Future challenges in measuring Africa's past: Lessons from estimating GDP for the Gold Coast, 1891-1954

Morten Jerven
School for International Studies,
Simon Fraser University
Vancouver
mjerven@sfu.ca

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Abstract: There has been a recent surge in research on long term African development. For this research agenda to be fruitful and its theories, it is crucial to have consistent estimates of economic change. This paper contributes with a new GDP time series for Ghana, 1891-1954. The series implies a sustained period of economic expansion from the late 19th century into the 1960s. This suggests a revision of some prevalent truths about the history of economic growth in Sub-Saharan Africa. The paper discusses the potential of creating historical national accounts for other African economies across the colonial and post-colonial period.

"*Avanti*, Economic historians!" sounded the call from Patrick Manning to African economic historians in 1987.[2] But instead of surging ahead, the discipline arguably went into relative decline.[3] However, during the past ten years there has been a surge in quantitative research on African development, and the impetus has arguably come from growth economists. Until recently, most growth economists focusing on Africa took 1960 as their starting point, primarily because data on national income and similar derivatives only are available back to this point. This has changed fundamentally recently; in particular, attempts have been made to establish relationships between

[2] Manning, 'Prospects for African Economic History', p. 58.
[3] Hopkins, 'New African Economic History'.

historical events and current income levels and inequalities.[4] 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 behind persistent slow growth in Africa. For this research agenda to be fruitful and 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's major contribution is to present annual growth estimates for the Gold Coast

colony, roughly corresponding to the territory currently named Ghana, between 1891 and 1954. This

upgrade in our time series of economic growth allows an investigation of patterns and immediate

causes of economic change across the whole 20th Century. The new time series implies a long and

sustained period of economic growth since the late 19th Century, lasting until the 1960s, only

interrupted by the World Wars. This finding tends to weaken the view that Ghana, and perhaps also

other similar African economies, are suffering from a chronic failure of growth. The finding also

tends to strengthen the view that the failure of economic growth of Sub-Saharan African economies

in the 1970s and 1980s was conjunctural rather than structural.

This article proceeds as follows: first the existing quantified knowledge regarding GDP

growth in colonial Ghana is presented. Ghana, or the Gold Coast as the country was called under

British Colonial Rule, 1821-1957,[5] is a particularly useful starting point. Arguably the Ghanaian

economy is one of the most intensively studied in Sub-Saharan Africa,[6] and this includes attempts of

creating historical national accounts.[7]   For Ghana there are already existing single-year estimates

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[4] For recent reviews see: Jerven, 'African Growth Recurring'; Austin, 'Compression of History'; Hopkins, 'New African Economic History'; and Fenske 'The causal history of Africa'.
[5] Just before independence in 1956 British Togoland, which had been under British trusteeship since 1919 was absorbed into the Gold Coast.
[6] In close competition with Kenya and Nigeria.
[7] Only South Africa has been subject of more historical national accounting research.

prepared by Angus Maddison and Robert Szereszewski. [8] These estimates are discussed and compared, and then aspects of Szereszewski's approach are adopted to present a new growth time series for the Gold Coast, between 1891 and 1954. The data and methods underlying the new data series are carefully discussed.

The paper concludes by discussing 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 on to consider different theoretical approaches to the estimation of national accounts and then compares the data needs of these models with historical data availability across the 20th century.

This investigation is the basis for giving 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 creation of national accounts data for Sub-Saharan economies comes down to an intriguing trade off. On the one hand, the data basis is severely limited, and any aggregation of data creates an illusion of being able to pinpoint economic change. On the other hand, unless data on economic growth are made available from earlier periods (e.g. 1900 onwards), the 'stories' of African economic growth will not take into account the long boom of export production and centralization originating in such periods.

I. Old and New Estimates of Economic Growth for the Gold Coast, 1891-1954

As mentioned, the growth and development of the Ghanaian economy is probably the best documented and studied in Sub-Saharan Africa. Angus Maddison provides estimates of total

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[8] Szereszewski, *Economy of Ghana, 1891-1911* and Maddison, *Historical Statistics of the World Economy.*

population and Gross Domestic Product in 1870 and 1913, and annual estimates are available from

1950 onwards.[9] These are the only pre-1950 single year estimates provided in the Maddison dataset

for Sub-Saharan African economies.[10] If we use these single year estimates to projected annual

growth rates we can paint the implied development trajectories for the population and the economy

by the Maddision estimates, from 1870 to 2008. Both projected and recorded annual growth rates in

the population and economy are plotted in the graph below. The focus in this article is to improve

upon what we know of economic change before 1950.

