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*Measuring historical income inequality in Africa:
What can we learn from social tables?¹*

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Abstract. Limited knowledge of African inequality trajectories hampers our understanding of the drivers of heterogeneous inequality outcomes in Africa today, and leads to a major omission in debates about global inequality. In recent years, African economic history has advanced towards the reconstruction of full income distributions of African economies using ‘social tables’. In this paper, we take stock of the social table literature covering the cases of Botswana, Ghana, Ivory Coast, Kenya, Senegal, and Uganda, 1910s to 1960s. Our contribution is twofold. First, we investigate commensurability and pursue methodological harmonisation. Second, we propose a new analytical framework to study income inequality in colonial Africa, revolving around export-oriented commercialisation and colonialism. We apply this framework to the six cases. Tracing country-level inequality trends and levels using three different inequality metrics, we find that i) inequality increased as commercialisation progressed and ii) relative levels of inequality differed substantially and were linked to European settlers and colonial institutions. Using inequality decompositions by sector and race, we further refine these insights. We find that capital-intensive commodities were associated with larger inequality in the self-employed sector and that the presence of European settlers and a large colonial administration increased the salience of race as a major fault line.

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1. Introduction

While ‘growth failure’ long dominated discussions about African economic performance and poverty alleviation, recent years have seen an increasing interest in economic inequality (Moradi and Baten 2005; Van de Walle 2009; Fosu 2009; 2015; Manning and Drwenski 2016; UNDP 2017). Alongside *whether* Africa is rising, we ask *whose* Africa is rising (Khisra 2019). The importance of distributional issues is pertinently reflected in the increasingly available data showing that many African economies are characterised by large *internal* disparities. 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. This includes South Africa, which tops the global ranking of economic inequality (Cogneau et al. 2007; Bigsten 2018; Shimeles and Nabassaga 2018; Boone and Simson 2019; Chancel et al. 2019; UNU-WIDER 2021).

Scholarship on African inequality emerges in tandem with vibrant global debates about the distributional effects of capitalism and globalisation among and within countries. The seminal contributions of Piketty (2014; 2019), Milanovic (2016; 2019) and Scheidel (2017), amongst others, have made a strong case for viewing inequality in a long-run and global-comparative perspective. By looking at trajectories over time, we can gain a better understanding of the determinants of inequality, both persistence and change. For Africa, scholars have highlighted the importance of taking a historical perspective to understand current regional variations, pointing especially at the colonial legacy of a ‘dual economy’ of high wages and low (agricultural) self-employed incomes (Cogneau et al. 2007; Van de Walle 2009). Yet, African inequality trajectories have featured only marginally in the global inequality literature, which has focused strongly on Europe, the United States, and parts of Asia (Simson and Savage 2020). This limits our knowledge of African inequality in the long-run and increases the danger of Eurocentric theorization of the drivers of inequality.

To test the principle claims about the ‘colonial origins’ of African inequality and insert African experiences into the global inequality debate, it is crucial to develop a firmer empirical base. Since the early 2000s, the field of African economic history has experienced a veritable ‘data revolution’ (Fourie 2016) with collection of new quantitative evidence and re-interpretation of existing data using new approaches to test and further develop explanations of African long-run development. However, measuring income inequality comprehensively provides a challenge. It requires both breaking down the aggregates (Jerven 2014; Broadberry and Gardner

2019) and moving beyond capturing the wage sector, which typically engaged only a small share of the total population (Frankema and van Waijenburg 2012; 2019).

So far, researchers have harnessed microdata on land and wealth distributions to reconstruct income for very specific locations and socio-economic groups. This has led to results that are interesting and revealing but hardly representative for the broader context (Galli and Rönnbäck 2020; 2021; Fourie and Von Fintel 2010; 2011). Other studies have focused on the upper tail (0.1 percent or less) of the income distribution using tax records (see, e.g., Alvaredo and Atkinson 2010; Atkinson 2014, 2015; Alvaredo, Cogneau and Piketty 2020). We know that overall inequality trajectories are largely driven by top incomes and the approach has unveiled important trends and level-differences in inequality. However, information on top incomes in colonial Africa comes from tax data that was only collected from the late-colonial period onwards, and the income shares rely on crude estimates of aggregates. By default, tax data only captures the (European) top income earners, while differences among the remaining 99.9 percent of income earners, particularly African but also Asian, remain unexplored. The method of ‘distributional national accounts’ that has been applied to estimate income shares across the full income distribution in Africa post-1990 (Chancel et al., 2019), is more comprehensive but relies on survey data that is not available for the more distant past.

The construction of social tables remedies several data limitations and gaps. The approach has been tried and tested in non-African, mostly pre-industrial settings predating the era of comprehensive household surveys and tax registers (Milanovic et al., 2011; Milanovic, 2018). Recently, several social tables have been produced also for African countries allowing for a rich exploration of inequality trends, underlying economic and sectoral changes, and transitions of economies over time (Aboagye and Bolt 2021; Alfani and Tadei 2019; Bigsten 1987; Bolt and Hillbom 2016; De Haas 2021). 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. Because of data intensity, they are constructed only for benchmark years, but with consecutive years we can follow changes over time and determine long-term trends. They move beyond a simplified (and self-fulfilling) understanding of African income structures as ‘dualistic’ as they capture more than the large income gaps between small expatriate and African salaried elites versus the African masses. Also, they account for differentiation between African groups, both wage earning and self-employed, and explicitly identifies the potentially substantial incomes of African rural capitalists that commonly did not appear in tax records.

In this paper, we conduct a comparative study of social tables for six African countries – Botswana (Bolt and Hillbom 2016), Ghana (Aboagye and Bolt 2021), Ivory Coast and Senegal (Alfani and Tadei 2019)², Kenya (Bigsten 1987), and Uganda (De Haas 2021), and we make both substantive and methodological contributions. In section 2, we engage with key strands of global inequality literature, exploring their relevance in our context and developing a new analytical framework to study the dimensions and drivers of inequality in colonial Africa. We also introduce the six country cases. Next, we address critical assumptions underpinning the construction of our social tables, discuss the implications of choices made and show how social tables can be meaningfully compared. We lay the foundations of a consistent framework for building social tables for historical Africa. Then we show, compare and discuss country-level trends using different inequality metrics. We find that overall African inequality increased between c. 1910 and 1965, but we observe substantial heterogeneity between colonies and those with large European presence ranks as the most unequal. In section 5, we decompose inequality along the lines of sector and race. Overall, we conclude that colonial policies and settler presence had a large influence on relative *levels* of income inequality, while *trends* were primarily driven by processes of commercialisation, which were mediated by existing social inequality, resource requirements, and colonial policies. Our final section concludes.

2. African inequality in a global perspective

While a growing literature maps and analyse long-term income trends in colonial Africa, limited attention has been paid to the study of income inequality levels and trends capturing the whole economy. We present and discuss the state-of-the-art, propose an analytical framework bringing the African experience into existing inequality theory, and relate the framework to our six country cases.

2.1. Global inequality: what do we know about Africa?

Despite shaky empirical evidence, Kuznets' (1955) original research agenda to investigate patterns in the relationship between long-term economic development (growth) and (income) inequality remains the workhorse of the inequality literature. However, except for a limited

² See Alfani and Tadei (2019) and unpublished revisions.

number of countries relying on extractive industry and the labour-intensive manufacturing of Mauritius, sub-Saharan Africa has generally not experienced high and sustained levels of industrialisation. Consequently, we should expect inequality levels in most of Africa today to be comparatively low and fairly homogenous, which is at odds with the heterogeneous and overall high levels we observe. Thus, from an African, long-run perspective, the ‘Kuznetsian’ analysis yields limited analytical insight and a poor empirical fit, although elements of it have been applied to sectoral change in more recent years (Bigsten 2018).

Meanwhile, Piketty (2014) postulates that capitalism, if left unchecked, disproportionately benefits capital owners and has an inherent tendency to drive up income inequality. Declining inequality is not the result of market forces but of interventions by modern welfare states, which attenuated inequality through taxation, wage policies, and government transfers. Capitalism has progressively (albeit unevenly) penetrated African labour relations and production systems throughout the 19th and 20th centuries. First, through processes of agricultural commercialisation, and subsequently through mineral and oil discoveries generating high rates of return on capital. Also, African history offers few examples of comprehensive and well-funded state-led resource re-distribution by a welfare state. While some post-colonial states engaged in land distribution or implemented socialist policies to mitigate colonial legacies of inequality, sub-Saharan Africa never went through the post-war egalitarian regime that characterized Europe, the United States and parts of Asia and that is central to Piketty’s analysis of inequality reduction over the past century (Alveredo et al. 2018:42). The expansion of capitalism in Africa should therefore be reflected in rapidly rising inequality, especially in areas and eras of unfettered capitalist expansion. However, available evidence for the post-colonial era does not support such a position. Instead, though capitalism reigned since structural adjustments in the 1980s, inequality since the 1980s has stagnated (Chancel et al. 2019: 21) or even declined (Simson and Savage 2020:7).

While African inequality was hardly mediated by the ‘benign’ interventions of the welfare state, Africa during the 19th and 20th centuries has faced numerous ‘malign’ shocks such as diseases, warfare, violent transfers of political power, and state failure. Following Scheidel’s (2017) argument about the ‘four horsemen’ of inequality reduction, we might therefore expect African inequality to be low, and concentrated in the most disaster-stricken countries and regions. While some of Africa’s most conflict-stricken countries, such as Mozambique and the Central African Republic, record very high inequality levels, others such as Sierra Leone and Sudan, have low inequality (Chancel et al., 2019). When no clear pattern emerges, it suggests that other, and

perhaps more fundamental, drivers are at stake, which need to be analysed to understand differentiated impacts of shocks on inequality.

Meanwhile, Milanovic (2018) extends the analysis of long-term inequality trends into the pre-industrial world. He points out that inequality fluctuated considerably, and there was no patterned relationship between inequality and economic development. This point is affirmed by Alfani (2021). Instead, Milanovic argues that episodes of pre-industrial inequality decline were, in line with Scheidel (2017), driven by ‘malign’ forces, of which the 14th century Black Death is the most clearly pronounced example. At the same time, upswings in inequality were the outcome of commercial expansion processes, which enabled elites to convert power, wealth, and market access into income. Although 20th century Africa can hardly be called pre-industrial, non-industrial commercialisation processes, often taking place within the agricultural sector and in a colonial context, were a salient characteristic of economic development. Recent work has tentatively concluded that colonies tended to have among the highest levels of inequality, but they barely cover African cases (Alfani 2021; Milanovic 2018).

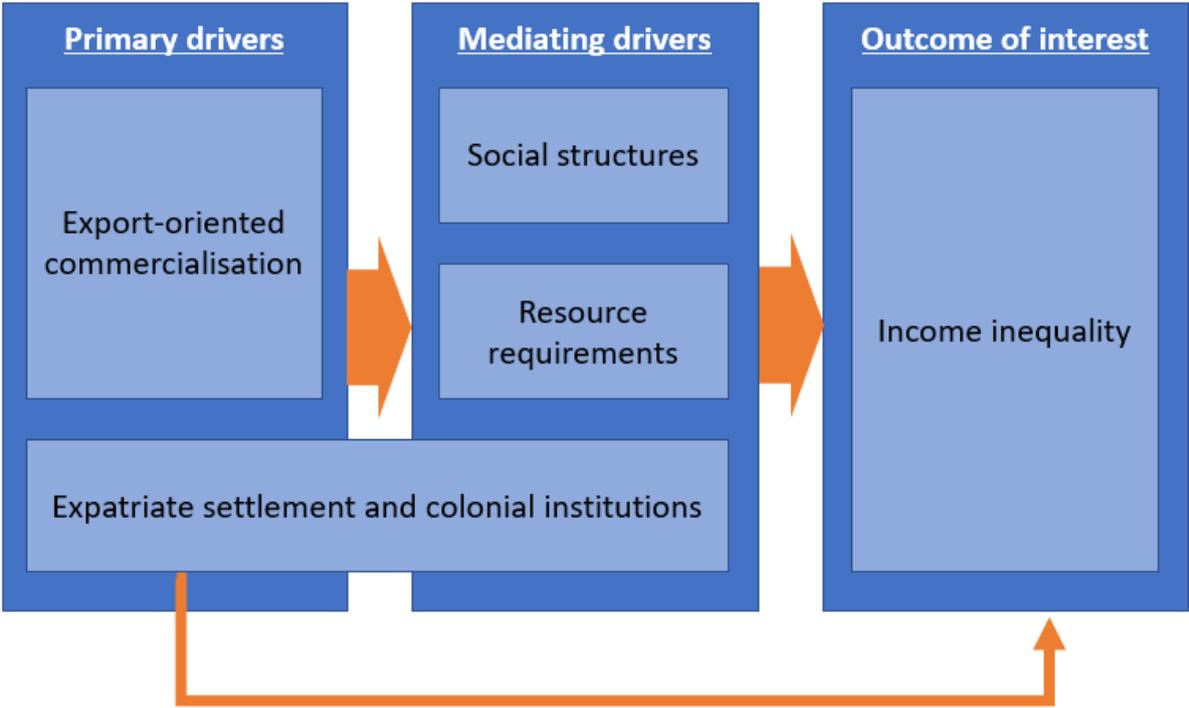
Quite separate from the debates in the ‘global inequality’ literature, economists and political scientists focusing on Africa have also shown renewed interest in income inequality. The issue was central to Marxist and underdevelopment scholarship until the 1980s, but has been largely abandoned in favour of studies on ‘growth fundamentals’. To explain high and heterogeneous inequality levels today, these studies have referred to the legacy of colonial policies, which exacerbated inequality between regions and created persistent income ‘dualism’ between the farm and non-farm sector (Bigsten 2018; Van de Walle 2009; Roessler et al. 2020). Such dualism, which initially had racial characteristics, survived into post-colonial African societies (Bossuroy and Cogneau 2013; Chancel et al. 2019). While helpful, the focus on dualism has resulted in a rather generalized and static evaluation of African inequality under colonialism. It overlooks the substantial temporal dynamism and cross-sectional heterogeneity that we will demonstrate and scrutinize in this study, both in terms of overall inequality levels and the drivers and dimensions underpinning it.

