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Trade costs and the integration of British West Africa in the global economy, *c*. 1840–1940

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Abstract

Despite the essential role of trade for African economies, in the extensive literature on the historical evolution of international trade costs, Africa is still missing. In this article, we contribute to filling this gap by (1) providing the first estimates of British West Africa's trade costs with Britain *c*. 1840–1940 by computing relative price gaps in a representative sample of African export and European import prices, and (2) analysing the main determinants of trade costs trends, by regressing price gaps on measures of transport costs, market efficiency, and trade barriers. The results uncover a diverging pattern in African and global trade costs trends, which was not noticed in the previous literature. British West Africa experienced a reduction in its trade costs with Britain *c*. 1840–70, similar to the one we observe in other world areas, thanks to improvements in shipping technology and market efficiency. From the late 1870s, however, as colonial monopsonistic trading companies consolidated their control of African export markets, trade costs continued to decline in the rest of the world, but not in British West Africa. Consequently, from the late nineteenth century, trade for West Africa became relatively more expensive than for other world regions.

KEYWORDS
Africa, British West Africa, colonization, market integration, monopsony, price gaps, trade, trade costs

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Africa's economic development is heavily dependent on the export of primary products.[1] Still, despite the essential role that external trade has historically played for African economies, we have little systematic knowledge about the role of trade costs in the process of integration of African export markets into the world economy.[2] From the extensive literature on commodity market integration in the nineteenth and twentieth centuries, we have a good knowledge of international trade costs between Europe, the Americas and Asia,[3] yet Africa is still missing.[4] Was Africa different compared with the rest of the world? Did Africa suffer from higher international trade costs than other world regions? And, if this was the case, why?

In this article, we contribute to filling this gap by analysing trade costs of British West Africa with Britain from the mid-nineteenth century to the eve of the Second World War. We define trade costs in a broad sense as 'all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself',[5] thus including observable components (e.g. shipping, insurance cost, and duties) and others that are more difficult to measure (e.g. information frictions and monopoly mark-ups).

[1] Deaton, 'Commodity prices'; Jerven, 'African post-colonial'; Williamson, 'Great divergence'; idem, *Trade and poverty*; idem, 'Commodity prices'.

[2] Much has been written about the global integration of British West Africa – see the seminal work of MacPhee, *British West Africa* and the more recent discussion in Austin, 'More and more one cog' and Inikori, 'British imperialism and globalization' – yet we know less about trade costs.

[3] Jacks, 'Intra- and international commodity market'; idem, 'Commodity market integration'; Jack, Meissner and Novy, 'Trade costs'; Jacks, O'Rourke and Williamson, 'Commodity price volatility'.

[4] A relatively large literature has focused on inland transport costs, while international trade costs have been somewhat disregarded. Chaves, Engerman, and Robinson, 'British West Africa', analysed wheeled transportation in British Africa. Bertazzini, 'Italian colonial roads', looked at roads in Ethiopia, Somaliland, and Eritrea. Jedwab and Storeygard, 'Infrastructure investment' constructed a database of railways in Africa between 1862 and 2015. Jedwab, Kerby, and Moradi, 'History, path dependence', Jedwab and Moradi, 'Transportation revolutions', Okoye, Pongou, and Yokossi, 'New technology', and Herranz-Loncán and Fourie, 'Public benefit' focused on railroads in Kenya, Ghana, Nigeria, and the Cape Colony, respectively. Tadei, 'The Long-term effects' and idem, 'Measuring extractive institutions' collected estimates of inland transport costs for French West and Equatorial Africa. Other papers provide information only on specific components of international trade costs, such as freights. Limiting our review to Africa, Pascali, 'Maritime technology' gathered data on freight rates between the UK and Algeria, Cabo Verde, Cape of Good Hope, Mauritius, Sierra Leone, and Tunisia in the second half of the nineteenth century. Federico and Tena-Junguito, 'World Trade' collected freight rates between the UK and Alexandria, Cabo Verde, and Cape Town between 1848 and 1938. Most closely related to our work are Tadei, 'Measuring extractive institutions' who estimated international trade costs for French West and Equatorial Africa, and Tadei, 'Colonizer identity', who extended these estimates to British West and East Africa. In both cases, however, the estimates are limited to the first half of the twentieth century, not allowing for the analysis of the evolution of African trade costs in the long run.

[5] Anderson and van Wincoop, 'Trade costs', p. 691; Jacks, 'Intra- and international commodity market'.

Our contribution is two-fold. First, we provide novel estimates of trade costs of British West Africa with Britain from the 1840s to around 1940 by computing relative price gaps in a representative sample of British West African export prices and corresponding British import prices. This lets us assess the development of British West African international trade costs from a global comparative perspective. We uncover a diverging pattern in the evolution of British West African trade costs compared with the rest of the world, which was not noted in the previous literature. International trade costs in British West Africa decreased considerably from the early 1840s to the 1870s, with a similar decline also being observed in other world regions. From the 1870s, however, trade costs continued to decline in the rest of the world, but not in British West Africa, which instead experienced a sharp increase. After the First World War, trade costs were declining across the globe, and to a smaller extent also in Africa. Yet, from the 1920s, and particularly in the wake of the Great Depression, British West African trade costs rose more rapidly than in other world regions. Overall, from the late nineteenth century, trade for British West Africa became relatively more expensive than for the rest of the world.

Second, we investigate the factors behind this divergence. We start by analysing the different components of British West African trade costs. Observable factors such as shipping, port charges, insurance costs, and export duties generally account only for a part of our trade cost estimates (at most one-half). Instead, other components, which are more difficult to measure (e.g. inefficiencies, information frictions, monopoly mark-ups, and other trade barriers), seem to play a more significant role in affecting trade cost dynamics.[6] To further explore this result, we follow Chilosi and Federico[7] and regress our price gaps–measure of trade costs on measures of transport costs, market efficiency, and barriers to trade, such as the presence of colonial trade monopsonies. We find that the reduction in British West African trade costs between the 1840s and the 1870s can be explained by declining transport costs due to the introduction of new shipping technologies and by increased market efficiency. The rise in trade costs in the late 1870s–80s, and the consequent divergence between Africa and the rest of the world, can be largely attributed to the activity of monopsonistic trading companies. Their large markups produced a substantial increase in British West African trade costs, which could not be compensated by the reduction in transport costs and the improvement in efficiency experienced by West African markets in the same period (introduction of telegraph lines, construction of railways).

To the best of our knowledge, this paper provides the first systematic estimates of trade costs for British West Africa and their major determinants from the mid-nineteenth century to the Second World War, thus allowing us to compare the process of integration in the global economy of Africa with those experienced by the other world regions.

The rest of the paper is structured as follows. Section I provides the historical and institutional background regarding West African trade. Section II describes the price data. The paper's main results are shown in section III, where we present estimates of British West Africa trade costs with Britain and draw comparisons between international trade costs for British West Africa and the rest of the world. In section IV, we explore the determinants of trade costs trends. Section V provides concluding remarks.

[6] Similar results are found in Chilosi and Federico, 'Early globalizations' and in Steinwender, 'Information frictions'.

[7] Chilosi and Federico, 'Early globalizations'.

I | HISTORICAL BACKGROUND

For West Africa, the nineteenth century marked the development of an agricultural export economy.[8] According to Hopkins, the development of commodity trade, namely palm oil, and in the second half of the century, groundnuts, represented an important break in West Africa's economic history and indicated the start of modern economic history in West Africa.[9] The commercial transition from slave to commodity exports led to the entry of new European and small-scale African producers and traders and the growth of commodity trade made the distribution of incomes more egalitarian.[10] Still, Hopkins notes some key elements of continuity with the slave trade.[11] Indeed, during the first half of the nineteenth century, the palm oil trade was organized to a large degree around the foundations, organization, and practices (port facilities, merchant relations, and credit instruments) that had characterized the slave trade era.[12] Slave labour was used in the production as well as in the transportation of palm oil.[13] Palm oil commerce relied heavily on shipping (initially on sail but later in the century on steam) and on water transportation by canoes, making extensive use of broking and trading networks established during the slave trade.

