



ORIGINAL ARTICLE

Income inequality and export-oriented commercialization in colonial Africa: Evidence from six countries

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Abstract

Limited knowledge of African historical inequality trajectories hampers our understanding of inequality outcomes today and leads to a major omission in debates about global inequality. Economies in colonial Africa were characterized by a process of export-oriented commercialization. We hypothesize that this process itself, the capital intensity of the commodities produced, and the relative importance of European and Asian expatriates and settlers in the economy shaped heterogeneous inequality outcomes. We evaluate these hypotheses using 33 social tables from six predominately agricultural countries between 1914 and 1969. Social tables capture income across the full distribution, aggregated in classes. We assess and improve the commensurability of the different social tables. We then apply different inequality metrics, and find that Gini and Theil coefficients and Inequality Extraction Ratios rose over time. Gini coefficients moved in conjunction with the real value of commodity exports per capita. Using Theil decompositions, we observe a trade-off between inequality among African classes on the one hand, and among non-Africans and between races on the other. Whenever present, non-Africans captured a large share of the export profits. Inequality patterns towards the end of the period

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suggest that capital-intensive commodities were associated with higher levels of inequality in the agricultural sector.

KEYWORDS

Africa, colonialism, income inequality, export-oriented commercialization

After two decades of optimism about ‘Africa rising’, the question of ‘*whose* Africa is rising’ is receiving increased attention.¹ The importance of distributional issues is reflected in the increasingly available data showing that significant internal disparities characterize many African economies. In addition, there is substantial variation in inequality levels between countries, covering a spectrum from relatively equal economies in western and northern Africa to highly unequal countries in central, eastern, and especially southern Africa.² The growing interest in African inequality has emerged in tandem with broader debates about the distributional effects of capitalism and globalization among and within countries. This has involved influential pleas to view inequality from a long-run and global-comparative perspective.³ By looking at trajectories over time, we better understand inequality’s dimensions and determinants, both its persistence and change.⁴ Until recently, however, Africa’s trajectories have featured marginally in the global inequality literature.⁵

Existing scholarship has pointed out two key historical explanations for African inequality outcomes. First, high-income inequality today has been linked to the colonial legacy of a ‘dual economy’ of high wage incomes of expatriate groups and formally employed Africans on the one hand, and low (agricultural) incomes for the large majority of self-employed Africans on the other.⁶ However, given that both the historical role of Europeans in African colonial economies and contemporary inequality outcomes vary widely, generalized conclusions about a colonial legacy of inequality are not warranted. Further, comparative quantitative research on *how* colonial rule and European settlement affected economic inequality unevenly across African colonies remains sparse and is confined mainly to conjectures about inequality differences between ‘settler’ and ‘peasant’ economies.⁷ Second, the increasing participation of African colonial economies in international commodity trade and the consequent commercialization of these economies boosted income-earning opportunities in the export sector, benefitting regions, ethnic groups,

¹ Khisa, ‘Whose Africa is rising?’.

² Cogneau et al., ‘Inequalities and equity in Africa’; Bigsten, ‘Determinants of the evolution’; Fosu, ‘Inequality and the impact of growth’; Fosu, ‘Growth, inequality’; Shimeles and Nabassaga ‘Why is inequality high’; Boone and Simson, ‘Regional inequalities in African’; Chancel et al., ‘Income inequality in Africa’; Chancel et al., *World Inequality Report 2022*; UNDP, *Income Inequality Trends*; UNU-WIDER, *World Income Inequality Database*.

³ Alfani, ‘Economic inequality in pre-industrial times’; Milanovic, *Global inequality*; Milanovic, ‘Towards an explanation of inequality’; Piketty, *Capital in the twenty-first century*; Piketty, *Capital and ideology*; Scheidel, *The great leveler*; Van Zanden et al., ‘The changing shape’.

⁴ Alfani and Ammannati, ‘Long-term trends’, p. 1072.

⁵ Frankema et al., ‘Inequality regimes in Africa’; Galli et al., ‘Economic inequality’; Simson and Savage, ‘The global significance’.

⁶ Cogneau et al., ‘Inequalities and equity in Africa’; Bigsten, ‘Determinants of the evolution’.

⁷ Nel, ‘Inequality in Africa’; Van de Walle, ‘The institutional origins’; Chancel et al., ‘Income inequality in Africa’.



and social layers unevenly, again with long-term effects.⁸ However, the quantitative study of the concrete and variegated impact of export-oriented commercialization on the nature of African income distributions and levels of inequality remains confined to a few isolated case studies.⁹

In recent years, efforts have been made to strengthen the empirical basis to study economic inequality in colonial Africa. An essential first step towards a quantitative assessment of inequality in African colonies was made using indirect proxies of income, such as heights. While a helpful starting point, these data are conjectural and do not measure economic inequality.¹⁰ Others have found avenues to estimate inequality directly. One central strand of work has focused on the income distribution's upper tail (0.1 per cent or less) using tax records.¹¹ This approach has yielded valuable insights into economic inequality, as top incomes significantly drive overall inequality. However, it also has notable limitations. First, top income shares rely on income tax data only collected from the late-colonial period onwards and on a crude denominator (estimates of total income, i.e. gross domestic product). Second, as income taxes were only levied on the very top (wage) income earners, differences among all other income groups remain unobserved in top income approaches. This is a major limitation, given that in a context of export-oriented commercialization in an agrarian setting, income differences among Africans, as well as Asians and Europeans below the top 0.1 per cent of earners, were sizeable and subject to changes over time. In another approach, historical microdata on land and wealth distributions have been collected to reconstruct income for specific locations and socio-economic groups. Due to data limitations, this is only feasible for a limited number of idiosyncratic cases, such as South Africa's Cape and Sierra Leone's Free Town and hinterlands.¹² Although these studies reveal unique insights into local distributional patterns, their relevance for understanding broader inequality patterns in colonial Africa is limited.

Our study instead builds on inequality estimates derived from social tables, which, we maintain, hold substantial promise for an in-depth quantitative and comparative analysis of the distributional consequences of export-oriented commercialization and European and Asian settlement under colonial rule. The social tables approach allows for the construction of inequality indicators for the full income-earning population in the context of limited data availability. This method is long-established for studying inequality in pre-industrial settings, before the era of comprehensive household surveys and tax registers.¹³ Essentially, social tables simplify a country's income distribution by identifying a limited number of 'social classes' and assuming a uniform income within each class. As social tables capture streams of non-monetized incomes and commercial farming, they inform us about the incomes of self-employed groups as well as wage earners. Hence, we can investigate income differentiation across the full income distribution – albeit grouped – and evaluate whether colonial economies were as 'dualistic' as they are often made out to be. Because of the considerable data collection effort required to

⁸ Nel, 'Inequality in Africa'; Roessler et al., 'The cash crop revolution'; Van de Walle, 'The institutional origins'.

⁹ Aboagye and Bolt, 'Long-term trends'; Bolt and Hillbom, 'Long-term trends'; De Haas, 'Reconstructing income inequality'.

¹⁰ Martin and Baten, 'Inequality and life expectancy'; Moatsos et al., 'Income inequality'; Moradi and Baten, 'Inequality in sub-Saharan Africa'.

¹¹ See, for example, Alvaredo and Atkinson, 'Top incomes'; Atkinson, 'The colonial legacy'; idem, 'Top incomes in East Africa'; Alvaredo, Cogneau, and Piketty, 'Income inequality'.

¹² Fourie and Von Fintel, 'The dynamics'; eisdem, 'A history with evidence'; Galli and Rönnebeck, 'Colonialism'; eisdem, 'Land distribution'.

¹³ Milanovic, 'Towards an explanation of inequality'; Milanovic et al., 'Pre-industrial inequality'.



build social tables, they are constructed only for selected benchmark years. Being mindful of the context of the selected years and with careful interpretation, it is possible to trace trends over time.

For six African countries, we investigate a total of 33 social tables in the period 1914–69 to establish how inequality evolved and how it was associated with the expansion of export-oriented commercialization and the presence of European and Asian expatriates and settlers (hereafter referred to as non-Africans). Our sample includes Botswana, Ghana, Côte d'Ivoire, Kenya, Senegal, and Uganda.¹⁴ To the best of our knowledge, these are the only sub-Saharan African economies for which repeated social tables for the entire population during the colonial era have been constructed. The six countries all experienced substantial export-oriented commercialization based primarily, but not exclusively, on a variety of agricultural commodities (cocoa, coffee, cotton, groundnuts, and livestock). Further, they constitute a diversity of economic structures and colonial institutions, including both 'peasant' and 'settler' economies, with a variation in the prevalence and roles of non-Africans. The countries are selected on the basis of data availability and cannot be treated as representative of sub-Saharan Africa. Nonetheless, the sample contains sufficient variation for a novel and informative comparative analysis of how export-oriented commercialization and non-African presence affected income inequality in African agrarian societies within different colonial economic structures.

We use the social tables to calculate several measures of economic inequality, each with different characteristics. As our baseline metric, we use the Gini coefficient (Gini hereafter), which is the most used inequality measure and has a significant advantage in that it is responsive to changes in the middle of the income distribution. We also calculate Inequality Extraction Ratios (IER), which take into account that the scope for inequality increases as economies become richer and more 'surplus' income is generated beyond basic survival. As such, it provides a more conservative approach to inequality increases in periods of economic growth. Finally, we consider the Theil coefficient (Theil), which is more responsive towards changes at the extreme ends of the income distribution than the Gini coefficient and has as its main advantage that it is fully decomposable.

