what is to our knowledge the first systematic analysis of the evolution of income inequality in British India in the late XIXth century and the first half of the XXth century. Because the income tax reports were published by each province, we also estimate the evolution of the distribution of top incomes across provinces between 1885 and 1946.

We identify three key facts that we put in perspective with the economic and political changes that took place over the period: (1) the evolution of income concentration in British India was U-shaped, decreasing between 1885 and 1920 and increasing until Independence; (2) in contrast with other colonies where most of the top income earners were Europeans (Atkinson, 2014; Alvaredo et al., 2016), in British India the majority of top income earners were non-Europeans; and (3) there were important changes in the location of top income earners over the period, with the province of Bombay gaining in importance at the expense of Bengal.

Our work contributes to several strands of literature. First, it adds to the top income literature (Atkinson and Piketty, 2007, 2010). It

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¹ As quoted in Banerjee (1930).

relates in particular to Banerjee and Piketty (2005, 2010) who use similar income tax statistics to study income concentration in India. However, their series start only in 1922. Second, our results contribute to the literature that aims at quantifying income inequality in colonial societies (Alvarado et al., 2016) and more particularly in British India (Maddison, 1971; Milanovic et al., 2011; Roy, 2007).² We improve on these studies by providing yearly estimates of income concentration in British India between 1885 and 1946. We also add to this literature by documenting the evolution of income concentration at the sub-national level, a topic that has received little attention both in British India³ or in any country studied by the top income literature.⁴ Third, we shed new light on the literature on the colonial origins of development. Engerman and Sokoloff (2002) argue that income inequality is a determinant of long-term development, while Acemoglu et al. (2001) argue that differences in colonial economic institutions resulted in divergences in economic development. Both analyses imply that the level of inequality within colonial societies is essentially stable, determined by factor endowments for the former and by political institutions for the latter. This is at odds with the important changes in income concentration that we observed in British India over the period.

The organization of the paper is the following. In Section 2, we describe the data sources, make particular reference to their limitations, and present the evolution of income concentration over the period. In Section 3, we interpret our findings in light of the economic and institutional changes of the period. In Section 4, we discuss the nationality of top income earners, and Section 5 presents the regional distribution of top income earners as well as our interpretation of this evolution.

2. Top income shares in British India

2.1. Data construction and hypothesis

Our analysis relies on the income tax tabulations published annually by each province of British India.⁵ Introduced first temporarily in 1860, the income tax was reintroduced in 1886 and has remained in place (with changes) ever since.⁶ It was initially a schedular tax, before becoming a tax on overall income (excluding income from agricultural activities) in 1922. We provide a detailed description of the history of the income tax in British India in Online Appendix 1, while the data and methodology used to compute the estimates are presented in Online Appendices 2–4.

The schedular income tax in place between 1886 and 1922 was by definition not levied on the total income of an individual, but on different sources, or schedules of income: salary, annuity, pension and

gratuity (schedule one); net profit made by a company (schedule two); interest on the securities of the Government of India (schedule three) and other sources of income, i.e. income from commerce, trade, property, learned professions, manufacturing and construction (schedule four). The fact that the tax was levied on a schedular basis means that using these statistics to assess income concentration requires a number of assumptions. Indeed, the related schedular income tax in place in the UK in the XIXth century intentionally prevented the calculation of a taxpayer's total income. For our estimation purposes, this could be problematic, in particular if some individuals had multiple sources of income (and were assessed under many or all the schedules), or if some individuals were assessed several times in the same schedule (and were thus counted multiple times).

To compute the distribution of income we rely on the following assumptions. First, we sum the number of taxpayers under schedule one and four by income ranges. Second, we sum the amount of tax collected under schedule one and four, also by income ranges, and estimate the amount of income by using the tax rate affecting each range.⁷ As a consequence, by assuming that no taxpayer is liable to both schedules one and four simultaneously, we are most likely underestimating the degree of income concentration. As long as this underestimation is constant over time, it will not affect our estimates of the trend. We can get a sense of the extent of this bias by comparing the difference in levels of income concentration before and after 1922, when the Indian income tax becomes a modern income tax applied to total income.⁸

A specific feature of the Indian income tax is the exemption of agricultural incomes.⁹ This is a relevant concern given the importance of agriculture in British India. However, some historical sources suggest that only a minority of top income earners were landowners and that they did not earn enough to significantly affect our estimates.¹⁰ Indeed, using social tables, Maddison (1971) shows that big zamindars and jagirdars (i.e. Indian very large landowners) constituted around 0.3% of the population and earned 3% of national income in 1938. These numbers imply that taking into account agricultural incomes could at most increase the share of the top 0.1% in total income from 8% (our estimate for 1938) to 11% in the very unlikely case of extreme inequality among large estate proprietors. To assess more systematically the impact of the exclusion of agricultural incomes on our estimates, we propose a simple accounting exercise in Online Appendix 5. This exercise shows that while the exclusion of agricultural incomes might bias our estimates downwards (income concentration could have been higher than what we estimate, due to the sheer size of the agricultural sector), the evolution of income concentration over time would remain unaffected, and may actually be reinforced.

² Maddison (1971) provides a description of the social structure of India at the end of British rule. Milanovic et al. (2011) use social tables for British India in 1947 and estimate that the Gini coefficient increased between 1750 and 1947 (their estimate of the Gini coefficient lie between 38.5 and 48.9 in 1750 and between 48.2 and 49.7 in 1947). Roy (2007) uses Atkinson (1902) national income estimate for 1875 and the first compilation of the national accounts in 1948 to estimate that the Gini coefficient decreased between 1875 and 1948 (his estimates of the Gini coefficient are 35 in 1875 and 30 in 1948).

³ Caruana-Galizia (2013) study the evolution of GDP per capita across British India provinces from 1875 to 1911, but do not measure income inequality per se. Roy (2014) uses a creative analysis based on tax revenues and public goods provision in 1908 to argue that regional income inequality is mainly driven by geographic differences.

⁴ Foellmi and Martinez (2014) and Sommeiller and Price (2014) study income concentration at the sub-national level. However, they look at income concentration within subnational units and not at the distribution of top income across space.

⁵ The income tax was only implemented in British India but not in the princely States, the latter representing around 20% of the population of India as a whole. We collected all the available income tax reports published by each province of British India between 1886 and 1947. We are grateful to Banerjee and Piketty (2005) for sharing their scans of reports from 1922 to 1946.