British merchants bought palm oil from the Gold Coast and Nigeria (in particular from the regions of Bonny, Old Calabar, and Elem Kalabari) and shipped it to major British ports (Liverpool, Bristol, and London) and to a lesser extent to other European ports (Hamburg). By the 1850s, palm oil was one of the two most important West African exports (the other one being groundnuts, which was traded by French merchants in Western Sudan, British merchants in the Gambia, and Portuguese ones in Guinea Bissau), while Britain had become the largest importer of palm oil in the world.[14] More generally, estimates show that while Britain and France accounted for about four-fifths of Europe's trade with West Africa, Britain's share was two-thirds to three-quarters of this total.[15] The determinant factor here was the industrialization of Britain and the soaring demand for raw materials and industrial intermediates (e.g. fuels, oils, and fibres), several of which were available in British West Africa. Palm oil was used as a lubricant for industrial machinery and railway stocks and became an essential ingredient in the manufacturing of soap, candles, and tinplate production.[16] During this period, the merchant community thrived. From the middle of the century, together with palm oil, trade in palm kernels also grew, with

[8] For palm oil trade, in particular, we refer to Lynn, *Palm oil trade*, pp. 11–59, 105–50, for cocoa, to Austin, *Ghana*, pp. 46–56, 236–249, and 279–303, while for all West African commodities analysed in this study (cocoa, groundnuts, palm oil, palm kernels, and rubber), see Hopkins, *West Africa*, pp. 173–237. Moreover, Tosh, 'The cash-crop revolution' provides an excellent overview of the expansion of tropical Africa's agricultural production during 1890–1930 and Austin, 'The Ghanaian cocoa' a more recent analysis.

[9] Hopkins, *West Africa*.

[10] Ibid., pp. 175–6.

[11] Ibid., p. 182. It is worth pointing out that Chamberlin, 'Bulk exports' argues that the transition from slave to commodity exports trade is often referred as the transition to 'legitimate trade', but this terminology lacks economic character as it does not recognize the fact that new extraordinary demand for bulky products entirely changed the trading structures of West Africa.

[12] Lynn, *Palm oil trade*, pp. 11–59.

[13] Ibid., pp. 51–2.

[14] On groundnuts, see Swindell and Jeng, *Groundnut trade*, for Gambia, and Hogendorn, *Nigerian groundnut exports*, for Northern Nigeria.

[15] Hopkins, *West Africa*, p. 179.

[16] Lynn, *Palm oil trade*, p. 105.

Germany (Hamburg) becoming a major importer, suggesting an increasing integration of West Africa into the world markets.

Until the mid-nineteenth century, there were formidable barriers to entry into the palm oil trade, which derived from the way it was structured (high start-up capital, high costs for buying or chartering shipping, expert knowledge and experience of the African market). However, later in the century, the adoption of steamship propulsion as a new transport technology represented a major change. In 1852, the first regular shipping line was established by the African Steamship Company and in 1868 another shipping company, the British & African Steam Navigation Company, entered the West African market.[17] The use of steamships, initially with the high-pressure compound engine and later on with the triple expansion engine, increased fuel efficiency and reduced costs remarkably (at the end of the nineteenth century, transporting a ton of palm oil from Lagos to Liverpool costed around £2 10s).[18] The steamer was not only cheaper per ton/km but, as opposed to sailing, could also guarantee regularity of service, thus higher efficiency. Moreover, the use of the steamship significantly reduced risk in West African trade, opening the palm oil market to new sources of competition. The steamship services opened West African trade to independent and smaller-scale traders by providing freight space (meaning that traders no longer had to own or charter their own ships) and by stopping at many more ports, which facilitated trade along the coast (especially for traders that would operate at low margins). As a consequence, in the second half of the nineteenth century, several new trading firms (often of smaller-scale) – British as well as French and German – but also African merchants (mainly liberated enslaved persons and their descendants) entered the West African export trade, generating competition and causing problems to incumbents.[19]

To alleviate the competitive pressure, several British companies merged into the United African Company, which started its activities on the West African coast in 1879.[20] Such mergers allowed the new company to obtain a de facto monopsony in the purchase of goods from local African producers. Despite not being an official monopoly, the company's ability to negotiate commercial treaties with local authorities substantially increased with the obtention of the royal charter in 1886, after which it changed its name to Royal Niger Company. In 1889, when the African Association entered the market, the monopolistic position of the Royal Niger Company was temporarily challenged. In 1893, however, the two competing companies undertook market-sharing agreements to establish regions of influence.[21] In 1899, the cartel agreement was extended to include two other smaller trading companies and further control the West Africa export market. Steamship companies offering shipping services from Britain to West Africa also exerted market power. In the late 1860s, the African Steam Ship Company and the British & African Steam Navigation Company

[17] Rönnbäck and Broberg, *Capital and colonialism*, p. 177.

[18] Lynn, *Palm oil trade*, p. 109.

[19] Hopkins, *West Africa*, pp. 202–3; Lynn, *Palm oil trade*, pp. 137–8. Dumett, 'African mercantile entrepreneurship' notes the rise of a significant group of smaller-scale African merchants in the Gold Coast as a result of the steamship's faster service, larger cargo-carrying capacities, and provision for transporting cargoes in smaller lots in the second half of the nineteenth century. Nwabughuogu, 'African middlemen' provides an in-depth analysis of the decline of wealthy African middlemen in Eastern Nigeria from the early twentieth century, which marked the beginning of direct trade between the British merchants and the native producers.

[20] Rönnbäck and Broberg, *Capital and colonialism*, p. 178. Hopkins, *West Africa*, suggests that the Scramble for Africa of the 1880s was, in effect, an extension of the firms' strategies of concentrating ownership. More generally, the imposition of colonial rule could be seen as one the factor integrating West Africa into global markets (Austin, 'More and more one cog', and Inikori, 'British imperialism and globalization'), at least up to a point.

[21] Rönnbäck and Broberg, *Capital and colonialism*, pp. 178–80.

agreed to fix freight rates and sailing dates.[22] In 1890, Elder Dempster & Company obtained control of all West African British shipping companies, still competing, however, with German companies.[23] Finally, in 1895, it reached an agreement with the main German shipping company, Woermann Linie, to limit competition and establish the West African shipping 'conference' cartel.[24]

The late nineteenth century saw falling palm oil prices and reduced trade value. In the 1890s, the US tariff policies hit the British tinplate manufacturers, causing a drop in the demand for palm oil, and palm kernels became an important West African export.[25] In Britain, palm kernel oil was used in the production of the innovative 'Sunlight Self-Washer' soap and the manufacture of margarine, while palm kernels became an important food for cattle.[26] However, neither the increase in the value of palm kernel exports nor the increase in palm oil production compensated for the decline in returns from the palm oil trade[27] and trade eventually switched to rubber.[28] The last quarter of the nineteenth century witnessed an impressive but short-lived growth of trade in wild rubber from trees in the forest area from Guinea to Nigeria. However, around 1906–7, once the natural supply of rubber trees approached exhaustion, the rubber trade collapsed. The main problem was that rubber was not profitable as a cultivated crop, certainly not compared with cocoa.[29]

In subsequent years, cocoa cultivation experienced the most spectacular growth of all West African cash crops. With the increasing commercialization of chocolate production and the invention of new cocoa presses, it became the most important West African export in the twentieth century. The Gold Coast's volume of exports increased from a few hundred tons per year in the 1890s to more than 300 000 tons in 1936/7.[30] Overall, from 1911 to the 1970s, the Gold Coast was the world's largest producer of cocoa beans.[31] As with the commerce of palm oil, the cocoa trade made use of existing African broking and trading networks up until the 1930s. Cocoa cultivation had a particularly noticeable influence on land occupation. As a result, there were significant organizational innovations in this period. Cocoa farmers in the Gold Coast and Nigeria, for example, formed companies or lineage groups to buy land collectively and organize labour recruitment. Cocoa production earned many farmers prosperity, and the Gold Coast became one of the wealthiest colonies until independence.[32] Technological, telecommunication (e.g. postal services), and infrastructural developments (e.g. railways) during the 1900s and 1910s helped spread cocoa quickly. Railroads decreased inland transportation costs, making cocoa production profitable for export markets. Cocoa output continued to increase until the mid-1930s due to increased capacity installed but peaked since then as cocoa prices dropped after the Great Depression.[33]

[22] Lynn, *Palm oil trade*, pp. 107–8.

[23] For a history of Elder Dempster in West Africa, see Davies, *The trade makers*.

[24] Hopkins, *West Africa*, pp. 252–3.

[25] Ibid., pp. 178, 189.

[26] Lynn, *Palm oil trade*, p. 118.

[27] Ibid., pp. 120–121, 123.

[28] The volume of British palm oil imports peaked in 1895 with steep increases in early 1850s, early 1870s, and early 1890s.

[29] Austin, *Ghana*, p. 48.

[30] Hopkins, *West Africa*, p. 224.

[31] Austin, *Ghana*, p. 51. On Ghanaian cocoa, see also Hill, *Cocoa-farmers*.

[32] Austin, *Ghana*, p. 249.