Figure 1: Annual GDP and Population Growth in 'Ghana', 1870-2008 (%)
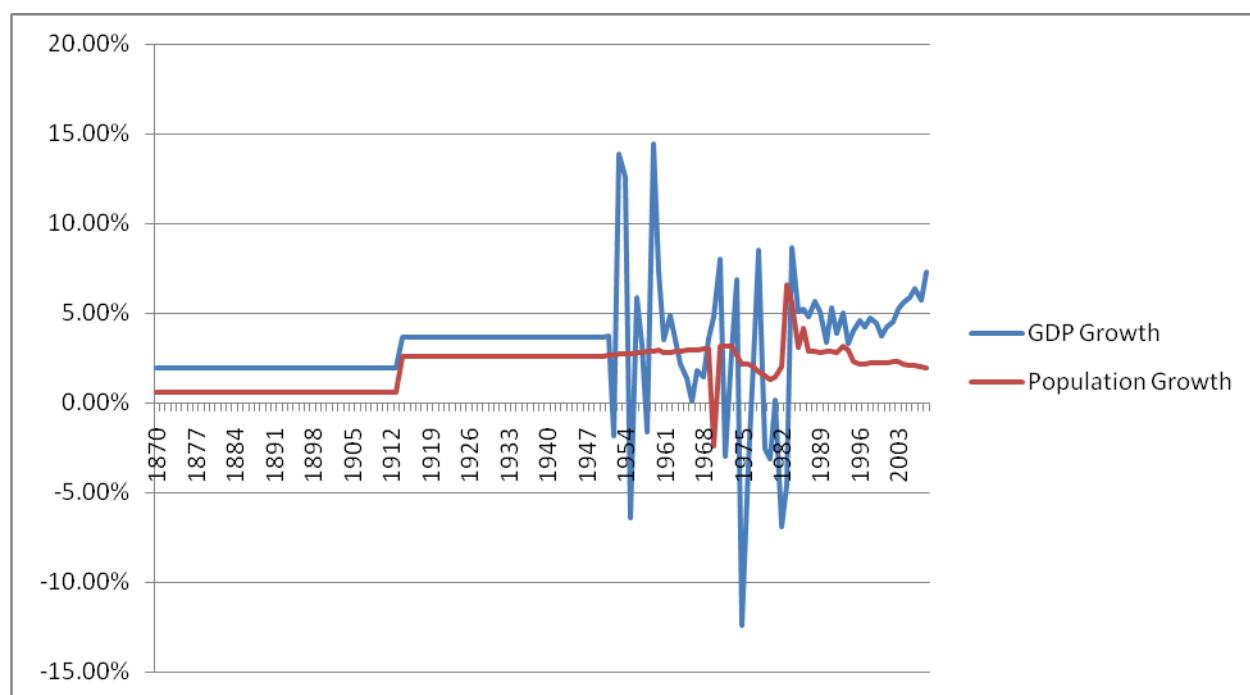
Source: Maddison, *Historical Statistics of the World Economy*

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[9] There is also a total GDP estimate for Ghana for the year 1820.
[10] Using the normal definition of Sub-Saharan Africa: excluding those countries on the African continent that have a Mediterranean coast (i.e. North Africa) and also South Africa.

Between 1870 and 1913 in the Maddison data-set the projected growth rate for total population and total GDP were 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. It is interesting to note that the estimates from Maddison imply lower GDP per capita growth between 1913 and 1950, than between 1870 and 1914. The economy was expanding rapidly, but this was almost outdone by a very rapid population growth during the late colonial period.

