Controversy, Facts and Assumptions: Lessons from Estimating Long Term Growth in Nigeria, 1900–2007

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CONTROVERSY, FACTS AND ASSUMPTIONS

Lessons from Estimating Long Term Growth in Nigeria, 1900–2007

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ABSTRACT: This article contributes to the debates surrounding "New African Economic History" by exploring the feasibility of constructing a time series of economic growth in Nigeria spanning the whole twentieth century. Currently most datasets for African economies only go back to 1960. The sources for their creation exist, but these valuable colonial data remain underutilized. This is an exploratory paper in a project aiming to create measures of economic growth through the twentieth century for a sample of African economies. The paper offers a systematic discussion of the different available datasets on population, agricultural production and income for the country. It finds that the existing data, often presented as facts, are more accurately described as projections based on assumptions. If these assumptions are already made in the production of the data, this precludes empirical testing of important questions. The main lesson is that any African economic history investigation must both begin and end with a critical analysis of the quantitative data, and must further be supported by careful qualitative evaluation.

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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 focused on other topics. Until recently, most economists working on Africa took 1960 as their starting point, primarily because data on national income and similar derivatives 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 precolonial 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 datasets on African economies exist, but these valuable colonial data remain underutilized.

This article contributes to the "New African Economic History" by exploring the prospects of creating a time series of economic growth across the colonial and the postcolonial period in the case of Nigeria. Nigeria is today the most populous African country and arguably also the most important economy in the region apart from South Africa.[4] Thus the lessons learned in the case of Nigeria might be relevant for similar efforts focusing on other African and non-Western economies. The case of Nigeria is in some cases exceptional—it is a large country, with a large population, and it is dependent on petroleum. In particular, the basic questions of how to count the population and assess agricultural production are issues of general relevance. The article has two main parts. The first establishes the extent of our current ignorance regarding economic change in Nigeria. It offers a systematic discussion of the different available datasets on population, agricultural production, and income for the country. The second part discusses a method for measurement of economic change in Nigeria through the twentieth century.

In the first part of the article, it is found that the existing data, often presented as facts, are more accurately described as projections based on assumptions. These assumptions are often of great theoretical significance, such as whether the marginal productivity of labor in agriculture is zero

or whether the relationship between informal and formal sector growth is elastic or inelastic. If such assumptions are already made in the production of the data, it precludes empirical testing of these important questions. It is discussed which assumptions made by data compilers have widespread support in the scholarly literature on Nigerian development, and whether there is reason to think that the basic conditions for these assumptions change in the course of the twentieth century.

The data presented in the second part of the paper have been assembled using primary sources such as colonial reports and Blue Books produced by the colonial administrations, combined with annual abstracts and digests of statistics produced by the Federal Office of Statistics (FOS) and bulletins from the Central Bank of Nigeria. For many years, statistical abstracts either were not published on a regular basis or were not available in library collections. The time series presented here have been assembled after intensive use of libraries in North America, collections in the United Kingdom, and finally the libraries at the Federal Office of Statistics and the Central Bank of Nigeria, both in Abuja, Nigeria. In some cases, the data collection burden has been eased by the use of secondary literature rich in data appendices.[5]

The article is exploratory in nature, and while it has succeeded to assert some trends and developments with the use of quantitative data, the main lesson is that any African economic history investigation must both begin and end with a critical analysis of the quantitative data, and must further be supported by careful qualitative evaluation. The quest for quantitative resolution must be enriched with qualitative rigor.[6]

Facts, Controversy, and Assumptions

This part of the article proceeds to look at the controversy that surrounds estimating total population and population growth in Nigeria, before it considers the problems of estimating agricultural productivity trends in both the long and short term. Finally, the major changes in the methodology and sources in accounting for national income in Nigeria since 1951 are surveyed. Observations are based on reading primary documents on data collection in Nigeria, a careful investigation of competing datasets, and observations made during interviews conducted during a visit to the Federal Office of Statistics and National Population Commission (NPC) in Abuja, Nigeria, February 2010.