2.2. Proposing a new analytical framework

We propose an alternative analytical framework to study African inequality trajectories during the 20th century, particularly the colonial era (see Figure 1). While it follows some arguments

already made in the inequality literature, it is amended and enriched for the context at hand. Also, we suggest that it can further our understanding of export-oriented colonial and post-colonial economies in Asia and Latin America.

Figure 1
Drivers of changing income inequality in Africa



We single out two primary driving forces to have substantially reshaped the inequality landscape: export-oriented *commercialisation* and the imposition of colonial rule that came with the *settlement of expatriates* and introduction of *colonial institutions*. The export of agricultural commodities and minerals grew consistently for a century from the mid-1800s (Frankema, Williamson and Woltjer, 2018), and European influences expanded rapidly across Africa following the Berlin Conference (1884-5). Both forces – commercialization and colonialism – created new scope for income generation, extraction, and stratification.

Frankema, Green, and Hillbom (2016) argue that colonialism was a process that evolved and expanded over time, continuously informed by the context within which it operated. We apply a similar approach to understand commercialisation. Commercial integration took place at different times and to a different extent, both before and during colonial rule. Still, the nature

of commercialization differed depending on the characteristics of existing production systems, lobbying of interest groups, and so on. The opportunities and challenges for the process were also determined by external events such as mineral discoveries and alterations in markets, for example the Great Depression and the subsequent slump in international trade. Because uneven export-oriented commercialisation affected growth trajectories, wage developments, and income-earning opportunities, we expect that it was also a crucial force of income inequality. We do not presume that ‘initial’ inequality in Africa was absent or universally low (cf. Bigsten 2018), but that commercialization increased the size of monetized economies and progressively enabled the conversion of wealth, resources and social relations into monetary income. These developments reconfigured inequality by expanding the scope of potential accumulation. The impact of commercialisation on income inequality was not straightforward or uniform. Rather it was mediated by local variation in *social structures*, *resource requirements* and *colonial presence*.

First, pre-existing (but evolving) social structures were heterogeneous across African societies, and associated with various degrees of *social* and *wealth* inequality. For example, in highly stratified societies with large involvement in slave trading, such as the Sokoto Caliphate (Nigeria) or Ashanti (Ghana), elites were able to redirect slaves 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 19th and early 20th century likely reduced inequality as it increased the bargaining power of (migrant) laborers and facilitated small-scale cash crop production (Austin 2009; Law 2002).

Second, most of Sub-Saharan Africa, with some notable exceptions, was land abundant, providing rural populations with access to land to sustain food self-sufficiency and pre-empting the widening of income gaps between the ‘subsistence sector’ and the ‘modern sector’ that drives growing income inequality in ‘dual-economy’ development paths (Lewis 1954). However, large differences existed within and across African colonies in terms of the types of commodities exported, and the degree to which these commodities interacted with capital accumulation. Because annual field crops such as groundnuts or cotton are labour intensive, require a short planning window and involve little to no capital investment (Tosh 1980), their commercialisation generated relatively little inequality (when using free labour). Meanwhile, where commercialisation was based on tree crops such as coffee and cocoa, there was more scope for income inequality generation. Such crops required an upfront labour investment of

several years in ‘fixed capital’ (maturing trees) and once yielding, the returns to labour were substantially higher than for annual crops. Such conditions generated scope for large-scale plantations and the development of capitalist labour relations, based on a distinction between providers of capital and labour (Austin 2019). Livestock-based commercialisation was even more likely to result in increasing income inequality, since stock – widely considered a prime form of capital in African societies – only yields sustainable income once a specific herd size is reached (Bolt and Hillbom 2016). Finally, we expect commercialisation based on mineral extraction to involve the highest degree of income inequality, as returns were concentrated among a small number of (mostly expatriate) individuals and firms who brought in specific skills and large amounts of capital.

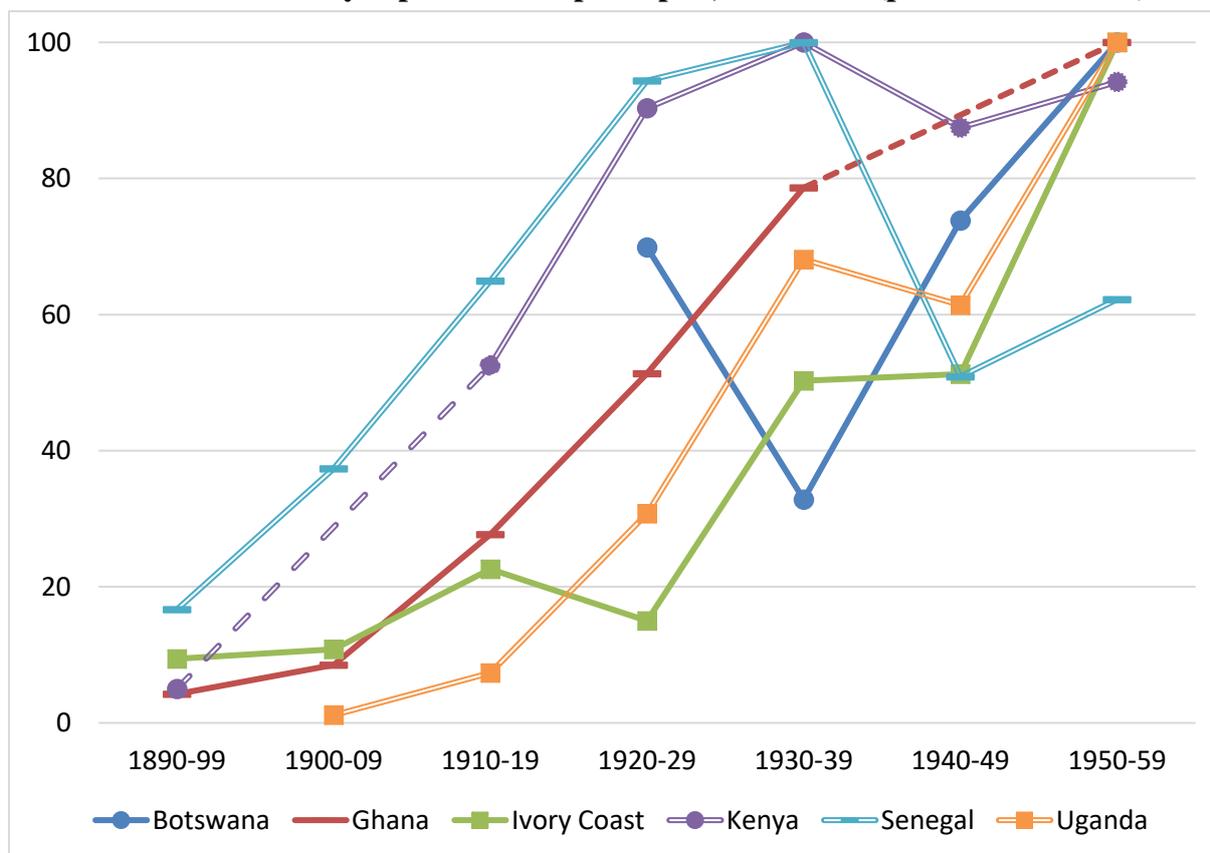
Third, when the colonial state supported expatriate settlement and enabled land-alienation and labour extraction, as was the case in the settler colonies of Southern Africa and Kenya, we expect inequality levels to be higher (Bowden et al. 2008; Mosley 1980). Conversely, colonial policies geared towards abolishing slavery are expected to lower inequality among Africans involved in cash crop production as it reduces the scope for labor coercion and allows numerous smallholders to enter into cash crop cultivation (Austin 2009). Colonial institutions and expatriate settlement also affected income inequality independent of commercialization. For example, colonial regulations could either facilitate or suppress local elites’ abilities to extract income from their populations. To varying degrees, colonial rule also facilitated the arrival of expatriates, often from Europe but also from the Middle East and South Asia, to establish settler farms or take up skilled and administrative occupations. Expatriates tended to have average incomes far above those of indigenous populations, a gap that was further augmented because government officials’ salaries were covered by directly or indirectly taxing African producers.

2.3. The six country cases

We confront our analytical framework with the six African colonies for which we currently have comprehensive social tables: Botswana, the Gold Coast/Ghana, Ivory Coast, Kenya, Senegal and Uganda. All underwent a process of rapid export-oriented commercialisation between 1890 and 1960, which is a key underlying premise of our framework (see Figure 2). The timing (and magnitude, which is not visible here) of the take-off varied substantially.

Figure 2

Index of commodity export volume per capita, 1890-1960 (peak decade = 100)



Note: Since commodities have varying value-for-weight, they have been weighted using the most valuable commodity for the period as a whole. The series for Ghana is based on all commodities included in the African Commodity Trade Database (ACTD) (Frankema, Williamson, and Woltjer 2018, and recent unpublished extensions). Uganda is based on cotton and coffee (De Haas 2017). Senegal and Ivory Coast are based on 11 main commodities, covering most of French West African trade, from Tadei (2020) and subsequent unpublished extensions. Kenya is based on coffee, hides, sodium carbonate, and maize, obtained from the ACTD and adjusted based on De Haas (2017). Botswana is based on unpublished research by Jutta Bolt and Ellen Hillbom.

In Table 1, we summarize several indicators for our three dimensions of local conditions mediating the relationship between commercialization and income inequality. Specifically, we classify the six colonies according to the presence and extent of initial inequality structures, capital or labour intensity of commercial agricultural production, main producers of export goods, and the size of the colonial bureaucracy. The six countries represent substantial variation along the axes of variation in which we are interested. Both Ghana and Botswana had high initial wealth inequality, but this was accompanied by high versus low social inequality, respectively. Only Uganda was characterized by higher initial social inequality than initial wealth inequality. Botswana, Ghana, and Ivory Coast produced capital-intensive goods (cattle and cocoa), Kenya produced commodities that were less capital intensive (coffee), and Senegal and Uganda produced mostly labour-intensive commodities (peanuts and cotton). While

Senegal had a large colonial bureaucracy, Kenya had successful European settler farming. We expect the various combinations of characteristics to have a discernible effect on resulting inequality trends, and on the underlying fault lines. For example, the role of racial differences, and inequalities within and between self-employed and waged sectors. We explore these issues in Sections 4 and 5, but first we discuss the construction and comparison of the six sets of social tables.

Table 1
Drivers of inequality in six commercialising African economies, c. 1900 – 1960

Country	Initial inequality (social structures)		Resource requirements		Colonial policies		
	Wealth	Social	Main commodities	Capital intensity	Colonial power	Primary producers	Colonial bureaucracy
Botswana	High	Low	Cattle	High	British	Africans	Small
Ghana	High	High	Cocoa	High	British	Africans	Small
Ivory Coast	Low	Low	Cocoa and coffee	High	French	Africans (settlers failed)	Small
Kenya	Low	Low	Coffee	Medium	British	European settlers	Small
Senegal	Medium	Medium	Peanuts	Low	French	Africans	Large
Uganda	Medium	High	Cotton and coffee	Low	British	Africans	Small

Notes: constructed by the authors based on qualitative literature and social table country studies.

