Skill, Race, and Income Inequality in the Wage Sector in British Tanganyika

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Abstract

In the literature on wages and income inequality in colonial sub-Saharan Africa, two recurrent themes can be observed: high racial inequality between European colonisers and the colonised African population and high skill premiums, a measure of the ratio of skilled to unskilled wages. For colonial Africa, these high skill premiums have usually been relegated to a mere confirmation of the frequent complaints over skilled labour shortages by colonial officials. Elsewhere, however, they have been identified as an important driver of income inequality, an indicator of human capital formation, and a predictor of long-run growth. Consequently, they warrant further investigation also in the colonial context.

In this paper, I investigate the levels and trends in income inequality in the wage sector in British Tanganyika from c. 1920-60. It focuses on the role of skill premiums and racial discrimination, and highlights the complex interrelations between skilled labour supply and demand on the one hand as well as skill premiums and racial income differences on the other.

I find that income inequality was, overall, high in the colonial wage sector, although it declined somewhat towards the end of the colonial period. While the overall trend in inequality was driven mostly by racial income differences, skill premiums played an important role, too. Moreover, part of the racial income differences did not stem from outright discrimination, but were linked to a persistent shortage of skilled labour and the resulting import of non-African skilled personnel. Underlying both high skill premiums and high racial income differences was the lack of educational provision for Africans by the colonial authorities. This failure to expand educational opportunities for Africans was also the principal barrier to African economic advancement in the wage sector, much more so than formal colour bars.

1. Introduction

The study of income inequality in sub-Saharan Africa has proliferated in recent decades, in part driven by the political and societal attention given to the topic as one of the major challenges to (economic) development on the continent (Odusola et al., 2017; Simson & Savage, 2020; van de Walle, 2009). The study of contemporary levels of inequality also has encouraged research on historical levels of inequality. A growing body of literature is now concerned with investigating colonial-era inequality and long-term inequality trends in sub-Saharan Africa (Aboagye & Bolt, 2021; Alfani & Tadei, 2019; Alvaredo, Cogneau & Piketty, 2020; Atkinson, 2015; Bigsten, 1987; Bolt & Hillbom, 2015, 2016; Chancel et al., 2019; de Haas, 2021). High levels of racial inequality between the European colonisers and the colonised African population, in incomes and otherwise, is the first notable theme within these and more general studies of the colonial period (see also Cooper, 1996; de Zwart, 2011, 2013; Hutt, 1964).

A second theme emerging from this research and the broader literature on colonial-era wages in sub-Saharan Africa is that of high skill premiums (Bolt & Hillbom, 2015; de Zwart, 2011; Fajana, 1975; Frankema, 2010; Frankema & van Waijenburg, 2012, 2019). Skill premiums, a proxy for the availability of and investment in human capital, have been used as a measure of institutional quality, a predictor of long-run growth, and, importantly, a driver of income inequality (Acemoglu, 2002; Acemoglu & Autor, 2012; Goldin & Katz, 2008; Tinbergen, 1974; van Zanden, 2003, 2009a). The high skill premiums found in colonial Africa are typically taken as evidence of the common complaint by colonial officials over skilled labour shortages (Bolt & Hillbom, 2015; Frankema & van Waijenburg, 2012), yet their implications for income inequality have eluded in-depth investigation. Instead of training the local population, colonial authorities could import skilled labour from Europe and Asia to remedy labour shortages (Frankema & van Waijenburg, 2012, 2019), meaning that part of the high racial income differences could be explained by implicit skill differentials. Clearly, the relationship between high skill premiums and income inequality amongst wage earners warrants a deeper analysis.

To investigate the role of skill premiums against the backdrop of racial income differences I focus on the unique case of British Tanganyika, which went from having one of the lowest skill premiums amongst the British colonies in the 1920s,[1] to the highest after World War II (Frankema & van Waijenburg, 2012). This stands in contrast to Bowden, Chiripanhura and Mosley's (2008) argument that protectorate colonies, which focused primarily on peasant development, showed higher investments in African human capital, thereby lowering skill premiums over the course of the colonial period. While Tanganyika was technically a mandate, not a protectorate, this should, if anything, have led to an even more pronounced focus on African (peasant) development. The mandate put clear obligations concerning the well-being of the subject population on the mandatory power and, while the enforcement of the mandate terms has been questioned, consensus remains that the chief policy obligation of the Tanganyikan administration was the well-being of the domestic population (Bates, 1955; Brett, 1973, p.217; Mangat, 1969, pp.135, 152; McCarthy, 1977).

One would therefore expect the extent of racial discrimination to be limited, if not because racial discrimination runs counter to the stipulations of the mandate, then because discrimination is costly and often requires collective action or government intervention to be enforced (Becker, 1957; Hutt, 1964; Knight & McGrath, 1977). In Tanganyika, settlers and expatriates had little political influence (Brett, 1973, pp.223–224; Cameron, 1967). At the same time, the colonial administration was very concerned about the fiscal position of the Territory (Bates, 1955; McCarthy, 1977). Taken together, this means that the administration should have been disinclined to incur the costs of discrimination for the gain of a small, politically sidelined European class. Yet, previous studies on the role and status of Tanganyika's African and Asian populations argue that there existed a clear three-tiered socio-economic hierarchy, with Europeans at the top, Africans at the bottom, and Asians occupying the middle ranks (Frenz, 2014; Ghai & Ghai, 1965; Rothermund, 1965).

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[1] While comparatively low, these skill premiums were still very high when compared to skill premiums in pre-industrial Europe (see, for example, van Zanden (2009a)).

The aim of this paper is twofold: 1) to estimate, for the first time, the level and trend of income inequality in the wage-earning sector in British Tanganyika; 2) to decompose these estimates to disentangle the contribution of the two factors argued to be primary drivers of income inequality in this sector, skill and race. The subsequent analysis is guided by four questions: What was the level and trend of income inequality in the wage sector in British Tanganyika? Why were skill premiums so high? Is part of the race premium in average incomes explainable by implicit skill premiums and the different skilled labour shares in the different populations? And, what impact did skill and race premiums have on overall income inequality in the wage sector? To answer these questions, I estimate income inequality using social tables, and analyse the relative wage differences in the form of skill and race premiums.

It is well established that colonialism in sub-Saharan Africa, including Tanganyika, led to broad socio-economic transformations, encompassing the expansion of markets and wage labour, the further integration of the colonial territories into the global market, and the establishment of Western bureaucracy (Austin, 2010; Frankema & van Waijenburg, 2019). I argue that in Tanganyika, the socio-economic transformation occurring throughout under British rule introduced a wide range of new technologies in production, communication, transportation, management, and administration, which led to skill-biased technological change and a high and increasing demand for skilled labour. This, in turn, resulted in high skill premiums amongst African workers. Due to deficiencies in improving the skilled labour supply through general education or targeted training programmes, the high demand for skilled labour led to the import of skilled labour from outside Tanganyika, notably Europe and Asia. The higher skill and higher cost of this imported labour can explain part of the racial income differences, although clear evidence exists for racial wage discrimination and persistent occupational segregation. Despite this, the ongoing Africanisation of the wage sector throughout the colonial period meant that income differences *within* the group of African wage earners increased, while overall income inequality, average income differences between racial groups, and wage discrimination decreased.

The rest of this paper is structured as follows: Section 2 provides a historical overview of British Tanganyika and its labour market. Sections 3 and 4 present the theoretical background on skill and race premiums. Section 5 provides an overview of the data used in the analysis. The remaining sections analyse the level and trend of the skill and race premium and their contributions to the trend in overall income inequality in the colonial wage sector. Section 9 concludes.

2. British Tanganyika: Not a Lewis Country

Originally colonised by Germany, Tanganyika came under British control during World War I. Control was formalised in 1922, when Britain was granted administration under a League of Nations mandate. British Tanganyika was predominantly an agricultural economy (Fuggles-Couchman, 1964; Iliffe, 1979; Leubuscher, 1944). While not a pure peasant export economy like Ghana, peasant agriculture was the main occupation for most of Tanganyika's African population and constituted an increasing share of agricultural exports throughout the colonial period (Brett, 1973, pp.217–222; Ehrlich, 1964).

Like in neighbouring Kenya and Uganda, a small non-African minority lived in the Territory, comprised of European settlers, colonial officials, and Asians, both Tanganyika-born and immigrants.[2] In 1930, this group's share it made up 0.52 percent of the total population (0.12 percent for Europeans), increasing to 1.05 percent (0.22 percent for Europeans) by the end of British rule (*Census* 1931, 1957). This low share, less than half of that found in Kenya, was caused by two factors: First, the circumstances and timing of re-colonisation under a mandate limited extensive settlement. The original German settlers were expelled from the Territory following World War I and the mandate "expressly prohibited the separation of land and labourers" (Paton, 1995, p.184). Access to land for new settlers and local Asians was initially confined to former German plantations. Land alienation still took

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[2] "Asians", in the colonial documents, encompass primarily Indians, Goans, and Pakistanis (Frenz, 2014; Martin, 1953; Rothermund, 1965).

place under British rule, but remained limited overall (Bryceson, 1990, p.100; Fuggles-Couchman, 1964, pp.17–22). Second, environmental conditions – Tanganyika's large size, climate, and lack of infrastructure, in addition to the mandate restrictions, did not make it an attractive destination for prospective settlers (Cameron, 1967; Cana, 1918; Coulson, 1977; Gillman, 1942).

Despite their small numbers, Europeans and Asians played an economically important role. Sisal, the main plantation crop, was Tanganyika's most important agricultural export. The wage sector, dominated by non-African enterprises and the colonial administration, employed hundreds of thousands of Africans, around 10 to 15 percent of the total labour force.[3] Estate agriculture accounted for fifty to sixty percent of formal employment throughout the British colonial period, followed by the public sector (including the Tanganyika Railways and Harbours), accounting for twenty to thirty percent. The remainder were employed in private enterprises in industry and services (see Figure 1).
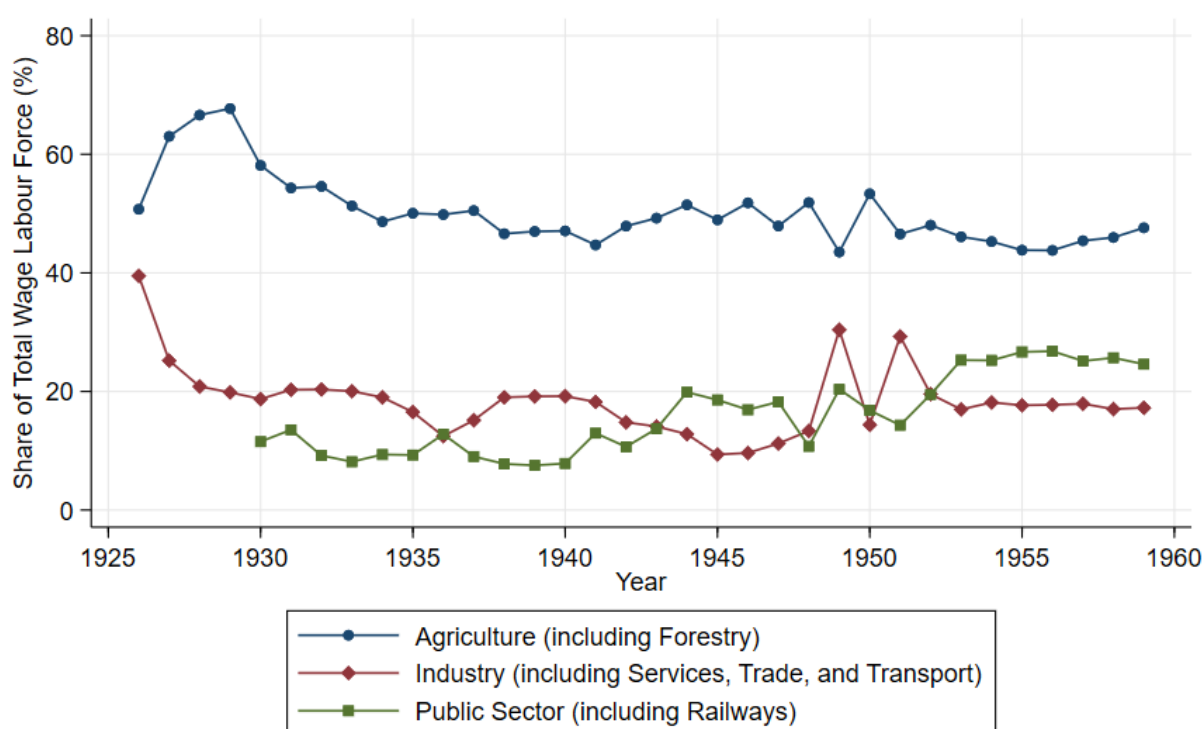

Figure 1: African employment shares by sector.
Note: The high volatility in sector shares between 1948 and 1951 is driven primarily by inconsistencies in the way the Annual Reports of the Labour Department counted and classified African labourers.
Source: Author's calculations based on data from the Blue Books and Annual Reports of the Labour Department.

While previous research on top-income shares in British Tanganyika shows that the European and Asian minorities received a significant share of total national income in late colonial Tanganyika (Atkinson, 2011, 2015), little is known about the interwar period and the specific levels and trends in income inequality in the wage sector. Within this sector, income inequality is driven by two components: relative wages (skill and race premiums) and the composition of the sector, which in turn depended on human capital formation and racial discrimination.

Relative wages have been widely employed to analyse economies were macro- or individual-level data are not available, especially in pre-industrial (Allen et al., 2011; van Zanden, 2009b, 2009a) and colonial settings (Bowden, Chiripanhura & Mosley, 2008; de Zwart, 2011; Frankema, 2010; Frankema & van Waijenburg, 2012). Skill premiums specifically have also been used to study the role of differential human capital formation in pre-industrial

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[3] Based on an average labour force share of 37 percent of the total population (see International Labour Office (1958, pp.666–667) and Ray (1966, p.15)).

societies to explain the Great Divergence (van Zanden, 2009b), and to understand trends in income inequality in industrial economies (Acemoglu, 2002; Acemoglu & Autor, 2012; Goldin & Katz, 2008; Katz & Murphy, 1992).

The skill premium, denoting the ratio of the wage of a skilled worker over that of an unskilled worker, is determined by the relative supply of and demand for skilled and unskilled labour and can be analysed using a simple supply and demand framework (Katz & Murphy, 1992; van Zanden, 2009b, pp.123–124). In Western Europe, skill premiums averaged around 50 to 60 percent from the fifteenth through the nineteenth century (van Zanden, 2009b). Outside of Europe, they were usually much higher, reaching over 200 percent in nineteenth-century India and Java and up to 400 percent in Korea in the same period (van Zanden, 2009b). In early twentieth century South Africa, average skill premiums reached 130 percent (de Zwart, 2011), and in the rest of British Africa, including Tanganyika, they were even higher, ranging from 200 to 400 percent (Frankema & van Waijenburg, 2012, 2019).[4] Despite providing estimates for skill premiums, studies on sub-Saharan Africa only contain cursory investigations into their determinants, stating that they confirm reports of skilled labour shortages (de Zwart, 2011; Frankema & van Waijenburg, 2012).

