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Comparing colonial and post-colonial output: Challenges in estimating African economic change in the long run

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Comparing colonial and post-colonial output: Challenges in estimating African economic change in the long run

Morten Jerven, Simon Fraser University

Abstract

Until recently, most economists' work on Africa has taken 1960 as the starting point because data on national income and similar derivates are only available back to this point. To date, the quantitative literature on Africa has made heroic leaps of faith, asserting causal relationships across time periods, without being able to account for different trajectories of economic development. This paper suggests some ways in which historical national accounts for African economies can be created and discusses whether such estimates will add to our stock of knowledge regarding African economic change, or whether they are likely to mislead. A new data-series approximating growth in Ghana from 1892-1954 is presented.

Keywords: Africa, Ghana, Colonialism, Economic Growth, National Accounts

JEL Codes: N17, F54, O55, E01,

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Introduction

"*Avanti*, Economic historians!" sounded the call from Patrick Manning to African economic historians in 1987.[1] But instead of surging ahead, the discipline arguably went into decline.[2] The history of economic development in Africa became almost exclusively an exercise for development economists, while historians focussed on other topics. Until recently, most economists working on Africa took 1960 as their starting point, primarily because data on national income and similar derivates are only available back to this point. However, during the past ten years there has been a surge in quantitative research on African development. In particular, attempts have been made to establish relationships between historical events and current income levels and inequalities.[3] This earlier neglect of the colonial and pre-colonial periods in the economic development literature is therefore increasingly being seen as a limitation; it does not allow for an analysis of the historical roots of poverty or for an evaluation of the causes of persistent slow growth in Africa. For this research agenda to be fruitful and/or its theories substantiated, it is crucial to have consistent and reliable estimates of economic change. Sources for the creation of long-term data sets on African economies exist, but these valuable colonial-era data remain underutilized.

This paper discusses the prospects and problems of estimating economic change for African economies across the colonial and post-colonial period. It is first suggested that the prospects are better than normally conceived, in particular the colonial data coverage and quality compares favourably with those deriving from post-colonial state administrations. The paper then moves into considering different theoretical approaches to estimating national accounts and compares the data needs of these models with historical data availability across the 20th century.

In order to give an empirical context, the paper discusses the case of Ghana. This is a particularly useful starting point because the Ghanaian economy is arguably the most intensively studied in Sub-Saharan Africa (aside from South Africa). Existing single-year estimates from Angus Maddison and Robert Szereszewski are presented.[4] Aspects of Szereszewski's approach are adopted in this paper, and some preliminary annual growth estimates between 1891 and 1954 are presented. The paper concludes with some advice regarding the prospects of building an economic growth database for a selection African economies covering the colonial period. It is concluded that the provision of data for Sub-Saharan economies comes down to an intriguing

[1] Manning, "Prospects for African Economic History"
[2] Hopkins, "New African Economic History"
[3] For recent reviews see: Jerven, "African Growth Recurring", Austin, "Compression of History", Hopkins, "New African Economic History" and Fenske "The causal history of Africa."
[4] Szereszewski, *Economy of Ghana, 1891-1911* and Maddison, *Historical Statistics of the World Economy.*

trade off. On one side the data basis is severely limited, and any aggregation of data creates an illusion of being able to pinpoint economic change. On the other side, unless data on economic growth are made available from earlier periods (e.g. 1900 onwards), the 'stories' of African economic growth will not take the long boom of export production and centralization originating in such periods into account.

Post-Colonial and Colonial Economic Data Revisited

Recently work evaluating post-colonial data has been undertaken; Jerven assessed the income level estimates on African economies for the year 2000 and found that these estimate are malleable.[5] After subjecting the datasets to tests of accuracy, reliability and volatility, it was concluded that efforts linking 'historical events' with 'income today' are futile. For all practical purposes, the income level of most African economies are not meaningfully different from each other. The handful of exceptions includes some enclave economies or islands (Mauritius, Seychelles and Equatorial Guinea) and economies directly linked with South Africa (in addition to South Africa; Namibia, Botswana, Lesotho and Swaziland).