In addition to these projections, three base-year estimates of expenditures on GDP have been provided by Robert Szereszewski for the years 1891, 1901 and 1911.[11] A projected growth rate based on these estimates (in constant 1911 prices) implies GDP growth of 2 percent between 1891 and 1901. Economic growth then accelerated to 4 percent between 1901 and 1911. The data from Szereszewski and Maddision are thus in agreement regarding the pace of growth some of the time, but not all of the time. There are conflict observations regarding the timing of the acceleration of that growth; in Maddison's version the acceleration to 4 percent only occurs after 1913, whereas according to Szereszewski estimates the rapid growth starts in 1911. The other main difference is that Szereszewski provides disaggregated estimates. His constant price estimates reproduced in Table 2. It is worthwhile noting that there is large share of the economy for which there is no information, which he called 'traditional consumption'. This share of the economy is assumed to grow proportionally with population growth, and accounts for 83, 75 and 57 percent of the total economy. Thus, this share rapidly diminished, while the recorded economy grew very rapidly during this period.

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[11] Szereszewski, *Economy of Ghana, 1891-1911*

Table 1: 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, *Economy of Ghana, 1891-1911*.

There are still some considerable gaps in information regarding economic growth in colonial Ghana. Between Szereszewski and Maddison and their some single year estimates we have some useful starting points. The ones from Szereszewski are well documented, while we know close to nothing about Maddison's deliberations when he readjusted Szereszewski's estimates to fit his

benchmark years.[12] We know how Szereszewski went about aggregating his level estimates, but know much less about how growth would look like between these benchmark years. Finally, the big gap in information is how Maddison decided upon how the history of economic growth between 1913 and 1950 should look like. Thus, we currently know how Ghana, or the Gold Coast would have ranked in terms of income levels in these years, but before growth rates between these dates are substantiated, we are not sure if these observations cohere, and whether the methods used in reaching them would result in commensurable estimates.

In order to fill this gap of information it would therefore be useful to be able to estimate economic growth for this period. The existence of a base year, which can be used as a starting point, makes the task of calibrating the growth estimator far easier. In order to make the process as transparent as possible each step of the estimation process is carefully described before the new time series is presented in four straightforward steps towards a new time series of economic growth for Ghana 1891-1954.

Step 1. The same data sources and methods as Szereszewski were employed to the greatest extent possible. First, the sectoral shares (1-7) for the 1891 estimates were used as a starting point. The details of these estimates are available in Table 1. Each sector was given a value as a share of the total, as corresponding to the first row in Table 2. For example, this means that in 1891, sector one; export production, accounted for 8.1 percent of the total economy in the base year.

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[12] Maddison briefly discusses Szereszewski's estimates in *Contours*, p. 231.

Table 2: Annual Growth Estimates, Gold Coast, 1892-1954.

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**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
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.

Step 2. We need annual economic change in totals, we also want the data to be expressed in constant prices. For some years we do not have total values, and we do not have enough price data to deflate all values. A simple solution is to calculate proxy annual growth indicators based on physical data. For exports, quantities of cocoa, gold, rubber and palm were used, while the proxy for imports was based on quantities of spirits, tobacco and textiles. For government services, growth in 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 (tree planting and land-clearing) in the production of cocoa. It would have been desirable to imitate this method, but unfortunately, the annual data availability was not sufficient for this task, and thus a constant relationship between the weighted growth of other sectors of the economy was used – thus capital formation is derived as a residual, determined by the growth of the rest of the economy and not an independent variable in this estimation. 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. Again, the same data sources and methods used by Szereszewski were employed to the greatest extent possible. The resulting annual economic change in each sector is found in Table 2, by reading the columns vertically.

Step 3. Based on the indicators described above, the annual change in each sector was calculated. These were multiplied with the original share in the 1891 base year provided by Szereszewski. Subsequently a new annual total was tabulated for each year. These new totals were added up and new rates of annual growth were calculated from these totals. The results are in the final column in Table 2 and the resulting growth rates are displayed in Figure 2 below. The series show large

fluctuations immediately following WW1 and WW2. These are in part caused in part by missing data in the period 1914-18 and 1940-1945.