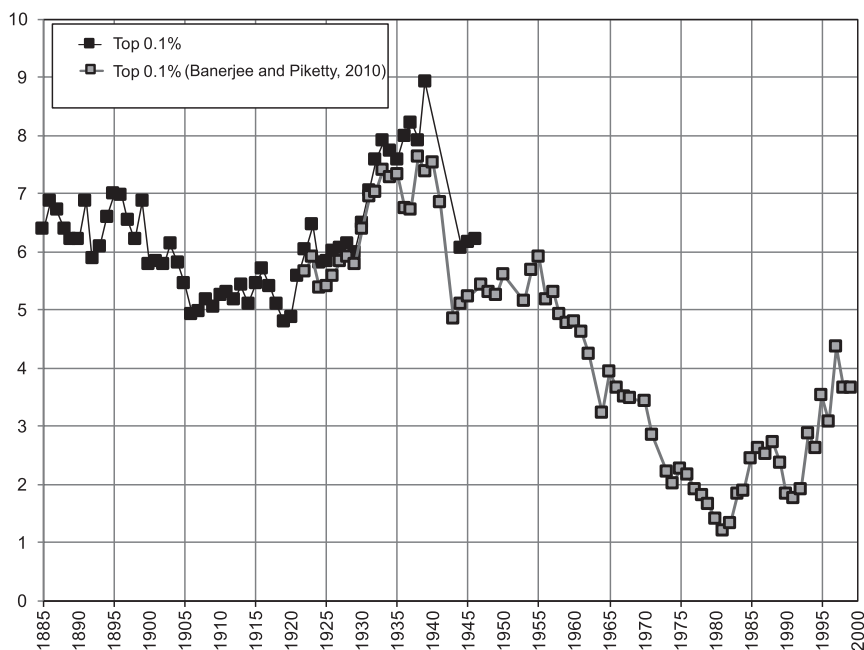
⁶ The tax was assessed in year $t+1$ (financial year) for incomes accrued in year t (income year). This explains why our series start in 1885, as we always refer to income years.

⁷ We do not use the information on net profit made by a company (schedule two) as it only concerns firms. We do not include Interests on the securities of the Government of India (schedule three) in our definition of total income since the *Annual Reports on the Administration of the Income Tax Act* and the *Triennial Reports on the Administration of the Income Tax Act* only report the total amount of tax collected but not the corresponding income bracket or the number of taxpayers. Throughout the period interests on the securities of the government of India represented on average 5% of the total reported taxable income.

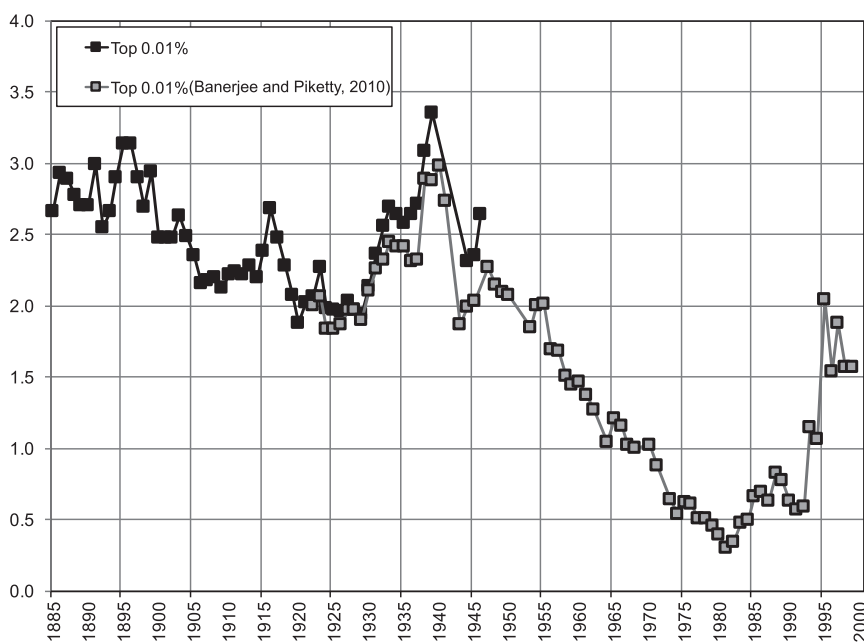
⁸ Fig. 1 shows that there is no visible discontinuity around 1922, which points to a negligible bias, at least for that year. This suggests that the employment structure of the Indian society at the time was simpler than its UK counterpart, where it was likely for a taxpayer to have multiple sources of income, as mentioned in Stamp (1916). For this reason, data structured in a similar way for the UK in the XIXth century cannot be used to study income concentration (Feinstein, 1988).

⁹ Pagar (1920) reports that “an attempt was made to bring agricultural incomes [...] under the income tax [...] but [...] the representatives of the great landed estates in combination with the official sympathisers always carried the amendment and left the law where it was before. [...] The usual arguments against inclusion of agricultural incomes such as the violation of the permanent settlement and the discouragement of industrial enterprise among landlords were re-emphasized.”

¹⁰ This is not to say that there were no very rich land owners, but that an important fraction of landowners might not have been rich enough to be part of the top 0.1% income earners which are the focus of this study.



(a) Top 0.1% income in percentage of national income



(b) Top 0.01% income in percentage of national income

Fig. 1. Top 0.1% and 0.01% income shares, 1885–1999.

Sources: Authors' calculations (1885–1946) and Banerjee and Piketty (2010) (1922–1999).

2.2. Trends in top income shares

Fig. 1 presents the evolution of the share of total income accrued to the top 0.1% and 0.01% groups between 1885 and 1946 (our series) together with the estimates for 1922–1999 from Banerjee and Piketty (2010).¹¹

¹¹ For the years 1922–1946 both series overlap but do not perfectly coincide. This is the case for two reasons: (i) Banerjee and Piketty (2010) use all India income tax statistics, which include small provinces for which we were not able to locate income tax reports (see Online Appendix 2 for the list of provinces and years included in our analysis); and (ii) Banerjee and Piketty (2010) estimate of the control totals refer to all India, while our control totals are for British India.

Over 1885–1946, top income shares followed a U-shaped evolution. From 1885 to the early 1920s, income concentration was stable at first and then declined slightly. Starting in the 1920s, the trend reversed and income concentration increased sharply until independence.

Looking at the broad dynamics over the XXth century, the evolution of income concentration seems to have followed a W-shape, with a first less pronounced U-shape during the 1885–1946 period and a much steeper one after Independence, which can also be observed in several other countries.¹² As underlined in Banerjee and Piketty (2010), the

¹² See Online Appendix 6 for a comparison of our top income series with similar series for the UK (Atkinson, 2007), Japan (Moriguchi and Saez, 2008) and two former British

decrease in income concentration after Independence might be linked to the increasing progressivity of the income tax after Independence. The remainder of the paper will focus on the pre-Independence U shape.

3. Understanding the evolution of income concentration

What are the causes of this evolution? Our indicator of income concentration is the ratio of the income accrued to the richest 0.1% to the total income earned. Hence, changes in income concentration are due to changes in the income of top earners (the numerator) and to changes in the income of the entire population (the denominator). This section sheds light on how the economic and political history of British India might have affected the evolution of income concentration over the period by its effect on the two components.

3.1. Economic evolution

3.1.1. Structural changes in the Indian economy

Our period of interest can be divided into two sub-periods: 1885–1920 and 1920–1946. Indeed, British India's income was growing in per capita terms until the 1920s, when growth slowed down (Fig. 2a). Hence, it appears that the reversal in income concentration was contemporary to important changes in the Indian economy.