Our findings are as follows. First, overall inequality increased during the colonial period of export-led economic expansion. This increase varied substantially across individual countries and depends on the measure of inequality used: the trend is significant for the Gini and IER but not for the Theil unless high-earning Europeans are excluded from the distribution. Increases in inequality are also associated positively and significantly with agricultural commercialization, which we define as real export earnings per capita, but only for the Gini and some specifications using the Theil. Second, using Theil decompositions, we explore how inequality was linked to the presence of non-Africans and the capital intensity of agricultural commercialization. Decomposing inequality by race, we establish that in the colonies with a larger proportion of non-Africans – Kenya and Senegal – racial cleavages accounted for a large proportion of overall inequality. We also observe that inequality among Africans was lower in colonies with a larger proportion of Asians and Europeans compared with colonies with limited non-African presence. This suggests fewer opportunities existed for Africans to benefit from the export economy when more non-Africans were present. These patterns indicate that colonial settlement played a significant role in determining how the incomes from export-oriented commercialization were distributed,

¹⁴ Aboagye and Bolt, 'Long-term trends'; Bigsten, 'Income distribution'; Alfani and Tadei, 'Income inequality' and revisions (see Online app. S.1 for full details of the revision); Bolt and Hillbom, 'Long-term trends'; De Haas, 'Reconstructing income inequality'.



echoing experiences in other colonial contexts, such as Latin America.¹⁵ Decomposing inequality by sector, we observe substantial inequalities within the agricultural sector. Albeit not conclusively, our results also suggest that specialization in capital-intensive commodities was associated with higher inequality in the agricultural sector, especially towards the end of the period studied.

The remainder of the article is structured as follows. Section I discusses previous literature on inequality trends and levels in colonial Africa and their relationship to processes of export-oriented commercialization and non-African presence. We derive three hypotheses that serve as the basis for our analysis. Section II introduces our six country cases. First, we discuss the comparability of the social tables and adjust some of them to increase commensurability. Second, we argue that our countries represent sufficient variation to meaningfully evaluate our hypotheses. Section III provides the results. First, we show inequality trends using the Gini, IER, and Theil. We also explore the correlation between changes in income inequality and export production. We then perform two decompositions, along race and sector, using the Theil index. A final section concludes.

I | COLONIALISM, COMMERCIALIZATION, AND INEQUALITY IN COLONIAL AFRICA

Kuznets' original research agenda to investigate patterns in the relationship between long-term economic development and income inequality has been confronted with a flurry of competing and complementary theories arising from long-term and global approaches. While Kuznets saw the rise of inequality as associated with industrialization and sectoral change,¹⁶ other scholars have argued that pre-industrial inequality also fluctuated considerably without such processes. For example, Van Zanden presented evidence from Western Europe during the early modern period of rising inequality going hand in hand with economic expansion without sectoral change.¹⁷ Meanwhile, Milanovic has argued for Kuznets-wave-like movements, where rising and declining inequality, in addition to 'Kutznetsian' mechanisms, is driven by non-economic factors such as epidemics, Malthusian pressure, wars, and institutional settings.¹⁸ This resonates with Alfani's and Scheidel's emphasis on shocks and disasters as drivers of historical inequality reduction.¹⁹ Piketty, meanwhile, postulated that unchecked capitalism, as well as slave and colonial societies, produced regimes of high inequality.²⁰ Despite their intended global scope, much of the empirical basis of the above claims is derived from the experiences of the Western world. African cases remain particularly marginalized and have so far played a limited role in theorizing historical inequality trajectories, with the exception of a recent study by Frankema et al.²¹ which has made a substantial effort in this direction.

¹⁵ Engerman et al., 'Factor endowments'; Sokoloff and Engerman, 'Institutions, factor endowments'.

¹⁶ Kuznets, 'Economic growth'.

¹⁷ Van Zanden, 'Tracing the beginning'.

¹⁸ Milanovic, *Global inequality*; Milanovic, 'Towards an explanation of inequality'.

¹⁹ Alfani, 'Economic inequality in pre-industrial times'; Scheidel, *The great leveler*.

²⁰ Piketty, *Capital in the twenty-first century*; idem, *Capital and ideology*.

²¹ Frankema et al., 'Inequality regimes in Africa'.



Quite separate from the debates in the global inequality literature, economists and political scientists focusing on Africa have shown renewed interest in the historical origins of economic inequality. While inequality was considered in pioneering early scholarship on African rural entrepreneurship, such as the work of Polly Hill,²² it remained marginal to the study of Africa's economic past.²³ Issues of social stratification and class formation did become a central concern in Marxist and underdevelopment scholarship during the 1970s and 1980s.²⁴ While the 1990s and 2000s saw a reduced interest in inequality and a stronger focus on economic growth and its 'fundamentals', scholars have more recently returned to historical explanations for Africa's high and heterogeneous inequality levels. Various studies have sought to identify the origins of spatial inequalities within and between countries, focusing on multiple issues, including ethnicity,²⁵ regional specialization in commodity export production,²⁶ colonial institutions and investments,²⁷ and income 'dualism' between the formal wage sector and predominantly agricultural, self-employed sector.²⁸ The exceptional case of South Africa, with its extreme levels of income inequality, has received particular attention.²⁹

Despite this expanding range of studies on the proposed historical origins of Africa's uneven inequality landscape, we still know very little about the actual historical processes through which economic inequality evolved. Certainly, economic inequality was rife in many pre-colonial African societies during the era of the slave trades, although the view that it only emerged on a meaningful scale during the colonial era remains pervasive.³⁰ Under colonial rule, most African economies were characterized by low levels of industrialization and urbanization. They were generally land abundant and came to specialize in the export of tropical commodities. Self-provisioning in food and other subsistence goods remained important, and domestic markets were often thin and limited to a relatively narrow range of goods. Meanwhile, both the volume and value of commodity exports rose substantially between the mid-nineteenth and mid-twentieth centuries.³¹

Export production was a key driver of processes of monetization and commercialization.³² It provided direct income for African farmers and migrant workers, European settlers, and plantation owners. Indirectly, trading, construction, infrastructure, administration, and service sectors depended heavily on the commodity export economy. Export production enabled colonial revenue generation, primarily through direct and import taxes and thus financed the wages of public sector employees, both non-African and African.³³ While rising exports and expanding

²² Hill, *The migrant cocoa-farmers*.

²³ Hopkins, *An economic history*, p. 292.

²⁴ Bernstein, 'African peasantries'. For a case study of Uganda: Mamdani, 'Extreme but not exceptional'.

²⁵ Alesina et al., 'Ethnic inequality'.

²⁶ Moradi and Baten, 'Inequality in sub-Saharan Africa'; Roessler et al., 'The cash crop revolution'.

²⁷ Alesina et al., 'Intergenerational mobility'; Van de Walle, 'The institutional origins'.

²⁸ Alvaredo et al., 'Income inequality'; Bigsten, 'Determinants of the evolution'; Bossuroy and Cogneau, 'Social mobility'; Chancel et al. 'Income inequality in Africa'.

²⁹ Alvaredo and Atkinson, 'Top incomes'; Díaz Pabón et al., 'Piketty comes to South Africa'; Terreblanche, *A history of inequality*; Van der Berg, 'Current poverty'; Wilson, 'Historical roots'.

³⁰ See e.g. Bigsten, 'Determinants of the evolution' and, for a critique, Frankema et al., 'Inequality regimes in Africa'.

³¹ Austen, *African economic history*; Frankema et al., 'An economic rationale'; Hopkins, *An economic history*.

³² Austin, 'Explaining and evaluating'; Hopkins, *An economic history*; Roessler, 'The cash crop revolution'.

³³ Gardner, *Taxing Colonial Africa*; Frankema and Van Wijenburg, 'Metropolitan blueprints'.



economies provided increasing income opportunities, these were unevenly distributed.³⁴ Hence, no matter the 'deep' origins of inequality, such as ethnic fragmentation or geographical endowments, expanding commodity production for export was a crucial 'proximate' or intermediary driver of income inequality, which deserves to be studied and understood better in its own right.

Using social tables, the association between export-oriented commercialization in the agricultural sector and income inequality in colonial Africa has been previously documented in individual country studies of Botswana, Ghana, and Uganda.³⁵ In each country, income inequality increased over time, in the whole economy or sections of it, as export production expanded. To acquire a fuller understanding of underlying mechanisms and account for the differences in outcomes in inequality levels and trends, it is important to carry out structured comparative work involving more countries. In our present analysis, we zoom in on how different income cleavages emerged during the colonial era and how export-oriented commercialization in six predominantly agricultural economies in colonial Africa was associated with overall inequality. We specifically explore two factors that plausibly mediated the association between agricultural commercialization and inequality: the extent of colonial presence (settlers and officials) and the resource requirements (i.e. capital versus labour intensity) of relevant agricultural commodities.

To varying degrees, colonial rule facilitated the arrival of non-Africans, often from Europe but also from the Middle East and South Asia, who established settler farms and took up skilled and administrative occupations in the public and private sectors. When working in the administration, non-Africans tended to have average incomes far above those of indigenous populations. The gap in real incomes was further augmented because government officials' salaries were covered by directly or indirectly taxing African producers and their commodity output.³⁶ In colonies where larger numbers of non-Africans arrived, colonial administrations often facilitated the establishment of large-scale farms through land alienation and labour extraction, as was the case in Southern Rhodesia (Zimbabwe) and Kenya.³⁷ Furthermore, European farmers generally obtained higher prices for their production from trading companies, while African producers often were paid below market rates.³⁸ This provided more opportunities for settler farmers to participate in and benefit from export expansion while reducing the scope for indigenous farmers. Thereby, non-African settlement enabled income inequality along racial lines, while income differentiation among Africans through African entrepreneurship was curtailed.³⁹

In non-settler colonies, colonial policies were primarily geared towards abolishing slavery and spurring commodity production among free African producers. Local farmers or 'peasants' retained control over land and labour, often initiating and driving the production of exported goods. For example, in Ghana, the rapid expansion of cocoa exports from the end of the nineteenth century onwards was mainly due to the efforts of indigenous farmers with a capitalist

³⁴ Hopkins, *An economic history*.