Population Estimates

The basic starting point when estimating either total income or trends in growth is a count of the population. It has been the practice of economic

historians to turn to estimates of population growth, size, or densities in the absence of data on economic growth or income levels. Similarly, a standard method at national accounting offices in sub-Saharan Africa is to use population data for the sectors of the economy for which data is not regularly collected.[7] Thus, for the informal sector and for subsistence production estimates, level estimates may be made using a per capita amount to account for these contributions to the national economy. Additionally, for these and other sectors, growth is often assumed proportional to population growth. Finally, population data is of course the central ingredient in the most conventional measure of development: real per capita income. Thus, data on population are vital for the measurement of development.

Unfortunately, the process of counting the total population in Nigeria has been subject to massive controversy and difficulty. Today, we are still left guessing about the size of the total population; in particular, we know very little about its growth rate. The history of census-taking in Nigeria is an instructive example of measurement problems in sub-Saharan Africa. It is also a powerful lens through which we can see the history of the legitimacy of the Nigerian colonial and postcolonial state.

The first population census, held by colonial authorities in 1866, only covered Lagos. Following suit, consecutive censuses in 1871, 1881, 1891, and 1901 also only covered Lagos and its immediate surroundings. In 1911, the census additionally covered Southern Nigeria (which merged with the Lagos colony in 1906). In 1921, the first census that in theory covered the whole territory, which today is called Nigeria, was held. In practice however, enumeration outside of cities was not rigorous.

Locust swarms in the North and tax riots in the southeast disrupted the following 1931 census.[8] Actual enumeration only took place in Lagos, five other townships and in 201 villages in northern Nigeria. The final population estimate was made using tax records.[9] In her analysis, Polly Hill has suggested that the estimates for 1931 were as much as 75 percent too low; indeed, the population in the North was probably around 20 million rather than the 11 million that the census yielded.[10]

The most serious problems for contemporary measurements and analysis arose with the discontinuity surrounding colonial rule and independence. Between the population census held by the colonial authorities in 1953 and the population census held in 1962, Nigeria gained independence. In 1953, the Nigerian population correctly anticipated that the census would form the basis for estimating tax receipts. We can safely assume that there was a significant downwards bias of measurement in the 1953 census. In 1962, the situation was the opposite, and again Nigerians probably assessed the situation correctly. The 1962 census would provide the foundation for federal development expenditure and investment, and

most importantly, the census would be the primary basis for future voting and the distribution of representational seats in the federal assembly.

The result was a high population count. In particular, the relative size—and thus, political power—of the North and the South was heavily contested by political parties.[11] The 1962 census was finally rejected by the government, led by the Northern People Congress and another census was commissioned the following year. These published 1963 population figures were again heavily discredited by southern politicians (represented by National Council of Nigeria and the Cameroons) and, according to the historian Toyin Falola, widely considered as fraudulent.[12] The census results for 1973 were also rejected and considered illegitimate.[13] No census was held during the military rule of the 1980s. Generally, in the postcolonial period the 1963 figures were used for planning purposes, and a growth rate of 2.5 percent from a 1963 base was adopted until 1976, when the assumed population growth rate was adjusted to 3.2 percent.[14]

A new census was proposed for 1991 as part of the return to civil rule by the Babangida regime.[15] Conscious of the past problems, this census was preceded by a publicity campaign and was well-funded by foreign donors.[16] The resulting count put the total population as low as 88 million. This would imply a very low population growth in the postcolonial period if the 1963 or 1973 data are used as a base year. The World Bank did not accept this low estimate and still reports 99.9 million for 1991.

The most recent census was planned for 2001—the Nigerian constitution decrees that they should be held at ten-year intervals. However, due to the transition from military to civilian rule, the census was heavily delayed, finally being held in 2006. The preparation for the 2006 census was rigorous. A Census Awareness Study was prepared which indicated that about one-third of the population would not trust the numbers provided by the census. In southern regions there was particular concern that, in the North, goats and cows would be counted as part of the household, reflecting the widespread suspicion that the North's political leaders would tamper with the census numbers.[17]