For pre-industrial (Western) Europe, van Zanden (2009b) argues that the comparatively low skill premiums resulted from low interest rates and efficient training institutions, which meant that the supply of skilled labour was both relatively high and could match increasing demand. Conversely, high skill premiums outside of Europe indicate relative deficiencies in human capital formation and skilled labour supply or point to an abundance of unskilled labour leading to the existence of Lewis conditions. Lewis (1954) argued that, if labour in rural areas is abundant while land is scarce, the marginal productivity in agriculture is negligible and there is disguised unemployment in agriculture. Under these conditions, labour can be freely transferred from this sector (the "traditional" sector) to the modern wage sector, without the need to raise wages above the subsistence level (because they are determined by the marginal productivity in the traditional, not the modern sector). In such a scenario, high skill premiums could then simply be a result of skilled labourers being paid wages according to their marginal productivity, while the wages of unskilled labourers stagnate at the subsistence level.

Tanganyika, a large, sparsely populated territory, had high land-labour ratios like most of sub-Saharan Africa, which makes the presence of Lewis conditions unlikely (Austen, 1985; Austin, 2008; Hopkins, 2020). This holds true even accounting for large areas of the territory that were not, or only minimally suited for agricultural endeavours and human settlement (Gillman, 1942, 1945, 1949). Frequent remarks concerning falling output in subsistence agriculture and issues of food security caused by cash crop production and labour migration also suggests that the marginal productivity of labour in African agriculture was, contrary to the Lewis scenario, not negligible (Bryceson, 1980; Frederick, 2018; Iliffe, 1979, p.307; Turshen, 1977).

Descriptions of the Tanganyikan labour market at the beginning of British rule also confirm that unskilled labour was not in abundant supply. While taxation led to some labour mobilisation, it did not increase supply to the point of abundance. Competition for labour between employers was frequent and demand for labour remained so high that employers reportedly absorbed all forthcoming labour rapidly (Cooper, 1996, p.60; Leubuscher, 1944, p.9; Orde Browne, 1927; Twining, 1951). The colonial administration refused to increase labour supply through coercive measures beyond taxation, so that unskilled labour had to be recruited on the market. Thus, we would expect unskilled wages to be determined by supply and demand, and to be higher than the subsistence level of the Lewis model. This is in line with Bowden et al.'s (2008) wage floor hypothesis, that the possibility of cash crop production as an alternative source of incomes in peasant colonies puts a floor on wages, which reduces the need for wage labour and thus increases its price.

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[4] These figures constitute a major upward revision of Frankema's (2010) earlier estimates of an average skill premium of 113 percent in urban trades in sub-Saharan Africa.

3. Skill Premiums and Income Inequality

If the supply of unskilled labour was not abundant, Lewis conditions are an unlikely explanation for the high and increasing skill premiums found previously. Instead, they point to a high and increasing demand for skilled labour as the driver of this trend. A well-known explanation for high and increasing demand for skilled labour is the theory of skill-biased technological change, which has been used to study trends in income inequality within developed economies over the twentieth century (Acemoglu, 2002; Acemoglu & Autor, 2012; Goldin & Katz, 2008). It states that technological change leads to an increase in the relative productivity of skilled labour and a subsequent increase in demand for it, as indicated by an increased share of skilled labourers within one sector (Zwick, 2001). The increase in the relative productivity of skilled labour also leads to an increase in skilled wages and higher skill premiums. Both the increasing number and income of skilled labourers then leads to an increase in income inequality (Acemoglu, 2002; Violante, 2016). Only when the supply of skilled labour increases enough to lead to a relative decline in skilled wages and an increase in unskilled and average wages is this trend reversed, and inequality decreases.

Colonisation in sub-Saharan Africa brought with it a wide range of new technologies, especially in the key sectors of the colonial economy like estate agriculture, industry, transport, and government (Austin, 2010; Frankema & van Waijenburg, 2019). Technology here needs to be understood broadly. It encompasses new machines or production methods such the use of fertiliser, but also administrative and organisational techniques used by the colonial government and estate agriculture. Technological change was accompanied by new occupations demanding new skills, which were scarce in the colonies. The most fundamental skills were English language proficiency and literacy, which have been important in explaining income differences amongst immigrants in other settings (Higgs, 1971). In colonial Tanganyika, both were frequently mentioned as important prerequisites for both white- *and* blue-collar occupations (*Railways* 1932-37, *Colonial Office* 1938).[5] New technologies also increased the demand for specialised skills. For example, engine drivers and draughtsmen working for the railways required technical knowledge; and agricultural overseers required managerial skills to efficiently supervise labour on plantations.

The Tanganyikan colonial economy expanded, with some setbacks, throughout the period of British rule, both in size and output. Especially after World War II, output growth in both the formal sector and African agriculture was rapid, driven in large parts by increases in labour productivity (Ehrlich, 1964; Fuggles-Couchman, 1964, pp.26–29). At the same time, we find a stagnating and even declining share in the labour force in the wage sector and the implementation of large-scale mechanised production, not only for the ill-fated East African Groundnut Scheme, but in estate agriculture in general (Fuggles-Couchman, 1964, pp.26–29, 83–84; Hogendorn & Scott, 1981; Rizzo, 2006).

All these developments point to the existence of skill biased technological change in colonial Tanganyika. Translating the theory into a concrete hypothesis, we would expect that the expansion of the colonial economy (and administration) led to an increased demand for skilled labour, which caused the increase in skill premiums Frankema and van Waijenburg (2012) observed, and which, in turn, led to an increase in income inequality in the wage sector. The developments in the late colonial period after World War II, then, depend on the supply response: whether efficient training and educational institutions were established and capable of increasing the supply of skilled labour to meet demand. If this was the case, we would expect skill premiums to fall. The impact of falling skill premiums on income inequality, however, would be difficult to predict due to compositional effects.

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[5] These abbreviations refer to the Annual Reports of the Tanganyika Railways and Harbours and the Annual Reports by the Colonial Office to the League of Nations/United Nations, respectively.

4. Race Premiums and Income Inequality

Developments *within* the African labour force are not the only driver of wage sector income inequality in colonial sub-Saharan Africa. Racial income differences also played an important, even dominant, role, especially in colonies with a larger non-African population. While the share of the non-African population in Tanganyika was much smaller than that of, for example, South Africa, research from Kenya and Senegal shows that even a relatively small non-African population can have a large impact on overall inequality levels (Alfani & Tadei, 2019; Bigsten, 1987). Since racial income differences in Tanganyika were reportedly high and because the existence of a three-tiered racial hierarchy is well documented, it is important to examine the role of racial discrimination (Cameron, 1967; Frenz, 2014; Ghai & Ghai, 1965; Mangat, 1969; Oonk, 2013; Rothermund, 1965).

First, it is necessary to define racial discrimination. Here, the term will be used to refer specifically to a situation where two individuals assigned to different racial categories "receive different treatment under conditions that are identical in every other respect" (Higgs, 2008, p.1). Following this definition, the existence of a racial hierarchy is *not, ipso facto,* sufficient evidence of racial discrimination if it is identified *solely* by differences in average incomes between groups (e.g. *all* European and *all* Asians), since these could be caused by other factors, like differences in average skill levels.

This paper focuses on two main forms of racial discrimination in the labour market. First, discrimination in remuneration, defined as "a difference in earnings among people of different races but of equal productivity as determined by their endowments of such economic characteristics as ability and human capital" (Knight & McGrath, 1977, p.245). Second, the racial segregation of the labour market, i.e., barring certain groups from certain occupations via (formal or informal) "colour bars" (Hutt, 1964). In South Africa, one of the most studied examples of racial discrimination in the labour market in sub-Saharan Africa, racial discrimination came in both forms. White labourers successfully lobbied for colour bars to artificially restrict competition in the labour market, and in those occupations which remained open to all South Africans, racial wage discrimination was the norm (de Zwart, 2011; Hutt, 1964; Knight & McGrath, 1977; Nattrass & Seekings, 2001).

One important aspect of racial discrimination is that its enforcement tends to be economically costly for an individual employer. If it is possible to employ someone from a discriminated group at a lower cost than someone of equal skill of a non-discriminated group, then whoever employs the non-discriminated over the discriminated individual will pay a higher cost for the same labour. Becker (1957, p.14) has pointed out that such a state of affairs might persist because of a "taste for discrimination", that is, an employer is willing to bear the additional cost because racial discrimination represents an economic good to them. Yet, if only a few employers do not have a taste for discrimination, one would expect them to hire the cheaper labour, outcompete discriminating employers, and eventually cause a convergence of wages between groups (Higgs, 1971; Knight & McGrath, 1977).

This "problem" posed by competition can be overcome through labour market segregation, which creates non-competing groups via colour bars. If labour markets are segregated so that the members of different racial groups cannot or do not compete for the same occupations, then the wages of the different groups will not necessarily converge (Hutt, 1964, passim; Knight & McGrath, 1977).[6] Non-competing groups can arise naturally or be created via institutional intervention. They arise naturally if, for example, literacy and English language skills are a precondition for clerical work in a colonial economy. Initially, the Anglophone and literate population will not compete with those individuals of the colonised population who are neither. Whether such a situation persists depends, then, chiefly on the provision of education. More often than not, however, labour market segregation has been maintained through the introduction of explicit colour bars, restricting entry into occupations based on race, even though such a system tends to increase the overall cost of labour (Hutt, 1964; Knight & McGrath, 1977).

In Tanganyika, racial wage discrimination and *de jure* and *de facto* colour bars existed. Until the mid-1950s, explicit racial wage discrimination existed in public sector salary scales (Cooper, 1996, pp.445–446). The upper echelons

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[6] Incidentally, the concept of non-competing groups originated in the literature on skill premiums (Douglas, 1926; Goldin & Katz, 2008, pp.316–320).

of the colonial administration were reserved for British citizens with an elite education, and Africans and Asians were barred from advancing beyond mid-ranking positions (Bryceson, 1990, p.66; Ehrlich, 1963; Iliffe, 1979, p.325). In addition, at least in the beginning of the British colonial period, widespread natural labour market segregation existed. New technologies and skill requirements, notably English language proficiency and literacy, restricted African access to many of the new (and higher-paying) occupations. The local shortage of these skills also led to the import of skilled labourers from Europe and Asia, who stood in a relationship of non-competition with the African labour force. Thus, the high average wage differentials reported between different racial groups are not necessarily the exclusive result of active discrimination but may well be due to implicit skill differences between imported and local labourers.

Whether the status of non-competition was maintained throughout the colonial economy is not clear. The racial situation in Tanganyika was quite different to that of, for example, South Africa, where the government maintained labour market segregation throughout the Apartheid period (Hutt, 1964; Knight & McGrath, 1977; Nattrass & Seekings, 2001). Tanganyika was not a settler colony, and the majority of Europeans were expatriates who arrived on temporary work assignments as, for example, plantation managers or colonial administrators. The colonial government thus did not have to guarantee many well-paying jobs to the white population. On the contrary, with regard to public sector employment, the administration had strong financial incentives to Africanise and lower the overall wage bill.

Thus, I hypothesise that, while racial wage discrimination and labour market segregation existed, racial income differences did contain an implicit skill premium. Moreover, assuming an increased supply in African skilled labour, discrimination in employment should have decreased over time through Africanisation and reduced labour market segregation, *especially* if racial wage discrimination existed.

5. Data and Methods

To analyse income inequality and the contributions of skill and race premiums in the wage sector, four main data series were calculated: 1) real skilled and unskilled wages for the African population; 2) overall income inequality for the wage sector, 3) the skill premiums in different sectors, and 4) the race premiums for specific occupations. As is common with colonial archival sources, the data available for British Tanganyika is often dispersed, differing widely in its level of detail, and generally varying in quality. No single official source of wage and employment statistics covers the entire British colonial period. Even within a single source like the Annual Reports of the Labour Department, the type and manner of data presented varied constantly, and changes were usually not explained.

The primary sources for African wage and employment data are the Blue Books (1921-48) and the Annual Reports of the Labour Department (1944-59). Depending on the year, these sources provided wage estimates either in the form of minimum and maximum wages for specific occupations or different skill groups, average wages for specific occupations or industries, or the distribution of employees by wage groups. Because of this, several averaging techniques were employed to create a time series covering the entire period. When reported averages were available, these were used. When wages and employment were given by wage groups, the weighted average for different occupations was calculated. When only minimum and maximum wages were available, these were converted into lognormal averages. Using the lognormal average brings the wage estimates closer in line with reported averages when compared to using only the simple mean (Bolt & Hillbom, 2016; Frankema & van Waijenburg, 2012). Table 1 illustrates this for Tanganyika. It shows reported averages, lognormal averages, and simple means of unskilled wages for the years 1954-56, for which the Annual Reports of the Labour Department provide both minimum-maximum scales and averages.

Table 1: Comparison of different estimates of average unskilled agricultural wages, shillings per month.
Source: Annual Reports of the Labour Department, 1954-56.

Year	1954	1955	1956
Reported average	29.9	30.4	32.3
Lognormal average	29.5	32.3	33.9
Simple mean	36.5	38.0	36.5

The nominal wage series were converted into real wages using the welfare ratio approach, which employs consumption baskets to deflate nominal wages. These baskets were based on an envelope approach combining the maize basket found in de Haas (2017) with a new basket that substitutes mixed meal for maize as the main staple.[7] Details on average wages, the contents of the consumption baskets, and the basket values can be found in Appendix A.

For the analysis of income inequality, several Gini coefficients were estimated. As data on the actual income distribution is not available before 1949, three Gini coefficients were estimated using social tables (1930, 1938, and 1947). Additional Gini coefficients for the years 1949, 1951-52, and 1957-59 were estimated using income distributions for African labourers found in the Labour Department reports combined with income tax records published by the East African Income Tax Department (1950-63). To disentangle the impact of relative income and compositional effects, Gini coefficients were estimated for both the entire wage sector and African wage earners only.

To create the social tables, the wage-earning population was split into five different classes based on skill and/or race: African unskilled, blue-collar skilled, and white-collar skilled workers, Asians, and Europeans. Each class was then assigned an average income. The size of each class corresponds to the number of labourers in each group. Employment numbers for Africans were taken from the Blue Books and Annual Reports of the Labour Department. The Blue Books, however, only provide aggregate numbers of labourers in each sector, and do not offer information concerning the number of skilled labourers. To disaggregate the total employment into the different skill levels, the share of blue- and white-collar skilled labourers in the total labour force in each sector was estimated for the years 1930, 1938, and 1947 by extrapolating from the trend in skilled labour shares in the 1950s. As skilled labour saw almost linear growth during this period, the log-linear growth rate of skilled labour from 1949 to 1959 was used to estimate the share of skilled workers for the social table years. Employment numbers for Europeans and Asians were only published sporadically. To estimate employment numbers for the social table years, the share of Asian and European employees in the total sub-population as reported in the Non-Native Census Reports (1931 and 1948) and the Annual Reports of the East African Income Tax Department (1952 and 1953, covering assessments for 1949 and 1950) were used (see Appendix B for details).

The average incomes for each group were estimated as follows: for African labourers, the average incomes in the different skill groups are weighted averages based on average incomes and the number of employees in each industry. European incomes were based on the average income of all Europeans employed in the Civil Establishment, assuming that this represents the overall European wage level. Asian incomes were based on the wages paid by the Tanganyika Railways and Harbours and the Public Works Department (in the form of lognormal averages), again assuming that these reflect the overall Asian wage level. A discussion of the social tables method, the social tables themselves, and a further discussion of the underlying assumptions can be found in Appendix B.