³⁵ Aboagye and Bolt, 'Long-term trends'; Bolt and Hillbom, 'Long-term trends'; De Haas, 'Reconstructing income inequality'.

³⁶ Gardner, *Taxing Colonial Africa*; Huillery, 'The black man's burden'.

³⁷ Mosley, *The settler economies*.

³⁸ Suret-Canale, *French colonialism*, p. 471; Tadei, 'The long-term effects'; idem, 'Measuring extractive institutions'; idem, 'Colonizer identity'.

³⁹ Bigsten, 'Income distribution'; Bowden et al., 'Measuring and explaining'; Fibeak, 'Rural income diversification'; Fourie and Von Fintel, 'The dynamics'; Mosley, *The settler economies*.



bent.⁴⁰ In such colonies, inequality was less likely to be driven by race (although a small cadre of high-paid non-African officials was always present) but more by the extent of uneven accumulation and differentiation processes among Africans.⁴¹ In these colonies, the resource requirements – particularly the capital intensity and the scope for capital accumulation – of specific agricultural commodities became a mediating factor strongly affecting the relationship between export production and inequality.⁴²

On one end of the spectrum of commodity resource requirements, annual field crops such as groundnuts or cotton were labour intensive, requiring a short planning window and involving little to no capital investment.⁴³ As a result, these crops needed limited initial wealth, the returns to labour were comparatively low, and there were few benefits to large-scale, plantation-style production using hired labour.⁴⁴ As long as these crops were produced with free labour, we should expect that commercialization generated limited scope for rising inequality. In contrast, agricultural commercialization based on tree crops such as coffee and cocoa required an upfront labour investment of several years in fixed capital (i.e. maintaining land and trees that were not yet mature). Once yielding, however, the returns to labour were substantially higher than for annual crops.⁴⁵ This made hiring external labour (especially during harvesting season) more attractive. Such conditions generated scope for developing large-scale plantations and capitalist labour relations.⁴⁶ Livestock-based commercialization was even more likely to increase income inequality since stock – considered a prime form of capital in many African societies – only yielded sustainable income for those who reached a certain threshold in herd size.⁴⁷ On the most capital-intensive end, we should expect that the commercialization of non-farm activities, such as mineral extraction, produced the highest income inequality. For example, in Belgian Congo, Northern Rhodesia (Zambia), and South Africa, profits made in mining were concentrated among a small number of (primarily European) individuals and firms who brought specific skills and large amounts of capital, and a small cadre of skilled employees.⁴⁸ Unfortunately, we lack social tables for mineral-resource-dependent African countries and cannot include them in our analysis.

Indigenous social structures also plausibly mediated the relationship between commercialization and inequality. Pre-existing (but evolving) social structures were heterogeneous across African societies. They were associated with various degrees of initial inequality linked to class structures and the prevalence of slavery and other forms of bonded labour.⁴⁹ For example, in highly stratified societies with considerable involvement in slave trading, such as the Sokoto

⁴⁰ Austin, 'Explaining and evaluating', p. 1035; Hill, *The migrant cocoa-farmers*.

⁴¹ Aboagye and Bolt, 'Long-term trends'; Austin, 'Cash crops'; Hopkins, *An economic history*, p. 292.

⁴² Significant spatial differences also existed within and across African colonies in terms of the volumes and types of commodities that could be produced for export. 'Horizontal' (spatial) inequalities could arise between those with access to fertile soils for certain crops, harbours, and railheads and those lacking such access. Labour migration to cash-crop areas was an option to overcome such spatial inequalities and one that was widely used. Still, migrants were often curtailed in their ability to access – let alone own – land independently (De Haas and Travieso, 'Cash-crop migration').

⁴³ Tosh, 'The cash-crop revolution'.

⁴⁴ Tosh, 'The cash-crop revolution'.

⁴⁵ Austin, 'Explaining and evaluating'; De Haas, 'Measuring rural welfare'.

⁴⁶ Austin, 'Capitalists and labour'; Hill, *The migrant cocoa-farmers*.

⁴⁷ Bolt and Hillbom, 'Long-term trends'.

⁴⁸ De Zwart, 'South African'; Juif, 'Migration and stabilization'.

⁴⁹ Frankema et al., 'Inequality regimes in Africa'.



Caliphate (Nigeria) or Ashanti (Ghana), elites were able to redirect enslaved people towards domestic agricultural commodity production, which potentially augmented income inequality in the early stages of commercialization. Although slave-based production gave a commercial head start to slave-owning elites, the process of abolition that accelerated in the late nineteenth and early twentieth centuries likely reduced inequality, as it increased the bargaining power of (migrant) labourers and facilitated small-scale cash crop production.⁵⁰ However, our data are not particularly suitable for capturing the role of indigenous social structures in shaping inequality outcomes. First, our social tables pertain to 1914–69, with most observations towards the latter end of this period. Hence, we do not capture inequality during c. 1880–1914, when indigenous societies clashed in various ways with new colonial economic and administrative systems. Second, most social tables are aggregated on the colony level, while pre-colonial social structures differed substantially within what would become colonial territories, and subsequently, independent African nations. To capture the effect of these different institutions, one would have to measure historical income inequality at a more disaggregated level, an approach that remains to be pursued elsewhere.⁵¹

On the basis of our discussion of previous research on export-oriented commercialization, non-African settlement and diverse characteristics of agricultural commodities, we formulate three hypotheses that guide our empirical analysis:

- H1. *Income inequality in predominantly agrarian African colonies is positively associated with export-oriented commercialization.*
- H2. *In colonies with larger non-African settlement, racial differences predominate overall inequality, while inequality between Africans is lower.*
- H3. *Colonies reliant on more capital-intensive agricultural export commodities have higher inequality within the agricultural sector, which in turn accounts for an important share of overall inequality.*

II | DATA

Social tables tabulate average incomes for several clearly defined groups of income earners. This contrasts with modern inequality studies, which calculate inequality over a much more refined distribution of individual income earners. We use evidence on income inequality for all African colonies for which full and consecutive social tables exist: Botswana, Côte d'Ivoire, Ghana, Kenya, Senegal, and Uganda. In total, we have 33 social tables, which, viewed within the wider literature, add up to a substantial number of observations. Our social tables are notably cohesive because they are from the same region and period. For comparison, Milanovic et al.⁵² and Milanovic⁵³ make inferences on the basis of 28 and 41 social tables, respectively, covering the

⁵⁰ Austin, 'Cash crops'; Law, *From slave trade*; De Haas and Travieso, 'Cash-crop migration'.

⁵¹ For regional approaches to inequality, see, for example, De Zwart, 'Inequality in late colonial' for income in Indonesia; De Haas, 'Reconstructing income inequality' for income in Uganda; Alesina et al., 'Intergenerational mobility' for educational inequality in Africa. For a study on pre-colonial inequality in Latin America, see Alfani and Carballo, 'Income and inequality'.

⁵² Milanovic et al., 'Pre-industrial inequality'.

⁵³ Milanovic, 'Towards an explanation of inequality'.

**TABLE 1** Basic characteristics of social tables used in this study.

Country	No. Tables	First table	Last table	No. Classes	Source
Botswana	5	1921	1963	10–12	Bolt and Hillbom, 'Long-term trends'
Côte d'Ivoire ^a	4	1939	1954	22 (340)	Alfani and Tadei, 'Income inequality' (and revisions) ^f
Ghana ^b	4 (7)	1921 (1891)	1960	17	Aboagye and Bolt, 'Long-term trends'
Kenya ^c	11 (14)	1914	1969 (1976)	13	Bigsten, 'Income distribution'
Senegal ^d	4	1939	1954	21 (231)	Alfani and Tadei, 'Income inequality' (and revisions)
Uganda ^e	5	1925	1965	11 (113)	De Haas, 'Reconstructing income inequality'

Notes: ^aFor Côte d'Ivoire, Alfani and Tadei, 'Income Inequality' (and revisions) distinguish 22 'vertical' classes, of which some are further subdivided 'horizontally' across spatial units, adding up to 340 income groups. ^bFor Ghana, Aboagye and Bolt, 'Long-Term Trends' have produced seven social tables in total. Three of them only apply to part of the territory and earlier decades (pre-1920) for which we have no evidence from other colonies, and therefore they are excluded from our analysis. ^cBigsten, 'Income Distribution', has produced 14 tables. Three of them have data from a late decade (post-1969) for which we have no evidence from other colonies, and therefore they are excluded from our analysis. ^dFor Senegal, Alfani and Tadei, 'Income Inequality' (and revisions) distinguish 21 'vertical' classes, of which some are further subdivided 'horizontally' across spatial units, adding up to 231 income groups. ^eFor Uganda, De Haas, 'Reconstructing income inequality' distinguishes 11 'vertical' classes, which are further subdivided 'horizontally' across spatial units, adding up to 113 distinct income groups.

^fSee Online [appendix S.1](#) for a detailed description of revisions.

entire globe and several millennia. The main characteristics of our social tables are summarized in table 1. For further details about the respective social classes in each set of tables, see Online Supplementary Materials, [appendices S.2 and S.4](#).