3. Refining the social tables approach

Data challenges are considerable in an Africa context where data quality is low, even of current official statistics (Jerven 2013), and colonial administrations had a limited capacity to document and count their subjects (Jerven et al. 2012). However, the social tables for the ancient civilisations in Rome and Byzantium, included in Milanovic et al. (2011) or Scheidel’s (2017: chapter 3) inequality trends in the long run for Europe, North America, and Latin America, suffer from the same difficulties, if not worse. Social tables allow for a more detailed and disaggregated perspective than top income shares and other potential inequality measures, such as the Williamson ratio (GDP pc /Median Wage) (Williamson 1997). The downside, however, is that their construction is a highly data-intensive endeavour and that data gaps sometimes need to be overcome using interpolations and assumptions about distribution and income. This has to be based on deep contextual understanding and often qualitative analysis. Since producers of

social tables have addressed such issues differently, it is crucial to explore the commensurability of the tables and harmonize them when possible. By carefully scrutinising and comparing assumptions and performing a variety of robustness and harmonisation exercises, a comparison of social tables allows us to reconstruct the broad contours of inequality development in colonial Africa.

First, we give an account of the past and present scope of social table studies. Then we address three major challenges related to the harmonisation of social tables data: calculating population units, deciding on social classes, and estimating subsistence levels. We explain and motivate the choices made for the comparison of our own social tables for Botswana (Bolt and Hillbom 2016), Ghana (Aboagye and Bolt 2021), Ivory Coast and Senegal (Alfani and Tadei 2019 and unpublished revisions), and Uganda (De Haas 2021) as well as Bigsten's (1987) social tables for Kenya. Bigsten's principles, especially related to the rural sector's disaggregation, are somewhat different than the ones developed in the other papers, and this issue is discussed as it surfaces in later sections.

3.1. Social tables: state of the art

The first social tables were produced by Gregory King for England and Wales in 1688. When computing numbers and size of households as well as incomes, expenses, and surplus for 26 occupations (or social classes), he pioneered a new approach to describe incomes and expenditures at the household and the national levels in statistical terms (Aspromourgos 1988). Three hundred years later, Peter Lindert and Jeffrey Williamson (1982; 1983) revived and revised the existing social tables for England and Wales for 1688-1913, covering both the pre-industrial and industrialising society. Allen (2019) further refined their estimates. In addition, Lindert and Williamson (2012) constructed social tables for British North America in the late eighteenth century, and Gomez-Leon and De Jong (2019) have built annual social tables for Germany and Britain between 1900-1950. Milanovic, Lindert, and Williamson (2011) compiled inequality data for 28 pre-industrial societies, a dataset that Milanovic updated in 2018.

There are also efforts to capture inequality in Asia and Latin America. They include Van Zanden's (2003) construction of GDP and PPPs in Java and the Netherlands in the nineteenth century, Lopez Jerez' (2014: 190) two social tables (1930 and 1936) for the rice economy of Cochinchina, and Saito's (2015) 'short' social table for Japan in the 1840s. For Latin America,

we have Berry's (1990) study of Peru in the eighteenth-century, Gomez-Leon's (2015) social tables for Brazil 1839-1950, and Rodriguez Weber's (2017) study of inequality in Chile between 1850 and 1970 using dynamic social tables.

For Africa, a (rudimentary) social table approach was pioneered by Amin (1966), who estimated income inequality in Algeria and Tunisia in the late colonial period. Two decades later, Bigsten (1987) presented the first comprehensive social tables, for Kenya (1914-1976) on which he based a thorough analysis of the wage-earning sector, highlighting both sectoral and racial inequality. However, differentiating within the large group of self-employed African smallholders proved challenging, and Bigsten ended up lumping them together in a residual category, containing some three-quarters of all Kenyan workers.

Recently, Bolt and Hillbom (2016) improved on the method by drawing on anthropological studies to explore income stratification in Botswana's rural sector (1921-1974) and using a 'welfare ratio' approach to estimate the income of 'subsistence farmers'. This allowed them to lay bare substantial income stratification in the African agricultural sector, resulting from cattle accumulation. In a subsequent study of Ghana (1891-1960), Aboagye and Bolt (2020) also relied on the allocation of export incomes (cocoa) to differentiate between income groups in the agricultural sector and the crop-based economy they captured was more complex compared to Botswana. Alfani and Tadei (2019) drew information from district-level production statistics and the Murdock Ethnographic Atlas to allocate agricultural income between several regions and social classes in the rural economies of Senegal and Ivory Coast (1939-1954). Finally, De Haas' (2021) study of Uganda (1925-1965) draws on village surveys and detailed regional data. It explores differentiation in the African rural economy by reconstructing income inequality among several layers of informal workers, smallholders, and larger farmers, and documents racial inequalities between Africans, Asians, and Europeans.

A budding social tables literature is now addressing colonial Africa. As new country studies are added, more variations of the approach are tested, and additional aspects of economic inequality are explored. This stands in contrast to scholars' previous hesitation to use the social tables approach to estimate historical economic inequality in Africa, citing prohibitive paucity of data. Still, there are several limitations arising from the context of limited data availability that should be addressed upfront. First, most African social tables have been constructed for years with available population (and occupational) censuses, whether these years are 'typical' or 'exceptional'. In some cases, idiosyncratic events, such as the Great Depression or the World

Wars, may affect inequality levels in a particular year. However, the impact of each event on African economies was substantial and spanned multiple years. We have little reason to believe that our overall conclusions are driven by the selection of benchmark years. Second, the colonial borders may have changed between benchmark years. In the case of Ghana, for example, the social tables for 1891, 1901, and 1911 pertain to the Gold Coast colony and cannot be compared directly to the later years after the colony had expanded geographically. Notwithstanding, these early years are unsuitable for cross-sectional comparison since the earliest observation for another colony is Kenya in 1914 and we have excluded them from the comparative analysis.

3.2. Population and income units

Social tables tabulate average incomes for several clearly defined *income groups* in a society. This contrasts with modern inequality studies, which typically calculate inequality over a much more refined distribution of *individual income earners*. Both approaches face a similar requirement to define the *population* whose incomes are ranked. Since colonial censuses tended to underestimate the indigenous population significantly, there have been efforts to re-estimate the colonial population numbers extrapolating backwards from the most reliable total population censuses. First, Manning (2010) used Indian growth rates, modified to account for local African circumstances such as the slave trade and tropical diseases. Later, Frankema and Jerven (2014) built on Manning's work but used neighbouring countries' growth rates for Northern and Southern Africa. We base our re-estimates of the total population on the method suggested by Frankema and Jerven (2014).

Next, one needs to decide whether to calculate inequality among the 'economically active' or 'workforce', the full universe of individuals including children and inactive adults, or aggregate households. One also needs to decide what *income* to assign to each of the units in the chosen population: total (individual, worker, or household) income, a portion of household income equally divided among its members, or a portion of household income differentiating consumer needs of its different members (for example using adult male equivalents). Combining these different options yields nine different types of inequality distributions (see Table 2). For an adequate comparison of social tables, we need to either consistently choose one of these approaches or establish that a difference of approaches does not substantially affect the comparison.

Table 2

Different ways to combine population and income units in social tables

		INCOME		
		Total income per unit	Portion of household income (simple <i>per capita</i> average) per unit	Portion of household income (<i>consumer-weighted</i> average) per unit
POPULATION UNIT	All individuals in the population	Botswana	Uganda	Uganda
	Individuals in the workforce	Botswana Ghana Ivory Coast Kenya Senegal		Ivory Coast Senegal
	Households	Uganda		

Sources: author’s own, based on Bigsten 1987; Bolt and Hillbom 2016; Alfani and Tadei 2019; De Haas 2021; Aboagye and Bolt 2021.

The tables we compare here are based on different bodies of administrative and other sources, which each require their own assumptions and transformations to be converted into a class-based income distribution. For Uganda, De Haas (2021) was able to link income to households rather than individual workers in each social class, having access to comparatively fine-grained information about household characteristics of different rural classes. He found that richer households tended to have more members, which substantially reduced *individual* inequality relative to *household* inequality when assuming the absence of intra-household inequality (as the income of richer households had to be distributed among more household members). Other studies did not have access to sources that would allow for such an analysis.³ Instead, they used the workforce as their population unit, including all formally enumerated wage earners, and all adult men and women in the self-employed sector, treating male and female farmers as

³ In their study of Ivory Coast and Senegal, Alfani and Tadei (2019) were only able to find coarse estimates of average rural and urban household sizes for the African and European social classes, but do not distinguish household sizes between rural classes. Household sizes are entirely unknown for the studies of Kenya, Ghana and Botswana.

independent workers. For workers in the self-employed sector, they added a mark-up to account for non-monetised self-provisioning.

To facilitate comparability and explore the ramifications of these assumptions, we adjust the Ugandan tables to make them methodologically consistent with the other tables. We do so in five steps. First, we ignore information about variations in average rural household sizes between classes. Second, we assume that wage-earning household contains one wage worker and consider cash income only (i.e., we presume a ‘male breadwinner household’). Third, we divide the cash income of self-employed households equally among adults and treat each adult as a worker. Fourth, we attribute rural children and other dependents equally among adult workers. Fifth, for each rural worker and each of their dependents, we add the value of a 2100 kcal food basket to account for the value of self-provisioning that the worker generates. In Figure 3, we compare the original household and individual Gini coefficients reported by De Haas, and the adjusted Gini coefficient, resulting from the procedures described above. The adjusted Gini coefficients are slightly higher than the original individual Gini’s and substantially lower than the original household Gini’s. These level-differences are primarily a consequence of the correlation between household size and income, which pushes up household-level inequality relative to individual or worker inequality. As aggregate household income and polygamy were plausibly correlated beyond Uganda and across African societies, we expect such level-differences between individual, workforce, and household approaches to exist in all our country studies. This should be kept in mind when interpreting the inequality *levels* presented in this paper, although the *trends* are probably much less affected.

Our adjustment to identify the workforce as our ‘common denominator’ has resulted in social tables that are internally consistent. This does not automatically mean that the tables (and derived Gini coefficients or other inequality indicators) are also directly comparable to (more recent) income distributions based on other sources, such as household surveys, which typically take households or individuals as their population unit. While external comparability falls outside the scope of this study, it deserves closer scrutiny and future social tables could make multiple computations, if the necessary data is available, based on the different possible population units.

Figure 3

Gini coefficients of Ugandan income inequality, using different population units



Sources: ‘Original’ series from De Haas (2021), ‘adjusted’ series based on authors’ calculations (see text).

3.3. Choice of classes

Social tables allow us to study changes between classes over time, but not to follow individuals. Each ‘class’ includes those with similar incomes, and there should be as little overlap as possible. The groups can be further disaggregated to facilitate decomposition and contextual analysis but taking the group as the unit of analysis has numerous implications for what we can measure. For example, we cannot study within-group distribution of income or social mobility between social classes. The number of classes that we can identify depends on each society’s economic structures and data availability. Lindert and Williamson’s (1982) study of England and Wales 1688–1812 contained 19 categories. Commonly, studies of developing countries have lower numbers of social classes. For example, van Zanden (2003) distinguished five social classes for Java in the early nineteenth century and Berry (1990) 9-12 for Peru 1870.

In our studies, Bigsten (1987) constructed 13 social classes for Kenya 1914-1976, Bolt and Hillbom (2016) 8 for Botswana 1921-1974, Aboagye and Bolt (2021) 17 for Ghana 1891-1960, Alfani and Tadei (2019 and unpublished revisions) 12 for Senegal and the Ivory Coast 1939-1954, although disaggregated by district there are 42 and 37 income groups, and De Haas’

(2021) 10 social classes for Uganda 1925-1965, which disaggregated by district adds up to 113 income groups (see Table 3). Details on the procedures defining the separate classes can be found in the underlying papers, but a few principles are worth noting. Bigsten (1987) based his choice of the number of classes only on the availability of income information in the wage sector thereby relegating almost three-quarters of the African rural population to a generic ‘African smallholder’ class. The studies on Botswana and Ghana distinguish between the different classes based on income information from primary sources for the wage-earning classes and on secondary and anthropological information to discern different classes within the self-provisioning group. The study on Senegal and Ivory Coast uses data on wages for the wage-earning classes and agricultural production statistics and qualitative information on local social structures to classify farmers. The study on Uganda uses wage observations and distributions to establish the incomes of three African, one Asian and one European wage-earning classes, and farm size distributions and output estimates to reconstruct income in five self-employed African classes.

As our social tables’ structures are different, we need to ensure that our income inequality measurements, such as the Gini coefficient, are comparable. We particularly need to verify that differences among colonies are not due to methodological idiosyncrasies, such as the choice of the type and number of social classes. To explore this issue, we build a simplified social table for each original table. We first use two main divisions of African societies: the racial divide between Africans and non-Africans and the divide between those working for regular wages and those not. The latter distinction is hard to define strictly. Most, but not all, non-wage workers were self-employed farmers; most, but not all, Africans not working for expatriates were self-employed. With these caveats in mind, we settle for the distinction between the ‘self-employed’ (including informal wage and share-cropping arrangements between Africans) and ‘wage earners’. We then further subdivide each of the resulting four categories, distinguishing the bottom-40-percent earners, the 40th to 90th percentile earners, and the top-10-percent earners. By intersecting these divides, we build harmonised 12-classes social tables.