Fig. 2b shows that the national income per capita slowdown was in large part driven by the halt in the primary sector, which represented the largest share of national income.¹³ As a matter of fact, while the share of the primary sector in national income was declining until the 1920s, it declined even more from the 1920s onwards. Another striking feature is the strong increase in the productivity of the secondary sector in the 1920s (Fig. 2c¹⁴). In contrast to the tertiary sector, whose productivity was increasing at a steady rate since the beginning of the XXth century, it is in the 1920s that the secondary sector productivity really started to diverge from that of the primary sector. As a consequence, to understand the inversion of the income concentration trend in the 1920s, we will focus on the evolution of the primary and secondary sectors.

3.1.2. Evolution of the primary sector

With its dominant share in total output, the primary sector is the main determinant of changes in the national income, our denominator. In addition, with around 75% of the workforce in agriculture during the period (Krishnamurty, 1983), understanding the evolution of the primary sector will allow us to better understand the evolution of the living conditions of the bottom 75% of income earners.¹⁵

Two patterns emerge from Fig. 3a, which displays the evolution of the value of agricultural production as well as the agricultural acreage from 1891 to 1946 based on Blyn (1966).¹⁶ First, the agricultural production, after having regularly increased, stagnated from the 1920s onwards. Second, the evolution of the agricultural area followed the

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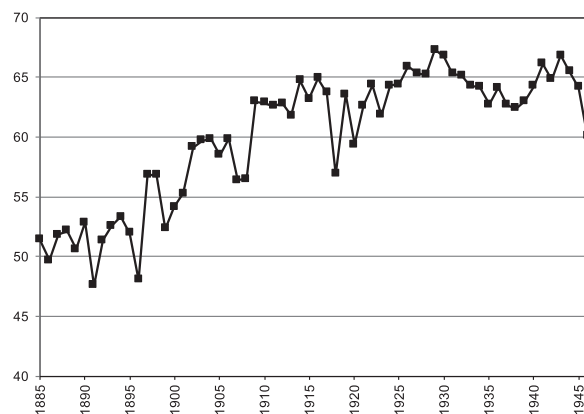
colonies: Zimbabwe (Atkinson, 2015b) and South Africa (Alvaredo and Atkinson, 2010).

¹³ See Roy (2006), Broadberry and Gupta (2010) or Chaudhary et al. (2016) for more details.

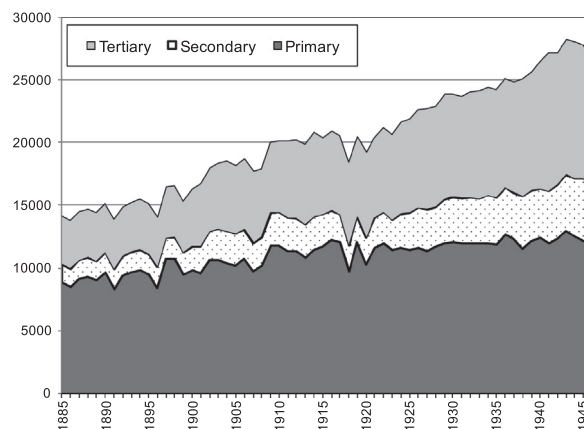
¹⁴ Note that to compute the pre-1900 sectoral shares and productivity, we follow the same method as Broadberry and Gupta (2010).

¹⁵ Naturally, not all the labor force working in the primary sector was situated in the bottom 75%, but it is reasonable to assume that the agricultural labor force was in its very large majority at the bottom of income distribution.

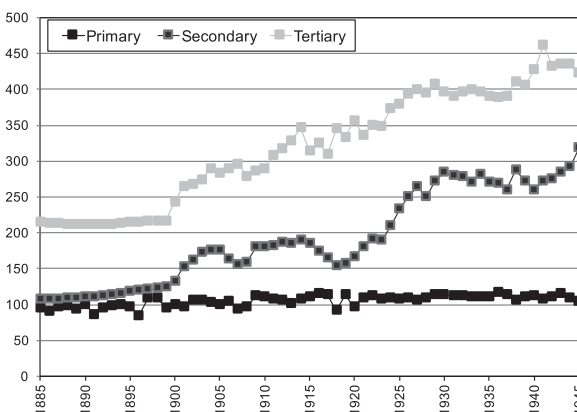
¹⁶ Blyn's (1966) estimates deal with the following crops: rice, wheat, jowar, bajra, ragi, maize, barley, gram, sugarcane, sesamum, rape and mustard, linseed, groundnut, cotton, jute, indigo, tobacco, and tea. These represented 82% of the surface cultivated in British India in 1940–1941. He also divided these into foodgrains (rice, wheat, jowar, gram, bajra, barley, maize and ragi) and non-foodgrains (sugarcane, cotton, jute, tea, tobacco, groundnut, rape and mustard, sesamum and linseed), a division that we kept in the presentation of his estimates. Note that despite certain criticisms (Heston, 1973, 1983), these series are accepted as the reference on the subject (Roy, 2006).



(a) National Income per capita, rupees 1938-39 prices.



(b) National Income by sector, million rupees 1938-39 prices.



(c) National Income per worker by sector, rupees 1938-39 prices.

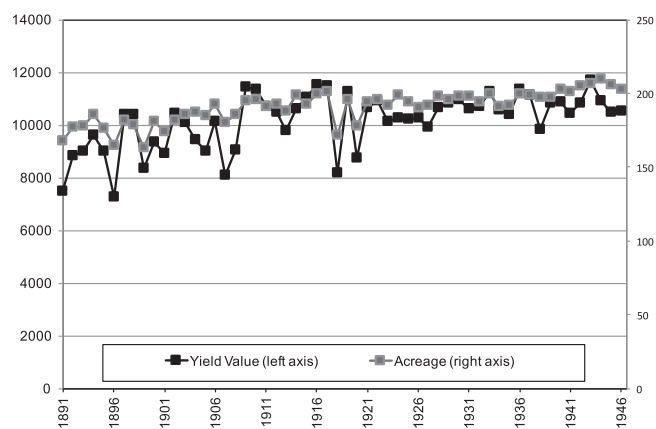
Fig. 2. National Income of British India, 1885–1946.

Sources: Heston (1983) and Sivasubramonian (2000) and authors' calculations.

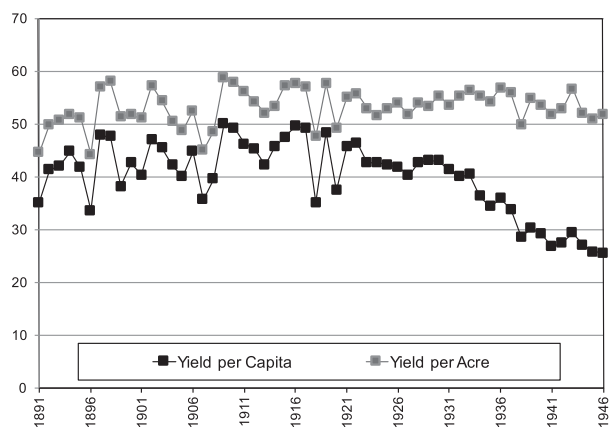
same pattern. As production per acre stagnated over the period (Fig. 3b), the evolution of agricultural production was caused by the evolution of acreage rather than by that of agricultural productivity.¹⁷

Productivity and acreage stagnation, combined with population

¹⁷ For more details, see Roy (2006) or Chaudhary et al. (2016).