To analyse the drivers of the inequality trends, relative wages in the form of skill and race premiums were estimated. Due to data constraints, it was only possible to estimate skill premiums for African labourers. These were calculated for different sectors of the economy, namely, agriculture, industry (manufacturing, trade, transport, and

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[7] In the envelope approach, the cheapest available consumption basket for any given year is selected as the deflator to estimate welfare ratios based on the minimum cost of purchasing a subsistence consumption basket. The mixed meal basket was included because of a significant divergence in recorded market prices off unmilled maize and mixed meal in the 1950s, when meal became the cheapest staple. It was also widely consumed amongst African labourers.

construction), the public sector, and the Tanganyika Railways and Harbours. The classification of skilled labour follows the official scheme employed in the colonial statistics.[8] Skilled labour in this classification scheme includes occupations like artisans, clerks, shop assistants, and domestic servants (Sarup, 2004, pp.622–623).

Following the approach by van Zanden (2009a), skill premiums (*SP*) were calculated using the formula shown in Equation 1:

$$SP = \frac{w_S - w_U}{w_U} \qquad (1)$$

where w_S = skilled wage and w_U = unskilled wage.

Two types of skill premiums were calculated – those for blue-collar workers and those for white-collar workers. Commonly, studies on pre-industrial skill premiums focus only on urban blue-collar workers (either artisans or construction workers) and use these premiums as an indicator for human capital formation (de Zwart, 2011; Frankema & van Waijenburg, 2012; van Zanden, 2003, 2009a). Here, skill premiums for white collar workers were added, as the wage sector of the colonial economy was an emerging modern economy, not a pre-industrial one. In this type of economy, a large share of skilled labour was not employed in skilled industrial occupations, but in bureaucratic and administrative positions. Moreover, in Tanganyika and other sub-Saharan African countries, white-collar workers like clerks and teachers constituted a significant portion of the nascent indigenous elite that rose to prominence after independence, when the public sector became one of the most important formal employers (Bennell, 1982; Simson, 2016; Weeks, 1971). Consequently, these workers are an important group to include in the analysis of skill premiums and human capital formation (Frankema & van Waijenburg, 2019). An overview of the skill premiums can be found in Appendix C.

The race premiums (*RP*) were calculated in an analogous manner to the skill premiums, replacing skill categories with racial categories according to the three-tiered racial hierarchy described for Tanzania (with the group higher in the hierarchy taking the place of skilled labour and the group lower in the hierarchy taking the place of unskilled labour). It follows Becker's (1995, p. 17) formula for the market discrimination coefficient and is shown in Equation 2 below:

$$RP = \frac{w_H - w_L}{w_L} \qquad (2)$$

where w_H = wage of the higher group in the hierarchy and w_L = wage of the lower group.

Data availability for the calculation of race premiums is even more limited. To investigate racial wage discrimination as defined above, and not simply differences in average incomes, it is necessary to look at individuals from different racial categories in the same occupations. Specific occupational wage data is rare and only available for the Tanganyika Railways and Harbours and the Public Works department, published in the Blue Books (1921-47).[9] For the 1950s, the Annual Reports of the Colonial Office to the UN General Assembly (1947-60) provide some information on wages, but only in the form of protracted salary scales, which do not allow for the identification of actual incomes of workers in different racial groups.

The inclusion of the race premium for maximum wages helps to limit the impact of compositional effects caused by the Africanisation of the economy, which saw the number of European employees in mid-level positions shrink significantly. To illustrate: while in 1934, there were 12 European clerks and 67 African clerks, by 1947 these numbers had changed to 1 and 145, respectively. Consequently, the average race premium compares the wages of often supervisory European staff to African wages which include both senior and entry-level workers, overstating

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[8] In other words, in contrast to studies on skill premiums in industrialised nations in the twentieth century, they are not based on the level of education attained by the labourer in question, as that information is not available.

[9] While relying on public sector salary scales is not ideal, given that the public sector might rely less on market incentives in its wage setting, it has been argued that public sector salaries in Eastern Africa played a major role in determining overall wages (Cooper, 1996, pp.445–446). Thus, these wages can be taken as reasonably representative of general trends in Tanganyika.

the difference between workers of similar skill and experience level. A detailed overview of the race premiums can be found in Appendix D.

6. Wage Sector Income Inequality in Tanganyika

Figure 2 shows the estimated Gini coefficients for the entire wage sector and for African wage earners only. Overall, income inequality in the wage sector was already relatively high in 1930: Europeans and Asians, while constituting only 3.6 percent of the wage labour force, earned around 46 percent of total income, while unskilled labourers, constituting 76.8 percent of the wage labour force, earned only around 29 percent of total income. During the early 1930s, as the effects of the Great Depression were felt in Tanganyika, income inequality in the wage sector increased further, both overall and amongst Africans only. This indicates that the relative effects of economic decline hit the African population, especially the unskilled labour force, harder.[10] The Gini coefficient drops substantially between 1938 and 1947. This drop was only temporary and is the result of sticky wages in the inflationary post-war environment.[11] In contrast to Frankema and van Waijenburg's (2012) argument that unskilled wages were sticky, here skilled wages, especially those of Europeans and Asians, were sticky, as public sector salary scales were only adjusted for inflation with some delay in 1948-49 after the review of the Holmes Commission (1947-48).[12]

Figure 2: Gini coefficients in the wage sector.
Source: Author's calculations based on data from the Blue Books (1921-48), Annual Reports of the Labour Department (1944-59), and Annual Reports of the East African Income Tax Department (1949-63). For details, see Appendix C.

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[10] This mirrors the experience in other British colonies, for example Uganda (de Haas, 2021).

[11] Sticky wages means that wages respond relatively slowly to changes in the economy.

[12] The Commission on the Civil Services of Kenya, Tanganyika, Uganda & Zanzibar, 1947-48.

Despite this initial decline, overall income inequality increased with the beginning of the developmental era following World War II.[13] During the 1950s, the trends in overall inequality and inequality amongst Africans diverge: after a sharp increase in overall inequality between 1947 and the early 1950s, a decline sets in towards the end of colonial rule. Amongst Africans, in contrast, the post-war increase in inequality stalled briefly in the early 1950s, but then continued towards the end of the decade.

The difference between African and total wage sector Gini coefficients throughout the colonial period indicates that racial income differences played an important role in determining the overall level of inequality. Moreover, whereas overall income inequality declined slightly towards the end of the colonial period, income inequality amongst African wage earners increased throughout the 1950s. This, combined with high skill premiums in the interwar period (discussed below), indicates that skill-biased technological change played an important role in driving inequality, especially amongst African wage earners. To disentangle these trends further, the following sections will provide a detailed analysis of the skill and race premiums and the composition of the wage sector.

7. Wages and the Skill Premium in Tanganyika

An overview of the five-year averages of different skill premiums for African labourers can be found in Table 2. African blue-collar skill premiums ranged from 92 percent to 448 percent, with an overall average of 245 percent. While these estimates are in the same range as found by Frankema and van Waijenburg (2012) for different colonies in British Africa, the trend for Tanganyika specifically diverges from earlier estimates after World War II. While the skill premium in this period did increase in some sectors, this increase was much less pronounced than previously suggested. Extending the series until the end of the colonial period shows that Tanganyika was not as much an outlier as it at first appeared: in Tanganyika, as in almost all other colonies analysed by Frankema and van Waijenburg (2012, 2019), skill premiums for blue collar workers decreased towards the end of the colonial period.

Table 2: Five-year average blue- and white-collar skill premiums for African labourers, by sector.
Source: Author's calculations based on data from the Blue Books and the Annual Reports of the Labour Department.

Year	1921-25	1926-30	1931-35	1936-40	1941-45	1946-50	1951-55	1956-60
Blue collar (Agriculture)	139%	367%	408%	448%	476%	231%	231%	142%
Blue collar (Industry)	191%	92%	132%	243%	271%	265%	208%	178%
Blue collar (Railways)	…	185%	262%	304%	439%	415%	174%	193%
Blue collar (Public sector)	…	237%	214%	195%	128%	159%	183%	229%
White collar (Agriculture)	…	…	…	…	…	…	224%	280%
White collar (Industry)	…	…	…	…	…	…	200%	174%
White collar (Railways)	…	235%	406%	433%	592%	535%	309%	268%
White collar (Public sector)	…	…	…	…	…	…	218%	302%

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[13] The developmental era denotes the period from around 1940 to 1973, during which colonial (and later post-colonial) governments intensified their efforts to develop the economies of the domains under their jurisdiction, usually through large-scale programmes implemented in an authoritarian manner (Cooper, 2002 *passim*, esp. pp.59-60, 197).

7.1. The Trend in Wages and Skill Premiums

Average blue- and white-collar skill premiums across sectors, as illustrated in Figure 3, show a clear trend of rising skill premiums up to the end of World War II, and a subsequent decline during the developmental era of late colonialism.[14] Overall, the trend in the skill premiums appears to confirm the story of skill-biased technological change and matches the general economic trajectory of British Tanganyika. In the early colonial period, after the East Africa campaign fought between Germany and Britain from 1914-18, the Tanganyikan economy lay in tatters. The campaign had devastating effects on the African population. The fighting led to large numbers of casualties and the widespread disruption of African agriculture, resulting in famines and further deaths (Maddox, 1986; Paice, 2007, pp.392–401, 2014; Turshen, 1977). Essential infrastructure, especially the railways, was damaged and many estates lay fallow after the expulsion of their erstwhile German owners (Bates, 1955; Dougherty, 1966; Hill, 1957, pp.154–167, 180–185; Iliffe, 1979, pp.269–272). Given the overall state of the economy, the immediate demand for labour, both skilled and unskilled, was relatively low.

Once economic (and administrative) recovery began, the demand for skilled labour increased, outpacing supply and leading to rising skill premiums. Juxtaposing this increase with the trend in African income inequality in Figure 2 shows that both rose in tandem before World War II, as the theory of skill-biased technological change would suggest. After World War II, the supply of skilled labour – lagging in the interwar period – improved, driven by the colonial administration's renewed developmental efforts, including the expansion of public education. This led to a decline in skill premiums towards the end of British rule. In other words, while technological change and the demand for skilled labour outpaced education in the interwar period, education caught up after World War II. The post-war decline in skill premiums was not accompanied by a concomitant decline in income inequality amongst African wage earners, however (Figure 2). Based on the model outline previously, this points to compositional effects, which outweighed the decline in skill premiums.

The trends in skilled and unskilled real wages, illustrated in Figure 4, lend support to the narrative developed so far. In the early 1920s, the colonial labour market was largely underdeveloped. Wages tended to be set by institutional fiat instead of being determined by market forces. The gradual abolition of forced labour led to a translation of the mandatory labour service (usually 30 days) into taxes, and wages were set so that 20 to 60 days' worth of work would correspond to the tax level (Frankema, 2010; Spear, 1997, pp.112–113). While taxes varied by locality, this generally translated into an unskilled wage of half to one shilling per day (*Note on Wages, CO892/11/4*). Concerning skilled wages, employers likely had a difficult time determining actual skill levels of forthcoming labourers. It is thus likely that skilled wages were set by custom, specifically by adding the "common" skill premium – as found in other colonial economies – of about 100 to 200 percent to the unskilled wage. Looking at wages for carpenters in industrial endeavours, for example, there is a rapid widening of the wage scale: in 1921, wages ranged from two to three shillings per day, while by 1925, the spread was one to six (*Blue Books* 1921-25). With time, as employers learned the capabilities of their employees and adjusted wages accordingly, the traditional wage-setting of the early 1920s gave way to supply- and demand-driven wage formation.

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[14] The averages in Figure 3 are unweighted averages. Computing weighted averages is not possible for all periods due to limited data availability, as shown in Table 2. For those periods where calculating a weighted average across all sectors is possible, the level of the average skill premium increases, although the trend remains the same.
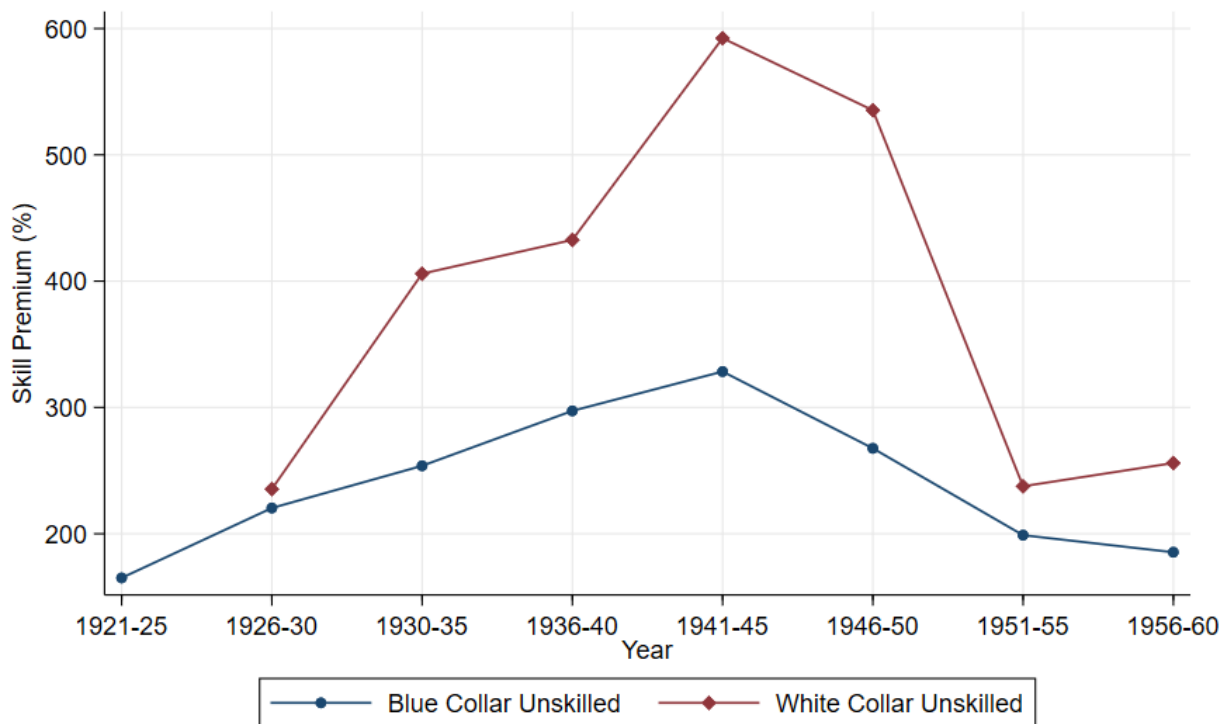
Figure 3: Five-year (unweighted) average blue- and white-collar skill premiums for African labourers.
Source: Author's calculations based on figures from the Blue Books and the Annual Reports of the Labour Department.
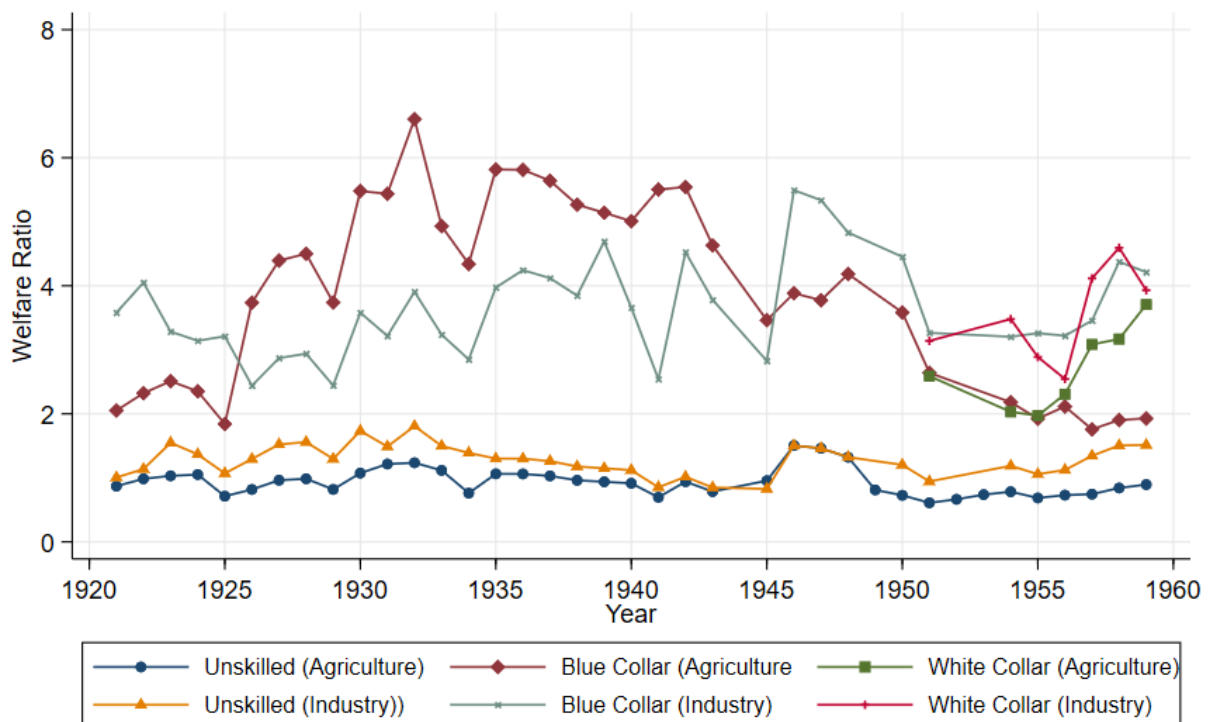
Figure 4: Real wages (welfare ratios) for unskilled, blue-collar skilled, and white-collar skilled African labourers in agriculture and industry.
Source. Author's calculations based on figures from the Blue Books, the Annual Reports of the Colonial office, and the Annual Reports of the Labour Department. For details, see Appendix A.