Except for a study by Derek Blades in the 1980s, African growth data has not been subject to critical empirical research.[6] In 2010, a study based on Botswana, Kenya, Tanzania and Zambia was published. This study concluded that growth rates varied significantly from source to source, and that these problems originated in a lack of transparency regarding which national account files were used and how the series (with different base years) were harmonized.[7] More detailed country-level studies showed that the GDP growth and level data are a product of aggregation of data components that vary significantly in quality.[8] Data on agricultural production, informal sector and small-scale operators are not available on an annual basis and are sometimes missing entirely.[9]

In conclusion, the data basis for economic analyses of the post-colonial era is overrated, and the necessary caveats are not carefully noted. On a more positive note—in particular for the question of hand—this leaves the colonial data in a relatively favourable light. While there are

[5] Jerven, "Relativitiy of African Poverty."
[6] Blades, "Levels and Growth of Output in Developing Countries"
[7] Jerven, "Random Growth."
[8] Jerven, "Growth, Stagnation or Retrogression?", "Revisiting Kenyan Economic Growth", "The official Evidence, Botswana".
[9] Jerven, "Measuring African Progress".

serious gaps of knowledge and coverage deficiencies, the data for the colonial period suffer from the same limitations as those of the post-colonial period.

Theoretical Needs and Empirical Realities: Estimating National Accounts for African Economies

In theory there are three distinct approaches to estimating national income: Income, Expenditure and Production. The first approach adds up profits, rents, interest, dividends, salaries and wages. This approach is not suitable for estimation of GDP for African economies, since the main component would be profits earned by farmers. This information is not directly available for either colonial or post-colonial African economies. The expenditure approach is, at face value, more feasible. Its components are private consumption, investment, government consumption and the balance of exports and imports. The problematic part in this disaggregation is personal consumption and the part of capital formation that accrues to the rural or non-modern economy. A third and final approach is to use the production method. Here, estimates of value added (output minus intermediate consumption) per sector are summed together to equal GDP. It is this latter method that has been preferred in official national income accounting in post-colonial Africa. In the system of national accounts it is prescribed that all three methods should be estimated independently, thus establishing a way of checking the accuracy of the estimates. In practice this is not applied. Post-colonial national accounts have typically been estimated using the production method, while expenditure on private consumption is derived as a residual.

In principle, it is feasible to create national accounts using either the expenditure method or the production method.

1) Expenditure method: $Y= C+I+G+ (X-M)$

As mentioned, there is a lack of data for estimating private consumption (C). In post-colonial accounts this component is usually derived as a residual, having first found (Y) through the production method. When it is estimated independently, either an assumption of a per capita value has to be made, by relying on household budget survey or basic guesses can be made such as relying per capita calorific consumption as suggested by the FAO. This can provide a starting point and subsequently a frequently used proxy for the growth in private consumption is population growth. For investment (I), there is limited data availability. For the colonial period,

the best possible method is to assume that capital formation follows trends in certain capital goods imports. However, there are important aspects of capital formation related to production for export that are invisible, such as planting and land clearing. Szereszewski has suggested a method for cocoa production in Ghana that can be applied to other products.[10] For government expenditure (G), there are ample data; the same is true of imports (M) and exports (X).

The resulting estimates will only be meaningful if expressed in constant prices. For private consumption this will not be a problem as the indicator of growth is already in volumes: population growth. For Imports and Exports, both prices and/or volumes are generally available (though for some countries volumes are not regularly reported in the 1970s and 1980s), and thus indicators can be made using either physical change or calculated indices of import and export price. Deflation of government services is more difficult, but a cost of living index usually was prepared, and CPI is available in the post-colonial period. Important work in establishing reliable real wage series for Colonial Africa is currently being undertaken by Frankema and Wajenburg can be helpful in this regards.[11]

2) Output Method: $Y = \sum$ Sectoral Value Added

The question is how we can find data to estimate value added for the economy disaggregated in sectors. For agriculture, the export quantities are available, but food crop data are missing entirely for the colonial period and are unreliable for the post-colonial period. For manufacturing, the colonial data are very weak. The best hope is that one captures it as a reduction in certain imports. The current wisdom is that there was a fall in local manufacturing during the late pre-colonial and early colonial period, which was followed by a rise—with import substitution industrialisation—following the Second World War. This should to some degree be borne out of the import data. If estimates are included to cover the post-colonial period, more detailed data on physical production from manufacturing censuses may be included to capture this later growth. For the construction sector, physical data on cement and timber can be used. Similar to manufacturing, this sector will have to rely on import data in the early period, but may later rely on domestic production in the post-colonial period. The sectors of utilities, transport, and government services can be accounted for using physical indicators such as electricity generation, length of railways and roads, and numbers of pupils, schools, patients and hospitals.

[10] Szereszewski, *Economy of Ghana, 1891-1911,* pp. 137-138. The method used is to assume a constant relationship between cocoa output and capital formation, where output is a function of past labour used in planting, assuming a constant per acre yield and using prevailing daily wages from the Blue Books. It was assumed that it takes 170 labour days to bring an acre to the bearing age and that each acre bears 420 lbs of cocoa.
[11] See for example Frankema and Wajenburg,"African Real Wages".

