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

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Abstract: Until recently most of 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 be misleading.

“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 an analysis of the historical roots of poverty or 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. The sources for the creation of long-term data sets on African economies exist, but these valuable colonial data remain underutilized.

¹ Manning, “Prospects for African Economic History.”
² Hopkins, “New African Economic History”.
This paper discusses the prospects and problems in 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 the historical data availability across the 20th century.

In order to give an empirical context the paper discusses the case of Ghana. It is a particularly useful starting point because the Ghanaian Economy is arguably the most intensively studied in Sub-Saharan Africa (aside from South Africa). The already existing single year estimates from Angus Maddison and Robert Szereszewski are presented. 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 a database for economic growth 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 trade off. On one side the data basis is severely limited, and 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 e.g. 1900 onwards the ‘stories’ of African economic growth will not take the long boom of export production and centralization of African states taking place since the beginning of the 1900s into account.

Post-Colonial and Colonial Economic Data Revisited

Recently some work on evaluating the post-colonial data has been undertaken. Jerven evaluated the income levels estimates on African economies for the year 2000, and found that these estimate are malleable. After subjecting the datasets to tests of accuracy, reliability and volatility, it is 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

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4 Jerven, “Relativity of African Poverty”
5 Jerven, “Random Growth”
and Equatorial Guinea) and the economies directly linked with South Africa (in addition to South Africa; Namibia, Botswana, Lesotho and Swaziland).

Save a study by Derek Blades in the 1980s the African growth data has not been subject to critical empirical research. In 2010 a study based on Botswana, Kenya, Tanzania and Zambia was published. It was concluded that the growth rates varied significantly from source to source, and that these problems originated in lack of transparency regarding which national account files were used, and how the series (with different base years) were harmonized. 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. Data on agricultural production, informal sector and small scale operators are not available on an annual basis, and sometimes missing entirely.

In conclusion, the data basis for economic analysis of the post-colonial is overrated, and the caveats 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. There are serious gaps of knowledge and shortages in terms of coverage, yet the data for the colonial period are suffering from the same limitations as those of the post-colonial period.


There are three 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 as the main component would be profits earned by farmers. This information is not available on current or historical African economies. The Expenditure approach is at face value more feasible. Its components are GDP equals to private consumption plus investment + government consumption plus the balance of exports and imports. The missing entity is personal consumption and the part of capital formation that accrues to the rural or non-modern economy. The final method is 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 National Income Accounting in post-colonial Africa. In the system of national accounts it is prescribed that all three methods should be estimated independently and that

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6 Jerven, “Growth, Stagnation or Retrogression?”
7 Jerven, “Measuring African Progress”.
they thus are a way of checking the accuracy of the estimates. In practice this is not applied. Post-colonial accounts have typically been estimated using the production method, and expenditure on private consumption is derived as a residual.

Empirically it is feasible to create national accounts using either the expenditure method or the production method.

Expenditure method: \[ Y = C + I + G + (X - M) \]

As mentioned there is a lack of data to estimate private consumption (C). The method used in the post-colonial data is to either assume a per capita value or take starting point in a form of household budget survey and then assume that population growth equals growth in private consumption. For Investment (I), there is limited data. For the colonial data the best possible method is to assume that Capital Formation follows trends in certain capital goods imports. 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, which can be appropriated for other products. For government expenditure (G) there are ample data, and the same is true for imports (M) and exports (X) as well.

The estimates will only be meaningful if expressed in constant prices. For private consumption this will not be relevant as the indicator used will be population growth. For Imports and Exports, both prices and 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 physical change, or import and export price indices can be calculated. Deflation of government services is more difficult, but usually a cost of living index was prepared, and CPI is available in the post-colonial period.