The second half of the 1920s saw an economic boom and a strong increase in the demand for all kinds of labour. As both the formal economy and African peasant agriculture burgeoned, and Africans were free to choose whether to earn cash through wages or agricultural pursuits, unskilled labour demand outstripped supply, to the point that all forthcoming labour was absorbed almost immediately (Labour in Tanganyika, 1926; Orde Browne, 1927). As argued earlier, unskilled labour was not in unlimited supply, such that with high demand, unskilled wages increased. Skilled real wages grew even more, especially in agriculture, leading to the rise in skill premiums observed in Figure 3.

The increase in both skilled and unskilled wages was arrested by the Great Depression, which struck all parts of the Tanganyikan economy and initiated a long decline in unskilled real wages. Skilled wages, especially in industry, while also affected negatively in the short term, recovered quickly. Retrenchment led to a reduction of the overall labour force, as well as a post-crisis reduction in unskilled labour supply (*Colonial Office* 1931, pp.55-56, 1935, pp.78-79). Employers sought to counter this trend and reduce cost by increasing the efficiency of their operations through both mechanisation and improvements in labour organisation (Fuggles-Couchman, 1964, pp.26–29). This meant that skilled labourers became more important and demand for them increased. The demand for skilled labour continued to increase towards the end of the 1930s (*Colonial Office* 1938, pp.85-89), but supply remained a major bottleneck. This explains the continuous increases in both blue- and white-collar skill premiums across all sectors. As the next section will show, this bottleneck resulted primarily from the low levels of government support for general education and industrial training.

7.2. The Long Shadow of Interwar Educational Policy

Given the high skill premiums and skilled labour shortages, an important question to answer is why the colonial administration did not increase educational provision and the training of skilled workers. Several factors played a role, including metropolitan policy preferences, the administration's focus on peasant development, and the (long-term) impact of the policy response to the Great Depression.

Starting in the mid-1920s, educational policy began to receive attention from the British administration. From the beginning, it was guided by the colonial government's overall policy goal: African peasant development. Charged by the mandate to "promote to the utmost the material and moral well-being and the social progress" (Article 3 of the British mandate for East Africa, quoted in McCarthy, 1977, p.577), governor Cameron (1925-31) put an emphasis on "moral well-being", which he considered best achieved through peasant development, indirect rule, and stability, both in terms of the "traditional" order of Tanganyikan (rural) society and in terms of acquiescence to British rule (McCarthy, 1977).[15] This meant, amongst other things, that while the administration was not outright hostile to non-African enterprises and their demand for (skilled) labour, non-African agricultural and industrial development were at best seen as complementary to the development of African peasant agriculture (Brett, 1973, pp.225–227; McCarthy, 1977). Concerning the development of peasant agriculture, colonial officials tended to question the value of post-primary education, especially in terms of its cost (Hall, 1936; Mumford & Parker, 1937; Smith, 1965). Nonetheless, the Cameron administration expanded social services significantly, including education, much to the ire of the British Treasury (Smith, 1965).

The decline in global market prices for Tanganyika's main exports, sisal, coffee, and cotton, during the Great Depression had widespread repercussions throughout the economy and led to large shortfalls in government revenue. Export incomes also declined and estates responded by reducing both the number of unskilled workers employed and unskilled wages. This, combined with lower revenues from African agricultural production, meant that Africans had less money to spend on imports, reducing revenue from import duties (Fuggles-Couchman, 1964, pp.17–18; Iliffe, 1979, pp.342–345; Leubuscher, 1944, pp.33–35, 72–73). Lower levels of production also

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[15] Stability was an important concept not only in Tanganyika. It meant, first and foremost, that colonial rule should be maintained without engendering resistance. Yet, rooted in the deep paternalism of British colonial rule, it was also concerned with the maintenance of "traditional" social structures and regarded slow, ordered progress according to colonial designs as preferable over the disorderly, destabilising processes of rapid economic development as witnessed, for example, during the British Industrial Revolution (Bernstein, 2006; Brett, 1973, pp.75–76; Ehrlich, 1963, 1973; McCarthy, 1977; Platt, 1947).

meant that the Railways had less freight to transport, causing revenue shortfalls in this department, too (Hill, 1957, pp.230–232).

The situation was so precarious that the Tanganyika administration barely avoided bankruptcy and required financial assistance from the British government (Bates, 1955). This assistance came at a high price, however. A principle of British colonial rule was that colonies should be financially self-supporting (Brett, 1973, p.141; McCarthy, 1977; Nugent, 2010). For Tanganyika during the Great Depression, this meant that the Colonial Office in London, following a budget report by Treasury official Armitage-Smith, mandated widespread cuts in public spending across all departments (Bates, 1955; Smith, 1965), including a 30 percent cut in the already limited educational budget between 1930 and 1934 (*Colonial Office* 1933, p.130).

To realise these spending cuts, then-Director of the Education Department Isherwood decided to align educational efforts exclusively with the goal of peasant development through vernacular education in village schools, focusing on agricultural instruction and "moral" education (Smith, 1965). Most central industrial schools, which provided English-language instruction to train skilled labourers, were closed down and the training of English-language teachers was suspended in 1932 (*Colonial Office* 1933, p.65, 1935, p.107; Smith, 1965). Support for missionary education was reduced significantly. While there had been a long-standing debate over the quality of such education – the colonial administration in 1925 noted that "the so-called teaching [in mission schools] is devoid of all human interest" (*Colonial Office* 1925, pp.65-66), mission schools at the time provided the majority of education in the Territory (Smith, 1965). Against the backdrop of economic crisis, reduced labour demand, and retrenchment in the public sector, these policies were also driven by a strong concern that an oversupply of skilled, literate, English-speaking Africans could threaten the stability of colonial rule in Tanganyika (Bates, 1955; Ehrlich, 1973; McCarthy, 1977; Smith, 1965).

As a result, at the end of the decade, few African pupils were enrolled in any type of school (see Figure 5). Of those that were, most attended vernacular village schools. By 1938, out of 72,000 African pupils enrolled in any kind of educational institution (government, government-aided, or private), only 1,174 attended an English-language primary school, 38 a middle school, 82 a secondary school, and 491 vocational training (*Blue Book* 1938).

Isherwood's policies were not universally supported, even at the time. The focus on vernacular primary education did not meet the demands of industry, which led to frequent confrontations between representatives of industrial endeavours and the colonial administration, as illustrated by an exchange between the Educational Department and the Tanganyika Railways and Harbours already in 1930. The Director of Education opined that it was "both undesirable and economically impossible in the present generation" that skilled labourers, in this case engine drivers, should be literate and able to speak English. In contrast, Maxwell, General Manager of the Tanganyika Railways and Harbours, noted that literacy and knowledge of English would be desirable, possible, and increase efficiency (*Railways* 1930/31, pp.11-12). The Railways and Harbours reiterated this point several times, noting that general education, knowledge of English, and literacy were not only prerequisites for clerical work, but also preconditions for the efficient training of any kind of skilled worker, including those in blue-collar occupations (see, for example, *Railways* 1934, pp.28-30, 1937, pp.54-55, 1938, p. 50).[16]

Others criticised the policies for being myopic, and they would quickly be proven right. Mumford (1935), for example, argued that while there might be a reduced demand for certain types of skilled labour, the response should not be to stop training altogether, but reorient it towards occupations which remained in demand. Indeed, as soon as cuts to the educational system were complete and the training of skilled labourers had been significantly curtailed, the economic situation improved and the demand for skilled labour across all sectors increased. By 1937, three years after Isherwood's reforms were concluded, the Commission on Higher Education in East Africa, in the De La Warr Report, highlighted the growing demand for skilled labour (Smith, 1965). It stated explicitly that "the danger of creating a class of educated unemployed is negligible" and recommended a "generous educational policy"

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[16] The Railways were also willing to pay higher wages for better-educated apprentices. In the Blue Book for 1940, for example, the salary scales indicate that apprentice artisans with a Standard VIII education (that is, eight years of schooling including secondary education) earned around 28 percent higher wages than those with only a Standard VI education. The wages of trainees employed by the Groundnut Scheme also depended on the level of education achieved (*Labour Department* 1950, p. 46).

(*Colonial Office* 1938, p.114). The colonial administration itself conceded that there was a high demand for "English-speaking Africans", skilled labourers and individuals with a sufficient level of education to become skilled labourers. It also conceded that, due to the neglect of African (post-primary) education, "there [was] little likelihood within the next ten years of the supply [...] exceeding the demand" (*Colonial Office* 1938, p. 121).

Overall, the interwar educational system fell far short of providing an adequate supply of skilled labour for the whole economy, leading, as has been shown, to high skill premiums and increasing income inequality amongst African labourers.
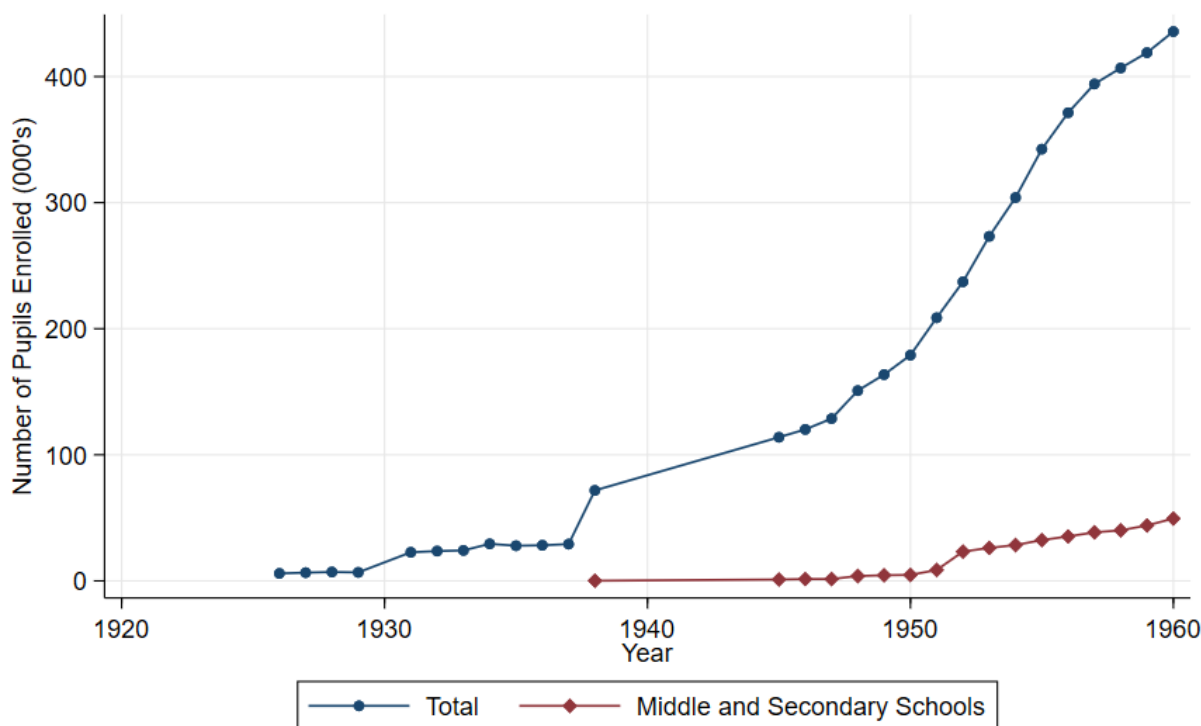

Figure 5: School enrolment of African pupils, total and post-primary.
Source: Author's calculations based in numbers from the Blue Books and the Annual Reports of the Colonial Office.

The outbreak of World War II further retarded educational reform (Iliffe, 1979, p.355).[17] It was only after the war, with the beginning of the developmental period of late colonialism (Cooper, 2002, p.197) and continued pressure from the Colonial Office (Eckert, 2007, p.155) that led to a change in colonial (educational) policy. In 1947, the implementation of a ten-year plan for education began. At that time, a decade after the 1937 report, the supply of skilled and semi-skilled labourers was still insufficient to meet demand (*Colonial Office* 1947, p. 122).

The reforms did lead to improvements – educational spending increased from 5.3 to 12.4 percent of colonial revenue between 1947 and 1958 and enrolment tripled (George, 1960, p.15, see also Figure 5 for enrolment numbers). At the same time, the Tanganyikan economy underwent major changes. Parallel to skilled labour shortages, unskilled labour supply continued to be a problem. Employers in the formal sector eventually abandoned their attempts to solve the issue through increased supply, settling for a "small is beautiful" approach instead (Paton, 1995, p.184). They limited the expansion of wage employment, focusing instead on mechanisation. The shift towards more capital-intensive production led to an overall reduction of the wage labour force and an increasing reliance on skilled labour. Skilled labour demand was reinforced by the expansion of the colonial administration, so that the share of skilled labour in the labour force increased from around 25 to 35 percent during the 1950s, as

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[17] Moreover, not everyone in the Tanganyikan administration shared the views expressed in the 1937 De la Warr Report. Isherwood's successor in 1945, Acting Director of the Education Department Mason, maintained that the need for Africans with secondary education in Tanganyika would be minimal (Eckert, 2007, p.155).

illustrated in Figure 6. At the same time, skill premiums declined (Figure 3). At first glance, it appears that the post-war educational reforms were a success and that the supply of skilled labourers was finally catching up to the (still increasing) demand.