(a) Agricultural production (million rupees at average prices of 1924–25 to 1928–29, left axis) and million acres (right axis)



(b) Agricultural productivity, rupees at average prices of 1924–25 to 1928–29

Fig. 3. Agricultural production and productivity in British India, 1891–1946. Source: Blyn (1966), and authors' calculations.

growth led to a decrease in agricultural production per capita from the 1920s onwards (Fig. 3b). As this probably meant lower food availability, it most likely resulted in a rise in poverty among the rural population.¹⁸ This increase in poverty could be one of the causes of the increase in income concentration during the interwar period. Indeed, as long as the income of the top 0.1% did not decline, an increase in poverty (and more generally, a decrease in the national income per capita) would lead to an increase of the share of the top 0.1%.

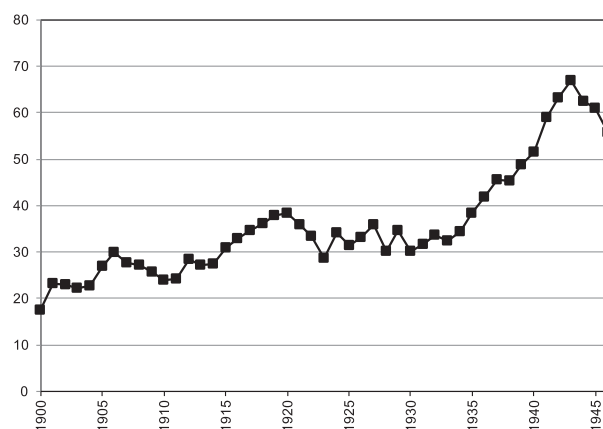
3.1.3. Evolution of the secondary sector

The evolution of the secondary sector is a natural candidate to explain that of income concentration. Indeed, in a dual economy model à la Lewis (1954),¹⁹ it is the evolution of the modern sector that drives the increase in income inequality. Most industries in British India were small-scale²⁰ and their workers would no doubt be considered as part of the unlimited labor supply. Hence, their activity did probably not affect the income of the top 0.1%, and therefore mostly affected our

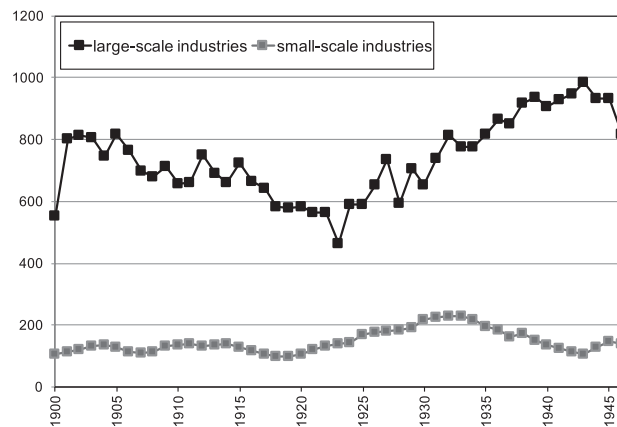
¹⁸ Note that Roy (2007), using series on agricultural wages, finds that agricultural wages declined in the interwar period, after having modestly risen in the preceding period, giving credibility to this view.

¹⁹ Lewis (1954) explicitly mentions India as a case to which his model could be applied to.

²⁰ We follow Sivasubramonian (2000) who defines small-scale as the industrial activities that do not fall within the purview of the Factories Act. Examples of small-scale industries are foundry, rice and flour mills, oil mills, and weaving factories with power-driven looms.



(a) Large-scale industries, percentage of secondary sector net value added



(b) Net value added per worker, rupees at 1938–39 prices

Fig. 4. Production and productivity for small-scale and large-scale industries in British India 1900–1946. Sources: Sivasubramonian (2000) and authors' calculations.

denominator. Large-scale industries,²¹ however, could be considered as the modern sector in a dual economy model. Hence, their activity allegedly generated high enough income to have an effect on the earnings of the top 0.1% and so on our numerator.

Between 1885 and the 1920s the secondary sector experienced relatively low growth rates of both production (Fig. 2b) and productivity (Fig. 2c). This period was characterized by the dominance of small-scale industries (Fig. 4a). Fig. 4b indicates that small-scale industries' productivity was low: they were on average five times less productive than large-scale industries, despite the decline in the productivity of the latter between 1900 and 1920. It is tempting to see in the decline in the productivity of the large-scale industries one of the potential causes of the decrease of top income shares before 1920, as it may have led to lower profits.

In contrast, between the 1920s and Independence the secondary sector grew twice as fast. As shown in Figs. 2b and c, the secondary sector experienced both an increase in its production and in its productivity. The development of large-scale industries played an important role in this increase (Bagchi, 1972; Morris, 1983; Roy, 2006; Gupta, 2014). Fig. 4a thus shows that the share of large-scale industries increased in the secondary sector in the early 1920s, while their productivity also increased (Fig. 4b), which may contribute to explain the rise in income concentration observed in our series.

²¹ Sivasubramonian (2000) defines large-scale industries by all the industrial establishments that fall within the purview of the Factories Act. Examples of large-scale industries are cotton mills, jute mills, woollen mills, steel, sugar, mining, paper, cement, and matches.

3.2. Economic policies

What were the causes of these economic changes? We will argue that the economic transformations experienced by British India were related to changes in its economic policies.

Indeed, the contribution of the colony to the WWI effort affected the composition of British India's budget, as new sources of revenues were urgently needed (Kumar, 1983; Roy, 2006). These budgetary tensions affected agricultural policies. As a matter of fact, agricultural productivity was low in India,²² due in particular to its relatively poor soil quality²³ and its reliance on monsoons rain. As a result, irrigation was central to both the extension of acreage²⁴ and the increase in productivity. But while large irrigation investments such as canals and tanks required state intervention,²⁵ public investment had always been relatively low,²⁶ and came to a halt in the 1920s when the Government of India faced a budget crisis.²⁷ Hence, the decrease in public investment probably contributed to the decline in agricultural production in the 1920s.

The limited government revenue also had important consequences on industrial policy. Since the Government of India was reluctant to raise direct taxation in order to preserve the regime's popularity among the elites (Gallagher and Seal, 1981; Chatterji, 1983), it decided to raise tariffs instead. This had consequences on the evolution of the industrial landscape, as it protected Indian infant industries from foreign competition.²⁸ Indeed, the tariff increase implemented during WWI remained in place afterwards when the enactment of the Fiscal Autonomy Convention (1919) allowed the Government of India to determine its own tariff policy. As a consequence, the interwar period marked the end of free trade for India.²⁹ Other protectionist policies such as the government stores purchases, which became increasingly biased towards goods produced locally (Tomlinson, 1979) also supported Indian infant industries during the interwar period. This movement directly benefited industrialists. The steel industry, based in Bombay, could, for example, not have survived the rising competition of Belgian and Japanese steel during the interwar period had tariffs not been imposed. According to Tomlinson (1979) and Bagchi (1972), industries such as cotton, paper, matches and rubber would not have survived and/or even existed absent the tariffs' protection.