[33] Ibid., p. 50. Using the case study of cocoa, Austin, 'Ghanaian cocoa' offers a comprehensive analysis of the 'cash crop revolution' of the late nineteenth and early twentieth centuries that took place in Ghana. In this line of research, Berry, 'Supply response' shows that there is little relation between cocoa plantings and Nigeria producers' terms of trade, imply-

At the same time, the twentieth century saw the consolidation of the monopsonistic power of exporting trading firms.[34] With the First World War, the cartel between the Niger Company and the African Association collapsed. Still, since the late 1910s, after a sequence of mergers and acquisitions, concentration increased again, and so did the market power of trading companies.[35] In 1919, the African Association and two smaller companies merged to form the African & Eastern Trade Corporation. In 1920, the Niger Company (previously Royal Niger Company) was taken over by Lever Brothers. The period of monopolistic competition which followed eventually ended in 1929 when the Niger Company merged with the African & Eastern Trade Corporation to create the United Africa Company (UAC).[36] The establishment of the UAC also spelt the end of the monopoly of the West African shipping conference. During the First World War, Elder Dempster obtained a full monopoly of shipping as the German firms stopped their operations in Africa, but after the war, other shipping companies entered the market.[37] A new shipping cartel was established in 1924, but in 1929 the UAC already established its own shipping line.[38] Overall, in the 1930s, the strength of the monopolistic position of the UAC was remarkable, handling alone about half of all West African trade.[39]

How could such monopsonies be implemented in West Africa? In British colonies, trade monopsonies were usually not officially supported by the government, at least until the 1930s, but were the outcome of market dynamics and political forces. First, West Africa had a long history of trade and a relatively high level of commercialization, which decreased the operational expenses for the first trading firms that entered the market and allowed them to gain large market shares. Second, most of the agricultural production was in the hands of African farmers,[40] who, unlike European settlers or plantation companies, had little political power to oppose the establishment of monopsonies.[41] If the entry of smaller companies was limited early on by high costs, later on, the major trading firms, such as the UAC, forced competitors into confidential market-sharing agreements. Such arrangements would establish fixed prices that the trading companies had to offer to African producers and the quantity that each company was allowed to purchase. If a firm had bought an excess amount, it would have had to provide compensation to the other ones through penalty fees, which were designed to eliminate any advantage gained from non-compliance. In such a way, the larger companies were able to transform their dominant position into a de facto monopsony.[42]

ing that producers did not greatly rely on crop prices (due to uncertainty about future cocoa prices). Instead, producers make their planting decisions on the basis of changing opportunity costs and the institutional structure of rural factor markets. On the beginnings of cocoa cultivation in Nigeria, see Hopkins, 'Innovation'.

[34] For an analysis of the consolidation of shipping and trading monopolies in Nigeria, see Olukoju, 'Inter-war Nigeria'; idem, 'European shipping lines'; and idem, *Maritime trade*).

[35] It is worth noting that the trend towards concentration was not unique to trading and shipping. In the banking sector, Austin and Chibuike 'Collusion and competition' document the collusion between the two major banks in British West Africa after 1916.

[36] Rönnbäck and Broberg, *Capital and colonialism*, pp. 185–6.

[37] Olukoju 'Elder Dempster'.

[38] Hopkins, *West Africa*, pp. 252–3; Rönnbäck and Broberg, *Capital and colonialism*, p. 187.

[39] Hopkins, *West Africa*, p. 251. On the UAC, also see Fieldhouse, *Merchant capital*.

[40] Hopkins, *West Africa*, pp. 264, 266, 273.

[41] Tadei, 'Colonizer identity'. In some cases, African farmers attempted forms of collective opposition to European cartels, the most famous example being the Ghana cocoa 'holds ups' (Miles, 'Rural protest'). Indeed, post-1900, price gaps between Africa and the UK were on average lower for cocoa in Ghana than for the other colonies/commodities.

[42] Bauer, *West African trade*, pp. 202–3.

In terms of the value chain, local farmers sold their crops to middlemen, who then transported the goods to marketing places where the trading company acquired them.[43] Due to the competitive nature of the internal market (many middlemen could be employed by the same company), middlemen's profits were low. Trading companies initially relied on the services of other companies who shipped the goods to Europe, but later on developed their own shipping lines, with the difference in price between Africa and Europe being the base for the company's profits.[44]

II | DATA

Overall, commodity exports played a fundamental role in the development of British West Africa. Yet, their importance can be fully understood only by analysing the integration of British West African markets into the global economy. One of the most relevant elements in the process of market integration is international trade costs. To measure them, we compute relative price gaps, defined as

$$G = (p_b - p_{af})/p_b \tag{1}$$

where p_b is the British import price and p_{af} the African export price. An increase in market integration implies a lower gap between export and import prices and thus lower trade costs.[45] We calculate real price gaps as a share of destination British market prices to obtain a unitless measure of the trade cost comparable across commodities, countries, and years. The choice of the commodity price as a deflator for nominal trade costs is in line with the literature.[46] Other options such as gross domestic product (GDP) deflator are not appropriate as they include non-traded goods and services.[47]

To calculate price gaps, we use data on cocoa, groundnuts, palm oil, palm kernels, and rubber exports from the Gambia, the Gold Coast (roughly correspondent to modern-day Ghana), Nigeria, and Sierra Leone, from the 1840s to 1938. These commodities were the most important agricultural goods exported from West Africa to Great Britain in the nineteenth and early twentieth centuries. In addition to their representativeness, they were exported from more than one colony in our sample, so the obtained price gaps are not colony-specific, reducing the possibility of measurement errors. At the same time, the British colonies accounted for a major part of West African commerce.[48] Similarly, as Britain's share of world trade was large (an average of about 20 per cent),[49] analysing trade flows between West Africa and Britain not only gives us information

[43] Hopkins, *West Africa*, p. 203.

[44] For a more detailed discussion of how monopsonies worked and how could be implemented, see Tadei 'Colonizer identity', sect. I.

[45] In the regression analysis in sect. IV, we use the log of price gaps as dependent variable. As the log of negative number is undefined, we remove a minority of negative gaps from the analysis. For consistency, also all other results exclude negative price gaps.

[46] Persson, 'Transport costs'; Shah Mohammed and Williamson, 'Freight rates'; Hynes, Jacks, and O'Rourke, 'Commodity market disintegration'.

[47] Persson, 'Transport costs', p. 128.

[48] Data from the African Commodity Trade Database (Frankema, Williamson, and Woltjer, 'West African scramble') show that British West Africa accounted for about one-third of all West African exports during the nineteenth century and around two-thirds in the twentieth century.

[49] According to the trade database by Fouquin and Hugot, 'Two centuries of bilateral trade and gravity data: 1827-2014', CEPII working paper no. 2016-14.

about the integration of the African colonies into the British imperial economy, but also provides insight about their integration into the global markets. The focus on West Africa is also justified because the commercial transition from slave to commodity exports occurred there first and only later in Central and East Africa.[50] Thus, West Africa is the ideal region to analyse to evaluate the evolution of African trade costs in the export of commodities in the long run. Finally, starting the analysis in the 1840s coincides with the value of commodity exports from West Africa overcoming for the first time the value of slave exports.[51]

In particular, we use annual data on cocoa exports from Nigeria (1888–1938) and the Gold Coast (1878–1938); palm oil exports from Sierra Leone (1843–1938), Nigeria (1863–1938), and the Gold Coast (1846–1938); groundnuts and/or palm kernels from the Gambia (1854–1938), Sierra Leone (1850–1938), Nigeria (1863–1938), and the Gold Coast (1875–1938); and rubber from the Gold Coast (1881–1938), Nigeria (1886–1938), and Sierra Leone (1877–1938).[52] African port prices (F.O.B.) are unit values of the exported item (total export value over total quantity) and are obtained from the African Commodity Trade Database.[53] The original sources are colonial yearly custom statistics, which reported the total value and quantity of exports by commodity. These records were compiled at local customs offices and subsequently consolidated at the colony level. British prices come from the World Trade Database[54] and were originally obtained from Sauerbeck[55] for palm oil and from various issues Annual Statement of the Trade of the United Kingdom for cocoa, rubber, and nuts and kernels.[56] The nature of Sauerbeck prices is unclear but are likely either wholesale or port/unit values prices, while prices based on the trade statistics are unit values, thus representing the value of goods at the British port (C.I.F.).[57]

Figure 1 plots the value of palm oil, cocoa, rubber, palm kernels, and groundnut exports as a percentage of all agricultural exports from British West Africa. From the late nineteenth century, these five commodities accounted for more than 90 per cent of the total trade value. Early on, palm products (oil and kernels) and groundnuts, especially in the 1840s and 1850s, represented the bulk of British West African exports. Later, at the turn of the century, rubber exports picked

[50] Law, *The commercial transition*; Frankema, Williamson, and Woltjer, 'West African scramble'.

[51] Frankema, Williamson, and Woltjer, 'West African scramble', figure 1, p. 234.