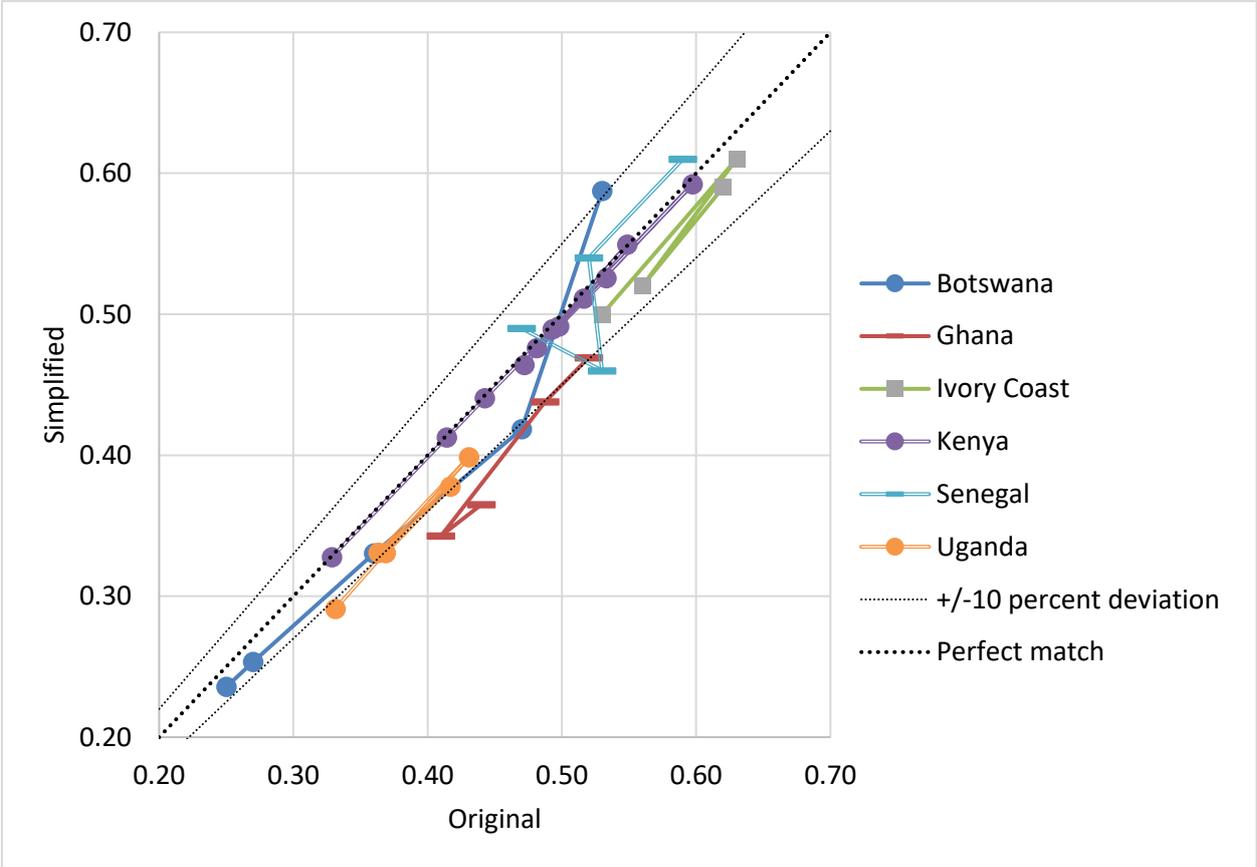
Table 3. Classes as distinguished in the social tables of six African countries

Race	Sector	Botswana	Ghana	Ivory Coast	Kenya	Senegal	Uganda
African	Formal wage earners	Agriculture Domestic Services Mining Mines South Africa Skilled labour African Government Officials	African government (admin, executive, etc.) African government (other) Skilled labour Commercial workers Domestic services Mines Agricultural wages Unskilled labourers	African administrators/heads of firms African employees African skilled workers African unskilled workers	African agricultural wage African non-agricultural private employees African public employees	African administrators/heads of firms African employees African skilled workers African unskilled workers	Formal wage earners, upper-tier (15 districts) Formal wage earners, mid-tier (15 districts) Formal wage earners, lower tier (15 districts)
African	Self-employed and informal workers	Large scale cattle holders Medium scale cattle holders Small-scale cattle holders Cattle less Bonded labour	Elite cocoa farmers Large Scale Cocoa Farmers Medium-scale cocoa farmers Small-scale cocoa farmers Fishermen Farmers Petty traders Subsistence group	African farmers, elite (6 districts) African farmers, middle-class (16 districts) African farmers, lower-class (6 districts) Subsistence group	African smallholder African self-employed	African farmers, elite (11 districts) African farmers, middle-class (11 districts) African farmers, lower-class (11 districts) Subsistence group	Self-employed elites (15 districts) Self-employed, upper-tier (15 districts) Self-employed, mid-tier (15 districts) Self-employed, lower-tier (15 districts) Landless laborers workers (5 districts)
Expat	Formal wage earners	European government officials	European government officials	European administrators/heads of firms European employees European skilled workers	Asian non-agricultural private employed Asian public employed European agricultural wage employees European non-agricultural wage employed European public employed	European administrators/heads of firms European employees European skilled workers	Asians* European females European males*
Expat	Self-employed	<i>None</i>	<i>None</i>	Europeans	Asian self-employed Asian agricultural wage employed European self-employed	Europeans	Asians* Male Europeans*
Total # of classes		12	17	37	13	42	113

Sources: Aboagye and Bolt (2021); Alfani and Tadei (2019 and unpublished revisions); Bigsten (1987); Bolt and Hillbom (2016); De Haas (2021). In the original tables for Uganda, Asians and male Europeans formed a single class. They have been split out into formal wage earners and self-employed based on census data.

Figure 4 compares the Gini coefficient obtained from the full social tables to those computed from the harmonised 12-class tables. The results show that the harmonisation of classes, in most cases, does not increase or decrease the Gini coefficient by more than 10 percent. Usually, the Gini coefficient is lower for the 12-class tables, which, upon closer inspection of the data, is mainly a result of merging income groups just below the top income groups, particularly African elites such as the wealthiest cocoa farmers in Ghana. In the case of Kenya, and some years in Botswana and Senegal, the Gini coefficient *increases* after harmonisation because some high-income groups are larger than 10 percent of their respective race-sector category, which means that the high incomes of the remainder spill over into the middle group, pushing up the Gini coefficient. Notwithstanding, harmonising the number of classes does not significantly affect the levels and relative position of the different countries or the trends within countries. There is no relationship between the original number of social classes, ranging from 8 (Botswana) to 113 (Uganda) and the difference between original and harmonised tables.

Figure 4
Comparing Gini coefficients from original and harmonised social tables



We conclude that the original social tables may be heterogeneous in terms of the number and sizes of social classes, but such differences are warranted by valid contextual considerations. Their heterogeneity, therefore, is no major concern for comparability. We observe that all tables distinguish, with sufficient detail, major income groups along the lines of race and type of employment. However, Bigsten's relegation of almost three-quarters of the African rural population to a generic 'African smallholder' class obscures any income differentiation within this group (cf. Fibaek and Green 2019) and probably underestimates overall inequality. Further, the number of social classes do not seem to have a major effect on inequality levels, as long as classes are sufficiently disaggregated to ensure internal coherence and limited overlap. Although subdivision of classes with similar incomes but different characteristics (e.g., self-employed versus waged) can be exploited for disaggregation exercises between sectors, races or regions. Therefore, individual social tables should be assessed in terms of quality before making explicit comparisons.

3.4. Self-provisioning and subsistence income

Most people in colonial Africa resided in rural areas, providing for themselves on small farms and engaging in various non-monetised self-provisioning activities. Such activities made up a large share of people's consumption and informed households' choices about engaging in wage labour and commodity markets (e.g., De Haas 2017). In such a context, maintaining a narrow definition of income excluding the value of self-provisioning would substantially overstate the living standards of non-agricultural workers (who buy their food on the market) while underestimating the incomes of individuals living almost entirely off subsistence farming and other non-monetised activities. Meanwhile, each of our tables seeks to estimate the monetary equivalent of self-provisioning, including careful choices regarding both assumptions made and methodologies applied. To understand the number of agricultural products produced, consumed and informally traded, and to determine their monetary value, requires knowledge of regional varieties and agricultural practices, such as crops grown and productivity. Given that large groups in colonial Africa relied on self-provisioning, especially though not exclusively at the lower rungs of the income distribution, the incomes we assign substantially affects inequality outcomes.

To estimate the volume of self-provisioning, which we define as 'the amount of food one must consume to survive and be productive', social tables use a 'subsistence income' approach. One relatively straightforward way is to construct a 'bare-bones basket' of goods that offers sufficient nutritional content as well as minimal amounts of fuel, lighting, soap, and cotton/linen for clothing.

This strategy is akin to the real wage literature and widely applied in an African context (Allen 2015; Frankema and Van Waijenburg 2012; Bolt and Hillbom 2015; De Haas 2017). However, we adjust our bare-bones basket approach to local conditions. Due to qualitative evidence reporting general malnutrition and poor variety in food, the Botswana’s study uses the original Allen (2001) basket containing a little over 1900 calories per adult per day. All other tables follow Allen (2015) and estimate caloric consumption at ‘subsistence’ to be 2100 calories per person per day. In terms of the composition of the items in the basket, some of the tables (Botswana, Ghana, Ivory Coast, and Senegal) have directly used the bare-bones basket approach in Frankema and Van Waijenburg (2012), which is based on the cheapest available calories. Others (Uganda) have used local agricultural production statistics to estimate the composition of the basket. This basket contains more varied and more expensive goods than the bare-bones basket, which better reflects actual rural consumption patterns (De Haas 2021).

Empirically most challenging and conceptually most ambiguous, is the process of assigning a *monetary value* to the self-provisioning. As most Africans in our subsistence group live in rural areas and the ‘conversion value’ of home-produced food crops is much lower than urban prices would suggest, rural prices are more appropriate. If we use urban prices, we substantially overstate the self-provisioning component in rural households’ income. Indeed, De Haas (2021) finds that the use of rural prices for his 1957 social tables results in a monetary valuation of self-provisioning that is very close to a contemporary estimate by the *East African Statistical Department*, based on far more disaggregated and detailed price and production data.

As colonial records often only consistently report urban prices, each of the social tables starts from urban prices, and then estimates farm-gate to urban price gaps (based on contextual considerations) to obtain rural prices. In Senegal, for example, rural prices are estimated at 66 percent of the urban price level. In Uganda, the rural price level is estimated to range between 40 percent (early years) and 50 percent (latest benchmark). In Ivory Coast, rural prices are estimated as 48 percent of urban prices. As there were no towns in colonial Botswana and the cattle-owning population stayed in their villages on a regular basis, prices collected for the ten main villages were used without applying a rural-urban conversion.