What is suggested here represents a minimalistic or parsimonious method of measuring change through the colonial and post-colonial period. The method might strike the reader as crude and misleading as it does not include agricultural production other than indirectly capturing the export of agricultural commodities and the import of food commodities. The method suggested here has obvious limitations.

Indeed, what questions can it answer? Rather than answering the question 'did Ghana develop?', the suggested indicator measures a very particular *type* of development. It does not measure productivity or living standards per se but modernization, where modernization is defined as the growth of formal markets, the capacity of the state to tax and spend and the average Ghanaian's ability to export and import, and thus formally participate in domestic and world markets, with an emphasis on the latter. There are some advantages to this method. The indicator makes explicit the data limitations and may establish to what extent what later became the Ghanaian state—colonial or post-colonial—has overseen growth in formal markets and increases in development expenditure in the 20th century.

The Ghana Data Set: Quality and Coverage of Indicators

The underlying dataset represents a collection of various economic and social statistics covering the years 1883-2008. The most detailed data coverage extend from the years 1887-1938 and from 1946-1989. There is a significant gap in the data for most indicators for the years 1939-1945. The dataset was collected using a range of primary and secondary sources. Wherever possible, primary source documents were given preference. In cases where there was disagreement between earlier and later figures within the same set of source documents, the later values were given preference.

Population data, especially for the years previous to 1960, are perhaps the most contentious figures within the set. The practice of taking censuses in Ghana predates the colonial administration; individual chiefs in the region regularly conducted local population counts by having individuals drop a single, easily countable object (such as grain) into a receptacle. The first two major censuses of the region, conducted by the British Colonial Government in 1891 and 1901 covered the Colony alone (excluding the Ashanti and Northern Territories) and relied heavily upon this traditional method of enumeration.

Each of these early tallies is assumed by many to be underestimates of the actual population. Indeed, colonial administrators later amended the official result of the 1901, raising

it by 148,000 (nearly a 10% increase). The 1928 Gold Coast handbook makes explicit mention of the difficulties in census taking, noting that the 1911 and 1921 censuses should both be taken as underestimates. The document cites a lack of experienced administrative officers, particularly in rural regions, as the chief cause of this discrepancy. It also notes the lack of a central native authority and "wildness of the inhabitants" as contributing factors. Finally, the document mention that, especially in regard to censuses before 1921, many local inhabitants viewed the enumeration with suspicion, wary that it might be a preliminary to the introduction of a poll or hut tax, thus leading to a significant non-response bias in the results.

The population data are a crucial component of all income estimation when other data are scarce. To date to little research has focussed on validating the population growth rates. It has been suggested that some colonial population estimates may be as much as 50 percent too low, but how this affects the recorded population growth rate acceleration from the 1950s to the 1960s is not yet clear.[12]

Table 1: Estimates of Population, Gold Coast and Ghana 1871-2010 (000s)

	1870	1871*	1891	1901	1911	1913	1921	1931	1937	1948	1960	1970	1984	2000	2010
Census Data		408	1474	1486	1502		2110	2870	3747	4118	6727	8559	12296	18912	24223
Szerezewski**			1650	1800	2000										
Maddison	1579					2043					6958	8789	12833	19736	

* The colony only
** Szereszewski adjusts the actual counts upwards. The upward adjustments are made on three grounds: census reports own estimates of undercount, adjusting for missing territories and finally taking advice from Kuczynski.