[52] Palm oil and groundnut West African and UK data began even earlier than in our analysis, see tab. 1.9 in Lynn, *Palm oil trade* and fig. 5.1 in Swindell and Jeng, 'Groundnut trade'. The choice of the sample is due to the unavailability of either British prices (for groundnuts) or African prices (for palm oil) in the earlier period.

[53] Frankema, Williamson, and Woltjer, 'West African scramble'.

[54] Federico and Tena-Junguito, 'World trade'.

[55] Sauerbeck, 'Prices of commodities'.

[56] For palm oil in 1843–4, we use Lynn, *Palm oil trade*, p. 29. Federico and Tena-Junguito, 'World trade' do not have separate prices for palm kernels and groundnuts, reporting instead a series for 'nuts and kernels'. For this reason, for each colony, we construct a combined African 'groundnuts and kernels' series by weighting the groundnuts and palm kernels series by their exported value. The correlation between the British 'nuts and kernels' series and the African 'groundnuts and palm kernels' series is 0.82, the highest correlation among all commodities, suggesting the procedure yields reasonable results. Moreover, as shown in online app. B, the results are not dependent on different weighting procedures used to construct the 'groundnuts and palm kernels'.

[57] Federico and Tena-Junguito, 'World trade, 1800–1938: a new data-set.' working paper on Economic History, no. 16-01 (2016), Universidad Carlos III de Madrid, Instituto Figuerola, p. 18. Even if reported prices were wholesale prices (thus, possibly including the cost of transporting goods from the port to the central market, London), this cost must have been quite small relative to the total trade cost from Africa to the UK (and it would be taken into account by commodity fixed effects in the regression analysis). On the contrary, Sauerbeck prices did not include duties (see p. 18).

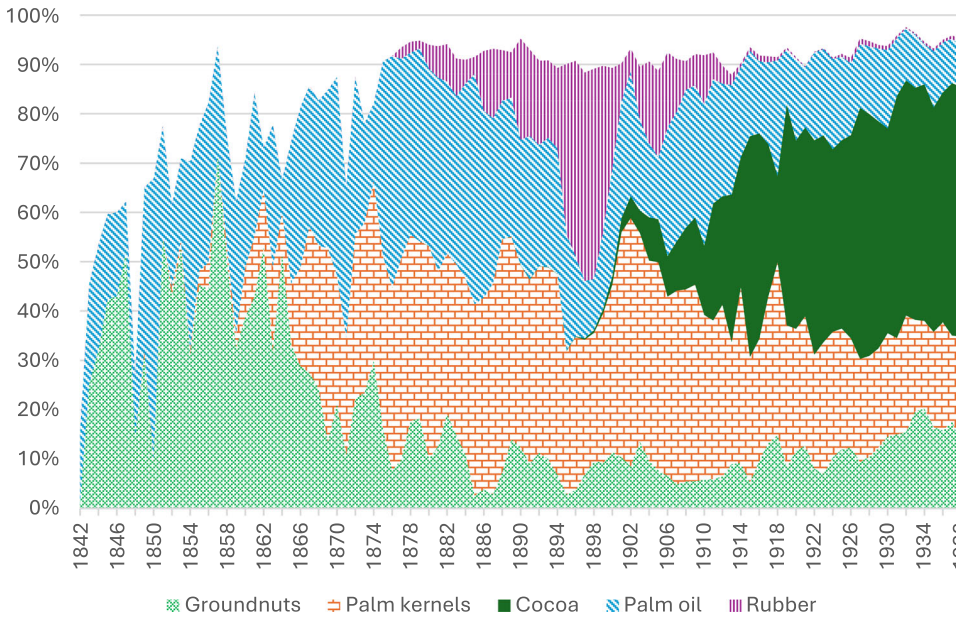

FIGURE 1 Percentage of cocoa, groundnuts, palm oil, palm kernels, and rubber over the total value of agricultural exports from British West Africa. *Notes*: Export values in African prices. *Source*: Created from the African Commodity Trade Database (Frankema, Williamson, and Woltjer, 'West African Scramble'). [Colour figure can be viewed at wileyonlinelibrary.com]

up but only for a short period. As the share of palm kernels declined in the early twentieth century, cocoa became the most significant commodity export.

Following Chilosi and Federico,[58] using price gaps between two markets as a proxy for trade costs requires the following conditions.

(i) First, there must be actual trade between the two markets, otherwise, there is no arbitrage, and prices move independently from each other. In our case, this condition is satisfied since Britain was the main trading partner of British West Africa.[59]

(ii) Second, the quality of goods must be the same in export and import markets. If this were not the case, a change in the price gap between West Africa and the UK, due to differential changes in quality over time, could be mistakenly attributed to variations in trade costs. In our specific case, however, this is not an issue. For British West African colonies, Britain was the primary destination market accounting for a major part of their overall exports. At the same time, most British cocoa, palm oil, and rubber imports came from West Africa.[60]

[58] Chilosi and Federico, 'Early globalizations', p. 2.

[59] See data from the RiCardo Project by Dedinger and Girard, 'Exploring trade globalization'.

[60] For example, between 1934 and 1938, British cocoa imports from West Africa amounted to around 91% of total British cocoa imports (see Montgomery and Taylor, *Cocoa*, table 74, pp. 138–9). In the case of palm oil and palm kernels, as we discussed in sect. I, West Africa was the largest producer in the world, with Britain being the main destination market (Lynn, *Palm oil trade*, p. 12). For rubber, from 1890 to 1905 the Gold Coast was the largest exporter of rubber in the British Empire (see Dumett, 'The rubber trade'). In the case of groundnuts, instead, a smaller proportion of British imports came from West Africa (in 1937, for example, British Africa and British India together accounted for about half of the UK imports, see United States Department of Commerce, p. 36). Yet the trade costs estimates are unlikely to be affected, as groundnuts

For this reason, variations over time in the average quality of goods in the two markets are comparable.[61]

(iii) Third, the traded goods must be representative of trade flows between the two markets. As shown in figure 1, this requirement is well satisfied, as the five commodities represented a very large share of total trade.[62]

Finally, we need to ensure that prices in both Africa and the United Kingdom are reliable. Generally, British trade statistics are considered quite accurate[63] for both import prices in Britain and export prices from the African colonies. As such, prices in Britain have been widely used in the literature.[64] Similarly, African prices from the British colonies have also been used in works where their reliability is key.[65] Given their accuracy, British prices have been employed as a benchmark to evaluate the reliability of other countries' export prices.[66] The value of British imports and exports statistics tend to match the value of corresponding trade flows reported by partner countries.[67] Moreover, British statistics seem sufficiently precise also in the case of developing regions or colonies[68] whose accuracy should be similar to that of African colonies.

To further check the reliability of price data, we look at their correlation with the world price indexes reported by Jacks[69] and with observed African producer prices.[70] Such correlations will not be perfect because of differential changes in trade costs, exchange, and inflation rates over time, but they should be large enough. The estimates show that prices in the United Kingdom are highly correlated with world prices, with correlation coefficients ranging from 0.81 in the case of palm oil to 0.89 in the case of rubber. Similarly, prices at the African ports are highly correlated with observed African producer prices, with correlation coefficients ranging from 0.79 to 0.97.[71]

III | RESULTS: TRADE COSTS BETWEEN BRITISH WEST AFRICA AND BRITAIN

Figure 2 shows real price gaps between British West Africa and Britain. To calculate overall price gaps from our colony/commodity series, we compute the average of the individual series weighted

are, from the late 1860s, only a small portion of total British West Africa trade (see fig. 1). Moreover, as shown in online app. C, the results are very similar including or excluding the groundnuts and palm kernels series.

[61] It is important to acknowledge that this argument is valid only for comparisons of average trade costs over time and that more caution is required when comparing trade costs between colonies as different price gaps between each colony and the United Kingdom might be explained by differences in quality across colonies.

[62] Exports are non-agricultural goods represented a very small portion of total trade.

[63] Lampe, 'Bilateral trade flows'; Pascali, 'Maritime technology'.

[64] Jacks, O'Rourke, and Williamson, 'Commodity price volatility'; Federico and Tena-Junguito, 'World trade'.

[65] Frankema, Williamson, and Woltjer, 'West African scramble'; Tadei, 'Colonizer identity'.

[66] See, for example Tena and Willebald, 'Export growth'.

[67] Federico and Tena-Junguito, 'Morgenstern revisited'.

[68] Carreras-Marín and Badia-Miró, 'Asignación geográfica' for Latin America; Federico and Tena-Junguito, 'Morgenstern revisited', pp. 264 and 271 for British India.

[69] Jacks, 'Real commodity prices'.

[70] As Jacks, 'Real commodity prices' reports indexes of real prices, we calculate nominal indexes using the US CPI from Williamson, 'Annual consumer price'.

[71] See tab. S1 of the online app. of Tadei, 'Colonizer identity'.