Figure 2: Estimated Annual GDP Growth, Gold Coast, 1870-2008 (%)
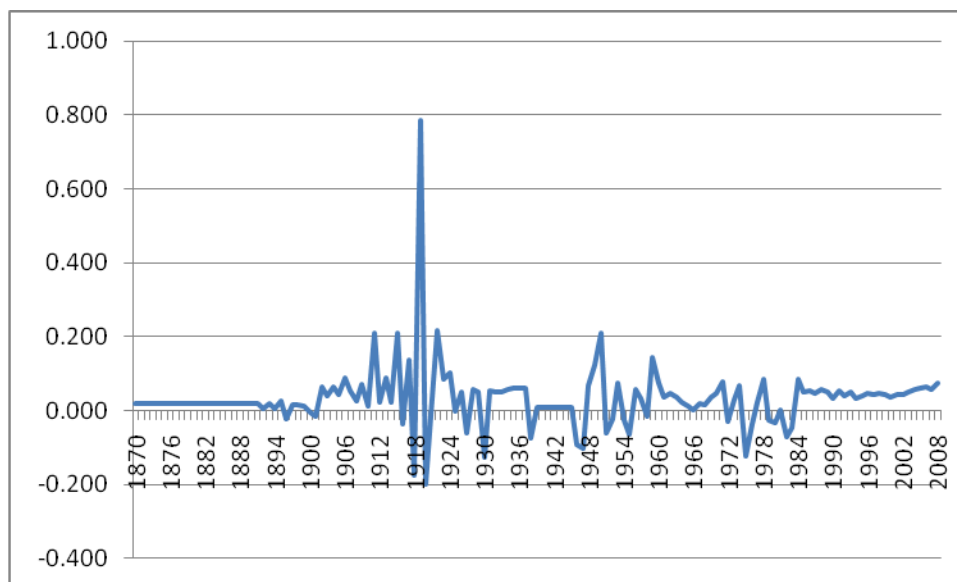
Source: Own estimates, see appendix for details.

Step 4. The resulting growth rate is then projected onto Maddison's implied level USD estimate for 1890, and thus a new GDP series for 1891-1954 is created, expressed in Maddison's 1990 International Geary-Khamis dollars. In Figure 3 below the different resulting GDP series are compared.

Figure 3: Estimated Annual GDP, Gold Coast, 1891-1954 (1990 International Geary-Khamis dollars, millions)
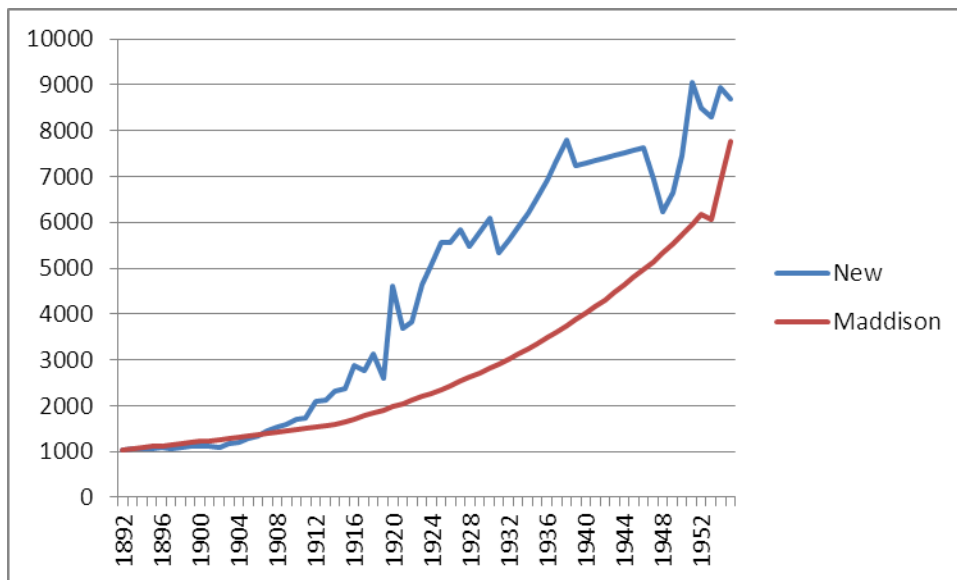
Source: Maddison, *Historical Statistics of the World Economy* and own estimates, see appendix for details.