The five original studies that underpin our comparison use different methodologies to distinguish their social classes and provide different levels of detail and disaggregation for specific parts of the income distribution. The reasons for these differences are substantive: economies differ in structure; hence, income class structures look different. However, some variation is plausibly driven, at least partly, by data availability limitations or idiosyncratic researcher decisions. If the latter is the case, we should determine if the different social tables are sufficiently commensurable for our comparative analysis. We deploy various strategies to assess and, if necessary, improve the commensurability of the original social tables. First, we scrutinize the methodological choices used by the different authors to construct their tables and assess to what extent these may interfere with our comparison. For Botswana and Uganda, we find that aspects of the original tables are too much at odds with those of the other cases to warrant direct comparison. Hence, we make modifications to increase commensurability. We also conduct a robustness exercise to harmonize the tables' class structures to see if this affects the resultant inequality levels and decomposition. Although this exercise affects inequality levels in some countries, the impact is not large enough to alter our findings. For other dimensions of potential incommensurability, we find upon inspection that the tables are sufficiently similar for the exercises conducted in our study. Before proceeding with the actual comparison, we further describe the modifications to the original tables and the harmonization exercise. Further details are supplied in the Online Supplementary Materials.



De Haas has shown for Uganda that the choice of ranking population – such as households, individuals, or the workforce – can significantly impact inequality levels.⁵⁴ Therefore, it is essential to use a consistent ranking population for comparison, which in our case, is the workforce. Relatedly, given the African colonial context where population statistics are often inaccurate,⁵⁵ we should use a consistent approach to measuring population. To ensure consistency in the population estimates, we modify the ranking populations in the original social tables of Botswana, Kenya, and Uganda. For the tables of Botswana, we find that the social tables use a wider concept of the workforce, including most children. The authors justify this choice in the original study, but it is inconsistent with the other social tables.⁵⁶ We thus re-estimate the size of Botswana's rural social classes, keeping incomes constant. Reassuringly, this modification has close to no impact on the inequality estimates.⁵⁷ For Kenya, we observe that Bigsten's population numbers underpinning his estimates of the size of the workforce diverge from Frankema and Jerven's, which have been used in the other social tables.⁵⁸ Consequently, we adjust Kenya's population and recalculate the workforce size, assuming that the 'miscounted' population belonged to the smallholder class. Because this population conversion relies on strong assumptions, and because using different population estimates does not alter Kenyan inequality in any substantive way, we stick with Bigsten's population numbers.⁵⁹ The original study for Uganda provides social tables using both individuals and households as the ranking population.⁶⁰ To make Uganda's tables commensurable, we re-estimate the distribution using the workforce instead.⁶¹

Next, we evaluate whether the degree of precision with which parts of the income distribution are tabulated is so uneven between the different studies that it reduces their commensurability. Our concern is not with workers in formal employment. The reported sizes and incomes of classes in formal employment in each table are based on census and employment survey data, so we have little reason to doubt these numbers. However, measuring the size and income of classes obtaining their livelihoods primarily through selling agricultural produce, self-provisioning, and informal employment contracts (such as sharecropping) is more complex and done indirectly in each social table. We therefore focus our attention on evaluating the commensurability of the estimates for classes in the rural sector.

One specific concern is that the original tables used different methodologies to measure non-monetized self-provisioning or 'subsistence income', especially among lower-income rural classes. If the income of these classes is assumed to remain at a 'barebones survival level' while the (measured) real incomes of other groups increase, inequality will artificially inflate over time. However, reassuringly, the original social tables generally did not assume that poor groups live at barebones survival level. The exception is a set of three consecutive tables for Botswana (1921–46), in which the researchers made a deliberate choice on the basis of their assessment of the living standards of the poorest income group of 'bonded labourers' at the time.⁶²

⁵⁴ De Haas, 'Reconstructing income inequality'.

⁵⁵ Kuczynski, *Demographic survey*.

⁵⁶ Bolt and Hillbom, 'Long-term trends'.

⁵⁷ Appendix S.2.1. provides more detail.

⁵⁸ Bigsten, 'Income distribution'; Frankema and Jerven, 'Writing history'.

⁵⁹ App. S.2.3. provides more detail.

⁶⁰ De Haas, 'Reconstructing income inequality'.

⁶¹ App. S.2.2. provides more detail.

⁶² Bolt and Hillbom, 'Long-term trends'.



Another concern, especially for the rural groups, is that the number, sizes, and incomes of different classes are too imprecise to compare countries on the basis of their social class structure. We follow two strategies to evaluate this potential concern. First, to see whether the number of classes and their sizes affect inequality levels, we perform an analysis in which we standardize the number of social classes and the cut-off points for distinguishing them. For this exercise, we start from a structure of four classes for which we are confident that they are correctly distinguished in the different social tables, namely, combinations of self-employed versus waged and African versus non-African, and then subdivide each of these by their top 10 per cent, bottom 40 per cent, and middle 50 per cent income shares. This results in social tables with 12 harmonized classes. Reassuringly, these harmonized classes' Gini coefficients of income inequality diverge only slightly from those based on the original class structures. Therefore, we stick with the original social classes, as they provide more disaggregated and better-contextualized information.⁶³

Second, we scrutinize the different strategies employed in the five underlying studies to distinguish non-waged classes and estimate their incomes. The studies used two contrasting strategies to differentiate incomes among rural classes. The social tables for Botswana and Ghana mainly used what we might refer to as a 'direct bottom-up approach'. They estimated the sizes of the different classes and their incomes directly, on the basis of evidence from a wide range of sources, such as rural household surveys. As a result, the relative incomes and sizes of the different rural classes are specific to (and therefore different for) each social table. Within-country regional differences remain implicit in this approach. Meanwhile, the social tables for Côte d'Ivoire, Senegal, and Uganda used an 'indirect top-down approach'. They first measured the total value of rural income, then they apportioned this total income to different classes on the basis of information about the sizes of these classes and their relative income differences. The number of classes and the strategies to apportion income differ among the latter studies. Still, they have one key feature in common: income is measured and apportioned at the district level to capture the substantial regional differences in agricultural output and to improve the indirect approach's precision. Finally, Kenya represents a mix of both approaches, and racial rather than regional differences were used to distinguish rural social classes, reflecting the importance of European and Asian expatriates and settlers to Kenya's rural economy.

Ultimately, both approaches provide a distribution that can capture 'vertical inequality' (between different social groups) and 'horizontal inequality' (between different regions). The method applied for Botswana, Ghana, and Kenya takes the first (vertical inequality) as the primary entry point. It leaves the second implicit (i.e. that some social classes at the country level are composed mainly of people from specific regions). Meanwhile, the method for Côte d'Ivoire, Senegal, and Uganda breaks down the distribution into regional units to refine otherwise coarser information on vertical inequality. Although the two methods differ, they can both arrive at plausible estimates of the actual distribution of income. To further corroborate this, we conduct some additional checks. First, to evaluate if the direct bottom-up approach yields plausible total income estimates, we correlate the per capita incomes from the social tables, deflated with the United Kingdom (UK) gross domestic product (GDP) deflator with real GDP estimates from Maddison and Broadberry and Gardner, and find that the two measures are closely associated, as we should expect.⁶⁴ Second, we spot check the indirect estimates for the Uganda tables using scattered direct

⁶³ App. S.3.2. provides more detail.

⁶⁴ Broadberry and Gardner, 'Economic growth'; Maddison, 'Historical statistics'. Online Supplementary Materials, app. S.3.3. provides more details.

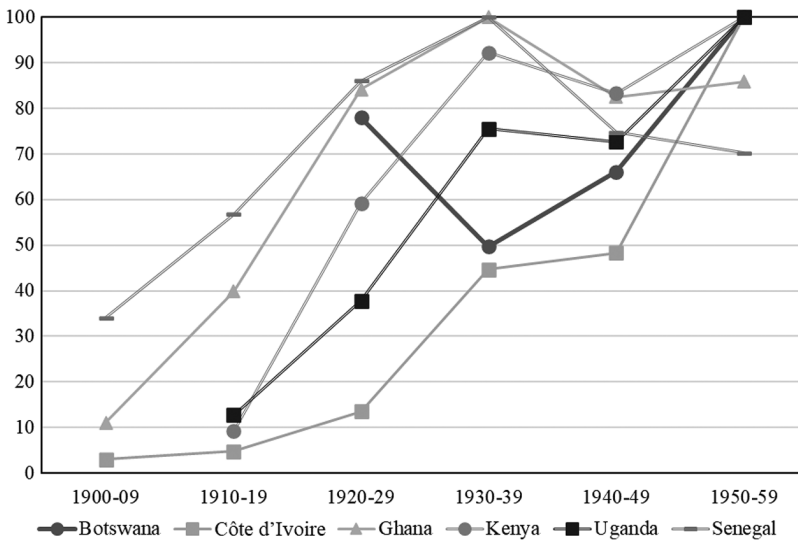


FIGURE 1 Commodity exports per capita, constant prices, 1890–1960 (peak decade = 100).

Note: The commodities considered for each country are the following. Botswana: butter, cattle, cattle carcasses, hides, sheep, and goats. Côte d'Ivoire: coffee, cocoa, palm kernel, palm oil, and wood. Ghana: kola nuts, copra, palm kernels, palm oil, cocoa, manganese ore, rubber, wood, diamonds, and gold. Kenya: coffee, maize, pyrethrum, tea, carbonate of soda, wattle bark, hides, and sisal. Uganda: coffee, cotton seed, cotton lint, tea, tobacco, and hides. Senegal: unshelled groundnuts, shelled groundnuts, groundnut oil, and gum and resins. Prices for 1957 (1956 for Senegal and 1958 for Côte d'Ivoire) are used to calculate constant price series because we have close to complete price series for that year. We have ascertained (but do not report) that using a different base year has only minor effects on the trends.