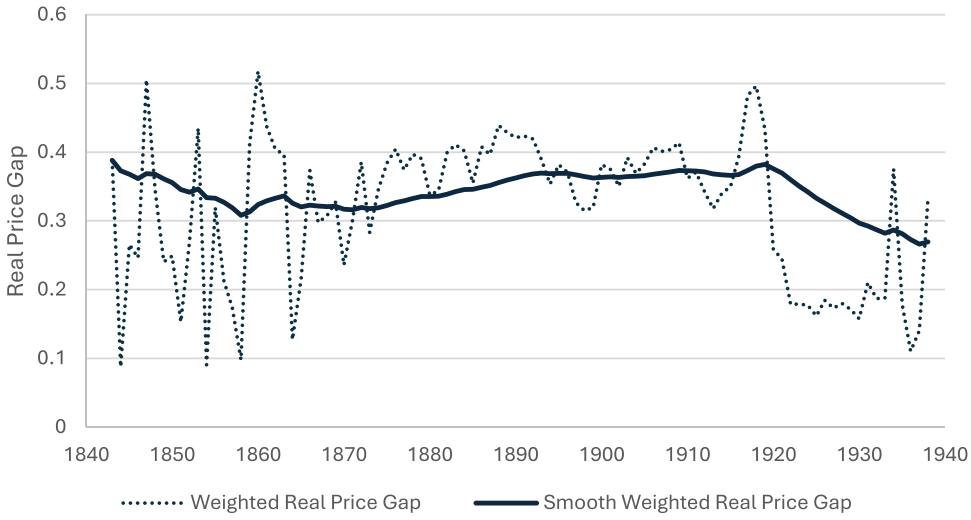

FIGURE 2 Real trade costs of British West Africa with Britain. *Notes*: Average of colony/commodity price gaps series, weighted by each colony/commodity export value at African prices. Exponential smoothing. *Sources*: Creation from original data from Frankema, Williamson, and Woltjer, 'West African Scramble' and Federico and Tena-Junguito, 'World trade'. [Colour figure can be viewed at wileyonlinelibrary.com]

by their relative share of total trade value. Averaging has the advantage that potential random errors in the single price gaps series are likely to cancel each other out. Moreover, weighting by value can reduce the impact of measurement errors in prices, which are more likely to happen for lower-quantity commodities due to the unit-value nature of our price data. Finally, as price gaps tend to be quite volatile, we extract the underlying trade costs trend by smoothing out our series with exponential smoothing.[72] This new series better reflects the change in unobserved trade cost by reducing the effect of short-term shocks. In online appendix A, we report real price gaps for each commodity and colony separately. The levels and the trends are similar across colonies/commodities, suggesting that the dynamics in the evolution of price gaps do not reflect changes in terms of coverage across goods and colonies throughout the period.[73]

At the beginning of our period of analysis, British West Africa price gaps were high, hovering around 40 per cent of the British price. During the second half of the nineteenth century, they experienced a decline to about 30 per cent until the mid-1870s, partly driven by the introduction of new shipping technologies such as steamships. From the late 1870s, however, real price gaps increased, reaching again almost 40 per cent of the British price around the First World War.[74] As we will show in section IV, this can be primarily attributed to the beginning of the activities of monopsonistic companies at the end of the nineteenth century.

[72] See Faust and Wright, 'Forecasting inflation'. In practice, we settled with a smoothing parameter of 0.05 – the same used by Faust and Wright, 'Forecasting inflation' – which is the weight given to current observations as opposed to past observations (the latter weight is 0.95). In online app. B, we show that the trends are similar if we remove outliers.

[73] Colony/commodity dummies can only explain 3% of the variation in log (real price gaps), while year dummies can explain 21% (adjusted R^2).

[74] Using data for all colony/commodity trade costs series, we can reject the hypothesis that price gaps in 1880–1915 are the same as in 1845–80.

The timing of this decline in trade costs in the initial period coincides with the boom in West African terms of trade, although the latter peaked a bit later as the terms of trade of French West African exports (e.g. groundnuts and gum) continued to rise until the mid-1880s.[75] The reason behind this correspondence is clear. Since African prices are set as the difference between global prices – determined by global demand – and trade costs, a reduction in international trade costs for British West Africa implied an increase in African export prices. At the same time, the decline in trade costs reduced the prices in Africa of European imports. As prices of imports declined and prices of exports increased, terms of trade increased. Thus, the fall in trade costs between 1850 and the late 1870s could at least partly explain the boom in terms of trade experienced by British West Africa during the same period.[76] Our findings are also consistent with the results by Chilosi and Federico,[77] who link the boom in terms of trade for Asian countries to their increased integration with the global economy.

How did the trend in British West African trade costs compare with other world regions? Figure 3 plots our West African price gaps together with price gaps between America and Europe and Asia and Europe. We compute Asian and American price gaps as the simple average of all (non-negative) real price gaps in Chilosi and Federico,[78] who gathered prices for Asia and (North) America from a variety of primary and secondary sources. In panel (a), British West Africa trade costs are compared with global costs, calculated as the simple average of the price gaps series of America and Asia, and in panel (b), we compare each region separately.

From the mid-nineteenth century to around 1870, trade costs declined for both British West Africa and the rest of the world. From the 1870s, however, the trends in international and British West African trade costs diverged. While trade costs in the rest of the world showed a steady decline until the 1920s (except for during the First World War), in British West Africa they increased. In the wake of the Great Depression, trade costs rose in all regions, but in British West Africa, they grew substantially more. These trends are statistically significant and we can reject the hypothesis of equal British West African and global trade costs after 1880. Overall, it appears that in periods of declining global trade costs, such as during the First Globalization, British West Africa's costs rather increased. At the same time, when international trade costs rose, such as during the Inter-War period, West Africa's ones rose even more. As a result, in the period under analysis, trade for West Africa became relatively more expensive than for other world regions.

IV | RESULTS: EXPLAINING TRADE COSTS TRENDS

To explain the trends in British West African price gaps, we start by considering the role of observable factors such as shipping costs, insurance, and export duties.[79] We analyse the case of palm oil. We estimate nominal shipping costs by applying the methodology of Tadei[80] to palm oil shipping

[75] Frankema, Williamson, and Woltjer, 'West African scramble', fig. 4.

[76] Underlying the boom in West Africa terms of trade before the 1880s was, to a large extent, also the dramatic decline in the prices of British manufactured goods as a result of the Industrial Revolution.

[77] Chilosi and Federico, 'Early globalizations', p. 16.

[78] Ibid.

[79] British import prices are measured net of import taxes, so such duties are not included in our trade costs estimates. See Federico and Tena-Junguito, 'World trade, 1800–1938: a new data-set', working paper on Economic History, no. 16-01 (2016), Universidad Carlos III de Madrid, Instituto Figuerola, p. 18.

[80] Tadei, 'Measuring extractive institutions' and idem, 'Colonizer identity'.