These economic policy changes were important determinants of the economic changes described in Section 3.1. As a consequence, they have likely contributed to the observed evolution of income concentration throughout the period.³⁰

²² Most of this paragraph is derived from Roy (2006) and Chaudhary et al. (2016).

²³ Which could be linked to an underutilization of manure as explained by Mukherjee (1926), quoted by Roy (2006).

²⁴ Through the transformation of previously dry areas into arable land, such as in Punjab or Sind.

²⁵ In particular because the nature of land taxation and land ownership may have led to private under investment (Banerjee and Iyer, 2005). Note however, that these policies did not change in the 1920s, so their contribution to the halt in agricultural production in the interwar was probably not important, despite their likely role in explaining the relatively poor agricultural performance of British India throughout the period.

²⁶ In particular in comparison to investment in railways which, it has been argued, may have served better the British interests.

²⁷ This may have had a multiplier effect because of the complementarity between public and private investments: by rising the value of land, public investment provided incentive for private ones (Roy, 2006).

²⁸ See for example Gallagher and Seal's (1981) description of the consequences of the 1917 rise in tariffs, as well as the consequences of the war itself on the development of an import substitution industry.

²⁹ Tariffs were regularly increased: starting at 4% in 1914, the general rate attained 25% in 1931, with spikes for certain commodities as high as 190% (sugar) (Tomlinson, 1979). See also Gupta (2016).

³⁰ Note that the monetary policy of the period had ambiguous effects, which is why we do not discuss it in details. Indeed, with a fixed exchange rate with the sterling at a level often considered too high, it was accused to go against Indian industrial interests (Tomlinson, 1979; Roy, 2006), which may have driven income concentration downwards. However, the deflationary policy that the fixed exchange rate led to in the 1920s also affected directly the entire population, making it difficult to firmly link monetary

3.3. Institutional evolution

Economic policies depended on the overall institutional and political environment (Tomlinson, 1982), which underwent important changes during the period.³¹ The development of the nationalist movement and WWI convinced the British that institutional and political changes should be enacted in India so as to co-opt a larger share of the Indian elite in the hope of "rallying the moderates" (Danzig, 1968; Gallagher and Seal, 1981).³² The British thus implemented the Montagu Chelmsford Reforms of 1919 and the Government of India Act of 1935. These reforms transferred more power to the provinces' governments and assemblies, elected by an enlarged electorate.³³ As the members of the elite were given representation in legislative bodies and control over certain policies, their political influence increased.³⁴ Both fiscal³⁵ and tariff³⁶ policies were affected by the increased influence of the Indian elite.³⁷

These political developments may have contributed to the rise in income concentration observed from the 1920s onwards. As the Government of India was mainly concerned with the opinion of the upper class, and because the political importance of this group grew with the reforms of 1919 and 1935 and the nationalist movement, reducing inequality was not a policy objective for the Government.³⁸ Moreover, the use of direct taxation as a source of revenue was avoided as much as possible, thus ignoring a policy tool which may have led to a decrease in income concentration.

4. Were the top income earners European or Indian?

A characteristic of income concentration in countries under colonial rule is that most of top income earners were Europeans (Atkinson, 2014; Alvaredo et al., 2016). Was it also the case in British India? There is no straightforward answer to this question, as the income tax data do not provide information about nationality. However, estimates

(footnote continued)

policy to distributional consequences, one way or the other.

³¹ Gallagher and Seal (1981) provide a vivid description of the interplay between the economic and interior politics constraints faced by Britain and British India's respective governments, and their consequences on (among other things) British India's institutions and economic policies.

³² Danzig (1968) writes for example: "[...] British rule in India could not function without the active collaboration of an elite and at least the passive acquiescence of the mass. It was feared that repression of 'extremists' would alienate the 'moderates' whose support was thus deemed vital. The government in the period 1916–17 therefore decided to 'rally the moderates' by presenting them with an acceptable ideal which would counter the extremist demand for immediate home rule."

³³ The enfranchised population would represent roughly 3% of the population in the 1920s and 10% after the 1935 reform.

³⁴ Simon (1930) writes that "with the considerable widening of the franchise, agricultural interests have dominated the provincial legislatures". Of course, the land owners are not present in our data, and the inclusion of agricultural income in our analysis only affect the level of income concentration and not its trend, as discussed in Online Appendix 5, but this speaks to the increased weight given to the upper class in general.

³⁵ At the local level, for example, Tinker (1954) notes that "In view of the very low incidence of local taxation both in town and countryside it would have been desirable if taxes could have been increased, especially those direct taxes which bore upon the richer section of society. But the middle-class members of municipal and district boards were, in the main, quite unprepared to tax themselves more heavily."

³⁶ Wagle (1981) writes: "...much of the Government of India's efforts during this period were directed towards bidding for the support of educated Indian opinion. In the commercial sphere [...] [t]he Fiscal Autonomy Convention, the introduction of formal tariff protection to Indian industry, and the abolition of the controversial countervailing cotton excise duty, were the principal measures initiated towards this end."

³⁷ Note also that for agricultural policies as well, a pro-elite bias has been documented, apart from the land taxation policy already mentioned. In Punjab, for example, the land made arable via irrigation work was mainly distributed to the landed elite (Ali, 1988; Cassan, 2015). We however did not see mentions that this pro-elite bias in agriculture had increased during the interwar.

³⁸ Roy (2006) writes: "...the internal taxation system was regressive. Public finance [...] carried an implicit bias for preserving hierarchies among Indians."

of the number of European *income tax payers* can be computed from other sources such as the Census or the electoral rolls. We use these alternative data sources to provide indirect evidence on the composition by nationality of top income earners.

Using population data from the Census, we know that the European population was extremely small. For example, in 1921, it represented only about 0.06% of the population. As a result, by construction, Europeans could not represent a large share of top 10% or top 5% groups. Out of them, a significant proportion were European soldiers, who did not earn enough to belong to the top 0.1% (Atkinson, 1902).

We can go one step further in the estimation of the number of European income tax assessees. The constitutional reforms of 1919 enfranchised roughly 3% of the population and created separate electorates,³⁹ while the electoral reforms of 1935 enfranchised an even larger share of the population (around 10%) and kept the separate electorates. In particular, Europeans were given separate electorates in most provinces from 1919 to 1929,⁴⁰ and in all provinces after 1935. One of the criteria to be enfranchised was to be an income tax assessee. As a result, we can use the number of voters in European constituencies from 1919 to 1947 as a proxy of the number of European income tax assessees.⁴¹ Throughout the 1920s, there were on average 29 electors per tax assessee; in 1937 this ratio was 137, and in 1947 it was 48. Since Europeans were on average richer and therefore more likely to pay the income tax than Indians, these represent an upper bound on the ratio of electors to assessees for the European population. An obvious lower bound would be 1; that is, all the European electors were income tax assessees. These two bounds allow us to calculate that the European income tax assessees represented at most from 0.0015% to 0.04% of the total tax units. That is, under the assumption that all European electors were at the very top of the income distribution in British India and that all European tax assessees were on the electoral roll, Europeans would have represented at most 40% of the top 0.1%.⁴² As a consequence, even if we cannot know where in the income distribution the Europeans were exactly located, it is fair to say that they probably did not represent a large share of the top income earners. Hence, as opposed to the other colonies studied in Atkinson (2014) and Alvarado et al. (2016), the top income earners in British India were likely to be Indian for the most part.⁴³

³⁹ Several “segments” of the Indian population were given separate electorates, that is constituencies in which only the members of a given community (Muslims, Sikhs, etc.) could vote for a member of that same community. Note that separate electorates had been introduced at the end of the XIXth century at the local level, and in 1909 at the national level, but only the 1919 reforms granted a franchise large enough to be useful for our purpose.