Sources: African Commodity Trade Database (Frankema et al., 'An Economic Rationale'), and unpublished extensions by Ewout Frankema and Felix Meier zu Selhausen.

income observations from various historical sources and find that they are reassuringly close to the indirectly derived estimates.⁶⁵

III | COUNTRY COMPARISON

Section I presented three hypotheses on the relationship between export-oriented commercialization and income inequality in predominately agrarian African colonial economies. How well do our six cases serve us to evaluate these hypotheses? Figure 1 charts the expansion of the total volume of exports for the six country cases. In each of the colonies in our sample, we observe substantial increases in, predominantly agricultural, commodity exports during the colonial era (1890–1960), both in the long term and during most of the individual decades that fall within our period of interest. However, the timing and speed of such expansion varied. On the basis of the postulation that export incomes accrue through direct channels to agricultural producers (via crop sales or agricultural wages) but also via indirect channels to other sectors in the economy

⁶⁵ See Online Supplementary Materials, [app. S.3.4](#), for more details.



(via consumption and production linkages or government taxation and spending), this leads us to a first expectation that we evaluate with our data:

- E1. In the long run, all six colonies should experience increasing inequality, and shorter-run variations in inequality should be linked to changes in the degree of export-oriented commercialization.

Next, we want to evaluate non-Africans' role in these six countries' income inequality patterns. The distinction between African versus non-African and between waged versus self-employed workers, which we made to build the harmonized social tables previously discussed, can also be used to assess the relative importance of the role of non-Africans, both employees (mostly in government service) and self-employed (business owners and settler farmers) in the economy. As shown in figure 2 in panels A and B, non-Africans made up only a very small share of the workforce in all six colonies (also see Online Supplementary materials, [appendix S.4](#)). The highest non-African share was found in Kenya in 1955 (2.6 per cent of the workforce), and the lowest share was in Ghana in 1948 (0.02 per cent of the workforce). In terms of income, non-African shares were much more significant, indicative of large racial income gaps. In Côte d'Ivoire, Kenya, Senegal, and Uganda, we find that non-Africans earned more than 10 per cent of all income for at least some years. In Kenya in 1950, non-Africans even earned more than half of all income (51.3 per cent). Senegal is a specific case, with a relatively low-income share going to self-employed non-Africans and a larger share going to non-African formal wage earners (and African formal wage earners). The large income share going to formal wage earners in Senegal is clearly related to the fact that it hosted the administration of a federation, *Afrique Occidentale Française* (AOF), which included Mauritania, Mali, Guinea, Côte d'Ivoire, Burkina Faso, Benin, Dahomey, and Niger.⁶⁶ On this basis, and in light of our second hypothesis, we expect to find the following:

- E2. In places of substantial non-African settlement (Kenya, Senegal, and, to a lesser extent, Uganda and Côte d'Ivoire), racial income inequalities predominate, while inequality between African classes is lower.

Finally, we are interested in the effect of the resource requirements of different commodities on inequality. The type of commodities exported varied substantially between our cases. On the two extremes, Botswana's exports were dominated by cattle, a capital-intensive commodity, while Senegal specialized in groundnuts, a labour-intensive commodity. The prime commodities of the other colonies stand in the intermediate range. Ghana produced primarily cocoa, Côte d'Ivoire cocoa and coffee, Kenya coffee, and Uganda cotton and coffee. Table 2 summarizes our assessment of these different commodities' capital intensity. The combination of substantial increases in export volumes (see figure 1) for all cases and their broad range of commodity specialization makes our sample suitable for evaluating the association between export-oriented commercialization and income inequality over time and between countries.⁶⁷ Unlike hypothesis 1, where we look at inequality in the economy as a whole, we expect that the capital intensity of different commodities affects inequality primarily through the direct agricultural income

⁶⁶ Fall, 'L'AOF: Jacobinisme'.

⁶⁷ Magnitudes, which are not visible here, also varied, with Ghana as the most and Botswana as the least commercialized economies in terms of values and volumes per capita. We will consider this later when we formally evaluate the correlation between commercialization and inequality.

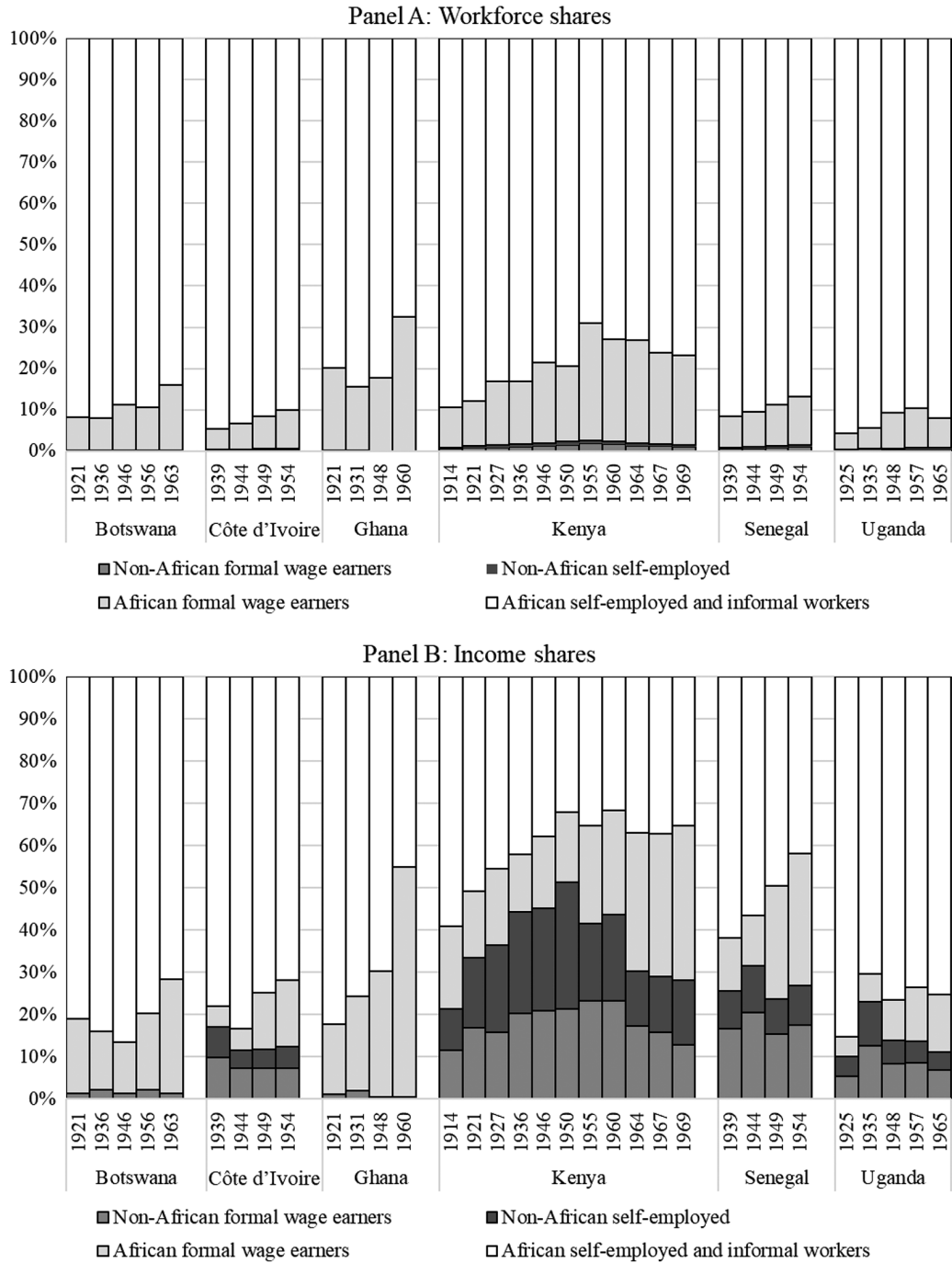


FIGURE 2 Workforce (A) and income (B) shares by race and employment type.

Sources: Authors' calculations based on Aboagye and Bolt, 'Long-term trends'; Alfani and Tadei, 'Income Inequality' (and revisions); Bigsten, 'Income distribution'; Bolt and Hillbom, 'Long-term trends'; De Haas, 'Reconstructing income inequality'.

**TABLE 2** Main export commodities and their resource requirements, c. 1900–1960.

Country	Main commodity ^a	Characteristics	Capital intensity ^b
Botswana	Cattle	Cattle herd management requires a long planning window, and a substantial herd is required to be able to generate income, especially from selling off animals for meat (Bolt and Hillbom, 'Long-term trends')	High
Côte d'Ivoire	Cocoa and coffee	Coffee requires substantial upfront planning and investment in the trees, which take 3 years to bear fruit (De Haas, 'Measuring rural welfare').	Medium-high/medium
Ghana	Cocoa	Cocoa: see Ghana Cocoa requires substantial upfront planning and investment in the trees, which take 5 years to bear fruit (Austin, 'Explaining and Evaluating')	Medium-high
Kenya	Coffee	Coffee: see Côte d'Ivoire	Medium
Senegal	Groundnuts	Groundnuts are a labour-intensive annual field crop with fast returns within one season (Tosh, 'The cash-crop revolution')	Low
Uganda	Cotton and coffee	Cotton is a very labour-intensive annual field crop with fast returns within one season (Tosh, 'The cash-crop revolution')	Low/medium
		Coffee: see Côte d'Ivoire	

Source: ^aSee figure 1. ^bCreated by authors from the sources mentioned in the column 'characteristics'. Also, see section I.

channel. Thus, we test this hypothesis by looking solely at income distribution in the agricultural sector. Meanwhile, we also hypothesize that, given the agrarian context of all our cases, we should expect inequality in the agricultural sector to contribute substantially to overall inequality. Tailoring our hypothesis 3 to the six cases at hand, we expect the following:

E3. Compared with Senegal and Uganda, which are primarily reliant on the least capital-intensive agricultural commodities (cotton and peanuts), income inequality in the agricultural sector is higher in Kenya, Côte d'Ivoire, Ghana, and especially Botswana, which are reliant on more capital-intensive commodities (cattle, cocoa, and coffee). Moreover, since all six colonies are predominantly agricultural, income inequality in the agricultural sector contributes a substantial share of overall inequality.