The new annual growth series has about the same average as the projected growth rate based on Maddison's level estimates which were presented in Figure 1. The Gold Coast economy grows at about 4 percent on average between 1890 and 1954. The new series implies a slightly higher average growth, and ends up with a total GDP which is 12 percent higher in 1954. Beyond the average and final results there is a fair bit of fluctuation. The new series also implies that larger gains were made in terms growth between the world wars. The factors that drive growth in the estimation are mainly an expansion in exports and increases in government provision of infrastructure and social services such as health and education. The growth in the former is picked up by data on increased exported quantities of goods, and the latter by increased mileage of roads and enrolment of students and patients in schools and hospitals.

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.[13] 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.[14] The growth in revenue were, in 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).[15] However, without the increase in exports, the expansion in importation of goods would not have 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.

What are the broader implications of these time series? It brings support to the argument put forward by Gareth Austin, the leading economic historian of Ghana, who argued that the manifest growth in production, exports, imports and increases in living standards in Ghana, and other non-settler economies in Sub-Saharan Africa during this period must be contradicting the claims put forward in the work of Acemoglu, Johnson and Robinson[16] and that of Nunn[17] and others who have suggested different variations of the proposition that these economies were stuck in an slow-

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[13] As documented and studied by Gareth Austin, *Labour, Land and Capital in Ghana.*
[14] Frimpong-Ansah, *The Vampire state*, pp. 55-72.
[15] Ibid, p.60.
[16] Acemoglu, Johnson and Robinson, 'Colonial Origins' and Acemoglu, Johnson and Robinson, 'Reversal of Fortune'.
[17] Nunn, 'Africa's slave trades' and 'Historical legacies'.

growth equilibrium during this period due to 'institutions'.[18] Certainly, as Jerven also has argued, this growth period was not indefinitely sustained in Ghana (but it was sustained until the 1980s in neighbouring Ivory Coast), but this should nevertheless indicate that the prevailing 'institutions' in this period, be they rules of taxations, property rights or general rule of law, were not incompatible with economic growth.[19] Other work on other areas in the less developed regions of the world may confirm or reject whether Ghana was an exception or typical case of this period. But the finding also coheres with scholars who have studied periods of convergence and divergence in the world economy, such as Dowrick and Bradford DeLong,[20] who argued that during the interwar period parts of coastal Africa, and chief among them Ghana, joined what they call 'the convergence club' and were in this period, 1914-1950, closing the gap to the industrial core. Alexander Gerschenkron suggests that, if estimates from quantitative data 'are at variance with what we should expect from general historical knowledge, they should be rejected'. Thus, while this GDP series was prepared with parsimonious data and assumptions – it seems to cohere with other findings. How serious the limitations of this data series are is the subject of the next section.

II. Caveats, Uncertainty and Data Deficiencies

To some surprise and considerable relief, the new annual growth series has about the same average as the projected growth rate as the one found based on Maddison's existing level estimates, and by projecting the growth rate on Maddison's dollar estimates from 1890, we end up with approximately the same level estimate in 1954. This is reliving because if the growth estimator was not correctly calibrated, one could end up with a growth rate implying that Ghana had turned into a

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[18] Austin, 'Compression of History'
[19] : Jerven, 'African Growth Recurring'
[20] Quoted in Platt, *Mickey Mouse numbers*, p. 1

Switzerland by 1950 – and this would go against other historical evidence, and what we know about economic conditions in Ghana at independence. The surprise derives from the fact there is such a large agreement. This finding allows us to generalize regarding the gaps of information that were discussed earlier in this section. It implies that the method used to estimate growth for colonial economies has the approximate formula:

(1) $GDP_{Independence} = (\text{Traditional economy}/GDP_{year\,0} * (\text{Population growth}^{(Independence - year\,0)} +$
    $(\text{Recorded economy}/GDP_{year\,0} * \text{Growth in recorded economy})$

Where;

(2) $\text{Growth in recorded economy} = (\text{Volume of Exports}_{Independence})/(\text{Volume of exports}_{year\,0})$

In this specific exercise, there were other factors – such as observed physical changes in publicly provided infrastructure, health and education services. The basic intuition following from expressing it in a reduced such as above, is that the basic determinant of growth is external trade, population growth and the assumed shares of traditional versus recorded share of economy in the end and/or start of the time series.