⁴⁰ The provinces in which Europeans had separated electorates were: Bombay, Bengal, Madras, United Provinces and Bihar and Orissa. These provinces accounted for 80% of the population of British India.

⁴¹ Elections took place in 1921, 1923, 1925, 1929, 1937 and 1947. Sources used for electorate data are His Majesty's Stationery Office (1921, 1923, 1927, 1931, 1937) are Manager Government of India Press (1948), as collected and digitized by Cassan and Iyer (2015).

⁴² Note that the definition of European does not include “Anglo Indians”. Including this population does not alter our estimates: in 1921, the total of European and Anglo Indian population represented less than 0.1% of the population. In addition, the 1937 and 1946 elections had separate constituencies for Anglo Indians in all provinces, thus allowing us to include this population to our calculation. When adding the Anglo Indian electors to our estimates, we reach a maximum of 0.06% of the total tax units, which would represent at most 60% of the top 0.1% group. This is still very far from the massive over representation of Europeans and their descendants in colonial South Africa (Alvarado and Atkinson, 2010) and Tunisia (Alvarado et al., 2016).

⁴³ Note however that we cannot rule out that the Europeans were all located in the top 0.04% of the income distribution. That is, even if a tiny minority of top income earners, Europeans could have earned a significant share of the income earned by top income earners.

5. Where were top income earners located?

5.1. The distribution of top income earners across provinces

While income tax statistics (as the ones used in this paper) are only available at the national level in most countries, the tabulations we use were published at the province level. This allows us to study the regional repartition of top income earners⁴⁴ and its evolution over time.⁴⁵

Two major findings emerge from the results presented in Fig. 5. First, we see that throughout the period, the majority of top income earners was concentrated in Bengal and Bombay. Indeed, between 1885 and 1946, Bengal and Bombay represented on average 32% and 27% of top income earners. Second, there were important changes in their location over the period: the province of Bombay gained in importance at the expense of Bengal. In fact, while the share of Bengal decreased from 35% in 1885 to 21% in 1946, the share of Bombay increased from 23% to 47%. To a lesser extent, the share of Punjab also increased from 8% to 17% with most of the increase happening between 1915 and 1946.

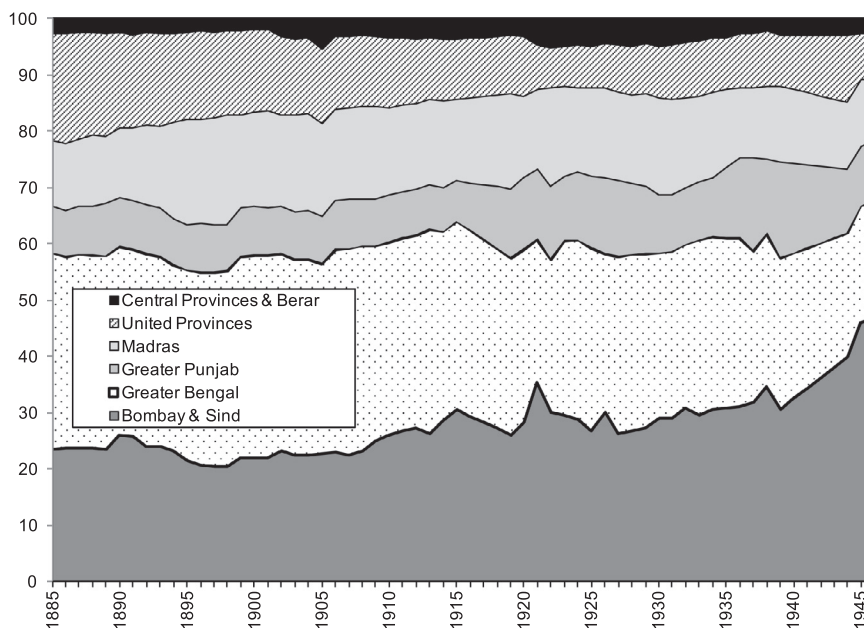
Fig. 6 provides additional details about the changes in the provincial repartition of top income earners. It shows that it is first among the extremely rich (the top 0.001%) that the share of Bombay started increasing during the first decade of the XXth century, mostly at the expense of Bengal. During the following years the share of Bombay among lower income deciles also increased. The share of the province increased in the top 0.005–0.001% in the 1920s, in the top 0.01–0.005% in the 1930s and finally trickled down to the full top 0.1% in the 1940s. This indicates that the rising share of Bombay within the top 0.1% group over the period was not entirely driven by a few very rich individuals getting even richer, but increasingly by new individuals joining the top 0.1% group in the province.

The increase in a province's share among top income earners can originate from three sources: population, income per capita and income concentration. If, holding the other two constant, a province sees either its population, its income per capita or its income concentration increase faster than that of other provinces, its share in the top income earners will rise. What is the role potentially played by each of these channels in the evolution of Bombay's share?

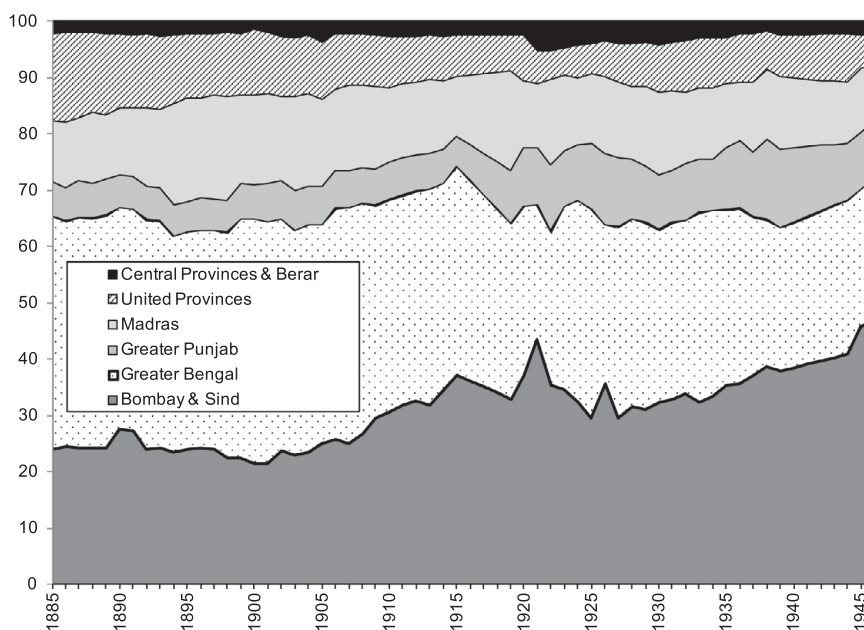
To analyze the role played by population, we construct an index of the over-representation of each province among the top 0.1% income recipients measured by the ratio of the share of the province in the top income group to the share of the province in the population of British India. Three major findings emerge from Fig. 7. First, Bombay is characterized by a striking over-representation matched by no other province. Second, the over-representation of Bombay increased from the 1900s onwards. Third, beginning in 1915 we see an increase in the over-representation of Punjab, at the expense of Bengal. While until 1915 Bengal was marginally over-represented in the top 0.1% and Punjab marginally under-represented, after 1915 we see the opposite pattern. We can then conclude that the rise of Bombay (and Punjab) among top income earners is not mechanically caused by an increase of its population.