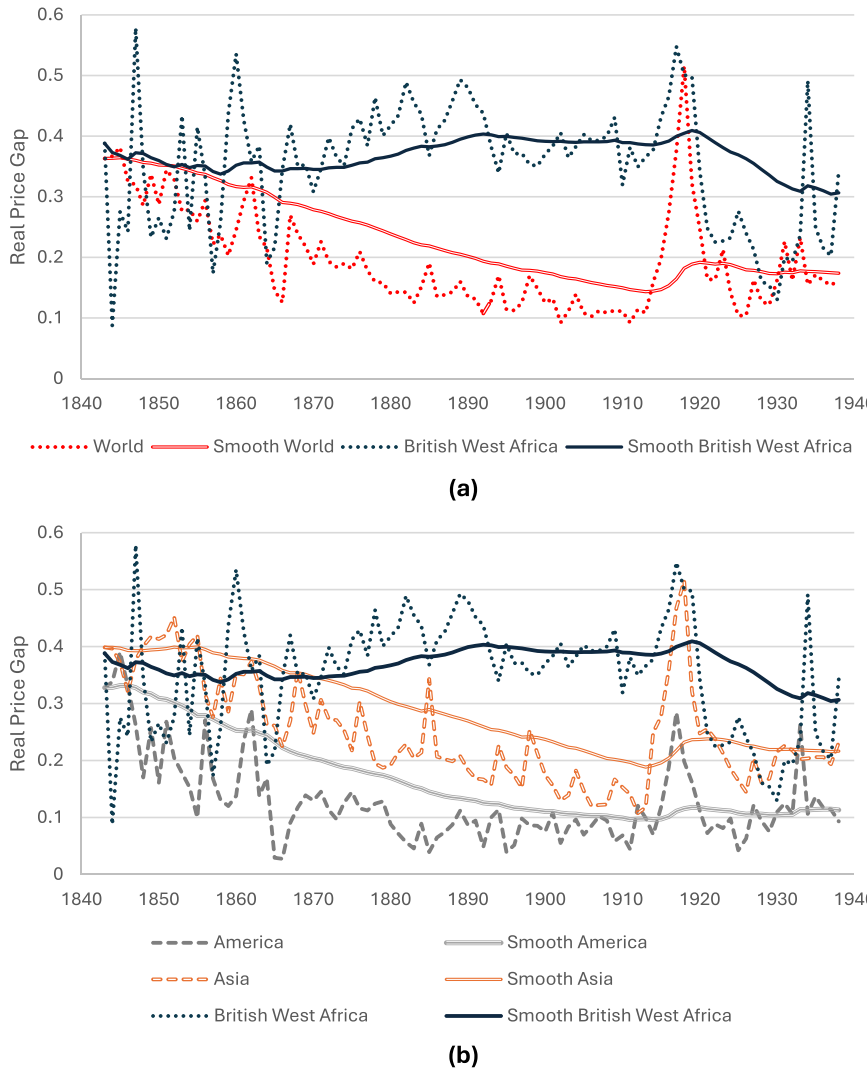

FIGURE 3 Comparison with global trade costs. *Notes*: In panel (a), world trade costs are the simple average of the average price gaps series of America and Asia. In panel (b), the series are the simple averages of all available commodity/route series. In computing averages, negative price gaps are excluded. Exponential smoothing. *Sources*: British West Africa: see fig. 2; other regions: elaborations from Chilosi and Federico, 'Early globalizations' [Colour figure can be viewed at wileyonlinelibrary.com]

costs per ton/km in base year 1881 from Lynn[81] and deflate them by the British palm oil price.[82] Our estimates show that shipping costs generally represented a relatively small share of total price gaps, accounting, at the start of our period, for about 30 per cent. Later on, with the introduction of the steamship, shipping costs temporarily dropped to around 20 per cent of price gaps to go up again during World War I and the early 1920s.

[81] Lynn, *Palm oil trade*, p. 109.

[82] To estimate nominal costs, the unit cost per ton/km in 1881 is first multiplied by the distance from each colony's port to Liverpool. Then, to estimate variation over time, it is multiplied by the freight index from Shah Mohammed and Williamson, 'Freight rates'. See Tadei, 'Measuring extractive institutions' and Tadei, 'Colonizer identity' for details.

Insurance also represented a relatively small portion of the trade costs of British West Africa with Britain. During the first half of the nineteenth century, it accounted for about 15 per cent of price gaps, since insurance for palm oil was 5–7 per cent of the value of the transported goods[83] and trade costs accounted for about 40 per cent of that value (see figure 2). Subsequently, with the introduction of steam and iron ships, the risk of transporting cargo declined substantially, and so did the insurance rates. For example, in the case of transatlantic trade, estimates show insurance rates after the 1920s at 1 per cent of the value of the goods, which would be equivalent to around 5 per cent of price gaps.[84]

Similarly, the share of trade costs accounted for by export duties was also small. Using information from the colonial British Bluebooks, we calculate customs duties for 1903–38 and find they represented on average only 5 per cent of price gaps. In the previous period, duties were likely to account for an even smaller share as taxes on exports were uncommon.[85]

Overall, observable components of trade costs of British West Africa with Britain such as shipping, insurance, and export duties accounted for at most 50 per cent of real price gaps.[86] Unobservable factors must have played a larger role in affecting trade cost dynamics. This echoes previous studies examining trade costs for Europe and the United States. Steinwender emphasizes the role of information frictions; Jack, Meissner, and Novy highlight the importance of monetary regimes; and Jacks finds evidence of trade costs being driven by the choice of monetary and commercial policies more than by changes in freight rates.[87]

In the case of West Africa, commercial policies were, in fact, an essential determinant of the structure of export markets. Data for the twentieth century show ample evidence of the monopsony power of colonial trading companies over West African producers. In French West Africa, producer prices were substantially lower than they would have been in a competitive market.[88] Similar results can be found for British West Africa, where monopsony profits were also significant.[89] On the basis of these figures, we calculate that monopsony profits amounted to about 15 per cent of the European price, accounting for about 45 per cent of price gaps.[90]

To formally investigate the reasons behind the trends in British West African trade costs, we follow the approach by Chilosi and Federico[91] and explain variations in real price gaps with changes in transport costs, barriers to trade, and market efficiency. In particular, we run the following fixed-effects panel data regression

$$\ln\left(G_{i,j,t}\right) = \alpha_{i,j} + \beta_1 T_{i,j,t} + \beta_2 B_t + \beta_3 E_t + \varepsilon_{i,j,t} \quad (2)$$

[83] Lynn, *Palm oil trade*, p. 96.

[84] Persson 'Transport costs', p. 139.

[85] Frankema, Williamson, and Woltjer, 'West African Scramble', p. 259.

[86] Other costs such as storage and spoilage must have been very small for palm oil and cocoa, two highly durable commodities.

[87] Steinwender, 'Information frictions'; Jack, Meissner, and Novy, 'Trade costs'; Jacks, 'Commodity market integration'. On a general note, Anderson and van Wincoop, 'Trade costs' suggest that trade costs remain very important even in highly integrated present-day economies where policy barriers (tariffs) are relatively small.

[88] Tadei, 'Measuring extractive institutions'.

[89] Tadei, 'Colonizer identity'.

[90] Monopsony profits could also increase if inland trade costs declined (e.g. due to improvements in transportation technology or new infrastructure) and European trading companies did not raise African producer prices by the same amount.

[91] Chilosi and Federico, 'Early globalizations', p. 10.

where $\ln(G_{i,j,t})$ is the logarithm of the real price gap for commodity i, colony j, and year t; $\alpha_{i,j}$ is a colony/commodity fixed effect; $T_{i,j,t}$ is the transport costs, measured by the logarithm of a real freight cost index; B_t is the trade barriers proxied by a set market structure dummies indicating market concentration among British trading firms; E_t is the market efficiency proxied by a linear yearly time trend; and $\varepsilon_{i,j,t}$ is the error term. Colony/commodity fixed effects allow us to control for unobservable time-invariant determinants of trade costs and identify the impact of freights, barriers to trade, and efficiency *within* each colony/commodity over time.[92]

We measure transport costs with a real freight rate index, which varies across colonies, commodities, and over time, assuming other transport costs to be proportional to freight.[93] To construct the index, we proceed in the following way. First, we compute the yearly per cent change for the nominal freight indexes for all routes from and to the United Kingdom, reported in the World Trade Historical Database,[94] and we average across trade routes to generate a nominal annual average index. Second, for each commodity, we divide the nominal index by the British price index (so that both trade and freight costs are in real terms). Third, we multiply the resulting real index by each colony's shipping distance from the UK.[95]

We proxy barriers to trade with a monopsony dummy, which takes the value of 1 in periods of strong trading monopsonies and the value of 0 in periods of weak or no trading monopsonies. In particular, we classify as strong trading monopsonies the following periods: 1879–88 (after the start of the operations of the British United African/Niger Company until the entry of the African Association), 1893–1913 (after the establishment of the first cartel agreement between the two major companies until its collapse with the First World War), and after 1929 (when the two main companies merged to create the UAC). Conversely, we classify as weak or no trading monopsonies the following periods: 1843–78 (before the United African/Niger Company),[96] 1889–92 (after the African Association entered the market until its agreement with the Niger Company), and 1914–28 (the collapse of the cartel agreements during the First World War and the period of competition which followed).[97] Moreover, we control for the effect of shipping monopolies by adding a dummy variable for the periods of activity of the West African shipping conference (1895–1918 and 1924–8, see the historical background in section I).[98]

We proxy improvements in market efficiency with a yearly time trend, which captures the introduction of telegraph lines in 1886 in British West Africa[99] and the general improvement in communication and markets over time. The alternative option of using a telegraph dummy is not feasible as it would be almost perfectly collinear with the post-Berlin Conference period, making

[92] We also estimated the model by adding the lag of the endogenous variable using the Arellano–Bond method. The lagged dependent variable is not significant, so we chose the non-dynamic estimation as the main specification.

[93] Following Chilosi and Federico, 'Early globalizations', p. 7.

[94] Federico and Tena-Junguito, 'World trade'.

[95] Shipping distances are calculated using https://sea-distances.org/.

[96] The period before the establishment of the United Africa Company in 1879 was characterized by increased competition in the African trade due to the new shipping lines which allowed smaller traders to enter the market. Indeed, the merging of several companies into United African Company can be seen as the result of these competitive pressures (Rönnbäck and Broberg, *Capital and colonialism*, p. 178).

[97] See the historical background in sect. I for details.