The most important caveat that needs to be taken into account then 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.[21] 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". I am guilty. My defence is that any GDP number quoted from any Sub-

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[21] Hill, 'Review' p. 136.

Saharan African economy involves such an assumption – though, as discussed in the second half of this section, it is usually not made explicit in the post-colonial estimates.

Another important point is that in this series it has been assumed growth this share of the economy -'traditional consumption'- grew at the rate of the population. The population data is in turn relying on colonial censuses where enumeration was unreliable and incomplete.

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.[22]

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 mentions that, especially in regard to censuses before 1921, many local inhabitants viewed the enumeration with suspicion, wary that it

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[22] Huq, *Economy of Ghana,* p. 37.

might be a preliminary to the introduction of a poll or hut tax, thus leading to a significant non-response bias in the results.[23]

Table 3: 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.
Source: Maddison, *Historical Statistics of the World Economy*; Szereszewski, *Economy of Ghana, 1891-1911*, Gold Coast Blue Books.

The population data –presented in table 3 - are a crucial component of the growth estimates here, as well as all kinds of estimation of living standards when other data are scarce. To date to little research has focussed on validating the population growth rates for Sub-Saharan Africa. It has been suggested that population estimates for the African continent in 1850 may be as much as 50 percent too low, but exactly how this affects the recorded population growth rate acceleration from the 1950s to the 1960s is not yet clear.[24]

As the term implies, there is better coverage of the recorded economy. The underlying dataset collected for the estimation of national accounts represents a collection of various economic and social statistics covering the years 1883-2008. The years with best overall data coverage extend from the years 1887-1938 and from 1946-1989. There remains 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. In cases where there was

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[23] *Gold Coast Handbook*, pp. 46-55.
[24] Manning, 'African Population'

disagreement between earlier and later figures within the same set of source documents, the later observation were given preference, assuming that officials were correct when they revised earlier, preliminary figures.

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 observed economy, which in the colonial period is confined to exports and imports and government revenue and expenditure, grows at a very rapid pace in this period. The larger one assumes the traditional economy to be in the base year, the slower the aggregate growth will be. If new estimates find cause to reconsider the pace population growth – the growth in the traditional sector will similarly need to be re-estimated. This will of course not affect per capita estimates. Note that while consumption is thus assumed to grow at a slow pace, the observed parts of consumption, through imports, are in this estimator causing growth to accelerate. However, if the non-observed economy growing (faster than population growth) in response to growth in the observed economy, then the growth series presented here is an underestimate. If the opposite was true, namely that parts of the non-observed economy were in in decline (not only relative, but in absolute terms – falling per capita) the series presented here is an overestimate of growth.

The data series presented here relies on some assumptions that can be questioned. There is a large and important non-observed economy for which our analysis is not grounded in verifiable quantitative data on the large and important non-observed economy. The aggregate growth depends crucially on the shares given to the unmeasured part of the Ghanaian or Gold Coast economy. Still, the data series presented here provide a guide for gauging the extent of formal sector growth and one should not expect more from a GDP series – in particular not those prepared for less developed regions.

The post-colonial African growth data has been investigated by by Derek Blades in the 1980s, and more recently in 2010, a study based on Botswana, Kenya, Tanzania and Zambia was published.[25] The study concluded that growth rates varied significantly from different sources of growth statistics. These inconsistencies originate in a lack of transparency regarding which national account files were used and how the series (with different base years) were harmonized.[26] More detailed country-level studies showed that GDP growth and level data both are a product of aggregated data components that vary significantly in quality.[27] Data on agricultural production, the informal sector and small-scale operators are not available on an annual basis and are sometimes missing entirely.[28] Thus, the growth data presented here are not remarkable worse than much of the growth evidence that is published with official approval by national and or international agencies.

This investigation has been focused on economic growth – not on comparing levels. Recently, work evaluating post-colonial GDP level data has been undertaken; Jerven assessed the income level estimates on African economies for the year 2000 and found that these estimates are malleable.[29] After subjecting the datasets according 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 current day income levels of most African economies are not meaningfully different from one another. The few exceptions include 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). Thus explaining differences in per capita income today with reference to particular historical experiences in the past is not likely to be a fruitful exercise.