An alternative way to obtain subsistence income levels is to use direct historical estimates from colonial surveys when available. For Ghana, for example, there are historical estimates of self-provisioning incomes for various years.⁴ These direct estimates tend to be higher than the

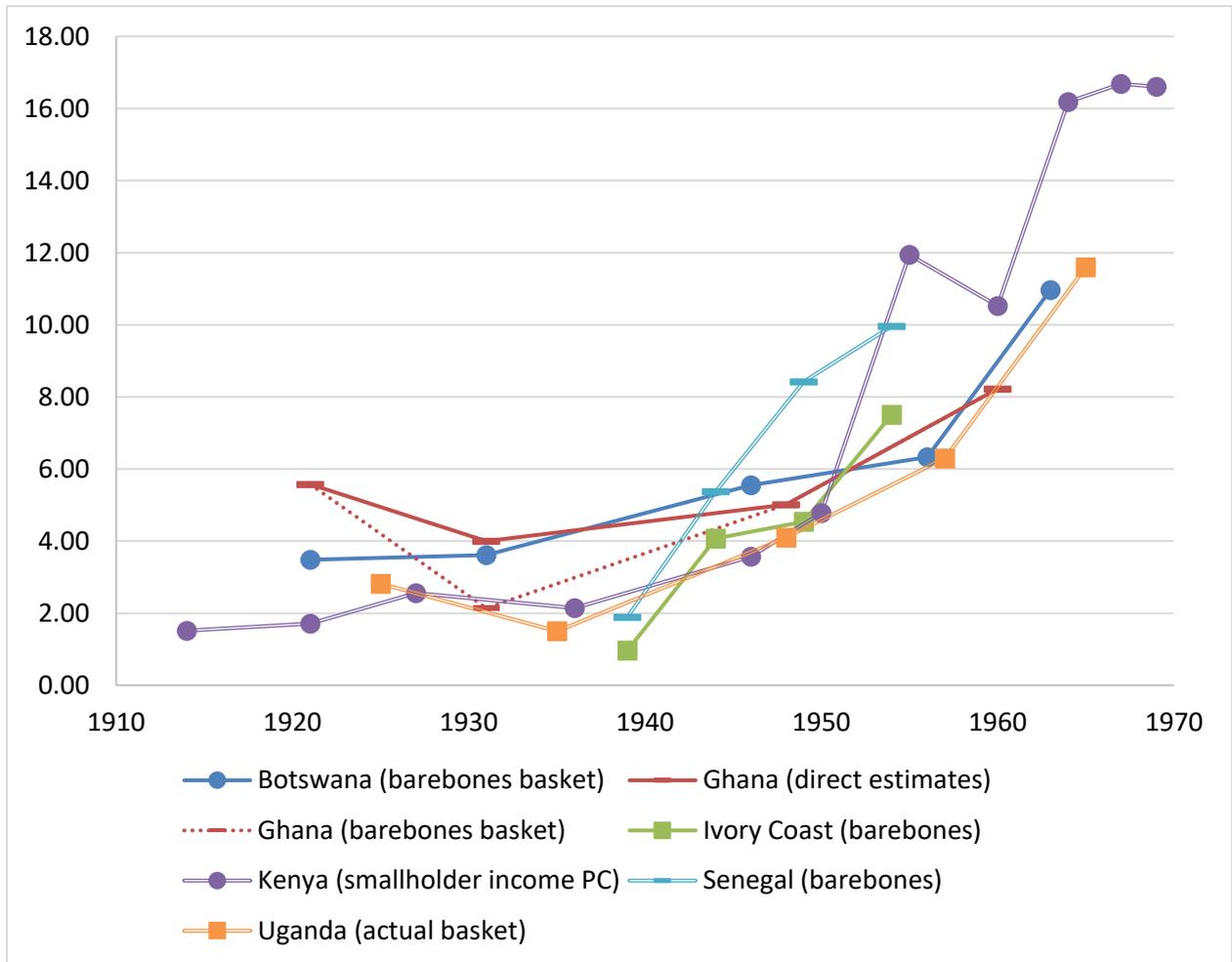
⁴ Szereszewski (1965), Cardinal (1931), various budget and expenditure surveys.

consumption basket approach, especially for the earlier years. This could reflect the fact that in Ghana, the ecology generally allowed for ample agricultural production that enabled farmers to earn a multiple of subsistence (Aboagye and Bolt 2021). This resembles the situation in Uganda described above. In the case of Kenya, we cannot entirely trace Bigsten's (1987) approach valuing subsistence. Instead, we take his estimate of smallholder income per worker and divide this over a projected number of dependents.⁵ Because African smallholders obtained substantial incomes from sources other than self-provisioning, it is likely an overestimate (especially in later years when smallholder cash cropping expanded), but nevertheless worth including in the comparison.

Figure 5 compiles the different estimates of the nominal value of a 2100 calorie food basket. The different approaches and data sources give a fairly consistent level of subsistence income and the distribution appears plausible. Uganda and Kenya have a lower level of subsistence income initially than both Ghana and Botswana, but experience a more rapid increase, leading to convergence of subsistence prices (which is consistent with Frankema and van Waijenburg's (2012) nominal wages). Subsistence incomes for Senegal and Ivory Coast start at comparatively low levels in the late 1930s, but rise towards high levels in the 1950s, which is consistent with wage developments and the overvalued CFA. Around the mid-1940s, there is broad agreement in the level of subsistence income for all countries included in our analysis.

⁵ We estimate the average number of dependents per rural household by dividing Kenya's estimated total population from Frankema and Jerven (2014), and Maddison (2013) for the post-1960 years, over the total number of workers. Thus, we assume the dependent-worker ratio for smallholders to be equal to this ratio in the economy as a whole.

Figure 5
Comparison of subsistence-level incomes



Note: For Senegal and Ivory Coast, the CFA Franc value is converted into Pound Sterling using ClioInfra (pound-franc exchange rate) and Wikipedia (franc-CFA exchange rate).

4. Country levels and trends

The three harmonisation exercises presented above show that after some modifications, the six social tables can be meaningfully compared. Subsequently, we calculate three different inequality indicators – the Gini coefficient, the Inequality Extraction Ratio (IER), and the Theil index – based on our social tables.

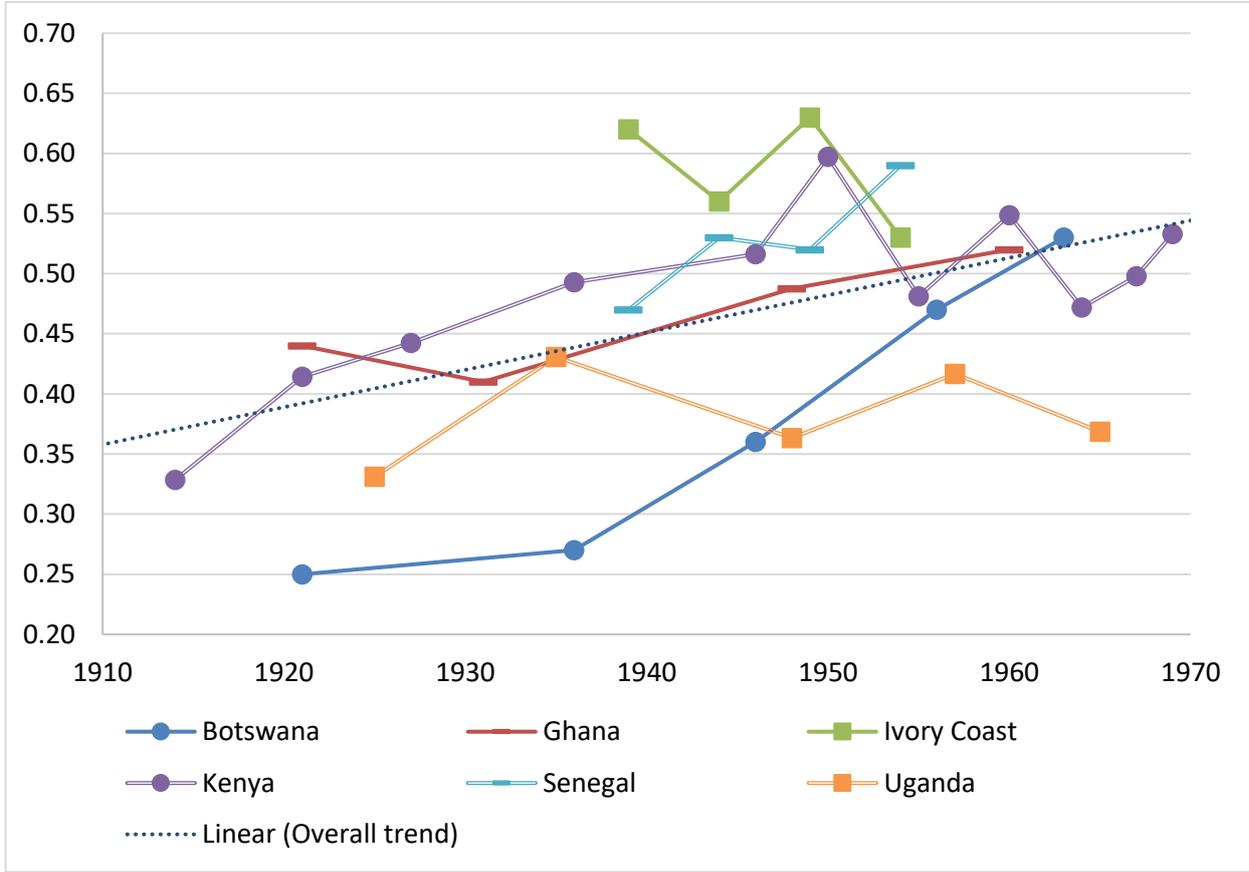
4.1. Gini coefficient

The Gini coefficient, running from 0 to 1 and computed based on the Lorenz curve, is most widely used by inequality researchers. Relative to other indicators, the Gini is quite sensitive to income

levels in the middle parts of the distribution. Constructing Ginis allows us to compare with other historical studies and, with proper selection and further calculations, we can in the future connect our estimates with data points for the independence era.

Figure 6 shows Gini coefficients for our sample of colonies between the 1910s and the 1960s. The overall average Gini is 0.47, which is higher than the global mean in the same period (UNU-WIDER 2021, average reported Gini in 1910-1965: 0.41). Inequality rose over time, with the average Gini increasing from 0.35 in 1910-25 to 0.50 in 1950-65. This increase is particularly evident in the case of Botswana (from 0.25 to 0.50) but can also be seen in Ghana (from 0.44 to 0.52), Uganda (from 0.33 to 0.39), and Kenya (from 0.37 to 0.52). If we would refine Bigsten’s tables for Kenya and differentiate and sub-divide the large group of African self-employed in Kenya, we expect the Gini to be higher and increase faster. Finally, it is plausible that Senegal and Ivory Coast also saw rising inequality during the colonial era, given their large inequality observed towards the end of the period, although we are not able to ascertain this empirically.

Figure 6
Gini Coefficients



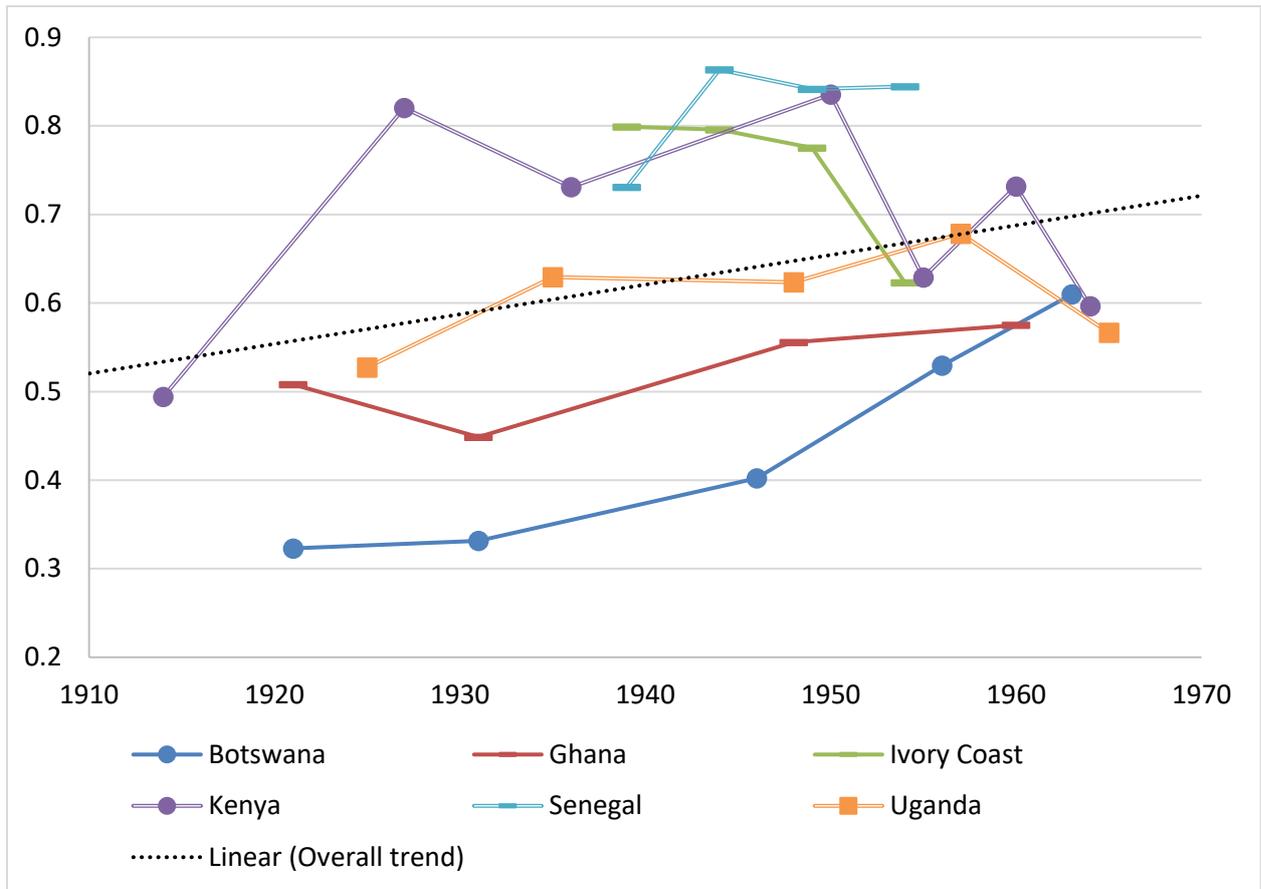
There are also significant differences among colonies, in terms of both inequality trends and levels. Ghana, Kenya, Senegal, and Ivory Coast show relatively high inequality (above world average) throughout the period. Meanwhile, Botswana has the lowest Gini at the beginning and one of the highest at the end, and Uganda reports below-average inequality both at the beginning and at the end of the period of analysis.