[98] The differential effect of trade versus shipping monopolies is thus identified by price gap differences in the following periods: 1843–78, 1889–92, and 1919–23, no trade nor shipping monopolies; 1879–88, 1893–94, and 1929–38, only trade monopolies; 1914–8 and 1924–8, only shipping monopolies; and 1895–913, both shipping and trade monopolies.

[99] Headrick, *The Invisible weapon*.

it impossible to disentangle the effect of the telegraph and that of colonial rule. We also include dummies for political and economic events that might have disrupted trade efficiency, such as formal colonial rule after the Berlin Conference of 1885, the First World War (1914–8), and periods of global economic crises (the Long Depression of 1873–96, the Short Depression of 1920–1, and the Great Depression of 1929–32).[100] Moreover, we also control for global price levels by including a British price index, computed as the average price index of the exported commodities. Finally, we control for the efficiency of internal markets by including the size of each colony's railway network over time.[101]

Table 1 presents the results.[102] The performance of the model is satisfactory. It fits the data reasonably well and the coefficients are stable. Furthermore, classical measurement errors in price gaps (the dependent variable) would only increase the standard errors, while the same type of measurement errors in our proxies for transport costs, barriers to trade, and efficiency (independent variables) would bias the estimates towards zero, decreasing the likelihood of rejecting the null hypotheses.

In column (1), we regress the (log) real price gap on the (log) freight rate index, the monopsony dummy, and the linear time trend. As expected, the freight and the monopsony dummy coefficients are positive and highly significant. At the same time, market efficiency, measured by the time trend, is negatively related to trade costs and is statistically significant. In column (2), we control for global price levels and include dummies for political and economic events that might have affected trade costs. The coefficient of World War I is positive and significant, consistently with the increase in trade costs during the war. The depression dummies are significant, indicating the influence of global economic forces on British West African trade costs, but their sign depends on the specific periods considered. This is not surprising, as economic turmoil might both increase the gap between African and UK prices due to the increase in trade costs or reduce it, given that trading companies would still need to pay African producers a minimum price for them to be willing to trade, even in times of lower global prices. This mechanism is also confirmed by the fact that the price index is positively related to price gaps. The post-Berlin conference period is associated with higher trade costs, suggesting an additional negative impact of formal colonial rule on top of the effect of trade monopsonies. In column (3), we include a measure of the efficiency of the internal market, as proxied by the size of each colony's railways network. Internal market efficiency is associated with reduced international trade costs.[103] In column (4), we control for monopolies in shipping by adding the West African shipping conference dummy. The coefficient of the shipping monopoly dummy is positive, suggesting higher trade costs during that

[100] In the UK, the Great Depression ended 1 year earlier than in the United States (Richardson, 'The economic significance').

[101] We estimate the extension of the railways network as the (log) share of the colony's 'cells', which are less than 10 km away from a railway line. The data come from Jedwab and Moradi, 'Transportation revolutions'.

[102] As, by construction, both freights and the price index are endogenous, we estimate the regression via IV. We instrument freights with its lagged value and, following the approach in Chilosi and Federico, 'Early globalizations', with the trend component of a Hodrick–Prescott decomposition of the series of nominal freights divided by the average prices. Similarly, we instrument the price index with its lagged value and with the trend component of a Hodrick–Prescott decomposition of the price index. In each specification, among the four possible, we select the set of instruments which maximize the *p*-value of the Hansen J overidentification test for exogenous instruments. Nevertheless, as shown in online app. C, the results are unchanged if we estimate the model with simple OLS. We also show that the estimates are similar if we measure the global price level with a United States price index from Jacks, 'Real commodity prices', instead of a UK price index.

[103] In specification (3), the time trend is not statistically significant. This could be due to that both 'year' and 'railways' may capture the same improvement in efficiency over time, making it impossible to precisely estimate their separate effect.

TABLE 1 Explaining trade costs.

	(1)	(2)	(3)	(4)	(5)
Ln (freight)	0.278***	0.254***	0.304***	0.407***	0.287***
	(0.075)	(0.071)	(0.075)	(0.079)	(0.087)
Monopsony	0.219***	0.327***	0.189***	0.234***	0.309***
	(0.054)	(0.051)	(0.053)	(0.055)	(0.058)
Year	−0.008***	−0.008***	−0.002	−0.009***	−0.004
	(0.001)	(0.002)	(0.003)	(0.001)	(0.003)
Great depression		−0.434***			−0.385***
		(0.109)			(0.119)
Short depression		−0.497**			−0.488**
		(0.209)			(0.207)
Long depression		0.287***			0.244***
		(0.057)			(0.067)
Post-Berlin		0.383***			0.309***
		(0.068)			(0.072)
WW1		0.285**			0.243
		(0.135)			(0.155)
Price level index		0.005***			0.006***
		(0.001)			(0.001)
Ln (railways)			−0.085***		−0.066**
			(0.026)		(0.026)
West African Shipping Confer.				0.256***	0.079
				(0.048)	(0.080)
Observations/groups	727/12	727/12	727/12	727/12	727/12
R^2	0.0596	0.2012	0.0743	0.0760	0.2070
Under identification (LM test)	*110.117*	137.778	111.400	102.336	152.680
p-Value	*0.000*	0.000	0.000	0.000	0.000
Overidentification test	*1.829*	0.611	5.267	0.066	1.050
(Hansen J)	*0.1762*	0.4345	0.0217	0.7978	0.3055
p-Value					

Note: The dependent variable is Ln (real price gap). All models include colony/commodity fixed effects and are estimated by IV using a robust variance-covariance matrix.
***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

period. In column (5), we include all control variables together. The coefficients are very similar to the previous specifications, but both the time trend and the shipping monopolies dummies are not significant. For the time trend, this is likely because it aims to proxy for changes in efficiency, which are already captured by the included dummies for political and economic events and by the efficiency of the internal markets. In the case of shipping monopolies, their effect is not precisely estimated and the magnitude of the coefficient is small (shipping monopolies increase trade costs by about 8 per cent). This is not unexpected, as shipping costs are only a relatively small portion of total trade costs (20–30 per cent). In columns (2), (3), (4), and (5), the coefficients of the primary variables of interest (freight, trade monopsonies) do not change much relative to column (1) and are statistically significant.

Turning to the magnitude of the effects, a 10 per cent decrease in freight is associated with an almost 3 per cent decrease in trade costs. Increases in market efficiency imply a reduction in trade

costs by less than 1 per cent per year. Monopsonies increased trade costs by around 30 per cent. These estimates are consistent with Chilosi and Federico who find, albeit in the different context of Asia, that the monopoly of the East India Company augmented price gaps by about 35 per cent in the short run and that a 10 per cent reduction in freights reduced trade costs by 3–7 per cent.[104] The estimated effect of monopsonies is also consistent with the direct evaluation of monopsonistic profits from Tadei, which suggests that such profits accounted for up to 40 per cent of trade costs in twentieth-century West Africa.[105]

To further check the relationship between monopsonies and trade costs of British West Africa with Britain, we take advantage of the temporal variation in the strength of monopsonies. We regress log (price gaps) on all significant variables from specification (5) of table 1 and a vector of monopsonies dummies, one for each of the following periods: 1879–85 (beginning of the United African/Niger Company's activity), 1886–88 (Royal Charter), 1889–92 (competition with the African Association), 1893–1913 (implementation of cartel agreements), 1914–28 (cartel dissolution and period of monopolistic competition), and 1929–38 (merger into the UAC).[106] The pre-monopsony period (1843–78) is the omitted category. This allows us not only to evaluate the impact of the presence of monopsonies, but also to test hypotheses regarding their relative importance over time. Figure 4 reports the coefficient of each monopsony period dummy (i.e. their impact on trade costs relative to the period before the first introduction of monopsonies) and 90 per cent confidence intervals. When comparing dummies across periods, it is important to remember that their difference might be significant at a 1 per cent or 5 per cent level even if their 90 per cent confidence intervals overlap (Cumming and Finch 'Inference'). We will comment on such differences in the discussion which follows.

The start of the operations of the British United African/Niger Company in 1879 should increase trade costs relative to the previous period and the 1879–85 dummy is positive and significant. In 1886, the obtention of the Royal Charter allowed the company to consolidate its monopsony power by establishing treaties with the local rulers, and the monopsony coefficient increases (the difference between the 1879–85 and the 1886–8 dummy is significant). After 1889, with the entry of the African Association, competition augmented and the monopsony coefficient declines (even if the difference is not statistically significant). After 1893, the two companies established a series of cartel agreements. The coefficient of the monopsony dummy is not statistically different from the periods of the royal charter. The dissolution of the cartels with World War I and the period of competition that followed should imply a reduction in the monopsony dummy, and this is exactly what we observe: the 1914–28 dummy is not statistically different from zero, indicating the absence of monopsonistic profits, and the difference with the previous period is statistically significant. Finally, the coefficient increases again and becomes statistically significant in 1929 when the Niger Company and the African Association merged to form the UAC (the difference with the previous period dummy is statistically significant). Overall, the trend in the monopsony-dummy coefficient nicely aligns with what we would expect from the historical description of the monopsony power trend over time, both in terms of the direction of the changes and their magnitude. This further emphasizes the importance of monopsonies as a determinant of trade costs trends in colonial British West Africa.