IV | RESULTS

We present our results in three parts – one per hypothesis and related expectations. First, we evaluate E1 by analysing trends in the Gini, Inequality Extraction Ratio (IER), and Theil and relating these to changes in commercialization. Next, we evaluate E2 and E3 using the Theil index, which enables us to decompose inequality between and within race and sector components.

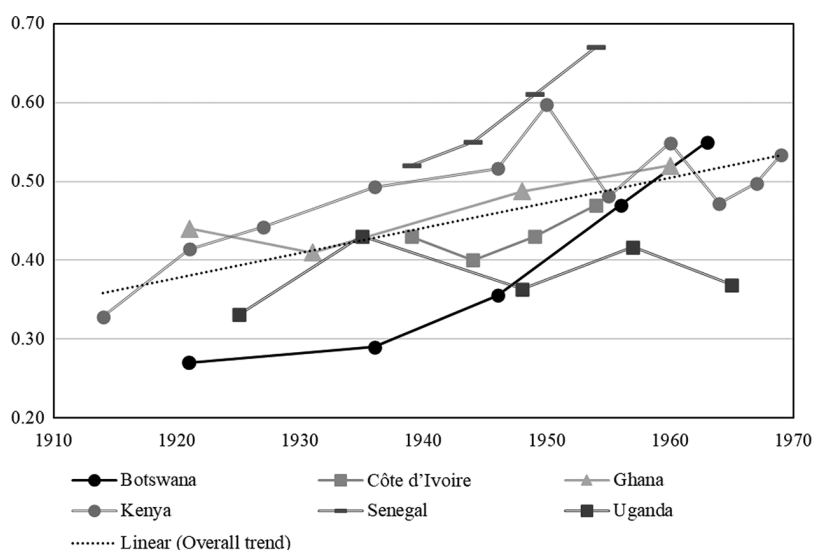


FIGURE 3 Gini coefficients.

Sources: Calculated by the authors on the basis of Aboagye and Bolt, 'Long-term trends'; Bigsten, 'Income distribution'; Bolt and Hillbom, 'Long-term trends'; Alfani and Tadei, 'Income Inequality' (and revisions); De Haas, 'Reconstructing income inequality'.

To evaluate inequality trends, we use different indicators to obtain a fuller and more robust picture. While the Gini coefficient, the IER, and the Theil index are highly correlated, each measure accentuates different aspects of the income distribution.⁶⁸ Thus, we may expect and indeed observe that inequality levels and trends are, to some degree, sensitive to the choice of the measure.

Figure 3 shows Gini coefficients for our sample of colonies between the 1910s and the 1960s. The overall average Gini is 0.46, which is higher than the global mean in the same period.⁶⁹ Inequality rose over time, with the average Gini increasing from 0.36 in 1910–25 to 0.51 in 1950–65. Appendix 1 shows that this trend is statistically significant by regressing Gini on a linear time trend, with and without country fixed effects. The fact that the trend is positive also within countries suggests that this result is not driven by changes in the sample of countries over time. The long-term increase is particularly evident in the case of Botswana (from 0.27 to 0.51) but can also be seen in Ghana (from 0.42 to 0.52), Kenya (from 0.37 to 0.52), and Uganda (from 0.33 to 0.39). Finally, although we lack data to evaluate this, we find it plausible, considering the moderate-to-high and increasing levels of inequality observed in Côte d'Ivoire and Senegal from 1939 onwards, that these two colonies also saw rising inequality in preceding decades as colonial rule became entrenched and export-oriented commercialization progressed. Overall, the observed pattern of rising inequality is broadly consistent with our expectation that processes of commodity-based commercialization during the colonial era are linked to rising inequality in predominantly agricultural economies (see section I and E1).

In figure 4, we present results for the IER. To calculate the 'non-extractable' subsistence income that underpins the IER, we construct barebones subsistence baskets evaluated at relevant

⁶⁸ See Online Supplementary Materials, appendix [tab. A5.2](#).

⁶⁹ [UNU-WIDER](#), *World Income Inequality Database*, average reported Gini in 1910–1965: 0.41.

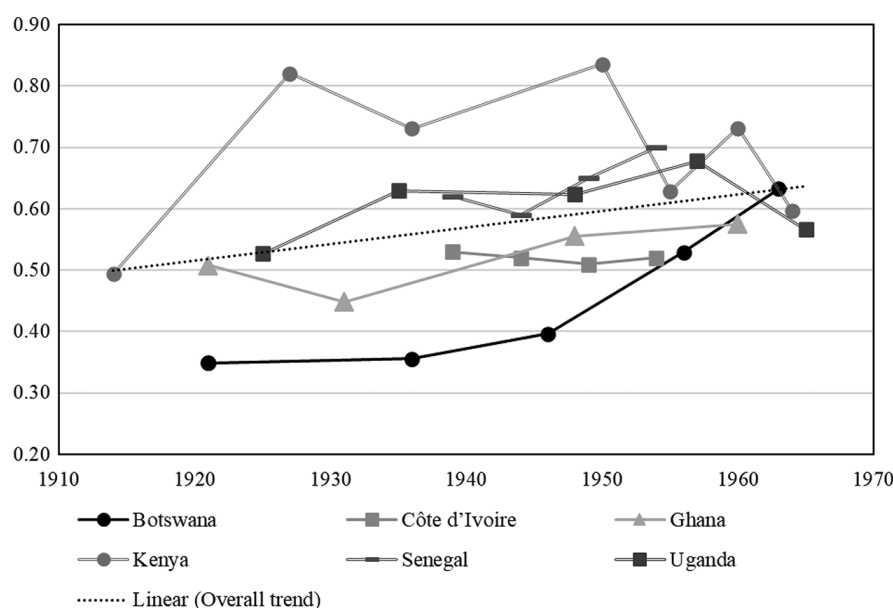


FIGURE 4 Inequality Extraction Ratios.

Source: Calculated by the authors on the basis of Aboagye and Bolt, 'Long-term trends'; Bigsten, 'Income distribution'; Bolt and Hillbom, 'Long-term trends'; Alfani and Tadei, 'Income Inequality' (and revisions); De Haas, 'Reconstructing income inequality'.

(rural) price levels.⁷⁰ During the period of analysis, the average IER is 0.58, which is lower than what we know about other pre-industrial societies.⁷¹ It should be noted, however, that our lower average may be due to our use of subsistence baskets rather than previous scholars' use of real GDP estimates to calculate the IER.⁷² The average IER rose from 0.47 in 1910–25 to 0.64 in 1950–65, and long-run increases are observable in all colonies except for Côte d'Ivoire, where the trend is stagnant. Notably, in Kenya, economic expansion in the final years of colonial rule resulted in more inclusive income structures. This is plausibly related to the fact that after years of restriction and repression, African producers were finally allowed and encouraged to independently expand lucrative cash crop production, which came at the expense of settlers' income shares.⁷³ The overall upward trend for all observations jointly is statistically significant (see appendix 1), suggesting that African colonial societies overall tended to become more extractive over time. Hence, the IER conveys a similar, although less consistent, message as the Gini regarding rising inequality. The upward trend of the IER also shows that rising inequality was not driven solely by a growing scope for inequality due to a rising average income.

⁷⁰ See Online Supplementary materials, [app. S.6](#).

⁷¹ Milanovic et al., 'Pre-industrial inequality', p. 263, reports an average IER of 0.77.

⁷² Due to data availability, using the best GDP estimates available would mean that we lose at least seven observations and are left with short series for Botswana, Côte d'Ivoire, and Senegal. Moreover, we consider the barebones basket to be a more precise indicator of non-extractable subsistence income than much more conjectural GDP estimates. In [app. S.3.3.](#), we explore the relationship between GDP estimates and our social tables.

⁷³ Mosley, *The settler economies*.

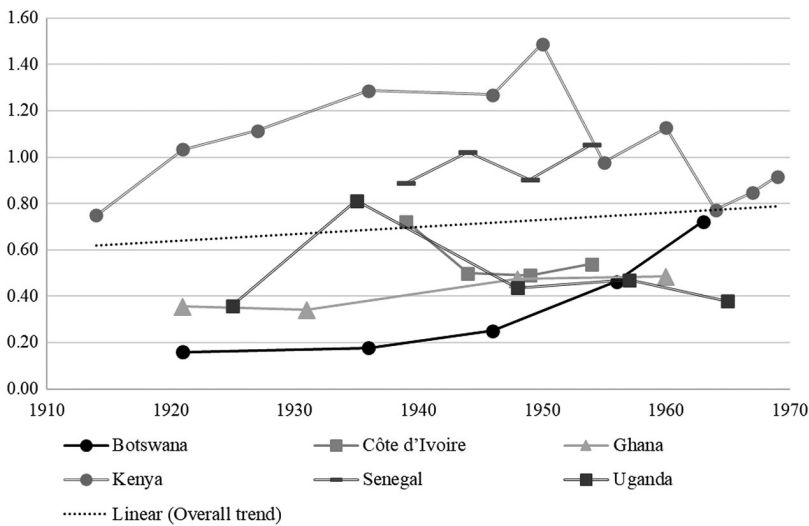


FIGURE 5 Theil Indices.

Source: Calculated by the authors on the basis of Aboagye and Bolt, 'Long-term trends'; Bigsten, 'Income Distribution'; Bolt and Hillbom, 'Long-term trends'; Alfani and Tadei, 'Income Inequality' (and revisions); De Haas, 'Reconstructing income inequality'.