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[25] Blades, 'Levels and Growth of Output in Developing Countries'.
[26] Jerven, 'Random Growth'.
[27] Jerven, 'Growth, Stagnation or Retrogression?'; 'Revisiting Kenyan Economic Growth'; 'The official Evidence, Botswana'.
[28] Jerven, 'Measuring African Progress'.
[29] Jerven, 'Relativity of African Poverty'.

This uncertainty regarding level estimates of the economy remains with us today. In November 2010, the 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.[30]

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 at hand—this leaves the colonial data in a relatively favourable light. While there are 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. Thefinal of this paper compares colonial and post-colonial data availability and analyses discussing the perils and potentials of creating similar historical national accounts for other African economies across the colonial and post-colonial period.

III.   **Theoretical Needs and Empirical Realities: Prospects for Historical 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 the 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

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[30] Ghana Statistical Service, 'Rebasing'.

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 verifying the accuracy of the estimates. Given the lack of quality data and sufficient statistical capacity needed to perform all three 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.

Thus in principle, for Sub-Saharan African economies it is feasible to create national accounts using either the expenditure method or the production method. The following discussion is based on attempts to build up a database for Ghana to complete such an estimate, further detail is provided in the data appendix.

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

As mentioned, there is insufficient data available for an adequate estimation of 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 a household budget survey, or basic guesses can be made through the use of proxies such as per capita calorific consumption as suggested by the FAO. This can provide a good starting point for a level estimate, a frequently used proxy for growth in private consumption is population growth. For investment (I), data availability is an issue once again. 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.[31] For government expenditure (G), ample data are available; 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. However, for

some countries volumes are not regularly reported in the 1970s and 1980s and in the early colonial

records data on all commodities are not available all of the time, 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 (CPI) is usually prepared, and made

available in the post-colonial period. Important work in establishing a reliable real wage series for

Colonial Africa that is currently being undertaken by Frankema and Wajenburg may be helpful in

this regard.[32]

(4)   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

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[31] 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, a constant per acre yield is assumed, and the prevailing daily wages from the Blue Books are used. 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.
[32] See for example Frankema and Wajenburg,

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.

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. In this paper, we took advantage of an already existing base year, and thus adopted a hybrid version of the two discussed here. The base year was aggregated using the expenditure method, but we used physical production data to proxy growth in all sectors. 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.

Conclusion

Data users are instructed to use caution when approaching both post-colonial and colonial GDP data on African economies. The paper shows that it is possible to construct indicators of formal economic change for the colonial period and that this improves our knowledge of economic growth in the late 19th and 20th century on the African continent. 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.

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 be 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 to 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 – often used as an indication of agricultural yields - or other evidence

of changes in consumption such as height data.[33] 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 paper suggests a path towards a research project aiming 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 derivatives 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 persistently 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.[34] These new historical national account estimates for Asia and Europe relies on better data availability – such as land taxes, urban population growth estimates and yield estimates.[35]

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[33] As in the research in progress by Alexander Moradi, see Austin et al (2007).

[34] See for instance the Maddison Project: http://www.ggdc.net/maddison/maddison-project/

[35] For a useful discussion of methods see Broadberry and Gupta, "India and the Great Divergence", for a discussion of whether these methods results in comparable level estimates in less developed regions, see, Jerven, "Unlevel Playing Field".

This paper has had to rely on less data – which in turn has determined the choice of the method in the paper. Nevertheless, the indicator coheres well with existing level estimates, thus showing some promise of replication to other countries. The results show that the colonial economy Gold Coast, contemporary Ghana expanded at a rapid pace from the late 19th century, and so that when the economy eventually stagnated in the 1960s it was one the eve of more than a half century of expansion. This expansion was already testament in the observed export quantities, but to reaffirm this fact with GDP estimates makes it possible to include Ghana in global narratives of divergence and convergence in the 19th and 20th century.

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. *Avanti*, Economic historians!

