

The integration of West Africa in the global economy 1842-1938

Nektarios Aslanidis, Oscar Martinez, Federico Tadei

Universitat Rovira i Virgili (URV), Universitat de Barcelona (UB)

CRETE 12-16 July 2021

- Large literature on 19th/20th century commodity market integration and its causes (technological advances, etc); Jacks (2005, 2006), Jacks, Meissner and Novy (2011), Federico (2012), Chilosì and Federico (2015).
- We have a good knowledge of international trade costs between Europe, Americas, and Asia, yet we know less about Africa.
- Africa's growth is heavily dependent on trade of primary products as economic growth is correlated with the increase in primary products trade.
- Was Africa different compared to the rest of the world?
- **Did Africa suffer from higher international trade costs than other world regions?**
- **Determinants of commodity market integration in Africa.**

- Contribute to filling this gap by analyzing commodity market integration of Africa in the world economy from mid-19th century to start of World War II.
- Provide estimates of **international trade costs** by applying Threshold Autoregressions to a representative sample of West African export prices and corresponding European import prices.
- Our approach allows us to compare African trade costs to those observable in other regions (Europe, Americas, Asia), answering the question of when West African trade costs arose relatively to the rest of world.

- We focus on **British West Africa** (Sierra Leone, Nigeria, Gold Coast and Gambia) and 5 commodities (palm oil, cocoa, rubber, palm kernels and groundnuts).
- As Britain's share of world trade flows was large (an average of about 20%), West Africa was integrating also into the global economy.

Why Start in mid-19th Century? Why West Africa?

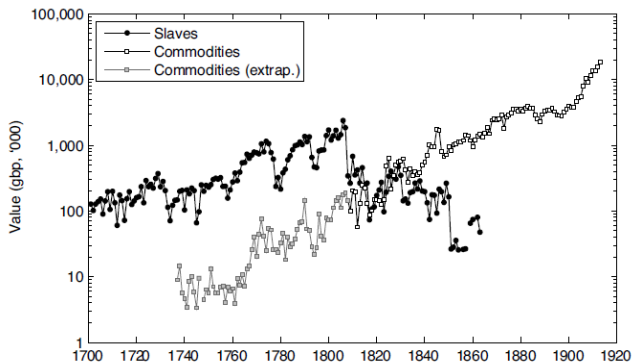
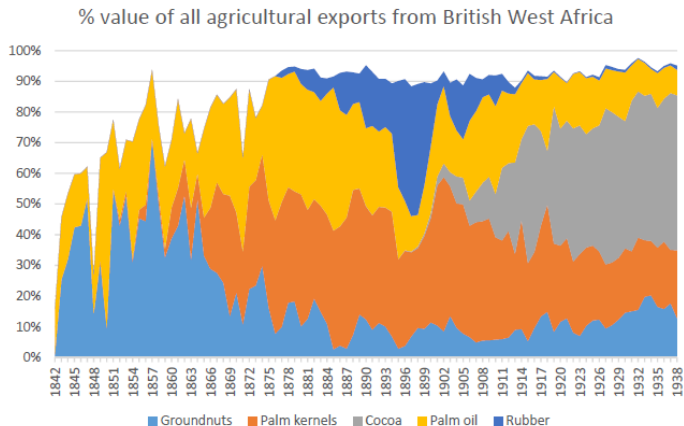


FIGURE 1
VALUE OF SLAVES AND COMMODITIES FROM WEST AFRICA, 1700–1913

"Commercial transition" started around 1840s and occurred first in West Africa, then in rest of Africa. Also, coincides with the value of commodity exports from West Africa overcoming for the first time the value of slave exports.

- We focus on **palm oil, cocoa, rubber, palm kernels & groundnuts** which are representative of West African trade flows.
- Annual data
 - Palm oil: Sierra Leone (1842-1938), Nigeria (1865-1938) and Gold Coast (1875-1938).
 - Cocoa: Nigeria (1888-1938) and Gold Coast (1892-1938).
 - Palm kernels & Groundnuts: Gambia (1851-1938), Sierra Leone (1858-1938), Nigeria (1873-1938) and Gold Coast (1875-1938).
 - Rubber: Gold Coast (1881-1938) and Nigeria (1886-1938) and Sierra Leone (1875-1908).