⁴⁴ Note that in theory, we could study separately the repartition of the highest incomes (that is, the repartition of the income of the top 0.1%) and of the top income earners (the repartition of the individuals in the top 0.1%) across provinces. In practice however, these are usually very close.

⁴⁵ As the borders of the provinces of India evolved throughout the period, we regroup the provinces that have been split into stable geographical units. In particular, Bombay regroups Bombay and Sind, Greater Punjab regroups Punjab, North West Frontier Province and Delhi, Greater Bengal regroups Bengal, Assam, Eastern Bengal, Bihar and Orissa, while Central Provinces also include Berar from 1904 onwards when Berar becomes part of British India.



(a) Composition of the top 0.1% income by province in percent.



(b) Composition of the top 0.01% income by province in percent.

Fig. 5. Composition of the top 0.1% and 0.01% income by province, 1885–1946. Sources: Authors' calculations.

To analyze the role played by income per capita, we would need data on provincial income throughout the period. To our knowledge, the only estimates of provincial level income per capita are provided by Caruana-Galizia (2013) and cover the 1875–1911 period. We analyze this data in Online Appendix 7. Between 1901 and 1911, when Bombay's share rose, the growth rate in Bombay's income per capita was actually lower than in Punjab, Madras, and Central Provinces, equal to the growth rate in the United Provinces and larger only to that of Bengal. Hence income per capita growth is not sufficient to explain the increase in the share of Bombay in terms of the number of top income earners. As a consequence, an increase in within province income concentration was likely one of the main determinants of the observed evolution for Bombay, at least during the 1901–1911 period.

5.2. Provincial economic evolution

To interpret this evolution, we focus on the evolution of large-scale industries across the provinces of British India. As we argued in Section 3, these industries may have generated high enough income to affect the earnings of the top 0.1%.

Throughout the period, large-scale industrial activity was highly clustered. In particular, the provinces of Bombay and Bengal produced the majority of the large-scale industrial output (Bagchi, 1972, 1976; Morris, 1983; Roy, 2006; Wolcott, 2016). Fig. 8a presents the net value added for eight major large-scale sectors between 1900 and 1945. We see that the most prominent industries were cotton spinning and weaving, mostly based in Bombay, and jute

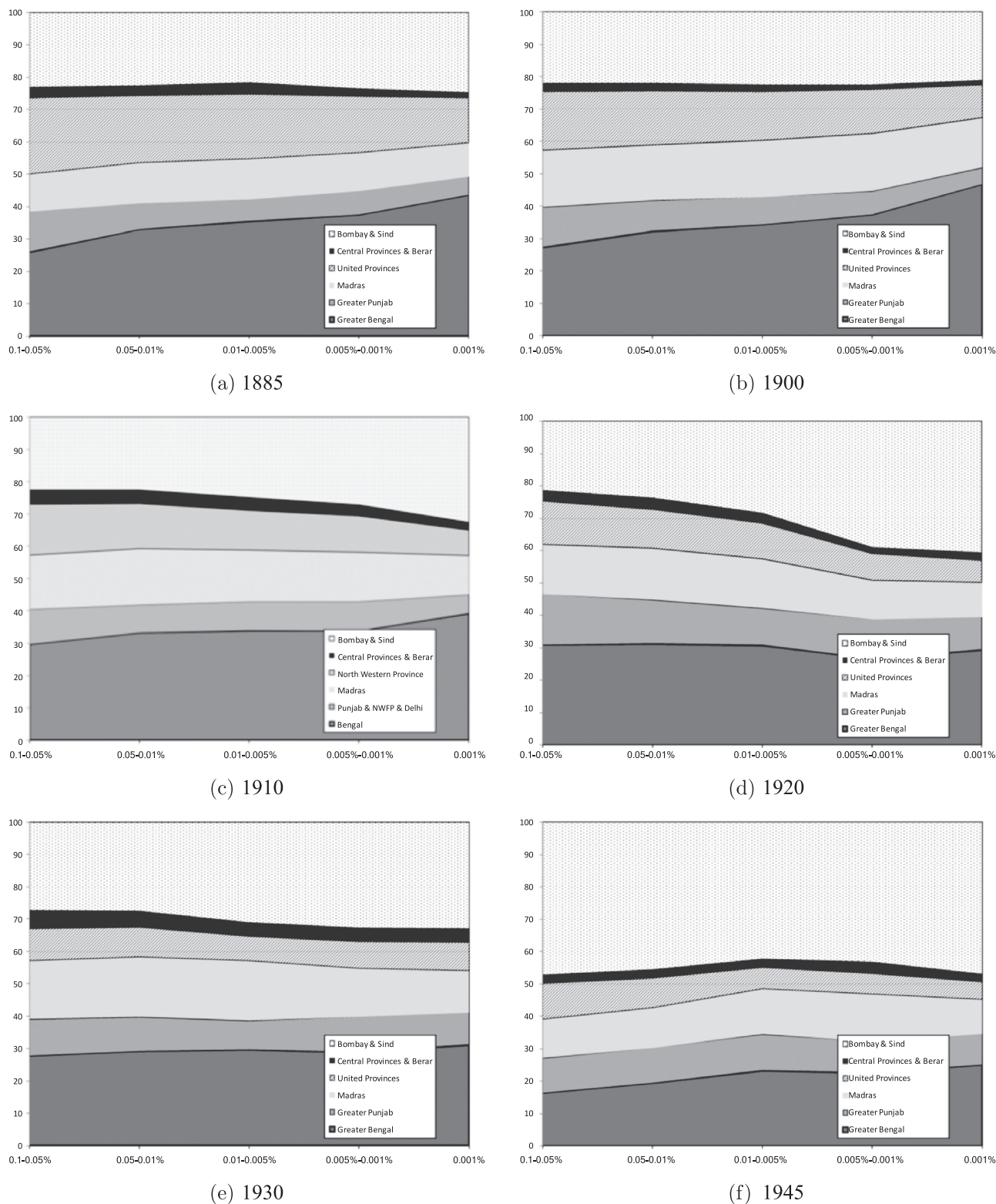


Fig. 6. Geographical location of top 0.1% income recipients, 1885–1945. Source: Authors' calculations.

spinning and weaving, mostly based in Bengal.⁴⁶ The concentration of the majority of top income recipients in the provinces of Bengal

⁴⁶ Bagchi (1972), in Table 7.4, provides data on cotton looms and spindles in Ahmedabad, Bombay city and all of India between 1900 and 1919. Ahmedabad and Bombay city, both belonging to the province of Bombay, represent respectively 17% and 52% of the total looms in India and 13% and 71% of the total spindles in India on average over the period. He argues that even higher fractions of jute looms and spindles were located in Calcutta.

and Bombay could therefore be related to the concentration of major large-scale industries in these two provinces, and in these two industries in particular.