The results of table 1 tell us how much of the variance in trade costs can be attributed to transport costs, monopsonies, and efficiency. Yet the most crucial question is to assess their

[104] Chilosi and Federico, 'Early globalizations', tab. 6, cols. 4 and 6.

[105] Tadei 'Measuring extractive institutions'; idem, 'Colonizer identity'.

[106] See the historical background in sect. I for details.

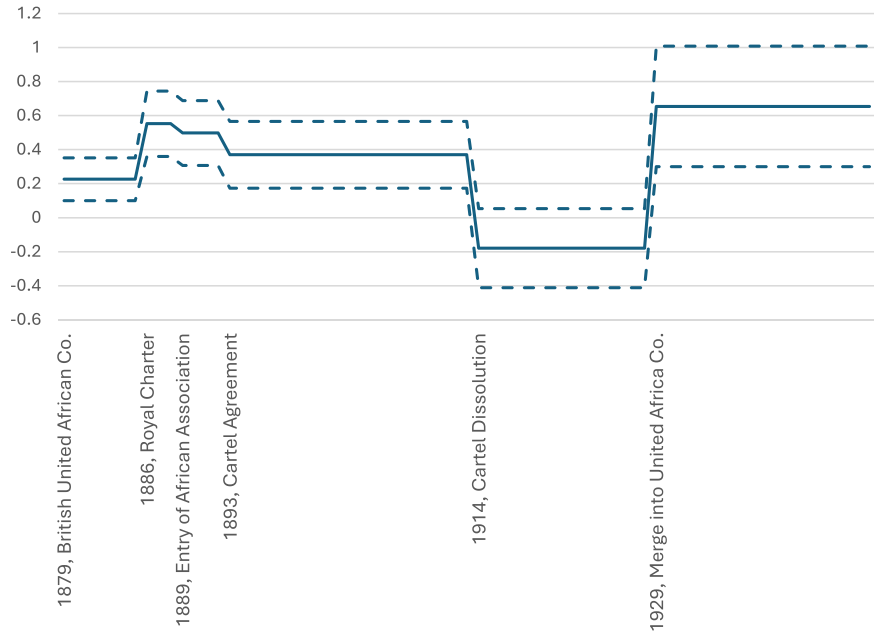

FIGURE 4 Strength of monopsonies over time. *Notes*: The figure reports the coefficient of the monopsony dummies (continuous line) and 90% confidence intervals (dotted lines) from the regression of log (trade costs) on log (freight), year trend, and a vector of monopsonies dummies, one for each period: 1879–85, 1886–8, 1889–92, 1893–1913, 1914–28, and 1929–38 (see text for details). Each coefficient can be interpreted as the increase in trade costs relative to the period before monopsonies (1843–78). All other variables' coefficients are consistent with the estimates of tab. 1. *Source*: Author creation, see text. [Colour figure can be viewed at wileyonlinelibrary.com]

contribution to the change in trade costs over time. To address this issue, we follow Chilosi and Federico and perform a decomposition analysis.[107] For every pair of decades, we first compute the change in average price gaps (i.e. the difference between the average price gap in the 1840s and the average price gap in the 1850s, between the 1850s and the 1860s, and so on).[108] Then, we evaluate how much of such change can be attributed to variations in transport costs, monopsonies (decade-average of the monopsony dummy), and efficiency. For transport costs and monopsonies, this is computed as the per cent change of the variable times its elasticity (calculated from specification 1 of table 1) times the initial price gap, divided by the total change in price gaps. For efficiency, to allow for differential increases or reductions over time instead of a constant increase as in table 1, we compute the contribution as a residual (i.e. the portion of the change not accounted for by transport costs or monopsonies).

Figure 5 shows the weighted average net variation in trade cost across colonies/commodities. For each pair of decades, we calculate the share of the net change in real trade cost due to transport costs, monopsony, and efficiency for each commodity and colony. Then, we calculate the mean across all series, weighted by their export values. Each bar represents the average net variation in British West African trade costs (measured with real price gaps) between decades and how much of this variation can be attributed to changes in transport cost, monopsonies, and efficiency.

[107] Chilosi and Federico, 'Early globalizations'.

[108] The change in price gaps is computed as the difference between the predicted value of the dependent variables at time 1 and at time 0, according to specification 1 of tab. 1.

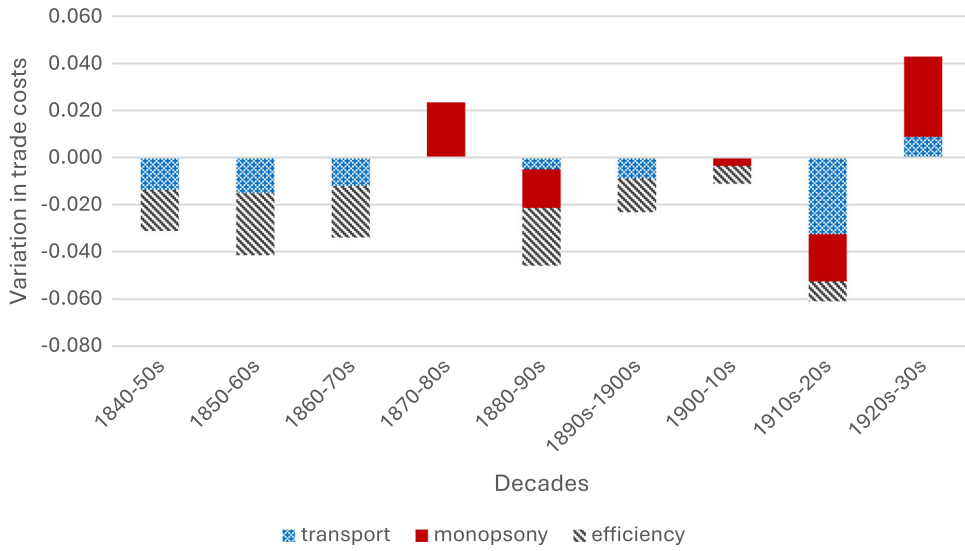

FIGURE 5 Explaining trade costs: decomposition analysis, full sample weighted average. *Notes*: The size of the three components in each bar represents the share of the net change, not the total variation due to each component. *Source*: Author creation, see text. [Colour figure can be viewed at wileyonlinelibrary.com]

The decline in trade costs from the 1840s to the 1870s is mainly explained by transport advancements and increases in efficiency. This is in line with the establishment of a regular steamship service between Britain and West Africa in 1852.[109] Later on, the continued improvement in transport costs and efficiency could not compensate for the establishment of monopsonies in the late 1870s, which explains the trade cost increase. In the following decades (the 1890s–20s), reductions in transport costs, increases in efficiency, and a decline in monopsony power were the main drivers of trade cost reductions. The increase in efficiency is consistent with the telecommunication and transportation advancements that took place in West Africa in this period. A telegraph cable was laid to link Britain and its West African colonies in 1886[110] and railway networks started expanding in the late nineteenth/early twentieth centuries. Moreover, the dissolution of trade cartels in the First World War and the period of competition in the 1920s also contributed to reducing trade costs. Finally, from the Great Depression onwards, increases in real transport costs and especially the strengthening of monopsony power, as the Niger Company and the African Association merged into the UAC in 1929, played a significant role.

V | CONCLUSIONS

Although there is a plethora of studies on trade costs in Europe, the Americas, and Asia, little is known about Africa. To fill this gap, in this article we provided novel estimates of trade costs between West Africa and Britain from the early 1840s to the late 1930s and we analysed the drivers of their evolution in terms of transport costs, market efficiency, and trade barriers. We show that

[109] Lynn, *Palm oil trade*, p. 105.

[110] Headrick, *The Invisible weapon*.

from the 1840s to around 1870, international trade costs decreased at a similar rate both in British West Africa and in the rest of the world. Yet, in the subsequent period, the picture changed. During the First Globalization, a period of declining global trade costs, British West African trade costs rather increased, and, in the Inter-War Years, trade costs increased more in British West Africa than in the rest of the world. Consequently, from the late nineteenth century, trade for West Africa became relatively more expensive than for other world regions. Our results suggest that the decline in trade costs until around 1870 can be explained by reductions in transport costs and improvements in market efficiency, while the change in trend after 1870 was mostly driven by the establishment of colonial trade monopsonies, which increased African producers' cost in accessing world markets.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available at OpenICPSR: https://doi.org/10.3886/E200621V1.

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