Output Method: \[ Y = \sum \text{Sectoral Value Added} \]

Thus the question in this method 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. We assume that a story of a fall in local manufacturing applied to the early colonial period, followed by a rise with limited import substitution following the Second World War. If estimates are included to cover the post-colonial period, data on physical production from manufacturing census may be included to capture this growth. For the sector of construction: cement and timber can be used, similarly to in manufacturing this sector will have to rely on import data in the early period, but may be changed to 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 is a minimalistic method of measuring change through the colonial and post-colonial period. The method might strike the reader 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. What questions can it answer? The method suggested here has obvious limitations. Rather than answering the question – did Ghana develop? rather than answering the question – did Ghana develop? The suggested indicator measures a very particular type of development. Not measuring productivity or living standards per se but modernization, 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, thus participating in the formal economy and the world economy. The advantage? The indicator makes explicit the data limitations and may establish to what extent the Ghanaian state, colonial or post-colonial has overseen growth in formal markets and increases in development expenditure the in 20th century.

Adapting a Method: Lessons from Ghana

The growth and development of the Ghanaian economy is probably the best documented in Sub-Saharan Africa, save South Africa. Angus Maddison provides estimates of total population and Gross Domestic Product in 1870 and 1913, and annual estimates are available from 1950 onwards. The projected annual growth rates for the population and the economy between 1870 and 1913 was 0.6 and 2 percent respectively, while 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

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8 There is also a total GDP estimate for Ghana for the year 1820.
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 a lower GDP per capita growth between 1913 and 1950, than between 1870 and 1914.

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. 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 in conflict with regards to the timing of acceleration of growth, as in Maddison’s version the acceleration to 4 percent occurs after 1913. Szereszewski provides disaggregated estimates as provided here in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>1891</th>
<th>1901</th>
<th>1911</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Export Production</td>
<td>872</td>
<td>740</td>
<td>3612</td>
</tr>
<tr>
<td>2. Private Consumption of Imported Goods</td>
<td>1595</td>
<td>2741</td>
<td>4310</td>
</tr>
<tr>
<td>Category</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<tr>
<td>3-4. Consumption of Government and Public Services</td>
<td>150</td>
<td>490</td>
<td>635</td>
</tr>
<tr>
<td>5. Gross Capital Formation</td>
<td>239</td>
<td>1567</td>
<td>3420</td>
</tr>
<tr>
<td>6. Traditional Consumption</td>
<td>9200</td>
<td>10000</td>
<td>11000</td>
</tr>
<tr>
<td>7. Imports of Goods and Non-Factor Services</td>
<td>-908</td>
<td>-2127</td>
<td>-3610</td>
</tr>
<tr>
<td>Total (A), 1+2+3+4+5+6-7</td>
<td>11148</td>
<td>13411</td>
<td>19467</td>
</tr>
<tr>
<td>Total (B), 1+2+3+4+5-7</td>
<td>1948</td>
<td>3411</td>
<td>8367</td>
</tr>
<tr>
<td>Annual GDP Growth (A)</td>
<td></td>
<td>1.9%</td>
<td>3.8%</td>
</tr>
<tr>
<td>GDP Growth (B)</td>
<td></td>
<td>5.8%</td>
<td>9.4%</td>
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The existence of a base year to use as a starting point makes the task of calibrating the growth estimator far easier. To as large extent as possible the same data sources and methods were used as those by Szererszewski. I used the shares (1-7) as a starting point, and calculated annual growth indicators for each share, based on physical data. For export Production: quantities of cocoa, old, rubber and palm, for imports: quantities of spirits, tobacco and textiles. For government services: length of roads and numbers of schools and pupils. For capital formation I used machinery imports and I did not include a measure for capital formation in the cocoa production. The traditional was assumed to grow with population growth, and for imports I used quantities of other imports not included in the measure of consumption. Based on these indicators I then calculating annual change in each of share and got a new annual total, I added up the new totals, and based on these I calculated new rates of annual growth as provided in the figure below.
If this growth rate is projected on Maddison's level estimate for 1891 we get the following comparative picture.
Interestingly, the new calculated growth rate matches Maddisons estimated average growth rate. The average growth with the new method was 3.9, as compared to Maddisons growth rate of 4 percent between 1913 and 1950.

Conclusions

This is an exploratory paper in a research project aiming to create measures of economic growth across the 20th Century for a sample of African economies. Until recently most of economists’ work on Africa has taken 1960 as the 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 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 or 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 these valuable colonial 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 are now being constructed for European countries and other regions far back in time. 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 needs to be undertaken, for as many countries as feasible.

References