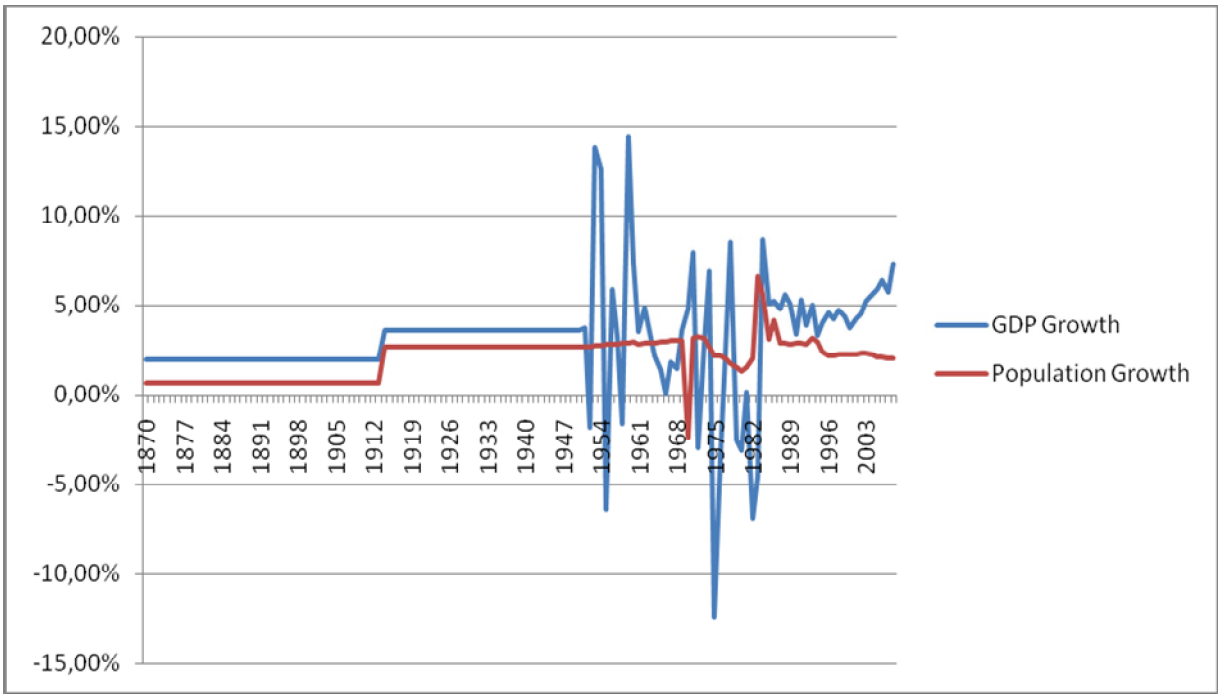
Adapting a Method: Lessons from Ghana

As mentioned, the growth and development of the Ghanaian economy is probably the best documented in Sub-Saharan Africa. Angus Maddison provides estimates of total population and Gross Domestic Product in 1870 and 1913, and annual estimates are available from 1950 onwards.[13] The projected annual growth rates for the population and the economy between 1870 and 1913 was 0.6 and 2 percent respectively. For the period between 1913 and 1950, the annual population growth was projected to grow at 3 percent, while the economy was growing at 4 percent. The projected growth rates and the recorded annual growth rates in population and the economy are plotted in the graph below. Note that the estimates from Maddison imply lower GDP per capita growth between 1913 and 1950, than between 1870 and 1914. In addition to

[12] Manning, "African Population"
[13] There is also a total GDP estimate for Ghana for the year 1820.

these projections, three base-year estimates of expenditures on GDP have been provided by Robert Szereszewski for the years 1891, 1901 and 1911. A projected growth rate based on these estimates (in constant 1911 prices) implies GDP growth of 2 percent between 1891 and 1901. This growth accelerates to 4 percent between 1901 and 1911. These data are thus in agreement regarding the pace of growth, but they are in conflict with regards to the timing of acceleration of that growth; in Maddison's version the acceleration to 4 percent occurs after 1913. Szereszewski provides disaggregated estimates as provided here in Table 2.

Figure 1: Annual GDP Growth in 'Ghana', 1870-2008 (%)



Source: Maddison

Table 2: Expenditure Shares in Total GDP of the Gold Coast, 1891-1901-1911, Constant 1911 prices (£ 000).

	1891	1901	1911
1.Export Production	872	740	3612
2.Private Consumption of Imported Goods	1595	2741	4310
3-4. Consumption of Government and Public Services	150	490	635

5.Gross Capital Formation	239	1567	3420
6. Traditional Consumption	9200	10000	11000
7. Imports of Goods and Non-Factor Services	-908	-2127	-3610
Total (A) , 1+2+3+4+5+6-7	11148	13411	19467
Total (B) , 1+2+3+4+5-7	1948	3411	8367
Annual GDP Growth (A)		1.9%	3.8%
GDP Growth (B)		5.8%	9.4%

Source: Szereszewski

The existence of a base year, for use as a starting point, makes the task of calibrating the growth estimator far easier. To as large an extent as possible, the same data sources and methods as Szereszewski were employed. The shares (1-7) were used as a starting point. Proxy annual growth indicators based on physical data were calculated (see Data Appendix). For exports, quantities of cocoa, gold, rubber and palm were used, while the proxy for imports relied on quantities of spirits, tobacco and textiles. For government services, growth based on the length of roads and numbers of schools and pupils were tabulated. With regards to capital formation, Szereszewski used machinery imports and a measure for capital formation in the production of cocoa as described above. Data was not sufficient, and thus a constant relationship between the weighted growth of other sectors of the economy was used. The traditional economy was assumed to grow with population growth. For imports, quantities of those imports not included in the measure of consumption were used. Based on these indicators, annual change in each 'sector' was calculated. These were calculated with the original share and a new annual total was tabulated for each year. These new totals were added up, and based on these, new rates of annual growth was calculated as shown in the figure below. The large fluctuations immediately following WW1 and WW2 are caused in part by missing data in the period 1914-18 and 1940-1945. If this growth rate is projected on Maddison's level estimate for 1891-1954 we can compare the different resulting GDP series. The new annual growth series has the same average: the Gold Coast economy growing at about 4 percent. Beyond showing a fair bit of fluctuation, the new series also imply

that larger gains were made in terms growth between the world wars. This growth is driven by an expansion in exports and government provision of infrastructure and social services such as health and education.