Figure 6: Formal employment as share of the total labour force and skilled labour as share of formal employment. Source: Author's calculations based on data from Annual Reports of the Colonial Office, the Annual Reports of the Labour Department, the International Labour Office (1958, pp.666–667), and the Labour Force Survey of Tanzania (Ray, 1966, p.15).

Interestingly, the trend in skill premiums stands in contrast to the widespread argument that, despite reforms, the educational system remained deficient (Cameron, 1967; Eckert, 2007, pp.154–155; George, 1960, p.8; Kifile, 1963). International visiting missions to Tanganyika, including the Working Parties on Higher Education in East Africa (visiting in 1955 and 1958) and a United Nations mission in 1957, continued to criticise the shortcomings of African education and stressed that demand for all kinds of skilled labourers remained high (George, 1960, pp.35, 51). How then, does one reconcile the observed discrepancy between the qualitative reports and estimated skill premiums?

One part of the puzzle concerns the trend in *unskilled* wages. Cooper (1996, pp.326–327) and Paton (1995, pp.195–196) argue that mounting political pressure from below – organised action by African labourers – and changes in colonial policy led to an increase in unskilled wages. The evidence from real wages presented in this paper confirms this. Growth in unskilled wages outpaced growth in skilled wages in the private sector, and skill premiums saw a decline (see Figures 3 and 4). The trend in skill premiums also has to be analysed against the overall decline of wage labour as a share of the total labour force (see Figure 6). This moderated the increase in skilled labour demand so that the limited expansion of educational provision, combined with the accumulation of skill in the labour force, satisfied the immediate demand. Thus, on average, skill premiums declined. Yet, despite this decline, income inequality did not drop, as compositional effects – the increased share of skilled labourers – outweighed the change in relative incomes.

An exception to this average trend was employment in the public sector, where increasing Africanisation led to high skilled labour demand and increasing skill premiums towards the end of the colonial period. This offers some explanation for the impression of the visiting missions concerning the skilled labour situation in the Territory.

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Moreover, with independence on the horizon, the visiting missions, as well as those who have evaluated the colonial educational system since, likely had in mind the supply of skilled labour for an expanding wage sector, instead of the contracting one present in the Tanganyika of the 1950s.

In sum, despite gradual improvements, skilled labour was in short supply for most of the British colonial period. This did not only lead to high skill premiums and high income inequality amongst African wage earners. It also led to the import of many Asians and Europeans to fill the gaps left by the shortage of local supply. With these immigrant labourers came disparity in average incomes between different racial groups and high levels of overall income inequality in the wage sector, thus finally, raising the question of racial discrimination.

8. The Question of Racial Discrimination

Prima facie, economic motivations for racial wage discrimination and occupational segregation are not self-evidently applicable in the case of Tanganyika. In addition to colonial administrators, Europeans usually engaged in agriculture as self-employed farmers, worked as entrepreneurs, or held managerial positions in industrial and agricultural businesses (Kifile, 1963). There was no "poor white problem" (as was the case in South Africa) and no white working class (Gillman, 1942, on the poor white problem, see Hutt, 1964, pp.32-37). Unlike the settlers in neighbouring Kenya, those in Tanganyika had only limited influence on colonial policy and received little support from the administration, financial or otherwise (Brett, 1973, pp.223–225; Cameron, 1967; Rothermund, 1965).

Likewise, the Asian minority was primarily engaged in finance, commerce (wholesale and retail), and worked as professionals like lawyers and doctors. Many Asian occupations were historically inaccessible to Africans, either because they were organised in family firms, or because, as in the professions, there were hardly any (if any) Africans who had an opportunity to attain the necessary educational requirements. It is unlikely that the British colonial administration would discriminate against the African population in favour of the Asian population. In fact, frequent complaints by Asians against the colonial administration concerned policies, for example surrounding crop marketing, purported to benefit African development by discriminating against the Asian minority (Ghai & Ghai, 1965; Mangat, 1969; Rothermund, 1965).

Yet, average income differences between the different groups in the racial hierarchy were persistently high and were a main driver of high overall income inequality in the wage sector. One explanation for the observed differences in average incomes, which does not revolve around *direct* institutional discrimination, is rooted in the persistent shortage of skilled labour, caused by a deficient educational system, analysed previously.[18] As has been argued, the shortage derived from a mismatch of skilled labour supply in the face of high and increasing demand for skilled labour, driven by skill-biased technological change.

One feature of the new technologies introduced in Tanganyika was that they were only new locally, but already well-established elsewhere. The clearest example is perhaps that of literacy and English language proficiency: the latter was, for obvious reasons, common in Britain and mass education was spreading, providing an ample supply of literate individuals (Lindert, 2004, pp.87–90). On the other side of the Indian Ocean, in British India, the appropriate skills were relatively abundant due to the country's longer colonial history (Brett, 1973, pp.284–285; Frankema & van Waijenburg, 2019; Hancock, 1950, pp.30–32). Consequently, importing skilled labour from overseas was one way to deal with local shortages and to fill essential functions in the colonial administration. The annual report of the Tanganyika Railways and Harbours from 1922 illustrates this point well. It states: "There is still great difficulty in obtaining efficient artizans [sic] and guards from India. The arrival of European artizans has been a great help and by their means, it is hoped by next year to reduce the demand on India by the training of Africans" (*Railways* 1922, p. 4).

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[18] Of course, the deficiencies in educational provision are an institutional factor, too. Whether this was racially motivated or primarily rooted in other policy objectives, such as peasant development, will be addressed below.

If Europeans and Asians were disproportionally represented in skilled positions, then implicit skill premiums might explain the large observed differences in incomes between the different groups. Table 3 shows race premiums for average incomes for the social table years. Average income differences were extremely high, but the differences diminish already when looking at African white-collar workers. Thus, compositional effects likely played an important role in the large differences in average incomes. Of course, these compositional effects might still be rooted in racial discrimination in the form of intentional wage discrimination and labour market segregation. Below, both of these facets of racial discrimination are analysed in turn.

Table 3: Race premiums based on average incomes.
Source: Author's calculations based on data from the social tables. See Appendix B for details.

Year	1930	1938	1947
European-African (Average)	4439%	5958%	2679%
Asian-African (Average)	634%	941%	583%
European-Asian	519%	482%	307%
European-African (White collar)	1202%	1161%	1072%
Asian-African (White collar)	110%	117%	188%

8.1. Wage Discrimination

The level and extent of racial wage discrimination can be gauged with the help of race premiums for specific occupations. Given limited data availability, the focus here lies on occupations in the Tanganyika Railways and Harbours which were held by Africans, Asians, and Europeans simultaneously during British colonial rule. While they can be classified as skilled labour in general, they reflect different levels of skill requirements (see Appendix D for details).

The race premiums, illustrated in Figure 7 (for average wages) and Figure 8 (for maximum wages), show clear evidence of racial wage discrimination. Before 1935, Europeans could expect to earn on average seven to eight times as much as Africans in the same occupation, and their maximum incomes were set at around four times the maximum attainable income for Africans.[19] Clear income differences also existed between Asians and Africans, although at a lower level than for Europeans. Between 1934 and 1947, income differences declined, most significantly in terms of the European-African premium, and while the premiums for specific occupations were high, they were well below the premiums calculated using average incomes from the social tables (see Table 3).

Following the market mechanism described previously, without government intervention, profit-maximisation will lead to an equalisation of wages between individuals regardless of their race, as the wages of the lower group in the racial hierarchy increase while those of the higher group decrease.[20] The existence and persistence of clear wage discrimination thus suggests that government intervention did take place and counteracted equalising market forces, even though the administration should have had few economic incentives to do so. How, then, did this situation arise? One easy answer is that the public sector was not beholden to profits, and thus, the colonial administration could indulge in its taste for discrimination. This has been proposed as the reason for the especially prevalent discrimination in the South African public sector (Knight & McGrath, 1977).

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[19] Recall that the race premium, like the skill premium, is interpreted in such a way that a premium of 100 percent means that the higher category receives double the income.

[20] To reiterate, this would be expected even if there was a widespread taste for discrimination as long as only some employers opted to replace otherwise identical labourers from the higher-paid group with those from the lower-paid group.

An alternative answer is linked to two factors: 1) that there was a shortage of skilled labour, and 2) that we are looking at public sector salary *scales*. These two factors combined meant that a unification of salary scales, mimicking the outcome of the market process of wage equalisation, would have one of two undesirable consequences for the colonial administration. If, on the one hand, wages were lowered to reflect only what was locally competitive – in other words, if wages were just high enough to attract all available African skilled workers – then supply would not be sufficient to satisfy demand, as high-skilled immigrants would not offer their labour.[21] If, on the other hand, wages for African employees were adjusted upward to match those of the Asian and European employees, the overall wage bill would increase significantly.

Precisely these arguments were made by the Holmes Commission, which in 1947-48 was tasked with the re-evaluation of public salary scales in light of the high rates of post-war inflation in Eastern Africa. Their mandate explicitly stated that the new scales should provide "equal pay for equal work", that is, to end wage discrimination in the public sector. The Commission argued, along the lines presented above, that wage equality was untenable, settling instead for the three-fifths rule: Africans could earn as much as three fifths of European incomes, but no more (Cooper, 1996, pp.445–446; *Holmes Commission* 1947, pp.22-27). A few years later, in 1954, this rule was struck down, and *de jure* wage equality was established. Because the labour supply problem remained unresolved, a compromise was adopted and the new salary scales provided different wages for locally domiciled employees and those hired on overseas terms. These so-called inducement terms were again justified using the rationale presented in the previous paragraph: with a general shortage of skilled labour, skilled workers had to be hired overseas, and to attract overseas workers, it was necessary to pay competitive wages in relation to the labour markets on which the overseas personnel is hired, namely India and Europe. Locally hired personnel, in contrast, would only require locally competitive wages to be induced to offer their services (Cooper, 1996, pp.445–446). Despite the different inducement terms, the new salary scales meant that the majority of African and local Asian staff received the same wages.[22] Strikingly, the implementation of equal pay for equal work led to the predicted effect: a reduction in skilled labour supply, especially Asian skilled labour. Whereas after the 1948 reforms, the number of Asians in the Civil Establishment continued to grow, reaching a peak of 2,493 individuals in 1951, it dropped sharply afterwards, to a low of 1,155 in 1958 (*Colonial Office* 1947-58).

Taken together, racial wage discrimination in specific occupations only explains part of the average income differences between Africans, Asians, and Europeans. Race premiums declined precisely when average income differences increased significantly in the 1930s, and the implementation of equal pay for equal work legislation did not leave a mark on overall levels of income inequality, either. Thus, it is necessary to turn to the question of occupational segregation.

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[21] Or would quit their jobs and move elsewhere if they had previously been employed.

[22] Technically, Europeans in lower-grade clerical positions would have received the same salaries, too, though the wages proved so unattractive that no European applied for any of these positions.
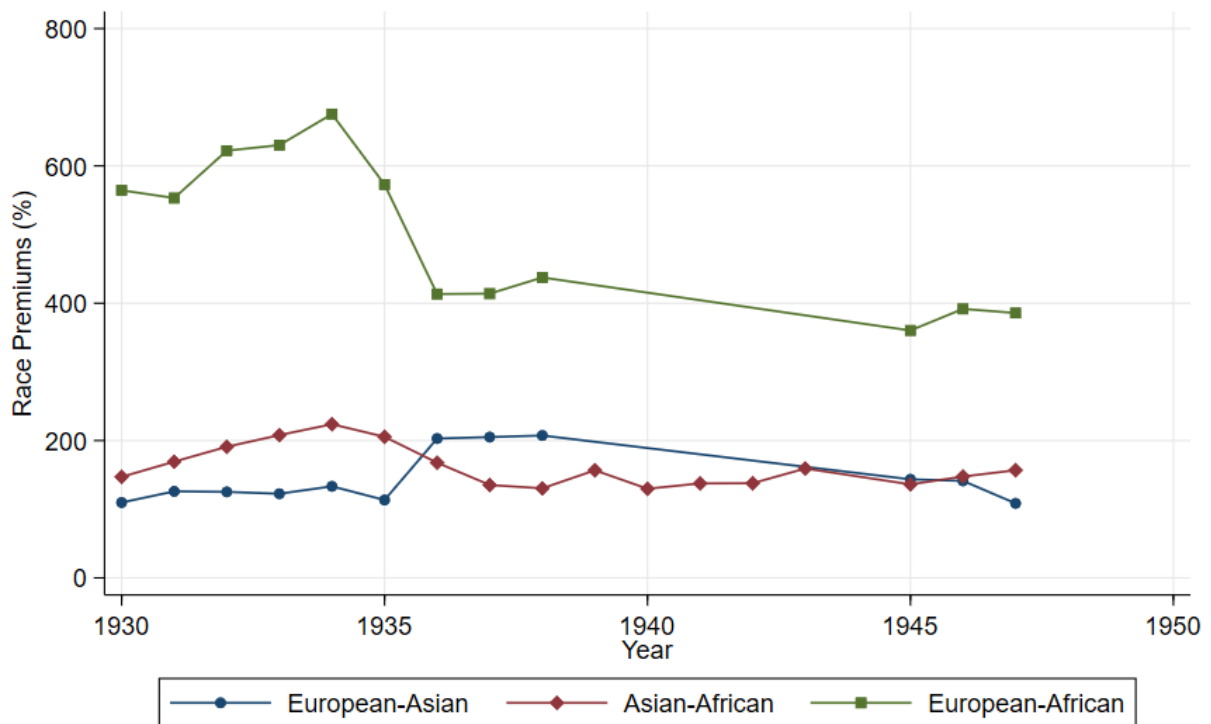
Figure 7: Race premiums, based on average incomes for specific occupations.
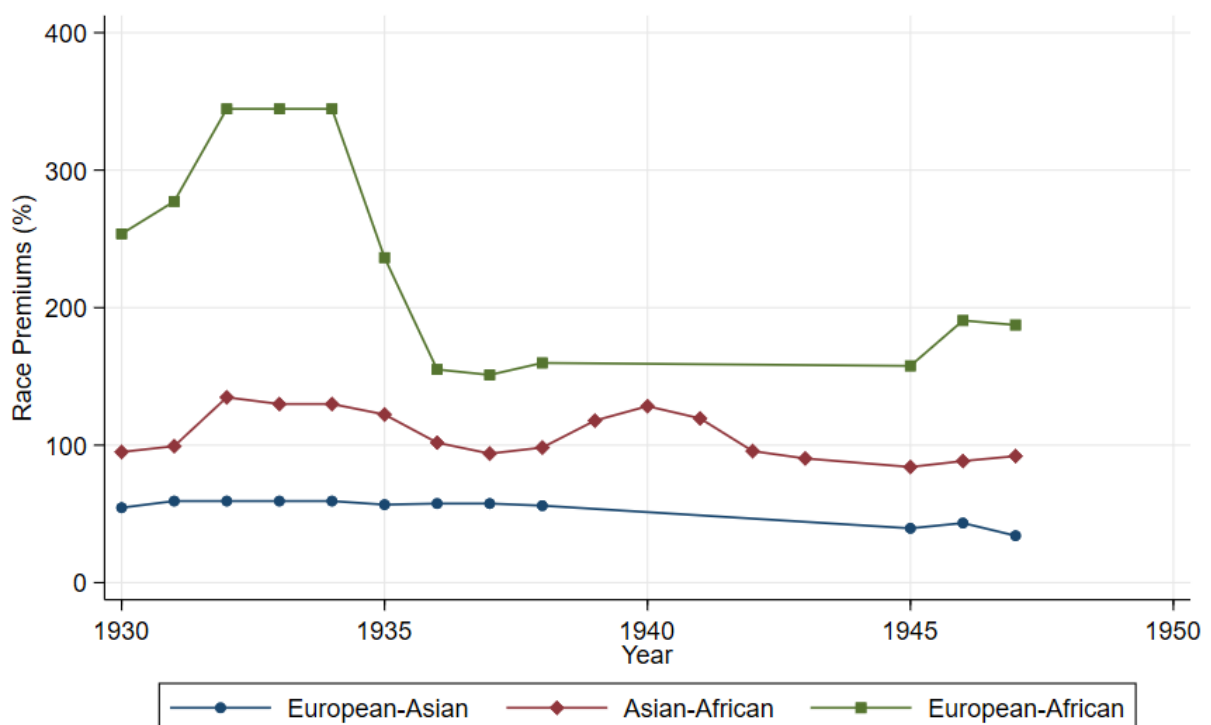Source: Author's calculations. See Appendix D for details.