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Appendix: Ghana Dataset

The underlying Ghana dataset represents a collection of various economic and social statistics covering the years 1883-2008. This only used the data from 1890 to 1954, but the full documentation is recorded here for scholars that are attempting similar efforts for other countries across the 20th century.

Data coverage is best in these two periods 1887-1938 and from 1946-1989. There remains a significant gap in the data for most indicators for the years 1939-1945 and after 1989.

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. In cases where individual figures appeared to suffer from obvious typographical error (such as a missing decimal point), a comment regarding the assumption of error and the original value as printed was attached.

Government Revenue and Government Expenditure

> Total of government revenues are available and for many years these are disaggregated into sources of government revenue. Data covering the years 1887-1938 are entirely from the colonial *Blue Books*, while data for 1950-1986 are available in Douglas Rimmer's *Staying Poor* and official statistics printed in *Economic Survey*.

Exports, Volumes & Values

> Up to 1954 both volume and values are available in the Blue Books. Post 1954 these data are reported in the *Economic Surveys*, in the 1980s this data source is not available and one must rely on secondary sources.

> In some instances, during periods of overlap, various documents occasionally agreed on values for some years while disagreeing on others. This was especially the case with different issues of the *Economic Survey*. In these cases the latest reported number has been used, assuming that changes reflect revisions of data.

Imports, Volumes & Values

> Very few import volumes are available prior to 1906. Date after that period and leading up until 1929 and in 1946-1954 are available in the *Blue Books*. After 1954 we have not found volume data. A further problem, and this was sometimes found regarding export data, value data in the *Economic Survey* were disaggregated into six separate, broad categories, rather than per commodity. Thus, for the period 1960-1982, figures from Huq's *Economy of Ghana* have been used to supplement the coverage.

Other Physical Indicators

> Especially in the early years (covered by the *Blue Books*), production data indicators were among the least consistent. For example, road length, was originally provided as a single entry, but later this is divided into government maintained roads and those maintained by local chiefs. No indication was given as to whether the earlier values represented the addition of these two categories or simply government maintained alone.

Production quantities have been supplemented by Huq (intermittently from 1960-1980), by World Bank data (1971-2007), Austin (intermittently from 1921-1959), and by Frimpong-Ansah's *The Vampire State* (1921-1930).

Education Indicators

Education indicators had similar issues. Recorded in the set are the most consistent figures across time, with the years 1888-1938 being covered by the Blue Books and the years 1971-2008 being taken from the World Bank.

Health Indicators

Health Indicators following the year 1938 (covered by the Blue Books until that date) were also absent from the remaining sources. Some attempt to cover this was made by the inclusion of World Bank data on number of hospital beds per 1000 inhabitants. This series intermittently covers the years 1960-2005).

Crop Statistics

Although crop production data were largely missing from the Blue Book sources, detailed accounts from the years 1950-1991 were found in the *Economic Survey*, *The Vampire State*, and in Sarpong's *Growth in Ghana*.

Mineral Extraction

Mineral extraction for Blue Book years covered gold mining alone; however, the years 1921-1930 have been supplemented by data reported in *The Vampire State*. The years 1960-1984 have much more detail and are covered by the *Economic Surveys*.

Cost of Living Indices

Cost of living indices were taken almost entirely from secondary sources. ILO/LABORSTA, *The Vampire State, The Economy of Ghana*, and Austin's *Politics in Ghana* were all used to cover the years 1918-2008. This has been further supplemented by the Price Indices taken from the FAO for the years 1967-1991.

Wages

Consistent data on wages are available in the Blue Books, but unfortunately they cover only a short period (1931-1938). *Economic Survey* provide the most detailed data (1951-1979) broken down by sector, while ILO/LABORSTA extend this coverage forward (1975-1991). *The Vampire State, Economy of Ghana,* and *Staying Poor* each had individual series which were used to supplement the dataset.

Employment

Employment, except in the case of miners, came almost entirely from secondary sources. The exception to this was the Economic Surveys, which covered employment data for a brief period from 1961-1969. The secondary sources used were *Economy of Ghana* and *Vampire State*.

Population

Population before 1950 comes entirely from Blue Book sources and records official census years only. After 1950 the *Economic Survey* has census figures as well as annual population estimates.

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