Dataset: Commodities



- Trade costs are *broadly defined* (Anderson and Wincoop (2004), Jacks (2005), Steinwender (2018), Tadei (2018), among others).
- ① Direct/observable barriers to market integration (e.g., shipping, insurance, export duties, etc).
- ② Indirect/unobservable barriers to market integration (e.g., information costs, market/monopsony power)

Historical and Institutional Background

- 19th century (first half), palm oil trade was determined to a large degree by foundations and practices that had marked slave trade era.
- Palm oil and groundnuts became most important West African exports - industrialisation of Britain and generated demand for tropical and intermediate products (oils and fats of all kinds).
- Later in the century, the use of steamship reduced costs significantly and opened the market to new sources of competition. Overall, the second half of 19th century saw falling costs as well as falling prices.

Historical and Institutional Background

- The effects of these problems were partially compensated for by the development of the palm kernels trade.
- Late 19th century, rubber became important and in 1880-90s enabled the region to diversify its export bill at a time when falling prices for palm products threatened economic stagnation. However, once natural supply of rubber trees approached exhaustion (1906 – 07) and price declined, rubber trade took a downward path (was not profitable as a fully-cultivated crop).
- Early 20th century, cocoa was to witness most spectacular growth and Gold Coast became the market leader in cocoa (increasing commercialization of chocolate production).

- **African palm oil, cocoa, rubber, palm kernels & groundnuts prices:** *African Commodity Trade Database (ACTD)*
Frankema, Williamson and Woltjer (2018, *Journal of Economic History*).
- **British palm oil prices** are obtained from Sauerbeck, A. (1886, 1893, 1908, 1917) , *The Statist* (1930, 1950) and *Liverpool Mercury*, as reported by Lynn (2002).
- **British cocoa, rubber and palm kernels & groundnuts prices** come from *Federico-Tena World Trade Database*.

- Commodities move from Africa (source market) to Britain (destination market). Define *price margin*, PM_t :

$$PM_t = (p_t^{British} - p_t^{Africa})$$

- $p_t^{British}$ → British prices are wholesale prices of the imported item, GBP per kg
- p_t^{Africa} → African prices are unit value of the exported item, GBP per kg
- Commodity market integration implies ↓ PM_t and ↑ trade between the "core economies" and commodity-exporting "periphery".

- *Threshold autoregression* (TAR); Obstfeld and Taylor (1997), Rogoff (1996), Jacks (2005), Hynes, Jacks and O'Rourke (2012).

$$\Delta PM_t = \begin{cases} \lambda(PM_{t-1} - TC) + \varepsilon_t & \text{if } PM_{t-1} > TC \\ \varepsilon_t & \text{if } PM_{t-1} \leq TC \end{cases} \quad -1 < \lambda < 0$$

where $TC > 0 \rightarrow$ trade costs, while $\lambda \rightarrow$ efficiency parameter.

- 1 Below trade cost ($PM_{t-1} \leq TC$) \rightarrow *No Arbitrage Regime*. There is no "error correction" force at work, so for small price differences, arbitrage does not take place, therefore random walk ("no-arbitrage area" or "area of inaction").
- 2 Above trade cost ($PM_{t-1} > TC$) \rightarrow *Arbitrage Regime* (reversion towards *equilibrium*). Arbitrage takes place with speed of convergence λ .

- *Estimation: grid-search procedure*

The parameters $\theta = (TC, \lambda)'$ are estimated by grid-search Least Squares (LS) \rightarrow minimal residual sum of squares:

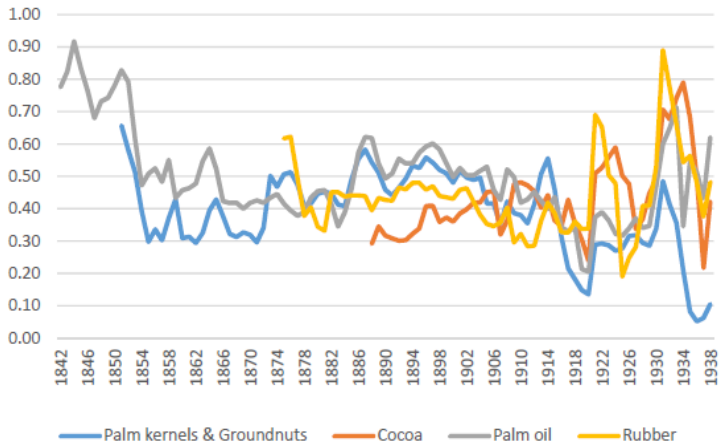
- 1 Sort the distinct values of the observations on the threshold variable, PM_{t-1} .
 - 2 Eliminate the smallest and largest $\% \pi$ of observations and search over the remaining $T \times (1 - 2\pi)$ observations of PM_{t-1} .
 - 3 Grid search over different values of TC .
 - 4 Best choices for trimming parameter $\pi = \{0.05 - 0.15\}$.
- For theoretical results on threshold models, see seminal papers, Tong and Lim (1980) and Hansen (1996, 2000).
 - Evolution of market integration over time by performing a rolling window estimation using 20 annual observations ($RW20$).