Figure 5 reports Theil indices. The average Theil rose from 0.53 in 1910–25 to 0.79 in 1950–65. Kenya, the most dualistic economy in our sample, with a substantial high-earning non-African settler population, comes out particularly unequal when using this measure. Unlike with the Gini and more so than with the IER, we observe substantial declines towards the end of the period in Côte d'Ivoire, Kenya, and Uganda. This is consistent with the decline in the share of the very top incomes of Europeans in British and French African colonies since the Second World War, which is visible in figure 2 and has also been noted in previous studies.⁷⁴ The overall upward trend of the Theil index is not statistically significant (see appendix 1), which is plausibly explained by the relative decline in European top incomes in the latter part of the period (as the Theil is more sensitive than the Gini to changes in income levels at the far ends of the income distribution). To test if high-earning Europeans indeed drive the different trend for the Theil compared with the Gini and IER, we remove the Europeans from the income distribution and recalculate the Theil. The upward trend now becomes more pronounced as well as statistically significant.⁷⁵

All three inequality metrics show an upward trend from the 1910s to the 1960s, but the slope and consistency of the trends vary by metric. While this sensitivity calls for some caution when interpreting the results, the different behaviour of inequality measures also yields interesting information, and is plausibly explained by changes in different parts of the income distribution. Top incomes (especially those of European officials), which weigh heavily into the Theil index, were certainly very high in colonial Africa, and their prevalence substantially impacts level differences in inequality between the six colonies. However, they are only one part of the overall inequality trends we observe. Indeed, increases in inequality over time in these predominantly agricultural economies were also driven by diversification among African classes in the (upper-)

⁷⁴ Alvaredo et al., 'Income inequality'.

⁷⁵ See Online Supplementary Materials, appendix tab. A6.1.

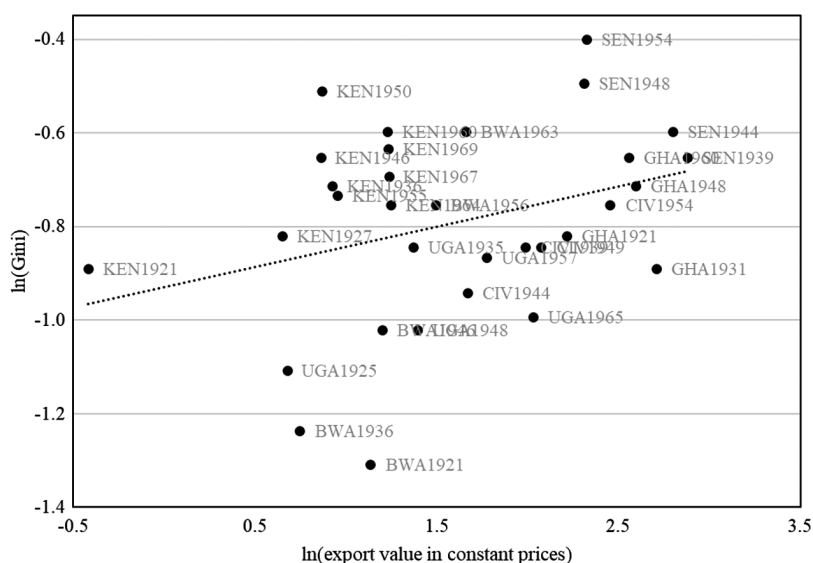


FIGURE 6 Commercialization and inequality.

Sources: See figure 1.

middle parts of the distribution, to which the Gini is more sensitive.⁷⁶ That the upward trend in inequality is most pronounced when using the Gini is consistent with our argument that export-oriented commercialization affected broad sections of the population. Moreover, it vindicates the use of social tables because it is precisely through this approach that one can unveil that increases in inequality over the colonial period took place along the entire income distribution, not just the (very) top.

How do we interpret these trends in light of our hypothesis about commercialization (H1)? So far, we have shown that long-term income inequality and agricultural commercialization are two processes that are positively associated in the long term. However, what if we consider more precisely the correlation between varying levels of commercialization and inequality across individual observations? To evaluate this relationship, we correlate income inequality to ‘export intensity’, that is, the real value of export production per capita, which we measure using constant prices from the late 1950s (see figure 1 for more details). For each observation, we take the average of the constant export value of the 5 years leading up to and including the year for which we have social tables. Thereby, we smooth annual variations and allow some time for changes in export intensity to translate into changes in inequality. Because we are interested in comparing differences in the level of inequality and how this is linked to differences in commercialization, we take the natural logarithm of both variables. This allows us to interpret the result in percentage changes.

Consistent with our first hypothesis and expectation, we find a positive correlation between export intensity and the Gini coefficient, as shown in figure 6. Appendix 2 shows that this relationship is statistically significant and robust to the inclusion of colony fixed effects and

⁷⁶ Notably, developments at the very top and in the middle parts of the distribution, respectively, could be moving in opposite directions. Simultaneously, there can be growing differentiation below the very top incomes (i.e. among Africans) combined with a convergence of top incomes (non-Africans) with those in the remainder of the (African) economy, which likely happened in the late colonial period (see also De Haas, ‘Reconstructing income inequality’).



colony-specific time trends. A doubling (100 per cent increase) in the levels of export intensity is associated with a 9–17 per cent higher Gini coefficient, depending on the specification. For the IER, the relationship is not significant, and for the Theil index it is only significant when colony dummies and time-trends are included. That the Gini is positively associated with export intensity and the IER is not indicates that export intensity enabled greater inequality by raising mean incomes (for which the IER accounts). That the Theil results are weaker suggests that the middle parts of the distribution are more affected by commercialization than the extremes which the Theil picks up. Thus, while we find evidence for the expected positive association between commercialization and inequality, the sensitivity to specific measures warrants caution when linking commercialization to income inequality broadly defined. We should reiterate that our sample of observations is dictated by limited data availability, and therefore is small and not representative of a broader context. Moreover, due to the small sample size, we have limited statistical power and cannot control for a host of potential confounders. Further research based on a broader and possibly more representative set of observations, which is not yet available, should assess whether the hypothesized relationship is indeed causal and robust to the inclusion of other colonies and years.

To evaluate our hypothesis on the racial dimension of inequality (H2), our first decomposition focuses on inequality among African classes, on the one hand, and between Africans and non-Africans and among non-Africans, on the other. We can use this decomposition to see how the link between commercialization and inequality was mediated by the presence of non-Africans who, aided by their influence over colonial institutions, could reap a large share of the income from commodity production.

Significant racial inequalities should be particularly visible in Kenya, the only settler colony in our sample, as well as Senegal, where many Europeans worked in the colonial administration. They should be visible to some extent in Uganda, where South Asians played a critical role in trading and processing agricultural commodities. Racial cleavages should also appear in Côte d'Ivoire, which had a substantial, albeit struggling European settler community. In Botswana and Ghana, racial inequalities are expected to be lower as settlers were mostly absent, and non-Africans played a comparatively small role in the upper echelons of their colonial bureaucracies (see figure 2).

Figure 7 is consistent with our expectations. Kenya indeed had the highest level of inequality involving non-Africans, followed by Senegal, Uganda, and Côte d'Ivoire. The decomposition shows an inverse relationship between inequality among Africans, on the one hand, and between Africans and non-Africans and among non-Africans, on the other. This is indicative of a trade-off: either Europeans or African elites reaped the benefits from commercialization.⁷⁷

Our second Theil decomposition focuses on inequality between a component representing inequality within the agricultural sector, and a component representing inequality between the agricultural sector and the non-agricultural sector plus inequality within the non-agricultural sector.⁷⁸ We are interested in finding out to what extent the resource requirements of specific

⁷⁷ This trade-off becomes even more marked when Senegal is excluded from the analysis, which makes sense given that a substantial proportion of the higher rungs of the administration in Dakar, which was gradually 'Africanized' during the period studied here, accounts for the rising inequality between African classes observed. As noted earlier and discussed by Fall, 'L'AOF: Jacobinisme', and suggested using fiscal data for 1925 by Westland, 'Agriculture and industry', these administrators in Senegal were at least partially financed through export proceeds in other parts of the French West African federation. In the case of Kenya, we should note that low inequality among Africans may also be driven, at least partially, by Bigsten's methodological choice not to differentiate in the African self-employed sector (Bigsten, 'Income distribution'). The inverse relationship is still present even if we drop Kenya.

⁷⁸ For Uganda, we lacked information about sectors, so we equated 'self-employed' with the agricultural sector, and 'formal waged' with the non-agricultural sector. For Kenya, we classified 'self-employed' classes as agricultural.

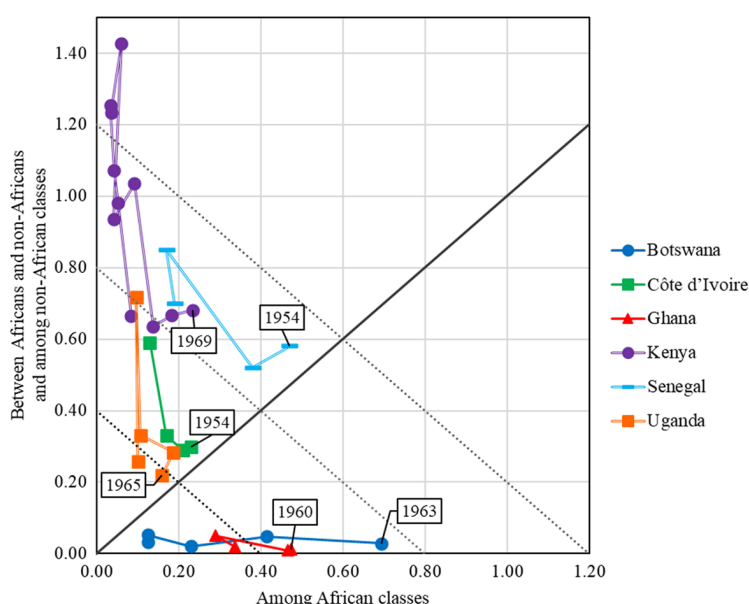


FIGURE 7 Theil decomposition by race.