These results are consistent with our theoretical discussions in section 2.3, where we argue that the type of commodities matters for inequality. Colonies that export capital-intensive commodities (cocoa in Ghana and Ivory Coast, coffee in Kenya, and cattle in Botswana) tend to experience higher inequality levels than colonies that produce labour-intensive commodities (cotton in Uganda). In section 5, we show that the high inequality in Senegal, a colony that also specialised in a labour-intensive crop (peanuts), is explained by the large gap in income between Africans and Europeans due to the central administration of French West Africa.

4.2. Inequality Extraction Ratios (IER)

The IER measures the gap between observed inequality and maximum feasible inequality at a given level of income per capita. Milanovic pioneered this approach, arguing that it is especially appropriate for investigating pre-industrial societies or countries with low levels of economic development in terms of GDP per capita (Milanovic 2018; Milanovic et al. 2011). Differently from the Gini coefficient, the IER considers that relatively poor societies have less scope for income inequality, simply because the amount of income beyond basic subsistence is exceedingly small. The IER is calculated by first estimating the maximum feasible inequality, which represents a value along the so-called Inequality Possibility Frontier (IPF) when the population earns just enough to sustain itself and all other income accrues to one earner. The IER is computed by dividing the observed Gini coefficient over the maximum feasible Gini coefficient and a value of 0 represents perfect equality, while a value of 1 represents maximum inequality. In Figure 7, we present IER for our sample of colonies. The ‘non-extractable’ subsistence income is calculated through the construction adjusted bare-bones subsistence baskets evaluated at relevant (rural) price levels (see Section 3.4.).

Figure 7
Inequality Extraction Ratios



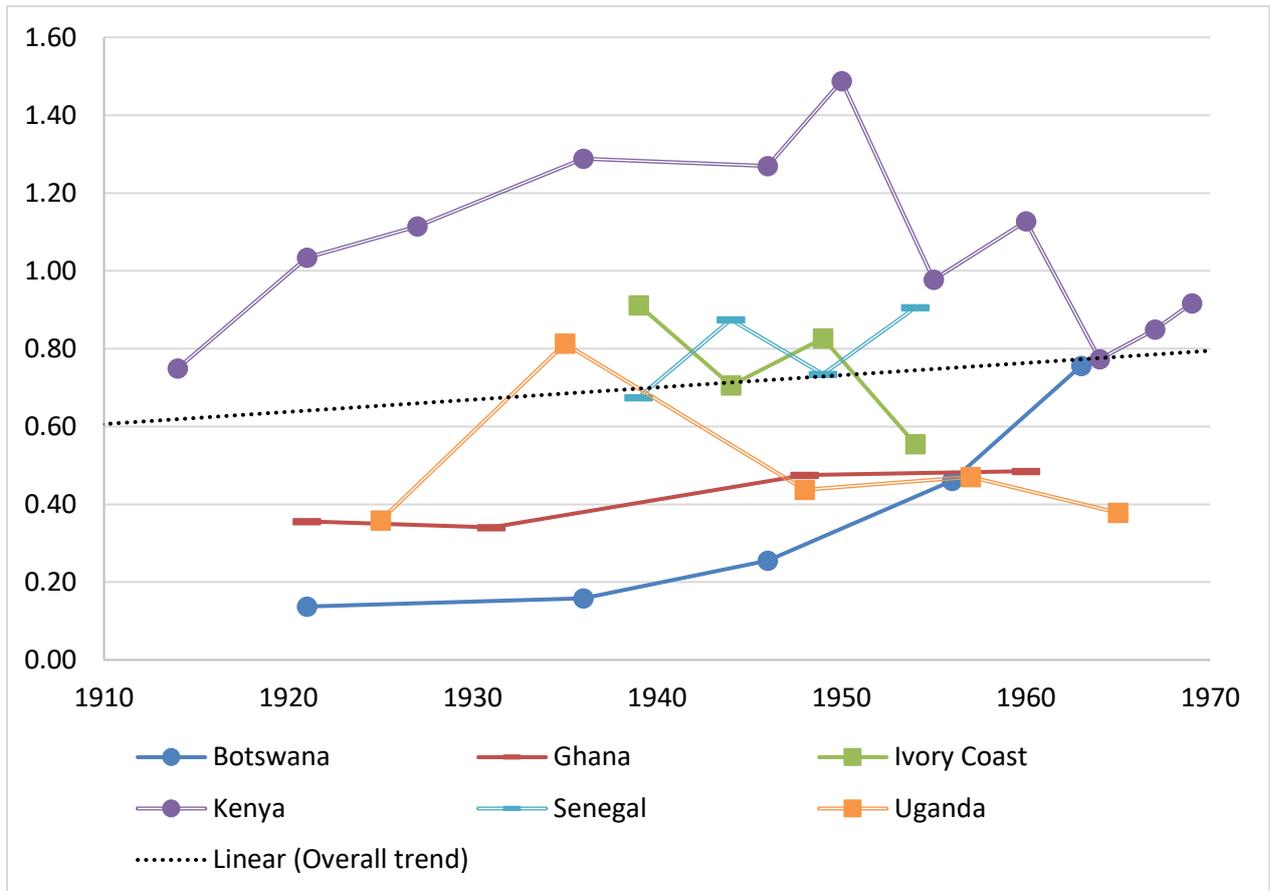
During the period of analysis, the average inequality extraction ratio is 0.64, which is lower than in other pre-industrial societies (Milanovic 2011 reports an average IER of 0.77, see Table 2 on p. 263), although this may be due to our use of subsistence baskets rather than more conjectural GDP estimates as previous scholars have done. In any case, it is clear that, over time, African colonial societies tended to become more ‘extractive’. The average IER rose from 0.46 in 1910-25 to 0.66 in 1950-65, and increases are observable in all colonies, except for Ivory Coast. The IER conveys a similar message as the Gini coefficient regarding the levels and trends of inequality in the six countries. One major difference is that the IER of Ghana and Botswana is comparatively low, and of Uganda comparatively high. The reason for these shifts between the Gini and IER is that Ghana had higher average incomes than Uganda, and therefore higher levels of maximum feasible inequality. That such income was not ‘extracted’ is consistent with Ghana’s status as a colony with comparatively limited expatriate influence and settlement, a circumstance that is also true for Botswana.

4.3. Theil index

The Theil index is the most widely used inequality measure in the broader category of general entropy indices. It is more sensitive to income levels at the far ends of the income distribution, especially high incomes and therefore we may expect the Theil index to be comparatively higher than the Gini coefficient in 'dual' economies with a polarised income distribution. Relative to the Gini, the Theil has the advantage of being fully decomposable into its constituent elements, something that we will return to in section 5.

Figure 8 reports Theil indexes for our sample of colonies. The analysis confirms the finding of overall increasing inequality as the average Theil rose from 0.53 in 1910-25 to 0.76 in 1950-65. This trend is shared in different degrees by all colonies, although we also observe declines toward the end of the period in Ivory Coast, Kenya, and Uganda. Compared to the Gini results, Kenya up to 1950 comes out as particularly unequal when we use the Theil, which is indicative of its 'dualistic' income structure. Ivory Coast in 1939 and Uganda in 1935 come out as remarkably unequal, but then there is a drop. In the end, Uganda rather turns out as a relatively low inequality colony which is consistent with the Gini estimates. As indicated by the Gini, Botswana initially has low and then sharply rising inequality levels. Ghana comes out comparatively more equal compared to using the Gini coefficient, with inequality levels on par with Uganda for most years. This reflects that inequality was not driven by a rich (expatriate) elite, but by African cocoa farmers and wage laborers just below the very top, to which the Theil is less responsive. The Ivory Coast also shows mixed results with low Theil but high Gini values, albeit to a lesser extent.

Figure 8
Theil Indexes



4.4. Synthesis of findings

Relating back to our analytical framework (see Figure 2), we observe that export-oriented commercialization under colonial rule was associated with rising income inequality *trends*, at least from the 1920s onwards. But what about differences in *levels* between colonies? In Table 4 we report average Gini, Theil, and inequality extraction ratio indicators for all colonies in the period 1930-1960. We also show the relative ranking in brackets. We find that Botswana, while presenting the sharpest increase over time, was the country with the lowest income inequality overall. Uganda and Ghana are ranked next, with comparatively low inequality levels. Kenya and Ivory Coast, and Senegal were more unequal.

Table 4
Summary of inequality statistics (average 1930-1960 and ranking)

	Gini	Theil	Inequality Extraction Ratio
Botswana	0.37 (6)	0.29 (6)	0.42 (6)
Ghana	0.47 (4)	0.43 (5)	0.53 (5)
Ivory Coast	0.59 (1)	0.75 (3)	0.75 (2)
Kenya	0.53 (3)	1.23 (1)	0.73 (3)
Senegal	0.53 (2)	0.80 (2)	0.82 (1)
Uganda	0.40 (5)	0.57 (4)	0.64 (4)

Notes: Country ranking (1= most unequal, 6= least unequal) of the average score (observations 1930 to 1960 only) in brackets.

Sources: Figures 6 to 8.

The relative ranking is consistent with our argument that in countries with comparatively more substantial colonial presence in the form of either a large colonial administration (Senegal) or higher numbers of settlers (Kenya), inequality levels were higher. Although Ivory Coast's settlers failed, an institutional setting which aimed to facilitate the supply of cheap (migrant) labor for European farmers, potentially contributed to its high level of inequality until such institutions were dismantled in the late 1940s. Conversely, in colonies with a comparatively larger role for Africans and a smaller expatriate presence (Botswana, Ghana), initial inequality levels were lower.

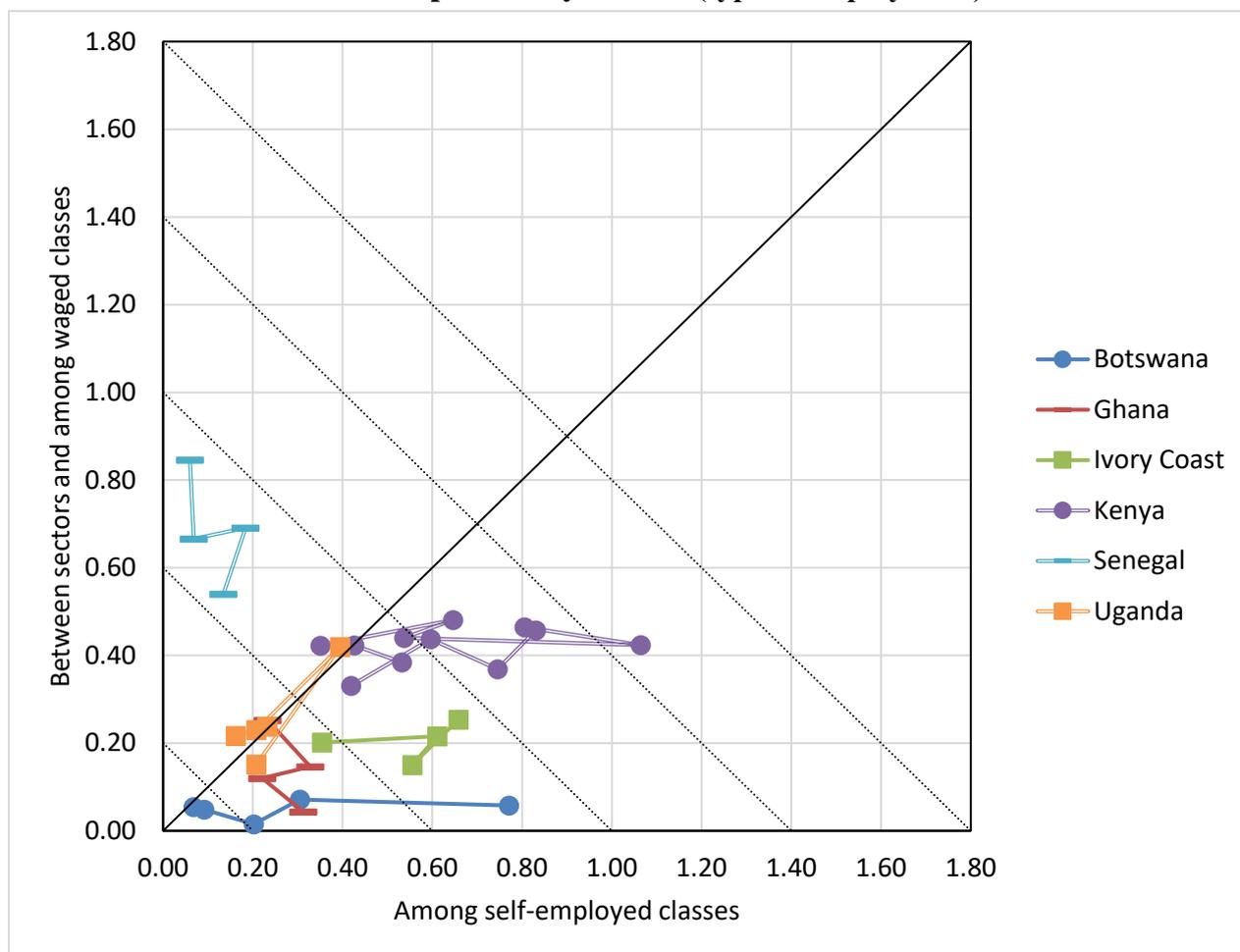
The metrics presented above express inequality at an aggregated level, but we may expect processes of commercialization and colonialism to generate specific fault lines in societies depending on the mediating factors outlined in Figure 1 and Table 1. We continue the analysis with a Theil decomposition which allows us to get a more precise understanding of the dimensions and drivers of income inequality in colonial Africa.