Real Trade Cost (% of British Price): All

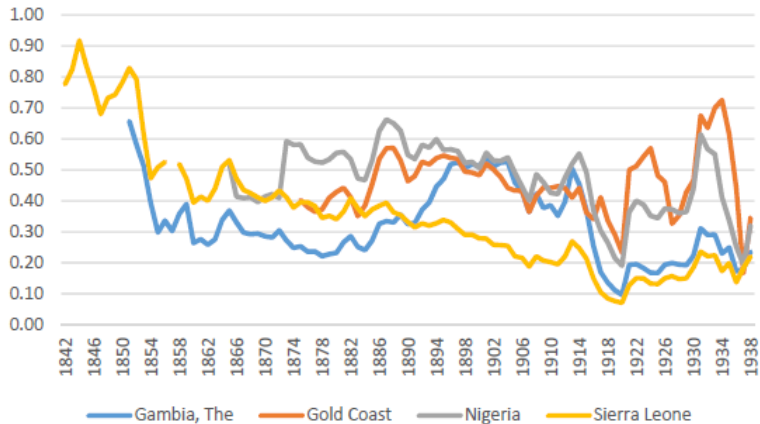


Note: Value-weighted average of colony/commodity trade costs series.

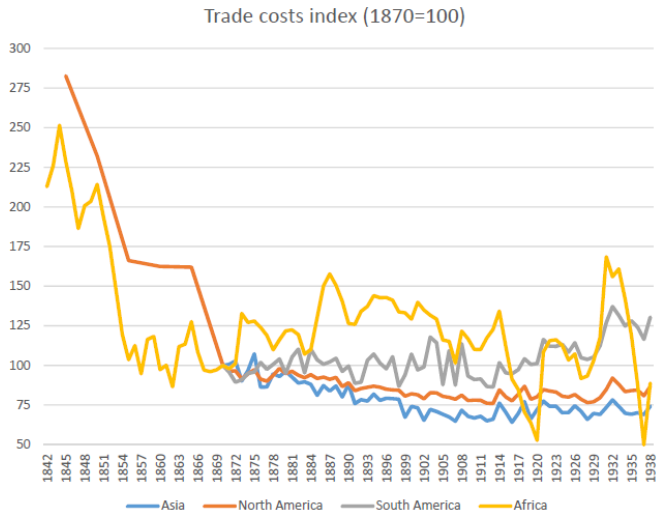
Real Trade Cost (% of British Price): By commodity



Real Trade Cost (% of British Price): By colony



Real Trade Cost: Comparison with Other Regions



Determinants of Commodity Market Integration

- What drove integration of West Africa with the international markets? The importance of technology efficiency, shipping costs and monopsony power:

$$\ln(TC_{i,j,t}) = \alpha_{i,j} + \delta \cdot t + \beta_1 \cdot \ln(\text{freight}_{i,j,t}) + \beta_2 \cdot \text{monopsony}_t + \varepsilon_{i,j,t}$$

where:

- ① $TC_{i,j,t}$ → trade cost estimates for commodity i , colony j at time t
- ② $\alpha_{i,j}$ → fixed effects by commodity i and by colony j
- ③ t → linear time trend
- ④ $\text{freight}_{i,j,t}$ → a real freight cost index for commodity i , colony j at time t (comes from *Federico-Tena World Trade Database*)
- ⑤ monopsony_t → market structure dummies (indicate market concentration among British trading firms)

Determinants of Commodity Market Integration

- What drove integration of West Africa with the international markets? The importance of technology efficiency, shipping costs and monopsony power:

$$\begin{aligned} \ln(TC_{i,j,t}) = & \hat{\alpha}_{i,j} - 0.008 \cdot t + 0.224 \cdot \ln(\text{freight}_{i,j,t}) \\ & (-7.64) \quad (2.96) \\ & + 0.241 \cdot \text{monopsony}_t + \hat{\varepsilon}_{i,j,t} \\ & (4.86) \end{aligned}$$

Note: T -ratios are based on standard errors clustered by year (Pesaran (2015): cross-sectional dependence, average pairwise, $\bar{\rho} = 0.28$).

- Overall, West African trade costs experienced a substantial reduction from 1842 to 1938, particularly during 1842-1870.
- West Africa trade costs increased during the 1870-80s (West Africa-specific shock) and increased more than in the rest of the world in the 1920-30s (worldwide shock).
- Therefore, in this period trade for West Africa became relatively more expensive than for other regions.
- Important determinants of West Africa trade costs appear to be technology efficiency, shipping costs and monopsony power.