Figure 2: Estimated Annual GDP Growth, Gold Coast, 1870-2008 (%)

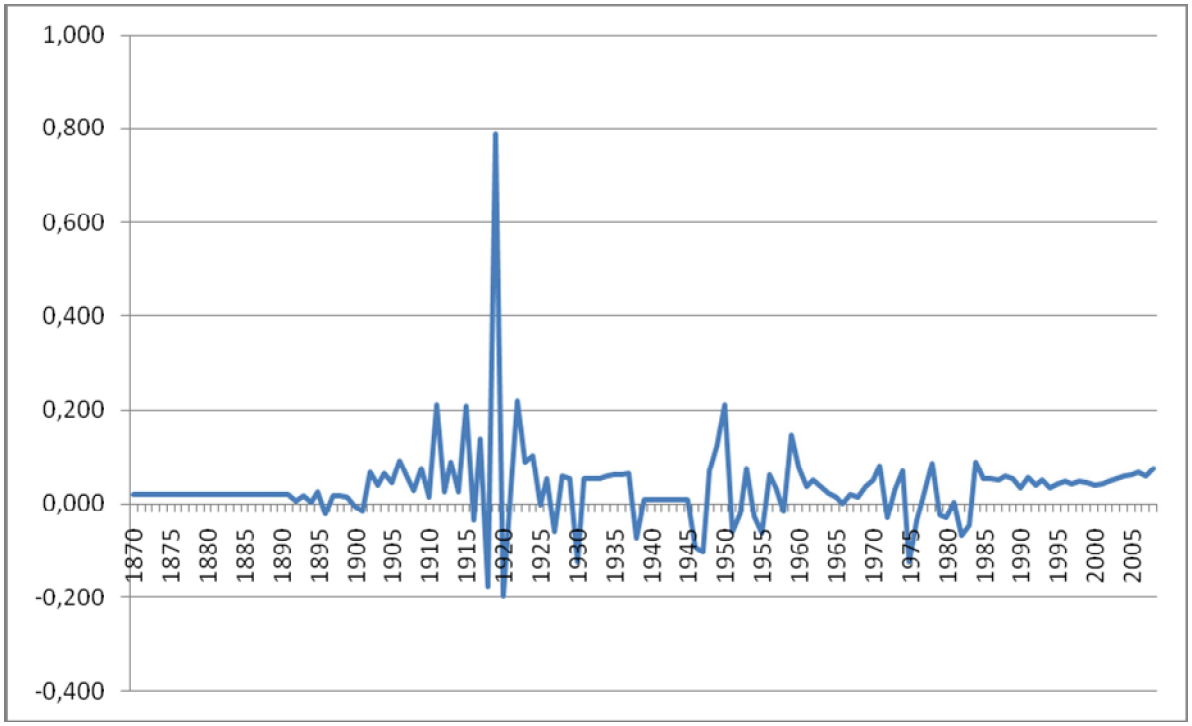
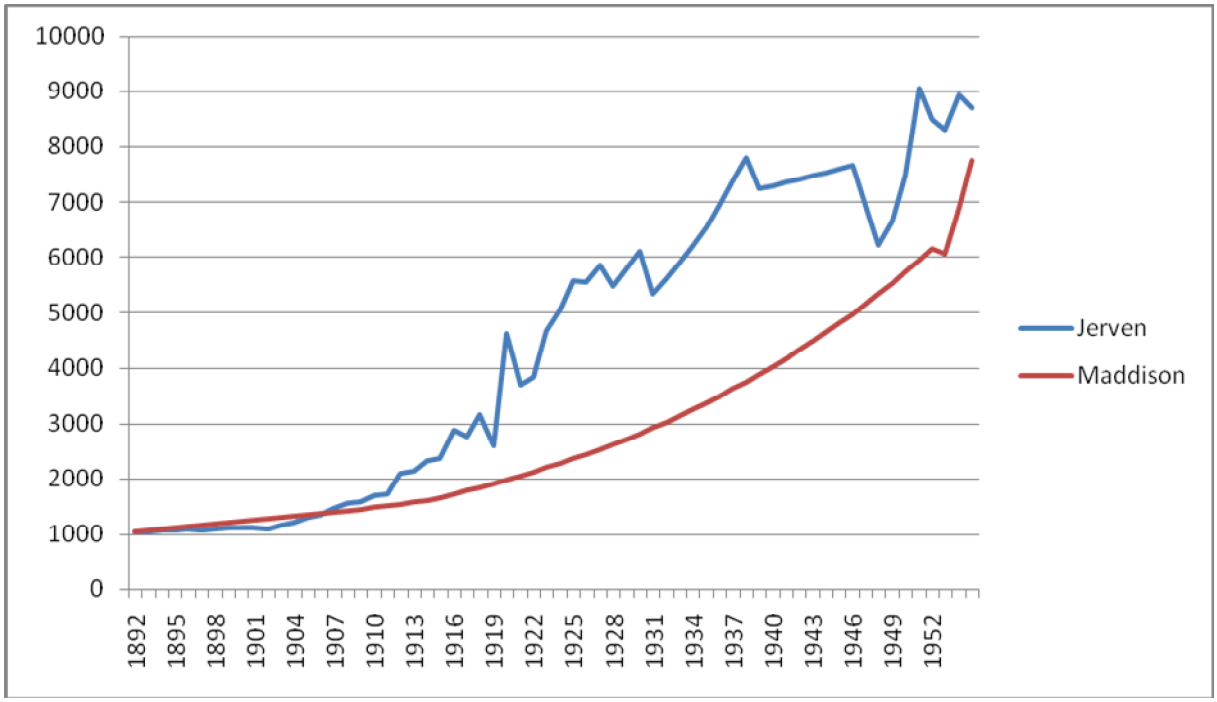