5. Decomposition by sector and race

To see to what share of the observed total inequality occurred among the self-employed and which share was driven by the size and incomes of wage workers, we decompose inequality between: i) a component representing inequality *within* the self-employed sector; and ii) a component representing inequality *between* the self-employed sector and *within* the waged sector (see Figure 9). Based on our analytical framework, we derive several expectations. First, we would expect higher inequality within the self-employed sector in colonies where either settlers or peasants produced (comparatively) capital-intensive agricultural commodities, such as cocoa, coffee, or livestock. We expect a smaller self-employed inequality component in colonies reliant on agricultural commodities with low capital intensity, such as cotton and groundnuts. Indeed, we observe that Botswana (in later years), Ghana, Ivory Coast (except in 1954), and Kenya had a larger self-employed inequality component than Senegal and Uganda (except in 1935, when the incomes of a small group of Asian traders and cotton ginner far exceeded those of African farmers, who faced depressed prices (De Haas 2021)).

Also, we expect colonies with a large colonial bureaucracy to have more inequality between the self-employed and waged sector, as well as within the waged sector. Because Senegal was the seat of the French administration of the much larger French West Africa territory, we expect it to have a higher degree of wage-sector inequality, which is indeed what we find. This also explains the ‘paradox’ of high overall inequality (see Section 4) in a context of commercialisation based on a cash crop with very low capital intensity (groundnuts). Kenya also had a relatively large and unequal waged sector, with a comparatively sizeable expatriate presence, which is reflected in a relatively large share of its overall inequality arising from the waged sector, although its European settlers in the self-employed sector predominated.

Figure 9
Theil decomposition by 'sector' (type of employment)

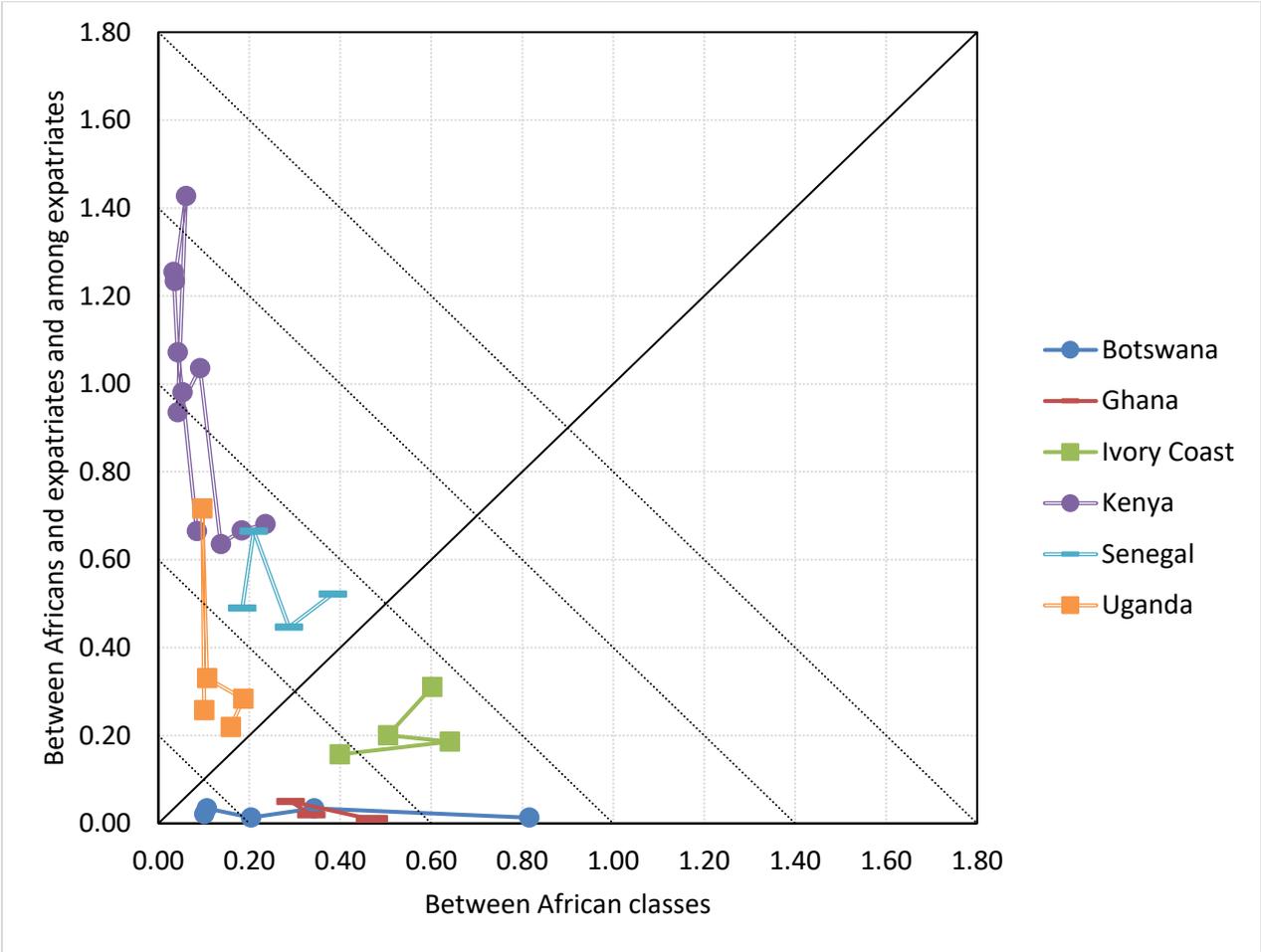


Notes: the dotted lines (top left to bottom right) are 'inequality indifference lines'. Along these lines, the total Theil index is constant. The line separating the top left and bottom right halves of the graph illustrates the decomposition where the 'self-employed' and 'waged' components are equal. All points below this line indicate that inequality among the self-employed contributed more to overall inequality than the waged sector, and vice versa.

Our second decomposition in Figure 10 singles out inequality among African classes on the one hand and between Africans and Europeans and among Europeans on the other. We expect that commercialisation processes driven by African producers rather than expatriate settlers lead to more inequality among African classes, especially in cases with scope for capital accumulation. This is what the decomposition by race shows for Botswana, Ghana, and Ivory Coast. Kenya, the only true settler colony among our six countries, has low inequality among African classes. While this confirms our substantive expectations, we note that this might also be driven by Bigsten's (1987) methodological choice to not differentiate in the African self-employed sector. Uganda, reliant on a labour-intensive cash crop, has comparatively low inequality among African classes, although it increases somewhat in later years (1957 and 1965) due to the growing importance of

coffee (De Haas 2021). To explain Senegal’s growing inequality among Africans, we need to consider the higher echelons of its colonial bureaucracy, where Africans increasingly participated and obtained higher wages (cf. Bossuroy and Cogneau 2013). Uganda’s high inequality between races and among expatriates is explained by the critical role of South Asians in the trading and processing of agricultural commodities in which Africans only marginally participated (De Haas 2021).

Figure 10
Theil decomposition by race



Notes: the dotted lines (top left to bottom right) are ‘inequality indifference lines’. Along these lines, the total Theil index is constant. The line separating the top left and bottom right halves of the graph illustrates the decomposition where the ‘expatriate’ and ‘African’ components are equal. All points below this line indicate that inequality among Africans contributed more to overall inequality than expatriates, and vice versa.

Our analytical framework also points to the role of indigenous social structures in mediating commercialisation processes on income inequality outcomes. For two reasons, such dynamics have proven hard to capture using the available social tables. First, our tables are aggregated on

the colony-level, while pre-colonial social structures differed substantially *within* countries. A good example is Uganda, where cotton was adopted in a wide variety of indigenous societies, some of which were kingdoms with hierarchical institutions and deep involvement in slave trading and ownership, while others had more egalitarian and diffuse social structures. To capture how these different institutions affected inequality, one would have to measure inequality at a more disaggregated level and with considerable precision (see for an example in Asia, De Zwart, 2020). Second, our social tables pertain to the period 1914 to 1965, with most observations towards the latter end. Hence, we do not capture inequality during period c. 1890 to 1914, when indigenous societies clashed in various ways with new systems of colonial administration, and in which, as a rich qualitative literature on each of our cases shows, pre-existing inequalities were refigured in substantial and uneven ways. If data availability allows, future studies may inform us more about inequality trends in the late pre-colonial and early colonial periods and probably reveal more about the role of indigenous social structures.

6. Concluding remarks

In this paper, we explore the historical roots of long-term inequality trends in Africa. Building on evidence for six African countries, we contribute to a growing literature that, based on new sources and explorations of quantitative methods, offers a richer, more nuanced view of African long-term development. For the analysis, we develop and apply a framework for understanding dimensions and drivers of inequality in colonial Africa. We argue that colonialism and commercialisation were the prime drivers of inequality in the period studied, the latter being mediated by indigenous social structures, resource requirements, and colonial policies.

Methodologically, we show that the social tables approach is a reliable strategy for studying long-run changes in income inequality. Our substantive contribution consists of three overall findings. First, by calculating Gini coefficients, IERs, and Theil indexes, we provide evidence that overall inequality increased between c. 1910 and 1965, in a context of export-oriented commercialisation and growing colonial bureaucracies. Second, decomposition exercises along the lines of sector and race confirm our expectation that colonial policies and expatriate presence are a primary explanation for high income inequality *levels*, both indirectly and through a direct effect of the presence of a large colonial bureaucracy. Third, our decomposition also shows that the particular resource requirements and commodity characteristics mediated the effect of commercialisation

and were the primary driver of inequality *trends*, both for Africans and non-Africans and particularly in capital intensive agricultural production.

Our findings and theoretical propositions can be deepened or adjusted as more evidence is produced. This will be a gradual process considering the data-intensive and time-consuming nature of social table construction. In particular, it will be interesting to add mineral economies to the comparison to explore our expectation of very high inequality in such economies. While it should be done with caution, there is also substantial scope in the future for linking the African social tables both ‘sideways’, comparing them to Asian and Latin American economies undergoing similar processes of commercialisation and colonisation, and ‘forward’, linking the series to more contemporary inequality estimates. Then we will truly have the empirical base to theorise about *global* long-term inequality trends.