Figure 8: Race premiums, based on maximum incomes for specific occupations.
Source: Author's calculations. See Appendix D for details.

8.2. Labour Market Segregation

To reiterate, there is no *a priori* reason to assume widespread, politically enforced occupational segregation in Tanganyika. The provisions of the mandate, which prohibited the establishment of outright colour bars as seen elsewhere on the continent, already made this difficult (Bates, 1955). While the colonial administration could have established far-reaching colour bars in an underhanded way, the incentives to do so are not self-evident. On the contrary, the existence of wage discrimination provided financial incentives for employers to replace more expensive Asian and European workers with lower-paid African ones. As noted by the Railways and Harbours: "A good native driver is preferable to an indifferent and careless European or Asiatic and much less expensive" (1930/31, p.12).

Yet, *de facto* and *de jure* institutionalised occupational segregation existed. As noted, high-ranking colonial officials were recruited from the elite of the British colonial service (Bryceson, 1990, p.60; Ehrlich, 1973; Iliffe, 1979, p.325). Especially in the interwar period, this segregation extended downwards through the hierarchy, and colour bars in the civil service prevented Africans and Asians from progressing beyond middle management at best. During the Great Depression, Africans and Asians were the first to be affected by retrenchment and hiring freezes. In 1931, the promotion of African clerks was suspended, and it took until after World War II for higher-grade positions to re-open for Africans (Iliffe, 1979, p.357). In the late 1940s, as reported by the Holmes Commission, Africans were consigned almost exclusively to the lowest ranks of the colonial administration (*Holmes Commission* 1947-48, pp. 10-11).

The discussion on racial wage discrimination already provided some implicit evidence that institutionalised occupational segregation existed to a much lower extent than, for example, in southern African settler-dominated colonies. For example, while the relatively low number of occupations held by Africans, Asians, and Europeans simultaneously is evidence for occupational segregation, the existence of such occupations *at all* is not a given in African colonial history. In Tanganyika, Africans were, supply permitting, employed in a variety of (high-)skilled occupations like clerks, draughtsmen, shunters, and even permanent way inspectors from the beginning of the British colonial period. In southern African settler colonies, in contrast, they were only allowed to enter these occupations in the 1960s and 1970s after prolonged protests (Elkan, 1963; Hutt, 1964, pp.108–109; Knight & McGrath, 1977).

From the 1950s, the situation changed rapidly. In the interwar period, peasant development was the mantra of the colonial administration. In the post-war era of developmental colonialism, Africanisation became the new principle and was pursued with relative vigour (*Colonial Office* 1938, 1947). The share of Africans employed in the civil establishment increased form around 75 percent in 1947 to 87 percent by 1958 (Figure 9). This is a remarkable achievement, especially considering the overall expansion of the Civil Establishment, which grew from 12,500 to over 27,000 employees between 1947 and 1958, with the number of African employees more than doubling. Still, many higher-ranking positions remained unattainable for the African population. Theoretically, racial discrimination in employment should have ended with the implementation of equal pay policies, but the reforms appear to have led to *de facto* occupational segregation in the upper echelons of the colonial service, something that was also observed in South Africa (Knight & McGrath, 1977).

Besides institutionalised segregation, a significant barrier to African advancement was the main bottleneck in the skilled labour supply: education. In addition to the already-discussed reasons for low educational provision – cost cutting and a focus on peasant development – this could have been an underhanded attempt at establishing *de facto* colour bars while avoiding censure from the mandate commission. In South Africa, for example, providing poor or no education to the black population was one means of preventing their move into higher-paying occupations (Knight & McGrath, 1977). The Tanganyikan educational system, like the rest of society, was structured according to the three-tiered racial hierarchy and African education heavily emphasised vernacular education and practical training for agriculture and "moral development" (Cameron, 1967; Eckert, 2007, p.155; George, 1960, p.43). The dominance of vernacular education limited African economic advancement quite significantly. It counteracted the African advantage, under existing wage discrimination, of being cheaper to hire than Asian or European skilled labourers and limited the Africanisation of higher-skilled occupations.
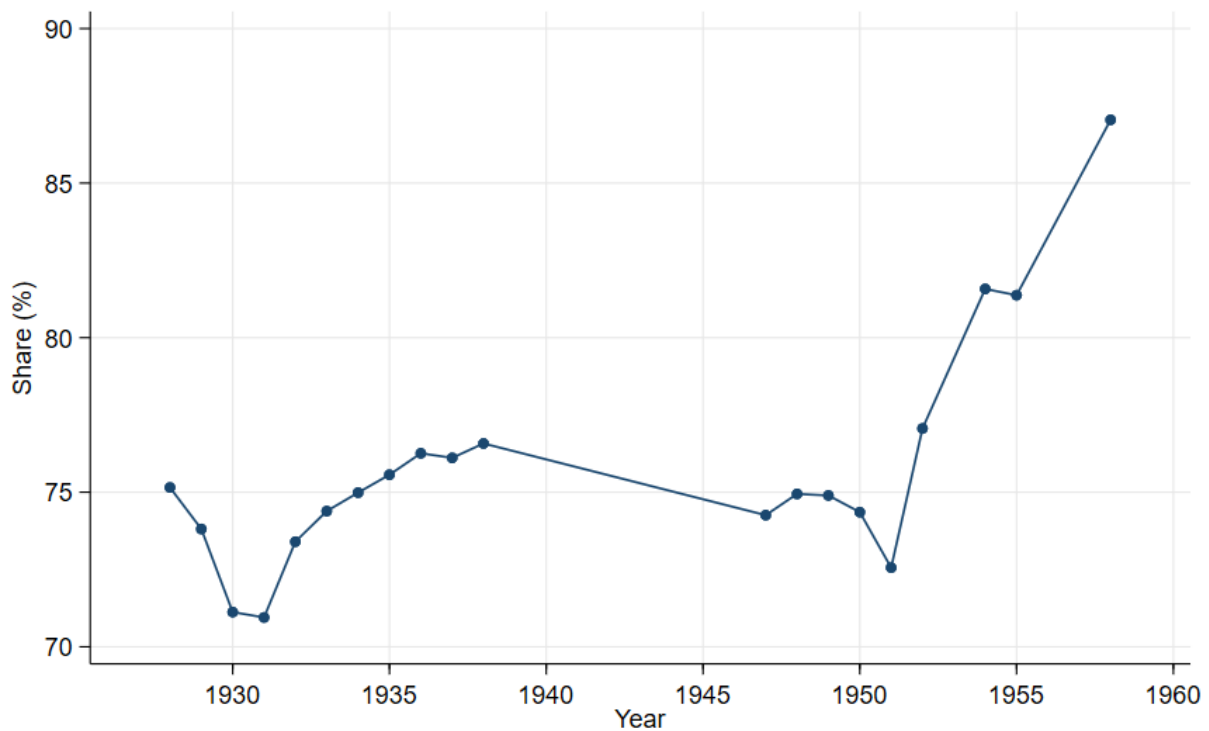
Figure 9: African share in the civil establishment.
Source: Author's calculations based on data from the Blue Books and the Annual Reports of the Colonial Office.

It is difficult to evaluate whether the main motive of this policy focus was occupational segregation *per se*, or whether this was only a by-product. On the one hand, the policy clearly shows the paternalistic mindset of the education department (and of the colonial administration more broadly). The focus on village-level primary education was also motivated by the fear of the destabilising effects that an educated African elite might have on colonial rule, especially if it was un(der)employed. On the other, the official reason for the focus on vernacular village-level education was that instruction in a child's first language, "their most effective vehicle of thought" (*Colonial Office* 1938, p.117) made it easiest to impart knowledge. This was a common pedagogical position at the time, such that the racial segregation of at least the primary school system can be seen a by-product of the desire to teach children in their mother tongue (Cameron, 1967).

Why, then, was English-language education not pursued more widely at least on the post-primary level? For the interwar years, the reasons have been discussed already. After World War II, two causes that are not linked to a desire to establish *de facto* colour bars can be identified. First, given the rudimentary state of African education overall, the colonial government chose to focus on widening the access to education as much as possible with the limited resources available. In the words of the administration: "[While] the ultimate objective is the building up of a community well equipped, by the advancement of education in its widest sense, to assume full social, economic and political responsibility […] progress towards the ultimate objective depends on the achievement of the immediate objective of the educational advancement of the most backward sections of the Territory's population" (*Colonial Office* 1951, p.150).[23]

The structural legacies of interwar educational policies meant that the options of the colonial administration were limited, even if it had wanted to expand post-primary education significantly. The task was monumental: in 1945, Isherwood himself estimated that mass education would require 30,000 teachers and 9,000 schools, while at that time, there were only 600 to 700 schools in the territory (Eckert, 2007, p.115). Teacher training was

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[23] Of course, one can argue that it would have been better to focus the available resources on educating fewer individuals to a higher average level, and perhaps this would have been a more useful approach in the long term, mirroring the general debate over equitable versus uneven development which persist to this day.

underdeveloped to the point that there were not even enough teachers available to provide the training (Twining, 1951). For English-language education, the situation was worse still, as the cuts to educational spending in the 1930s meant that very few English-language teachers remained, and most had to be recruited abroad at high cost (Smith, 1965).[24]

Regardless of the precise motivations, the educational policies pursued throughout the colonial period and a certain path dependence stemming from the policy decisions made during the Great Depression led to underinvestment in African human capital and significantly limited the availability of skilled labourers. Under these conditions, the rapid increase in the number of skilled and highly skilled Africans in the colonial administration and throughout the wider formal sector during the 1950s was remarkable. Their overall increase has already been shown, and even in high-ranking positions, the number of Africans increased dramatically, from five in 1954 to 346 in 1960 (Bryceson, 1990, p.137). Still, this did not suffice to alter the picture of racial income inequality dramatically. On average, the difference between African, Asian, and European incomes remained substantial and income inequality consequently remained very high.

9. Conclusion

Differences in relative incomes led to high levels of overall income inequality in the wage sector in British Tanganyika. Racial income differences played a significant role, but income differences within the African labour force were increasing throughout the colonial period. A main driver of these income differences was the expansion of the colonial economy and administration. Within the formal sector, it introduced a wide range of new technologies, which in turn, required skills that were in short supply in Tanganyika. The failure of the colonial administration to increase supply sufficiently meant that skilled labour demand was rarely met during the colonial period. This led to increasing skill premiums, intra-African wage differences, and rising inequality.

The shortage of skilled labour did not only lead to very high skill premiums in the Territory. It also led to the import of large numbers of skilled workers from Europe and Asia, whose wages were significantly higher than those of Africans. Part of this difference was rooted in active racial discrimination encompassing unequal wage and salary structures and colour bars preventing African (and Asian) advancement in the public sector. Yet, a large part of the differences in average incomes between different groups in Tanganyika's racial hierarchy is rooted in differences in the average skill level between the different groups.

The persistence of skilled labour shortages, very low African school enrolment, and the almost non-existent provision of higher education show that the largest barrier to African advancement in the wage sector was not racial wage discrimination *per se*, but colonial educational policy. There was a clear lack of support for comprehensive African education to address the labour demands of the formal sector. Fiscal constraints in the 1930s and a myopic response to them crippled the colonial educational system further. While the existence of racial differences in compensation could have provided a competitive advantage for skilled African labour, even those employers that wanted to take advantage of these opportunities struggled to find skilled Africans to hire.

The persistent shortfall in educational provision and low levels of human capital formation meant that Tanganyika was ill prepared for the skilled labour demands of independence. Despite the expansion of African education in the late colonial period and a strong effort at Africanising the civil establishment, skilled labour supply was so low that, in the early years of independence, the Tanganyikan government continued to rely on imported labour from India to fill vacant administrative posts. In 1962, just after independence, less than 1,000 African students graduated from secondary school, while the estimated yearly demand for individuals with this level of education in the public sector alone stood at 1,100 (Rothermund, 1965).

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[24] Tanganyikan attendance at Makerere College in Uganda, East Africa's prime institution for tertiary education at the time, illustrates the structural problems: until 1933, no Tanganyika school even taught up to the minimum required grade necessary for entry into the college. In 1939, the Tanganyikan administration announced a plan to increase annual entry of Tanganyikans to 60 individuals, yet by 1949, the total number of Tanganyikan students at the college was only 35 (Iliffe, 1979, pp.341, 356).

In the case of Tanganyika, then, contrary to the hypothesis of Bowden et al. (2008) the focus on peasant development did not lead to widespread improvements in African human capital. Rather, it ran counter to this goal. Government policies kept Africans in the "traditional" sector instead of assisting in the transition to the "modern" colonial economy and preparing a larger share of the population to take over responsibility in eventual self-government.

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11. Appendices

Appendix A: Wages and Consumption

To convert nominal wages into real wages, and to provide a more intuitive way of interpreting the wage levels, the welfare ratio approach was used. Welfare ratios serve the dual function of discounting nominal wages, making them comparable over time, and also measuring how real wages relate to a basic needs poverty line (Allen, 2001, 2015; de Haas, 2017; Fibaek, 2021). To calculate welfare ratios, nominal wages are divided by a consumption basket which reflects the minimum consumption needs of a household at the poverty line (the so-called barebones subsistence basket). There has been much debate over the composition of this family basket. Family baskets generally represent a multiple of the minimum subsistence basket for one adult male. The main issues of contention are a) what the minimum subsistence consumption of an adult male is and b) how many adult male baskets accurately represent the consumption needs of an average family (Allen, 2001, 2015; de Haas, 2017; Humphries, 2013). Following the current consensus (Allen, 2015; de Haas, 2017; Fibaek, 2021), calories per adult male basket were set at 2,100, which aligns well with minimum consumption needs as well as actual average calorie intake in colonial Tanganyika (Keller, 1965; Latham, 1967; Laurie, Brass & Trant, 1954; Trant, 1956). While originally, three adult male baskets were considered representative of the minimum consumption needs of a family (Allen, 2001), this assumption has been challenged, and the previously mentioned consensus suggests four adult male baskets. Is also suggested to additionally raise the income of the (urban) male wage earner by 20 percent to account for the female contribution to household income (Allen, 2015; de Haas, 2017). Instead of increasing the household income by a ratio proportional to the male income, the original three baskets are maintained in this paper and wage incomes are not increased, under the assumption that subsidiary household incomes constitute around one consumption basket.