Figure 3: Estimated Annual GDP, Gold Coast, 1891-1954 (1990 International Geary-Khamis dollars, millions)



Sources Figure 3 and 4: See appendix.

Underlying this period of growth and expansion of the Ghanaian economy was the boom in cocoa production for export. In 1891 exports were close to nil, the first tonne was exported during 1893, while in 1954 total exports stood at 214 thousand tonnes. This remarkable expansion was made possible by a reallocation of the factors of production: labour, land and capital.[14] Expansion was not in cocoa alone: production of gold, palm products and other products did matter too, but cocoa was dominant, and accounted for 70 percent of export earnings in 1955. The expansion in primary production enabled the expansion of the colonial state. According to estimates by Frimpong-Ansah (who in lieu of an appropriate alternative deflator used railway wages) government expenditures and revenues multiplied 8 fold over the period, with a particularly marked expansion in the post 1945 period.[15] The growth in revenue were part built on taxation exports (duties fluctuating between 2 and 5 percent of export value), but tariffs on imports were more important (fluctuating between 20 and 30 percent of export value),[16] though without the increase in exports, the expansion in importation of goods would not been impossible. The proceeds did not all disappear in consumption and administration – as the growth estimators testify – there was an expansion in investment in human capital as well as in infrastructure, particularly transport networks.

Conclusions

There are many unresolved issues that make the data series suggested here questionable. In particular the assumption of the size of the 'traditional economy' and its growth is important. For future research on this topic it may advisable to calibrate the model further by experimenting how different assumptions for the size and growth of this sector affect the aggregate growth rate. A further fruitful avenue of research will be to compare colonial and post-colonial population counts to attempt establish probable upper and lower bounds of population growth across the 20th century, for Ghana as well as other African economies. This quantitative resolution of trajectories of growth in the colonial period must be supported by qualitative research on issues such as whether growth in the cash crops came with a significant opportunity cost or not. Furthermore, the simplistic method of relying on population as a proxy for growth can be improved upon by complementing these data with data on rainfall or other evidence of changes

[14] As documented and studied by Gareth Austin, *Labour, Land and Capital in Ghana.*
[15] Frimpong-Ansah, *The Vampire state*, pp. 55-72.
[16] Ibid, p.60.

in consumption such as height data.[17] There is further opportunity to enrich these kinds of aggregate studies with research in business history that can substantiate relationships of wages, profits and capital formation in both the colonial and post colonial period.

This exploratory paper is part of a larger research project aimed at creating measures of economic growth across the 20th century for a sample of African economies. Until recently, most economists' work on Africa has taken 1960 as a starting point, because data on national income and similar derivates are only available back to 1960. This neglect of earlier periods is increasingly seen as a limitation, because it does not allow an analysis of the historical roots of poverty and of persistent slow growth. The past ten years have seen a surge in quantitative research on African development that attempts to establish relationships between historical events and income levels and inequalities today. This work has been dubbed 'the New Economic History of Africa' by Hopkins.