Notes: The diagonal lines (top left to bottom right) are 'inequality indifference lines'. Along these lines, the total Theil index is constant. The line separating the graph's top left and bottom right halves illustrates the decomposition where the 'non-African' and 'African' components are equal. All points below this line indicate that inequality among Africans contributed more to the overall Theil index than non-Africans, and vice versa. For each country, the year of the final observation is indicated.

[Colour figure can be viewed at wileyonlinelibrary.com]

commodities were mediated by the link between export-oriented commercialization and income inequality. We expect higher inequality among agricultural commodity producers in colonies reliant on capital-intensive agricultural commodities, such as cocoa, coffee, and livestock. Conversely, we expect lower inequality in the agricultural sector in colonies reliant on agricultural commodities with low capital intensity, such as cotton and groundnuts. As previously noted, we do not expect differences in the capital intensity of specific commodities to translate into differences in inequality outside the agricultural sector. Still, it is worth plotting the full decomposition (including the non-agricultural component) because it allows us to evaluate the relative contribution of intra-agricultural inequality to overall inequality. Given the agrarian nature of the six countries under investigation, we should expect this agricultural contribution to be substantial.

This decomposition exercise, reported in figure 8, provides evidence that, though not conclusive, is broadly consistent with our expectations. If we take the latest available observation for each of the countries in our sample – when the process of agricultural commercialization was most advanced – we find that the agricultural Theil indices line up almost entirely as expected, based on our analysis of commodity-specific resource requirements (table 2): Senegal (lowest, 0.05), Uganda (0.16), Côte d'Ivoire (0.19), Ghana (0.33), Kenya (0.55), and Botswana (highest, 0.59). Moreover, in most cases, half or more of all inequality arose within the agricultural sector, underlining that the agricultural sector was a key factor in shaping a differentiated inequality landscape in colonial Africa. In Côte d'Ivoire, with a fast-growing but still incipient agricultural export sector, inequality in the agricultural sector still contributed comparatively little to overall inequality.

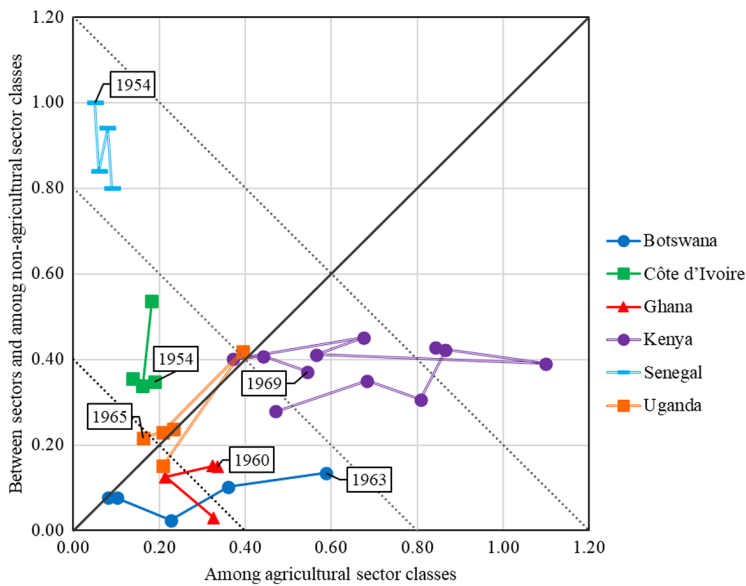


FIGURE 8 Theil decomposition by sector.

Notes: First and last observations by country are indicated. The diagonal lines (top left to bottom right) are ‘inequality indifference lines.’ Along these lines, the total Theil index is constant. The line separating the graph’s top left and bottom right halves illustrates the decomposition where the ‘agricultural’ (within) and ‘non-agricultural’ (within and between) components are equal. All points below this line indicate that inequality among the agricultural classes contributed more to the overall Theil index than the non-agricultural sector, and vice versa. For each country, the year of the final observation is indicated.

[Colour figure can be viewed at wileyonlinelibrary.com]

In Senegal, being the seat of the administration of the federation of French West Africa, the large formal wage sector generated most of its inequality. Meanwhile, inequality within Senegal’s agricultural sector, which was characterized by export-oriented commercialization based on a low capital intensity commodity (groundnuts), was low – as expected.

Aside from Botswana, we do not detect any clear trends over time in agricultural-sector inequality (as we did for overall inequality). This absence of a clear trend might be due to a lack of precision in the underlying data, idiosyncratic contexts of individual social tables (especially during the Great Depression of the 1930s), or because of confounding changes over time, for example, in the role of non-Africans in agriculture (especially in Kenya and Uganda), or the nature and extent of taxation. While worth unpacking further, these issues fall beyond the scope of this study and will require more fine-grained data, which are currently unavailable.

V | CONCLUDING REMARKS

In this article, we have compiled and harmonized quantitative evidence from social tables to explore income inequality levels and trends in six predominantly agricultural economies in colonial Africa from the 1910s to the 1960s, focusing in particular on the role of non-African presence and export-oriented commercialization. We formulated three hypotheses with derived expectations specific to the six countries at hand to analyse our empirical data. Using three distinct inequality metrics – the Gini, IER, and Theil – we provide mostly consistent evidence that



overall inequality increased between c. 1910 and 1965. We also find, albeit more tentatively, that inequality is positively associated with the intensity of export-oriented commercialization. Using Theil decompositions along the lines of race and sector, respectively, we show that a trade-off existed between intra-African and racial inequality. When present, non-Africans captured the profits from increased commercialization, directly through farming and business, and indirectly through higher salaries enabled by a growing economic base. When non-Africans were less prevalent, more opportunities existed for Africans to benefit from the export economy, leading to higher inequality between African classes. Second, we provide some evidence that inequality levels in the agricultural sector were higher in colonies exporting more capital-intensive agricultural commodities.

Our contribution is three-fold. First, although the relationship between increased commercialization and inequality in colonial Africa has been studied in specific regions and contexts, we provide the first study on the basis of comparable quantitative empirical evidence from a sizeable sample: 33 social tables capturing the entire income-earning populations in six mostly agrarian economies. While our case selection is based on data availability and cannot be treated as representative of the sub-Saharan Africa region, they cover much of the existing range of colonial economies with varied agricultural commodities, colonial institutions, and settler presence. Mining economies, however, are not part of our study. Because social tables inform us about full income distribution and because we have assured sufficient commensurability of our data, we can address and test hypotheses regarding key proximate drivers of inequality which we derive from previous research on the specific relationship between the expansion of export-oriented commercialization and income inequality in agrarian contexts. We contribute empirical evidence to a growing literature that, based on new sources and explorations of quantitative methods, contributes to a richer, more nuanced view of African long-term development and in particular the role of export-led commercialization, going beyond generic explanations of ‘colonial extraction’ or ‘dualism’. Further research is needed to test for causal relationships and evaluate the robustness and external validity of the findings.

Second, we show that social tables, while labour-intensive to produce, yield meaningful and comparable information which, unlike top-income approaches, allows for analysis of the (upper-) middle sections of the income distribution, which is where substantial change in economic activities took place in the context of colonial Africa’s agrarian economies. By evaluating and improving the commensurability of different social tables, our study provides a departure point for further construction of social tables and more elaborate comparative analyses of long-term trends in African inequality.

Finally, we strengthen the empirical foundation needed to link African inequality trajectories to those of Asian and Latin American economies undergoing similar processes of commercialization under colonialism as well as those of the industrialized world, which continue to serve as the template for our understanding of ‘global’ inequality. While such comparisons need to consider differences in context and chronology, ambitions in future research to write global history will benefit from having a fuller coverage of countries and populations, including Africa.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available at OpenICPSR: <https://doi.org/10.3886/E194503V1>. The social tables have also been published in the African Long-term Inequality Trends (AFLIT) database at <https://www.aflit.net/data/>.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A1
Inequality trends

A1

TABLE A1 Inequality trends.

	(1)	(1b)	(2)	(2b)	(3)	(3b)	(4)	(4b)
	Gini		IER		Theil		Theil (Europeans excluded)	
Year (× 100)	0.32*** (0.08)	0.31*** (0.06)	0.27* (0.14)	0.27* (0.14)	0.30 (0.37)	0.15 (0.25)	0.63*** (0.14)	0.64*** (0.13)
Colony dummies	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	33	33	29	29	33	33	33	33
R ²	0.27	0.74	0.10	0.63	0.02	0.75	0.31	0.57

Note: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$. Robust standard errors.



APPENDIX A2

Inequality and commercialization

A2

TABLE A2 Inequality and commercialization.

A. Gini			
	(1)	(2)	(3)
The dependent variable is ln (Gini)			
Ln (export volume)	0.09** (0.04)	0.17*** (0.05)	0.16** (0.06)
Colony dummy	No	Yes	Yes
Colony time trends	No	No	Yes
Obs.	32	32	32
R^2	0.10	0.63	0.90
B. IER			
	(1)	(2)	(3)
The dependent variable is ln (IER)			
Ln (export volume)	-0.02 (0.07)	0.10 (0.09)	0.07 (0.12)
Colony dummy	No	Yes	Yes
Colony time trends	No	No	Yes
Obs.	28	28	28
R^2	0.00	0.66	0.88
C. Theil			
	(1)	(2)	(3)
The dependent variable is ln (Theil)			
Ln (export volume)	-0.09 (0.13)	0.15 (0.14)	0.47*** (0.17)
Colony dummy	No	Yes	Yes
Colony time trends	No	No	Yes
Obs.	32	32	32
R^2	0.02	0.75	0.93

Note: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$. Robust standard errors.