References

- Aboagye, P. and Bolt, J. (2021). (forthcoming) Long-Term Trends in Income Inequality: Winners and Losers of Economic Change in Ghana, 1891-1960. *Explorations in Economic History*.
- Alfani, G. (2021). Economic inequality in preindustrial times: Europe and beyond. *Journal of Economic Literature*, 59 (1): 3-44.
- Alfani, G. and Tadei, F. (2019). Income Inequality in French West Africa: Building Social Tables for Pre-Independence Senegal and Ivory Coast, *UB Economics Working Papers 2019/396*.
- Allen, R. C. (2001). The great divergence in European wages and prices from the Middle Ages to the First World War. *Explorations in Economic History*, 38 (4): 411-447.
- Allen, R.C. (2015). The High Wage Economy. *The Economic History Review*, 68: 1-22.
- Allen, R.C. (2019). Class structure and inequality during the industrial revolution: lessons from England's social tables, 1688–1867. *The Economic History Review*, 72: 88-125.
- Alvaredo, F., Cogneau, D. and Piketty, T. (2020). Income Inequality Under Colonial Rule: Evidence from French Algeria, Cameroon, Tunisia, and Vietnam and Comparisons with the British Empire 1920-1960. *CEPR Discussion Paper No. DP14969*.
- Alvaredo, F., Chancel, L., Piketty, T., Saez, E., and Zucman, G. (2018). The elephant curve of global inequality and growth. In *AEA Papers and Proceedings*, Vol. 108, pp. 103-08.
- Alvaredo, F., and Atkinson, A. B. (2010). Colonial Rule, Apartheid and Natural Resources: Top Incomes in South Africa, 1903-2007. *CEPR Discussion Paper No. 8155*.
- Amin, S. (1966). *L'économie du Maghreb*. Paris : Editions de Minuit.
- Aspromourgos, T., (1988). The life of William Petty in relation to his economics. *History of Political Economy*, 20: 337-356.
- Atkinson, A. (2015). Top incomes in East Africa before and after independence. *WID Working Paper Series No. 201502*, World Inequality Lab.
- Atkinson, A. B. (2014). The colonial legacy: Income inequality in former British African colonies (No. 2014/045). *WIDER Working Paper*.
- Austin, G. (2008). Resources, Techniques, and Strategies South of the Sahara: Revising the Factor Endowments Perspective on African Economic Development, 1500-2000. *The Economic History Review*, 61 (3): 587–624.
- Austin, G. (2009). Cash crops and freedom: Export agriculture and the decline of slavery in colonial West Africa. *International Review of Social History*, 54 (1): 1-37.

- Austin, G. (2019). Capitalists and labour in Africa. In S. Bellucci and A. Eckert (eds.). *General labour history of Africa: workers, employers and governments, 20th and 21st centuries* (pp. 425-456). Woodbridge: James Currey (Boydell & Brewer).
- Berry, A. (1990). International trade, government and income distribution in Peru since 1870. *Latin American Research Review*, 25 (2): 31-59.
- Bigsten, A. (1987). Income Distribution and Growth in a Dual Economy: Kenya 1914-1976. *Gothenburg University, Department of Economics, Memorandum nr 101*.
- Bigsten, A. (2018). Determinants of the Evolution of Inequality in Africa. *Journal of African Economies*, 27 (1): 127-148.
- Bolt, J. and Hillbom, E. (2016). Long-term trends in economic inequality: lessons from colonial Botswana, 1921–74. *The Economic History Review*, 69: 1255-1284.
- Bolt, J., and Hillbom, E. (2015). Potential for Diversification? The Role of the Formal Sector in Bechuanaland Protectorate’s Economy, 1900–65. *Economic History of Developing Regions*, 30 (2): 95-124.
- Boone, C. and Simson, R. (2019). Regional inequalities in African political economy: theory, conceptualization and measurement, and political effects. *LSE Research Online Documents on Economics 100861*.
- Bossuroy, T. and Cogneau, D. (2013). Social Mobility in Five African Countries. *Review of Income and Wealth*, 59: S84-S110.
- Bowden, S., Chiripanhura, B. and Mosley, P. (2008). Measuring and explaining poverty in six African countries: A long-period approach. *Journal of International Development*, 20: 1049-1079.
- Broadberry, S., and Gardner, L. (2019). Economic growth in sub-Saharan Africa, 1885-2008. *CEPR Discussion Paper No. DP15206*.
- Cardinall, A. W. (1931). A Bibliography of the Gold Coast: As a Companion Vol. to the Census Report of 1931. Government Printer, South Africa.
- Chancel, L., Cogneau, D., Gethin, A., and Myczkowski, A. (2019). How large are African inequalities? Towards distributional national accounts in Africa, 1990-2017, *WID working paper no. 2019/13*.
- Cogneau, D., T. Bossuroy, P. De Vreyer, C. Guenard, V. Hiller, P. Leite, S. Mesple-Somps, L. Pasquier-Doumer, and C. Torelli (2007). *Inequalities and Equity in Africa*. Agence Francaise de Developpement (AFD).
- De Haas, M. (2017). Measuring rural welfare in colonial Africa: did Uganda’s smallholders thrive? *The Economic History Review*, 70: 605-631.

- De Haas, M. (2021). Reconstructing income inequality in a colonial cash crop economy: five social tables for Uganda, 1925-1965. *European Review of Economic History*, forthcoming
- De Zwart, P. (2020). Globalisation, Inequality and Institutions in West Sumatra and West Java, 1800–1940. *Journal of Contemporary Asia*, June, 1–27.
- Fibaek M. and E. Green (2019). Labour Control and the Establishment of Profitable Settler Agriculture in Colonial Kenya, c. 1920–45. *Economic History of Developing Regions*, 34 (1): 72-110.
- Fosu, A. K. (2009). Inequality and the impact of growth on poverty: comparative evidence for sub-Saharan Africa. *The Journal of Development Studies*, 45 (5): 726-745.
- Fosu, A. K. (2015). Growth, inequality and poverty in Sub-Saharan Africa: recent progress in a global context. *Oxford Development Studies*, 43 (1): 44-59.
- Fourie, J. (2016). The data revolution in African economic history. *Journal of Interdisciplinary History*, 47 (2): 193-212.
- Fourie, J., and Von Fintel, D. (2010). The dynamics of inequality in a newly settled, pre-industrial society: the case of the Cape Colony. *Cliometrica*, 4 (3): 229-267.
- Fourie, J., and Von Fintel, D. (2011). A history with evidence: Income inequality in the Dutch Cape colony. *Economic History of Developing Regions*, 26 (1): 16-48.
- Frankema, E. and M. van Waijenburg (2019). The Great Convergence. Skill Accumulation and Mass Education in Africa and Asia, 1870-2010. *CEPR Discussion Paper* No. DP14150.
- Frankema, E., Williamson, J., and Woltjer, P. (2018). An Economic Rationale for the West African Scramble? The Commercial Transition and the Commodity Price Boom of 1835–1885. *The Journal of Economic History*, 78(1), 231-267.
- Frankema, E., Green, E., and Hillbom, E. (2016). Endogenous processes of colonial settlement: The success and failure of European settler farming in sub-Saharan Africa. *Revista de Historia Economica*, 237-265.
- Frankema, E., and Jerven, M. (2014). Writing history backwards or sideways: towards a consensus on African population, 1850–2010. *The Economic History Review*, 67(4), 907-931.
- Frankema, E. and M. Van Waijenburg (2012). Structural Impediments to African Growth? New Evidence from Real Wages in British Africa, 1880-1965. *The Journal of Economic History*, 72 (4): 895–926.
- Galli, S. and Rönnbäck, K. (2020). Colonialism and rural inequality in Sierra Leone: an egalitarian experiment. *European Review of Economic History*, 24 (3): 468-501.
- Galli, S. and Rönnbäck, K. (2021). Land distribution and inequality in a black settler colony: the case of Sierra Leone, 1792–1831. *The Economic History Review*, 74 (1): 115-137.

- Gómez León, M. (2015). *Growth, Inequality and the Rise of the Middle Class*, Brazil, PhD thesis, Universidad Carlos III de Madrid.
- Gómez León, M. and De Jong, H.J. (2019). Inequality in turbulent times: income distribution in Germany and Britain, 1900–50. *The Economic History Review*, 72: 1073-1098.
- Jerven, M. (2013). *Poor Numbers: How We Are Misled by African Development Statistics and What to Do about It*, Cornell University Press.
- Jerven, M., Austin, G., Green, E., Uche, C., Frankema, E., Fourie, J., Inikori, J., Moradi, A. and Hillbom, E. (2012). Moving forward in African economic history: Bridging the gap between methods and sources. *African Economic History Network Working Paper Series* No 1/2012.
- Jerven, M. (2014). A West African experiment: constructing a GDP series for colonial Ghana, 1891–1950. *The Economic History Review*, 67 (4): 964-992.
- Khisa, M. (2019). Whose Africa is rising? *Review of African Political Economy*, 46:160, 304-316
- Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, 45(1), 1-28.
- Law, R. (Ed.). (2002). *From Slave Trade to 'Legitimate' Commerce: the commercial transition in nineteenth-century West Africa*. Cambridge: Cambridge University Press.
- Lewis, W. A. (1954). *Economic Development with Unlimited Supplies of Labour*. The Manchester School, 22: 139-191.
- Lindert, P. and Williamson, J. (2012). American incomes, 1774–1860. *NBER Working Paper Series* No. 18396, National Bureau of Economic Research. Cambridge, MA.
- Lindert, P., and Williamson, J., (1982). Revising England's social tables, 1688–1812, *Explorations in Economic History*, 19: 385-408.
- Lindert, P., and Williamson, J. (1983). Reinterpreting Britain's social tables, 1688–1913. *Explorations in Economic History*, 20 (1): 94-109.
- Lopez Jerez, M. (2014). *Deltas Apart - Factor Endowments, Colonial Extraction and Pathways of Agricultural Development in Vietnam*. PhD Thesis, Lund University.
- Manning, P and M. Drwenski (2016). The differences of inequality in Africa, in P. Hudson and K. Tribe (eds.) *The contradictions of capital in the twenty-first century; the Piketty opportunity*, Agenda Publishing.
- Manning, P. (2010). African population: Projections, 1850 – 1960. In: K. Ittman, D.D. Cordell and G.H. Maddox (eds.) *The Demographics of empire, the colonial order and the creation of knowledge*. Athens, Ohio: Ohio University Press, pp. 245 – 275.
- Milanovic, B. (2016). *Global inequality, a new approach for the age of globalization*, Harvard University Press.

- Milanovic, B. (2018). Towards an explanation of inequality in premodern societies: the role of colonies, urbanization, and high population density. *The Economic History Review*, 71: 1029-1047.
- Milanovic, B., Lindert, P.H. and Williamson, J.G. (2011). Pre-Industrial Inequality. *The Economic Journal*, 121: 255-272.
- Moradi A. and J. Baten (2005). Inequality in Sub-Saharan Africa: New Data and New Insights from Anthropometric Estimates. *World Development*, 33 (8): 1233-1265,
- Mosley, P. (1980). *The settler economies: studies in the economic history of Kenya and Southern Rhodesia 1900-1963*. Doctoral dissertation, University of Cambridge.
- Piketty, T. (2019). *Capital and Ideology*. Harvard University Press.
- Piketty, T. (2014). *Capital in the Twenty-First Century*. Harvard University Press.
- Rodriguez Weber, J. E. (2017). The political economy of income inequality in Chile since 1850, in Bértola, L., Williamson, J. (eds.) *Has Latin American Inequality Changed Direction?* pp. 43-64. Springer, Cham.
- Roessler, P., Y. I. Pengl, R. Marty, K. Sorlie Titlow and N. van de Walle (2020). The Cash Crop Revolution, Colonialism and Legacies of Spatial Inequality: Evidence from Africa. *CSAE Working Paper Series 2020-12*, Centre for the Study of African Economies, University of Oxford.
- Saito, O. (2015). Growth and Inequality in the Great and Little Divergence Debate: A Japanese Perspective. *The Economic History Review*, 68 (2): 399-419.
- Scheidel, W. (2017). *The Great Leveler, Violence and the History of Inequality from the Stone Age to the Twenty-First Century*, Princeton University Press.
- Shimeles A., and Nabassaga, T. (2018). Why Is Inequality High in Africa? *Journal of African Economies*, 27 (1): 108–126.
- Simson, R., and Savage, M. (2020). The global significance of national inequality decline. *Third World Quarterly*, 41 (1): 20-41.
- Szerezewski, R. (1965). *Structural changes in the economy of Ghana, 1891-1911* (pp. 53-1). London: Weidenfeld and Nicolson.
- Tadei, F. (2020). Measuring Extractive Institutions: Colonial Trade and Price Gaps in French Africa. *European Review of Economic History* 24 (1): 1-23.
- Tosh, J. (1980). The cash-crop revolution in tropical Africa: an agricultural reappraisal. *African Affairs* 79 (314): 79-94.
- UNDP (2017). *Income Inequality Trends in Sub-Saharan Africa: Divergence, Determinants and Consequences*, edited by H. Bhorat, G. A. Cornia, Ayodele F. Odusola, P. Conceição.

- UNU-WIDER (2021). World Income Inequality Database.
<https://www.wider.unu.edu/project/wiid-%E2%80%93-world-income-inequality-database>
- Van de Walle, N. (2009). The Institutional Origins of Inequality in Sub-Saharan Africa. *Annual Review of Political Science*, 12: 307-27.
- Van Zanden, J.L. (2003). Rich and poor before the Industrial Revolution: a comparison between Java and the Netherlands at the beginning of the 19th century. *Explorations in Economic History*, 40 (1): 1-23,
- Williamson, J. G. (1997). Globalization and inequality, past and present. *The World Bank Research Observer*, 12 (2): 117-135.