For this research agenda to be fruitful and its theories substantiated, it is crucial to have consistent and reliable estimates of economic change. The sources for the creation of long-term data sets on African economies exist, but valuable colonial-era data remain underutilized. To date, the quantitative literature on Africa has made heroic leaps of faith, asserting causal relationships across time periods, without being able to account for different trajectories of economic development. Meanwhile, historical national accounts which stretch far back in time are currently being constructed for European countries and other regions.[18] If Africa is not to be marginalized in global economic studies and if we are to understand the relative importance of historical events for African development today, similar reconstructive research should be undertaken where it is feasible.

The advantage of providing the estimates must be weighed carefully against potential downsides. Dudley Seers commented on this issue in the phase of implementation of National Accounting in the 1950s: "In the hands of authorities, such international comparisons may yield correlations which throw light on the circumstances of economic progress, and they tell us something about relative inefficiencies and standards of living, but they are very widely abused. Do they not on the whole mislead more than they instruct, causing a net reduction in human knowledge?"[19] This concern should not be taken lightly. This paper has aimed to instruct data users to use caution when approaching the post-colonial GDP data on African economies, and has shown that it is possible to construct similar indicators for the colonial period. These data are

[17] As in the research in progress by Alexander Moradi, see Austin et al (2007).
[18] See for instance the Maddison Project: http://www.ggdc.net/maddison/maddison-project/
[19] Seers, "National Income Estimates", p. 160.

relying on questionable assumptions and are not grounded in data on the large and important non-observed economy.

The most important caveat that needs to taken into account is that in the base year of the series, 1891, the non-observed economy was guessed to be about 80 percent of the total economy.[20] In a scathing review of Szereszewski's book, Hill argued that "it ought to be considered academically quite improper to quote an unqualified figure showing that 'traditional consumption' in 1891 was 84 percent of domestic products, however many doubts are cast on the accuracy of such an estimate on other pages". Furthermore, in this series it has been assumed that this share of the economy grew at the rate of the population. The population data is in turn relying on colonial censuses where enumeration was unreliable and incomplete. The resulting aggregate growth rates are sensitive to these contestable assumptions and the resulting data series presented here should be treated as a series of best, yet incomplete, guesses of economic change.

The data series provide a guide for gauging the extent of formal sector growth and the aggregate growth depends crucially on the shares given to the unmeasured part of the Ghanaian or Gold Coast economy. This uncertainty regarding level estimates of the economy remains with us today. November 2010 Ghana Statistical Service announced that the base year for the national accounts on constant prices was changed from 1993 to 2006, and in conjunction with this rebasing new definitions and basic data were introduced. The rebasing resulted in an increase of the GDP level of about 60 percent.[21] The database for colonial economic change is weak and important components are missing. That is however, equally true of those data we see reported in research on post-colonial economic change.

[20] Hill, "Review" p. 136.
[21] Ghana Statistical Service, "Rebasing".