To account for differential development in the prices of different staple crops, an envelope approach was used to calculate the monetary value of the barebones consumption basket. The envelope approach takes into account substitution effects in consumption. It assumes that households at the poverty line consume the cheapest possible basket, so that, if the price of one staple crop increases disproportionately, families would switch to another, cheaper staple (de Haas, 2017; Frankema & van Waijenburg, 2012). Colonial Tanganyika was a very diverse society in which a variety of staples were consumed, including maize, millet, sorghum, wheat, rice, cassava, and bananas (Jerrard, 1936). To create the envelope basket, two main staples were selected: maize and maize meal. Historically, these were the most widespread marketed staples in Tanganyika and throughout the colonial period either of the two was the cheapest staple available. The two baskets are reproduced in Table A.1. Quantities and calorie distributions across different contents were taken from de Haas (2017). Nutritional information for the estimation of the quantity of meal in the mixed meal basket was taken from Latham (1997).

Table A.1: Contents of an adult male subsistence consumption basket.

	Maize	Mixed meal
Maize	410 lbs	...
Mixed meal	...	416.5 lbs
Beans	44 lbs	
Beef	6.6 lbs	
Sugar	4.4 lbs	
Ghee	6.6 lbs	
Cotton goods	3.28 yards	
Soap	2.9 lbs	
Kerosene	0.22 gallons	

To estimate the value of an annual family subsistence basket, the contents of the consumption baskets in Table A.1 were multiplied by three and then converted into shillings using prices found in the Blue Books and the Annual Reports of the Colonial Office. To create the series for the envelope basket value, the cheapest of either the maize or the mixed meal basket was selected for each year. The basket values can be found in Table A.2, which also provides the lognormal average wages for unskilled and skilled labourers in agriculture and industry, as well as welfare ratios. For details on the estimation of these wages and the data sources, see Section 5.

Table A.2: Consumption basket values (shillings), average wages (shillings per month), and welfare ratios.

Year	Basket	Unskilled (Agriculture)		Skilled (Agriculture)		Unskilled (Industry)		Skilled (Industry)	
		Wage	WR	Wage	WR	Wage	WR	Wage	WR
1921	168.78	12.25	0.87	28.87	2.05	14.14	1.01	50.35	3.58
1922	149.19	12.25	0.99	28.87	2.32	14.14	1.14	50.35	4.05
1923	142.52	12.25	1.03	29.81	2.51	18.38	1.55	39.00	3.28
1924	161.39	14.14	1.05	31.62	2.35	18.38	1.37	42.24	3.14
1925	206.12	12.25	0.71	31.62	1.84	18.38	1.07	55.15	3.21
1926	196.70	13.42	0.82	61.24	3.74	21.21	1.29	40.00	2.44
1927	167.22	13.42	0.96	61.24	4.39	21.21	1.52	40.00	2.87
1928	163.32	13.42	0.99	61.24	4.50	21.21	1.56	40.00	2.94
1929	196.49	13.42	0.82	61.24	3.74	21.21	1.30	40.00	2.44
1930	134.09	12.00	1.07	61.24	5.48	19.36	1.73	40.00	3.58
1931	108.13	10.95	1.22	48.99	5.44	13.42	1.49	28.98	3.22
1932	89.04	9.17	1.24	48.99	6.60	13.42	1.81	28.98	3.91
1933	107.46	10.00	1.12	44.16	4.93	13.42	1.50	28.98	3.24
1934	122.09	7.75	0.76	44.16	4.34	14.14	1.39	28.98	2.85
1935	87.53	7.75	1.06	42.43	5.82	9.49	1.30	28.98	3.97
1936	87.61	7.75	1.06	42.43	5.81	9.49	1.30	30.98	4.24
1937	90.24	7.75	1.03	42.43	5.64	9.49	1.26	30.98	4.12
1938	96.66	7.75	0.96	42.43	5.27	9.49	1.18	30.98	3.85
1939	99.05	7.75	0.94	42.43	5.14	9.49	1.15	38.73	4.69
1940	101.64	7.75	0.91	42.43	5.01	9.49	1.12	30.98	3.66
1941	133.53	7.75	0.70	61.24	5.50	9.49	0.85	28.28	2.54
1942	132.59	10.39	0.94	61.24	5.54	11.22	1.02	50.00	4.53
1943	158.71	10.39	0.79	61.24	4.63	11.22	0.85	50.00	3.78
1944	176.62	…	…	…	…	…	…	…	…
1945	194.52	15.49	0.96	56.12	3.46	13.42	0.83	45.83	2.83
1946	207.25	25.98	1.50	67.08	3.88	25.98	1.50	94.87	5.49
1947	213.32	25.98	1.46	67.08	3.77	25.98	1.46	94.87	5.34
1948	235.66	25.98	1.32	82.16	4.18	25.98	1.32	94.87	4.83
1949	261.20	17.66	0.81						
1950	299.49	18.17	0.73	89.44	3.58	30.04	1.20	111.13	4.45
1951	427.33	21.73	0.61	94.02	2.64	33.60	0.94	116.28	3.27
1952	442.12	24.49	0.66	…	…	…	…	…	…
1953	422.60	25.98	0.74	…	…	…	…	…	…
1954	457.55	29.87	0.78	83.17	2.18	45.32	1.19	122.16	3.20
1955	531.04	30.36	0.69	85.20	1.93	46.78	1.06	144.24	3.26
1956	530.94	32.30	0.73	93.56	2.11	49.70	1.12	142.46	3.22
1957	507.65	31.53	0.75	74.36	1.76	56.90	1.34	146.28	3.46
1958	462.50	32.46	0.84	73.38	1.90	58.05	1.51	168.65	4.38
1959	509.53	38.01	0.9	81.83	1.93	64.24	1.51	178.84	4.21

Appendix B: Social Tables and Gini Coefficients

Social tables have been widely used to estimate income inequality in settings where individual-level data, such as detailed income statistics or household budget surveys, are not available, especially in preindustrial and colonial settings (Aboagye & Bolt, 2021; Alfani & Tadei, 2019; Bigsten, 1987; Bolt & Hillbom, 2015, 2016; de Haas, 2021; Milanovic, 2018; Milanovic, Lindert & Williamson, 2011). Social tables list "salient economic classes […] with their estimated average incomes and population sizes" (Milanovic, Lindert & Williamson, 2011, p.256). To generate reasonably accurate Gini estimates from social tables, it is crucial that the overlap of the average incomes of different groups is as low as possible (Milanovic, Lindert & Williamson, 2011; Modalsli, 2015). This can, at times, be problematic, especially when the population is grouped according to socio-economic class (for example, petty traders and unskilled labourers might be categorised as distinct groups yet have very similar average incomes). To minimise the overlap problem, the population in the social tables below has been classified according to their income group, based on differences in skill and position in the racial hierarchy. Average and absolute income differences between Europeans, Asians, and Africans in colonial Tanganyika were significant, so relatively little overlap can be expected.

Amongst the African wage earners, differences between skilled and unskilled labour are also clear, although differences between white- and blue-collar skilled labourers as well as semi-skilled labourers and other categories are not always clear-cut. For example, the highest-paid unskilled labourer might earn more than the lowest-paid semi-skilled labourer, and the highest-paid semi-skilled one more than the lowest-paid skilled one. The extent of this problem is difficult to assess. Because the social tables here cover wage employment in the formal sector, some of the overlap at the margins could resolve itself. If, for example, the number of semi-skilled and unskilled labourers overlapping is similar, we can imagine that the low-paid semi-skilled workers represent unskilled workers and vice versa, which would maintain conditions of strictly distinct incomes in the different groups in the table. To minimise the overlap problem as much as possible, only a few income groups were set, namely Europeans, Asians, African white-collar skilled, African blue-collar skilled, and African unskilled.

The social tables for the years 1930, 1938, and 1947 can be found below (Tables B.1 to B.3). The population for each category is comprised of male wage earners only. For European and Asian wage earners, population sizes are estimates based on the information on the share of male wage earners in the population found in the Censuses (1931 and 1948). These shares then have been used to estimate the number of wage earners for the social table years based on the overall European and Asian population. In addition to the censuses, the Blue Books also provide annual estimates for the number of Europeans and Asians in Tanganyika. The Blue Book estimates are not very accurate and show large fluctuations. To overcome this issue, the population sizes for Europeans and Asians were extrapolated from the numbers in the census year assuming linear growth of the populations. For African wage earners, population sizes were taken from the Blue Books. For most sectors, such as industry and agriculture, the Blue Books only provide total employment. To disaggregate the total number of employees by skill level, the log-linear growth rate of skilled labour for the period of 1949-59 was calculated. This growth rate was then used to project the share of blue- and white-collar skilled labour for each industrial sector (agriculture, mining, manufacturing, construction, transport, and government) backwards.

For Europeans, average incomes were estimated using the actual average income in the Civil Establishment, for which individual-level data is available, under the assumption that these average incomes are representative of average European wages in general. The average incomes of the Asian population were estimated using Asian lognormal average wages in the public sector (specifically, the Public Works Department and the Tanganyika Railways and Harbours). The overall average Asian incomes were calculated under the assumptions that incomes within the public sector were lognormally distributed and that average public sector incomes were representative for all Asian wage earners.

African average incomes were calculated using the lognormal averages of unskilled and blue-collar skilled wages by industry, and the lognormal average wage of clerical workers in the public sector (which were used for all white-collar skilled labour in each industrial sector). The total average income by skill group was then estimated using the weighted average of average incomes by skill group in each industry. Welfare ratios were calculated using the

consumption basket presented in Appendix A. The social tables data was then used to calculate Gini coefficients in the wage sector, both for the entire sector and for African wage earners only.

Table B.1: Social table for the Tanganyikan wage sector, 1930.
Note: Average and total income in shillings.

	Number	Population share	Average income	Total income	Income share	Welfare Ratio
European	3,720	1.49%	11,482	42,713,040	37.75%	85.63
Asian	5,251	2.11%	1,856	9,745,856	8.61%	13.84
African						
White-collar skilled	4,665	1.87%	882	4,114,530	3.64%	6.58
Blue-collar skilled	44,189	17.75%	528	23,331,792	20.62%	3.94
Unskilled	191,122	76.77%	174	33,255,228	29.39%	1.30
Total	248,947	100.00%		113,160,446	100.00%	

Table B.2: Social table for the Tanganyikan wage sector, 1938.
Note: Average and total income in shillings.

	Number	Population share	Average income	Total income	Income share	Welfare Ratio
European	4,291	1.61%	12,834	55,070,694	44.65%	132.77
Asian	6,327	2.37%	2,205	13,951,035	11.31%	22.81
African						
White-collar skilled	6,308	2.36%	1,018	6,421,544	5.21%	10.53
Blue-collar skilled	58,260	21.82%	473	27,556,980	22.34%	4.89
Unskilled	191,792	71.84%	106	20,329,952	16.48%	1.10
Total	266,978	100.00%		123,330,205	100.00%	

Table B.3: Social table for the Tanganyikan wage sector, 1947.
Note: Average and total income in shillings.

	Number	Population share	Average income	Total income	Income share	Welfare Ratio
European	4,624	1.47%	13,343	61,698,032	26.76%	62.55
Asian	7,056	2.24%	3,280	23,143,680	10.04%	15.38
African						
White-collar skilled	13,030	4.13%	1,138	14,828,140	6.43%	5.33
Blue-collar skilled	70,881	22.49%	948	67,195,188	29.15%	4.44
Unskilled	219,577	69.67%	290	63,677,330	27.62%	1.36
Total	315,168	100.00%		230,542,370	100.00%	

To test the robustness of the Gini estimates, several Gini coefficients were estimated changing some of the assumptions outlined above. Figure B.1 shows these different Gini coefficients. Specification 1 is the Gini estimated using the assumptions outlined previously. Specification 2 also includes the group of African semi-skilled workers. Specification 3 changes the group size of African skilled workers by assuming that, instead of growing over time, the share of African skilled labourers was fixed at the 1949 level. Specification 4, in turn, changes the group sizes of Europeans and Asians by using the population figures given in the Blue Books instead of the extrapolation employed for the other Gini coefficients. Figure B.1 shows that a change in the assumptions does not change the overall trend in income inequality significantly, either for the entire sector or amongst wage earners. However, as is to be expected, changes in the relative group sizes do have a noticeable impact on the level of inequality, across both the entire sector and for African wage earners. The further back in time the extrapolation of group sizes extends, the larger the margin of error. Conversely, the differences in the series shrink noticeably over the years under observation. Interestingly, changes in the assumption concerning the composition of the African wage labour force have only a marginal impact on income inequality in the entire wage sector, underlining the importance of racial income differences in driving the observed levels of and trend in Gini coefficients.
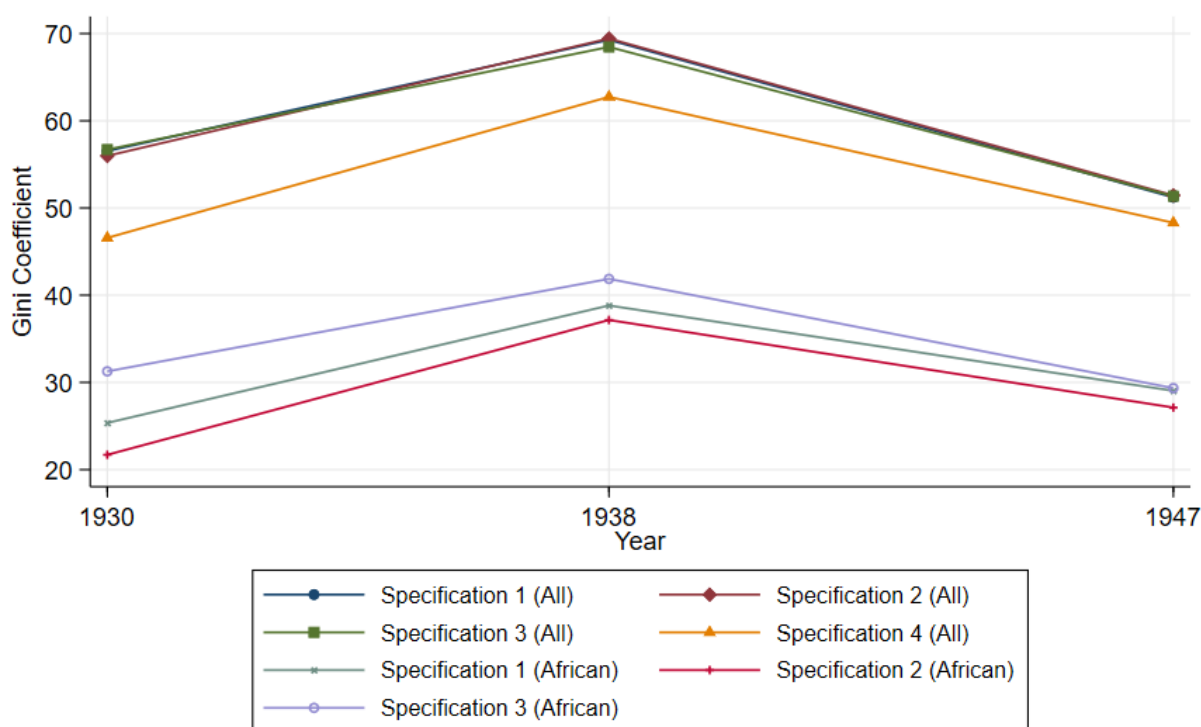
Figure B.1.: Gini coefficients for different social table specifications.
Source: Author's calculations.