The comparative evolution of the different industries may contribute to explain the changes in the concentration of income across provinces over time. In fact, while both jute and cotton industries prospered between 1885 and the end of WWI, the jute industry experienced difficulties in the interwar while the cotton industry

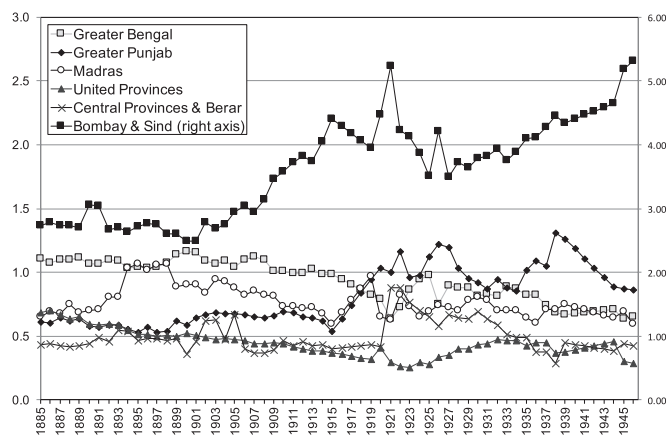
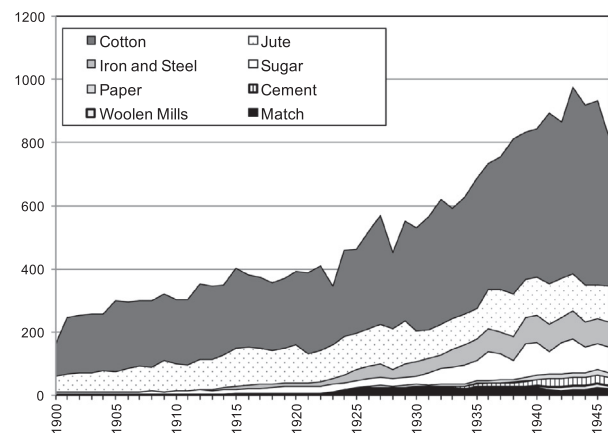
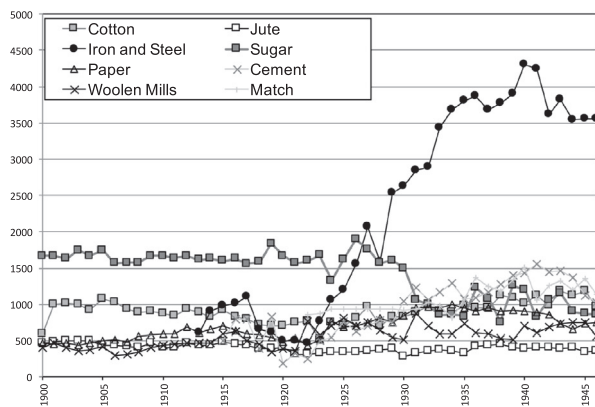


Fig. 7. Measure of provinces' over-representation in the top 0.1%, 1885–1946. Source: Authors' calculations. Key: In 1885, Bombay (on the right axis) was close to 3 times as much represented in the top 0.1% as it would have been if it had been represented proportionally to its population.



(a) Net value added for eight major large-scale industries, rupees at 1938–1939 prices



(b) Productivity for eight major large-scale industries, million rupees at 1938–1939 prices

Fig. 8. Net value added and productivity for eight major large-scale industries, 1900–1945. Sources: Sivasubramonian (2000) and authors' calculations.

continued to develop, partly thanks to tariff policies discussed in Section 3. To further deepen that analysis, we use novel data on Joint Stock Companies (JSC), the only type of firm on which data is, to

our knowledge, available⁴⁷ in Online Appendix 8 to discuss in more detail the evolution of the cotton and jute industries. In particular, we show that starting in the 1920s the number of JSC increased much faster in cotton than in jute. Since jute industries were mostly located in Bengal while cotton industries were mostly in Bombay, such different economic trajectories could have contributed to the increase of the fraction of top income earners in Bombay and its decline in Bengal, under the assumption that the number of JSC correlates with the number of top income earners.

It is also in Bombay that the nascent large-scale industries developed, the most prominent of which was the iron and steel industry.⁴⁸ As shown in Fig. 8a, the share of TISCO in the net value added of large-scale industries increased, especially between the 1920s and the 1940s. During this period TISCO also experienced an important increase in productivity as shown in Fig. 8b. Indeed, the major share of growth of net value added per worker in large-scale industries over the period can be attributed to TISCO (Wolcott, 2016). The development of TISCO might thus have contributed to the marked increase of the share of Bombay in the top income between the 1920s and the 1940s if this increasing productivity translated into more profit.

Finally the increase in the relative number of top income earners in Punjab at the expense of Bengal in the post-1910s period might be partially explained by changes in the tertiary sector, especially in government services. Indeed, as the capital of British India was moved from Calcutta to Delhi in 1911, it is tempting to see the increase in top income earners in Punjab at the expense of Bengal as a consequence of the displacement of the bureaucracy from Calcutta to Delhi.

6. Conclusion

Using a novel data set based on schedular and modern income tax reports by province from 1885 to 1946, we have shown that in the last 60 years of British rule in India, income concentration (as measured by the income shared accrued to the top 0.1% group) followed a U-shape. We linked the increase in income concentration during the post-WWI period to the economic and institutional changes faced by the colony. Indeed, per capita income growth stalled in the second half of the period, due to the slowdown of the agricultural production, while the industrial sector modernized, became more productive, and increasingly likely to generate high profits. This evolution was facilitated by insufficient public investment in agriculture and by the emergence of infant industries. Institutional changes also favored this pattern, as the political weight of the Indian elite increased due to its newly acquired political rights and increasing nationalist pressure. In addition, we provided indirect evidence indicating that the majority of top income earners were not Europeans, in contrast to other colonies for which data are available. Finally, we demonstrated that the location of top income earners changed over time to the benefit of Bombay and at the expense of Bengal, which appears consistent with the relative evolution of their industrial sectors.

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⁴⁷ According to Goldsmith (1983), “...nothing is known in quantitative terms about the development of unincorporated enterprises in manufacturing, where they played only a secondary role, as well as in handicrafts, trade, and services, where they predominated, the discussion must be limited to corporations outside of agriculture and finance. And even within this restricted field comprehensive or continuous statistics are limited to the information on the number and paid-up capital of joint stock companies...” Note for our purpose, because we are mainly interested in manufacturing firms, the lack of information on non-manufacturing firm is not too strong an issue.

⁴⁸ Bagchi (1972) shows that while the majority of the production and trade of iron and steel was concentrated in Bengal, the profits were mostly repatriated to Bombay, where Tata Iron and Steel Company (TISCO), the only firm in that industry during most of the period, is located.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jdevec.2017.01.005>.

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