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Data Appendix

Sector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Annual**
Share	*0.081*	*0.136*	*0.014*	*0.001*	*0.023*	*0.839*	*0.093*	**Growth**
1892	-0.02	0.00	0.00	0.09	0.00	0.009	0.00	**0.01**
1893	0.00	0.07	0.00	0.09	0.04	0.009	0.00	**0.02**
1894	0.03	-0.04	0.00	0.19	-0.01	0.009	0.00	**0.00**
1895	0.17	0.01	0.00	0.11	0.07	0.009	0.00	**0.02**
1896	-0.21	-0.05	0.00	0.15	-0.10	0.009	0.00	**-0.02**
1897	0.10	0.00	0.00	0.00	0.04	0.009	0.00	**0.02**
1898	0.09	0.00	0.00	-0.13	0.03	0.009	0.00	**0.01**
1899	0.05	0.00	0.00	0.08	0.02	0.009	0.00	**0.01**
1900	-0.14	0.00	0.00	-0.02	-0.05	0.009	0.00	**-0.01**
1901	-0.29	0.00	0.00	0.00	-0.08	0.009	0.00	**-0.02**
1902	0.90	0.00	0.00	0.01	0.38	0.01	0.00	**0.07**
1903	0.28	0.00	0.00	0.05	0.13	0.01	0.00	**0.04**
1904	0.40	0.00	0.00	0.08	0.23	0.01	0.00	**0.06**
1905	0.20	0.00	0.00	0.03	0.12	0.01	0.00	**0.04**
1906	0.39	0.00	0.00	0.00	0.27	0.01	0.00	**0.09**
1907	0.13	0.11	0.00	0.00	0.12	0.01	-0.03	**0.05**
1908	0.11	0.02	0.00	0.03	0.08	0.01	0.20	**0.03**
1909	0.24	-0.12	0.00	0.11	0.16	0.01	-0.07	**0.07**
1910	0.03	0.13	0.03	0.05	0.05	0.01	0.24	**0.01**
1911	0.55	0.03	0.48	0.06	0.47	0.01	0.01	**0.21**
1912	0.03	0.22	0.00	-0.01	0.06	0.03	0.39	**0.02**
1913	0.22	-0.09	0.01	0.00	0.17	0.03	0.22	**0.09**
1914	0.02	-0.16	0.17	0.08	0.00	0.03	-0.12	**0.02**
1915	0.36	-0.10	-0.05	0.02	0.32	0.03	-0.15	**0.21**
1916	-0.09	0.13	0.14	0.08	-0.07	0.03	0.06	**-0.04**
1917	0.21	-0.25	0.14	0.10	0.18	0.03	-0.33	**0.14**
1918	-0.25	-0.45	0.14	0.07	-0.25	0.03	0.75	**-0.18**
1919	1.41	0.16	0.77	0.03	1.37	0.03	0.04	**0.79**
1920	-0.28	-0.04	0.26	0.04	-0.26	0.03	0.15	**-0.20**
1921	0.05	-0.04	0.00	0.08	0.05	0.03	0.15	**0.03**
1922	0.31	-0.04	0.47	0.00	0.31	0.03	0.15	**0.22**
1923	0.12	-0.04	0.08	-0.09	0.12	0.03	0.15	**0.09**
1924	0.12	0.00	0.12	0.02	0.12	0.03	0.03	**0.10**
1925	-0.02	0.00	0.21	0.13	-0.01	0.03	0.03	**0.00**
1926	0.06	-0.01	0.06	-0.19	0.06	0.03	0.03	**0.05**
1927	-0.09	0.04	0.08	0.02	-0.08	0.03	0.03	**-0.06**
1928	0.07	0.05	0.07	-0.01	0.07	0.03	0.03	**0.06**
1929	0.06	-0.10	0.03	0.18	0.06	0.03	0.03	**0.05**
1930	-0.19	-0.02	0.10	0.00	-0.16	0.03	0.03	**-0.13**
1931	0.07	-0.02	0.01	0.01	0.06	0.03	0.03	**0.05**
1932	0.07	-0.02	-0.03	0.00	0.06	0.03	0.03	**0.05**
1933	0.06	-0.02	0.00	0.00	0.06	0.03	0.03	**0.05**

1934	0.07	-0.02	0.01	-0.04	0.06	0.03	0.03	**0.06**
1935	0.07	0.29	0.01	0.00	0.07	0.03	0.03	**0.06**
1936	0.07	0.03	0.01	0.00	0.07	0.03	0.03	**0.06**
1937	0.08	0.00	0.01	-0.04	0.07	0.03	0.03	**0.06**
1938	-0.10	-0.33	0.01	0.06	-0.10	0.03	0.03	**-0.07**
1939	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1940	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1941	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1942	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1943	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1944	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1945	0.00	0.00	0.01	0.00	0.00	0.03	0.03	**0.01**
1946	-0.15	0.00	0.01	0.22	-0.14	0.03	0.03	**-0.09**
1947	-0.18	-0.12	0.06	0.22	-0.16	0.03	0.03	**-0.10**
1948	0.08	0.45	0.06	0.23	0.08	0.03	-0.01	**0.07**
1949	0.26	0.68	0.06	0.23	0.25	0.03	0.42	**0.12**
1950	0.08	-0.17	0.06	0.23	0.07	0.03	-0.97	**0.21**
1951	-0.13	0.13	0.06	0.23	-0.11	0.03	0.03	**-0.06**
1952	-0.07	-0.03	0.06	0.23	-0.05	0.03	0.09	**-0.02**
1953	0.11	0.21	0.06	0.23	0.11	0.03	0.00	**0.07**
1954	-0.08	0.06	0.06	0.23	-0.06	0.03	0.32	**-0.03**

Notes:

(1) Export Production: Cocoa, Gold, Rubber and Palm Products (change in quantities exported)
(2) Private Consumption of Imported Goods: Spirit, Textiles and Tobacco (change in quantities imported).
(3) Consumption of Government Services: Roads (change in length).
(4) Consumption of Public and Related Services: Pupils and Patients (change in enrolment).
(5) Gross Capital Formation: Derived from weighted shares of 'sectors' 1, 2, 3 and 4.
(6) Traditional Consumption: Population growth.
(7) Imports of Goods and non-factor Services: Sugar, Salt and Flour (change in quantities imported).

When data were missing, which they were in many cases, growth was assumed to be constant between last and first observation.

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