The Gini coefficients for 1949-59 were estimated using distributional data for all wage earners. For African wage earners, wage and employment figured were taken from the Annual Reports of the Labour Department, which provide the number of African labourers across several income bands. For Asian and European wage earners, they were taken from the Annual Reports of the East African Income Tax Department. There is a risk of underestimating the number of European and Asian employees, as income tax assessments did not achieve full coverage, especially in the earlier years. As coverage increased throughout the 1950s, however, the estimates become more reliable.

In general, the income tax and wage scale data does not produce any overlapping groups, as the cut-off between them is based strictly on income and not, as in the social tables, on skill or racial categories. However, Africans were not exempt from paying income tax, so there is a slight chance of double-counting the highest African income earners who might also have been paying income tax, although the tax reports suggest that income taxes were almost exclusively paid by Asians and Europeans (due to the fact that African wage incomes were generally much lower). Table B.4 lists the Gini coefficients estimated based on the social tables (according to the preferred specification) as well as African wage distribution and income tax data.

Table B.4: Gini coefficients

Year	Entire wage sector	African wage-earners only
1930	55.98	21.70
1938	69.43	37.16
1947	51.45	27.12
1949	56.70	38.10
1951	68.18	36.48
1952	68.64	35.93
1957	66.21	41.46
1958	66.47	42.81
1959	65.69	42.93

Appendix C: Skill Premiums by Sector

The different skill premiums are presented in Table C.1 below. The blue-collar skill premiums were primarily based on monthly wages for "skilled" and "unskilled" workers classified as such in the sources. Commonly, wages for the different sectors were not provided for specific occupations, such as carpenters, sisal cutters, farmhands, etc. Instead, wages, in the form of minimum and maximum wages, are reported for *all* "unskilled" workers and *all* skilled workers without any further detail what kind of workers were categorised as skilled or unskilled, and whether, for example, certain skilled occupations consistently earned higher wages than others. For the Tanganyika Railways and Harbours (as well as the Public Works Department), however, minimum and maximum wages are provided for a wide range of specific occupations, instead of the entire group of "unskilled" or "skilled workers". These occupations include "classic" skilled workers such as blacksmiths and carpenters, but also specific occupations like timekeepers or station masters. Amongst the wide range of occupations, the wages for a large group of skilled labourers (see the above footnote) were given as a single minimum-maximum entry and have been chosen as representative and most comparable to the overall "skilled" wages reported for other sectors. For the Tanganyika Railways and Harbours, more detailed occupations were listed. Here, "labourers" represent the "unskilled" group found in other sectors, and the wages of a wide range of skilled blue-collar workers, including blacksmiths, carpenters, and masons, represent the "skilled" group found in other sectors.[25]

For the 1920s, the skill premiums in agriculture were based on wages for unskilled labour and "native overseers", while for industry, they are based on the wages for "native boys" and "carpenters and masons". For the period from 1921 to 1948, lognormal average wages were used to calculate skill premiums. For the 1950s, the sources report average wages by occupation and province. Here, weighted averages were calculated for unskilled labourers as well as carpenters and masons (representing blue-collar skilled labour) for each sector. White collar skill premiums were estimated using wages of clerks or employees in the "clerical" category instead of blue-collar skilled wages.

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[25] The full class of workers representing the average skilled workers in the Tanganyika Railways and Harbours covers "Carpenters, Moulders, Turners, Fitters, Blacksmiths, Erectors, Boilermakers, Tinsmiths, Coppersmiths, Machinemen, Masons, Wiremen, Painters, Upholsterers, Storemen, Carriage and Wagon Examiners" (*Blue Book* 1930).

Table C.1: Skill premiums in Tanganyika.

Notes: Agri. = agriculture, Ind. = industry, Rail. = Tanganyika Railways and Harbours, Public = Public Works Department.

Year	Blue (Agri.)	Blue (Ind.)	Blue (Rail.)	Blue (Public)	White (Agri.)	White (Ind.)	White (Rail.)	White (Public)
1921	136%	256%	…	…	…	…	…	…
1922	136%	256%	…	…	…	…	…	…
1923	143%	112%	…	…	…	…	…	…
1924	124%	130%	…	…	…	…	…	…
1925	158%	200%	…	…	…	…	…	…
1926	356%	89%	…	…	…	…	…	…
1927	356%	89%	…	…	…	…	…	…
1928	356%	89%	…	…	…	…	…	…
1929	356%	89%	…	…	…	…	…	…
1930	410%	107%	185%	237%	…	…	235%	…
1931	347%	116%	205%	165%	…	…	314%	…
1932	435%	116%	229%	…	…	…	363%	…
1933	342%	116%	297%	…	…	…	458%	…
1934	470%	105%	332%	198%	…	…	508%	…
1935	448%	206%	246%	278%	…	…	387%	…
1936	448%	227%	246%	…	…	…	387%	…
1937	448%	227%	275%	…	…	…	427%	…
1938	448%	227%	265%	206%	…	…	413%	…
1939	448%	308%	287%	199%	…	…	371%	572%
1940	448%	227%	447%	180%	…	…	566%	529%
1941	691%	198%	447%	58%	…	…	566%	497%
1942	489%	345%	447%	…	…	…	731%	837%
1943	489%	345%	437%	…	…	…	544%	498%
1944	…	…	…	…	…	…	…	…
1945	262%	242%	415%	146%	…	…	555%	…
1946	158%	265%	415%	146%	…	…	555%	…
1947	158%	265%	415%	146%	…	…	515%	…
1948	216%	265%	…	146%	…	…	…	…
1949	…	…	…	199%	…	…	…	…
1950	392%	…	…	…	…	…	…	…
1951	333%	246%	…	205%	324%	233%	…	193%
1952	…	…	…	…	…	…	…	…
1953	…	…	…	…	…	…	…	…
1954	179%	170%	…	143%	159%	193%	…	191%
1955	181%	208%	174%	201%	188%	173%	309%	270%
1956	190%	187%	193%	190%	216%	127%	268%	268%
1957	136%	157%	…	226%	314%	206%	…	355%
1958	126%	191%	…	257%	276%	205%	…	308%
1959	115%	178%	…	242%	314%	160%	…	277%

Appendix D: Race Premiums by Occupation

Table D.1 presents the race premiums between different groups for specific occupations. Race premiums were calculated for both average and maximum wages. The averages are based on both lognormal average incomes (for Africans and Asians) and actual averages (for Europeans), as the Blue Books only provide individual-level salaries for European employees. The maxima used are the maximum wage on the salary scale for Africans and Asians and the highest reported wage Europeans.

The high-skilled and blue-collar occupations selected were engine drivers (train drivers), clerks, draughtsmen (individuals producing technical drawings), guards, and (sub-)permanent way inspectors (individuals inspecting the railway infrastructure for damages). Race premiums were also calculated for lower-level blue collar skilled workers, namely carpenters and masons employed in industry and by the Public Works Department. All these occupations were held by Africans, Asians, and Europeans simultaneously at some stage during British colonial rule, and, while they can be classified as skilled labour in general, reflect different levels of skill requirements. Though the Tanganyika Railways and Harbours envisioned that all skilled positions be filled with individuals who had acquired a middle or secondary school level of formal education, engine drivers and others were initially also recruited from within the Railways and Harbours regardless of their educational background, and amongst both African and Asian engine drivers and sub-permanent way inspectors before World War II, at least some where illiterate (*Railways* 1927/28, pp.72-73, 1930/31, pp.11-12). Clerks and draughtsmen, it can be presumed, would have had to be literate and proficient in English to fulfil their duties.

Two caveats are needed when interpreting the race premiums. First, the specific occupations in the Railways and Harbours were paid according to salary scales fixed by the colonial administration, and at times even in London for different parts of the British colonial empire. Salary scales for the Indian railways, for example, were very similar to those in Tanganyika (*Royal Commission on Labour in India* 1931). Second, the mere classification of an employee as a "clerk" or "engine driver" does not mean that all individuals holding these occupations are equally skilled. It is likely that within-occupation skill differences remain, for example, between the above-mentioned illiterate engine drivers, who required assistance to fill out documentation related to their duties, and literate ones who could do so themselves *(Railways* 1930/31, pp.11-12, 1937, pp.54-55). Hence, the estimates of the race premium present an upper bound of within-occupation racial wage discrimination.

Table D.1: Race premiums for specific occupations.

Notes: Race premiums are presented for both lognormal average and maximum wages. PWI = permanent way inspector; EI = European-Asian race premium; EA = European-African race premium; IA = Asian-African race premium.

Year	1930 log	1930 max	1931 log	1931 max	1932 log	1932 max	1933 log	1933 max	1934 log	1934 max	1935 log	1935 max
PWI EI	56%	50%	60%	50%	52%	50%	49%	50%	52%	50%	56%	50%
PWI IA	…	…	…	…	…	…	…	…	…	…	…	…
PWI EA	…	…	…	…	…	…	…	…	…	…	…	…
Sub-PWI IA	67%	30%	67%	30%	67%	30%	97%	30%	97%	30%	111%	30%
Clerk EI	122%	48%	131%	60%	141%	60%	144%	60%	151%	60%	155%	57%
Clerk IA	273%	85%	223%	39%	223%	39%	223%	39%	223%	39%	226%	42%
Clerk EA	728%	174%	645%	122%	679%	122%	689%	122%	710%	122%	730%	122%
Engine EI	114%	38%	121%	38%	86%	38%	96%	38%	91%	38%	96%	38%
Engine IA	84%	125%	84%	125%	112%	125%	112%	125%	112%	125%	112%	125%
Engine EA	294%	210%	305%	210%	294%	210%	317%	210%	305%	210%	317%	210%
Guard EI	147%	82%	147%	82%	175%	82%	175%	82%	168%	82%	147%	82%
Guard IA	213%	162%	213%	162%	213%	162%	213%	162%	213%	162%	213%	162%
Guard EA	672%	377%	672%	377%	760%	377%	760%	377%	739%	377%	672%	377%
Draughtsman	…	…	172%	67%	172%	67%	148%	67%	204%	67%	…	…
Draughtsman	131%	150%	154%	200%	214%	362%	245%	362%	245%	362%	259%	362%
Draughtsman	…	…	590%	400%	756%	669%	756%	669%	948%	669%	…	…
Mason IA	67%	40%	137%	40%	260%	56%	341%	56%	341%	56%	299%	59%
Carpenter IA	195%	74%	308%	100%	247%	171%	225%	138%	336%	138%	219%	78%

Table D.1: Race premiums for specific occupations, continued.

Notes: Race premiums are presented for both lognormal average and maximum wages. PWI = permanent way inspector; EI = European-Asian race premium; EA = European-African race premium; IA = Asian-African race premium.

Year	1936 log	1936 max	1937 log	1937 max	1938 log	1938 max	1939 log	1939 max	1940 log	1940 max	1941 log	1941 max
PWI EI	60%	50%	63%	50%	62%	50%	…	…	…	…	…	…
PWI IA	72%	111%	63%	100%	60%	90%	65%	82%	69%	74%	56%	67%
PWI EA	174%	216%	166%	200%	159%	186%	…	…	…	…	…	…
Sub-PWI IA	154%	52%	149%	46%	151%	40%	16%	35%	18%	40%	31%	35%
Clerk EI	316%	60%	316%	60%	327%	54%	…	…	…	…	…	…
Clerk IA	104%	39%	104%	39%	104%	39%	257%	85%	257%	85%	257%	85%
Clerk EA	750%	122%	750%	122%	771%	114%	…	…	…	…	…	…
Engine EI	102%	38%	107%	38%	107%	38%	…	…	…	…	…	…
Engine IA	105%	125%	105%	125%	105%	125%	105%	125%	105%	125%	105%	125%
Engine EA	312%	210%	323%	210%	323%	210%	…	…	…	…	…	…
Guard EI	334%	82%	334%	82%	334%	82%	…	…	…	…	…	…
Guard IA	19%	-6%	19%	-6%	37%	26%	200%	162%	200%	162%	237%	147%
Guard EA	417%	72%	417%	72%	497%	130%	…	…	…	…	…	…
Draughtsman EI	…	…	…	…	…	…	…	…	…	…	…	…
Draughtsman IA	252%	285%	256%	362%	255%	362%	130%	362%	130%	285%	103%	285%
Draughtsman EA	…	…	…	…	…	…	…	…	…	…	…	…
Mason IA	233%	56%	189%	33%	194%	44%	308%	33%	…	…	155%	63%
Carpenter IA	403%	153%	198%	52%	137%	60%	173%	60%	…	…	158%	150%

Table D.1: Race premiums for specific occupations, continued.

Notes: Race premiums are presented for both lognormal average and maximum wages. PWI = permanent way inspector; EI = European-Asian race premium; EA = European-African race premium; IA = Asian-African race premium.

Year	1942		1943		1944		1945		1946		1947	
	log	max	log	max	log	max	log	max	log	max	log	max
PWI EI	…	…	…	…	…	…	84%	50%	82%	50%	63%	33%
PWI IA	56%	67%	72%	67%	…	…	18%	58%	15%	50%	19%	50%
PWI EA	…	…	…	…	…	…	118%	137%	111%	125%	94%	100%
Sub-PWI IA	28%	30%	4%	-43%	…	…	5%	-47%	53%	-25%	53%	-25%
Clerk EI	…	…	…	…	…	…	203%	29%	241%	45%	158%	35%
Clerk IA	189%	79%	254%	79%	…	…	132%	116%	132%	116%	203%	144%
Clerk EA	…	…	…	…	…	…	603%	178%	692%	214%	680%	229%
Engine EI	…	…	…	…	…	…	…	…	100%	35%	105%	35%
Engine IA	71%	114%	75%	114%	…	…	122%	119%	136%	148%	136%	148%
Engine EA	…	…	…	…	…	…	…	…	373%	233%	383%	233%
Guard EI	…	…	…	…	…	…	…	…	…	…	…	…
Guard IA	175%	62%	175%	62%	…	…	82%	42%	104%	33%	104%	33%
Guard EA	…	…	…	…	…	…	…	…	…	…	…	…
Draughtsman EI	…	…	…	…	…	…	…	…	…	…	…	…
Draughtsman IA	66%	177%	256%	154%	…	…	189%	100%	198%	100%	198%	100%
Draughtsman EA	…	…	…	…	…	…	…	…	…	…	…	…
Mason IA	212%	63%			…	…	414%	178%	414%	178%	414%	178%
Carpenter IA	306%	175%	279%	200%	…	…	128%	108%	128%	108%	128%	108%