To preempt this anticipated negative response, the National Population Commission engaged in an advocacy effort. This took place at the federal level, informing members of the national assembly and ministers of the importance of the census, thus gathering support for the exercise. The chairman of the NPC made courtesy calls to state governors, while lower-level NPC commissioners contacted local government and other traditional and political leaders in order to promote the importance of the census. The NPC credited the relative success of the census to this public relations exercise, to a relatively more favorable political climate, and to the

Table 1. Nigerian Population in Census Years (Millions)

	1911	1921	1931	1952/53	1962	1963	1973	1991	2006
"North"	8.12	10.56	11.44	16.84	22.01	29.78	51.38	47.37	n.a.
"South"	7.93	8.16	8.62	13.58	23.28	25.88	28.38	41.62	n.a.
Total	16.05	18.72	20.06	30.42	45.29	55.66	79.76	88.99	140

Sources: R. T. I. Suberu, *Federalism and Ethnic Conflict in Nigeria,* (Washington, DC: Institute of Peace Press, 2001), 169. Adapted from R. K. Udo, "Geography and Population Censuses in Nigeria," in *Fifty Years of Geography in Nigeria: The Ibadan Story,* ed. Olusegun Areola and Stanley I. Okafor (Ibadan: Ibadan University Press, 1998), 356 and the 2006 Nigerian Census report.

fact that both "in 2006 and 1991 the census was more scientific [than the previous censuses]. Both were conducted according to best practice. It was more accurate, better conducted."[18]

Despite these efforts by the NPC, the 2006 census was not executed without problems. In his report, the chairman of the NPC noted that "some enumerating staff deployed by the Commission were killed while some were assaulted and chased away during the current census in certain parts of the country."[19] The results were also fiercely disputed. The response from Nigeria's president Olusegun Obasanjo was to call "those who dispute the results 'confusionists', adding that when they saw the census didn't break the country, they sought to sow confusion. And he washed his hands of the issue: 'If you like, use it, [if] you don't like [it], leave it.'"[20]

One might address similar advice to academic users when it comes to interpreting the record of population size and growth. Table 1 shows the official results of the censuses conducted between 1911 and 2006. The data vary to a surprising degree, and consensus regarding "plausibility" is particularly hard to reach when the data have been so fiercely contested politically.

Table 2 presents some implied annual population growth rates. The implied growth rates from 1953 to either 1962 or 1963 are both implausibly high. At face value, it is difficult to accurately assert to what extent this is due to postcolonial over-counting versus colonial under-counting. The 1973 to 1991 growth rate is on the other hand implausibly low, which could be interpreted as a sign of over-counting in the 1962, 1963 and 1973 censuses, though we know that the World Bank considered the 1991 census an underestimate.[21]

In terms of evaluating the accuracy of these censuses, Hill reported that the 1953 census yielded an estimate for the population in Kano of

Table 2. Estimating Nigerian Population Growth (%)

From:	1911	1921	1931	1953	1953	1963	1973	1991	1911	1953	1963
To:	1921	1931	1953	1962	1963	1973	1991	2006	2006	2006	2006
Growth	1.55	0.69	1.91	4.52	6.23	3.66	0.61	2.31	2.31	2.92	2.17

Sources: See Table 1. Percentage growth calculated as compound growth rates between census years.

three million, a figure that in Hill's view should have been closer to 4.5 million—implying an underestimation of 50 percent.[22] The 1963 census did count the population in Kano to be five million, and thus *could* be closer to the truth. This interpretation rings well with John Caldwell and Chukuka Okanjo's interpretation of the 1962 census: "It may well be that in some areas in Eastern-Nigeria there was an inflation of the population figures. But the magnitude of the population increases recorded is probably to be accounted for more by undercounting in 1953 than by overstatement in 1962."[23]

Today, the National Population Commission still suffers from a bad reputation. The Federal Statistical Office and NPC remain separate institutions. Furthermore, according to this author's interviews with public affairs officers at both institutions, the FOS has no desire to join forces with the NPC as it fears this would ruin the already fragile credibility of their institution. On the other hand, NPC officers expressed that the separation was a "shame" since they were "sister-institutions."[24]

This section has two conclusions, one positive and the other with an agnostic, if not negative, flavor. The history of population census-taking in Nigeria appears to be one of increasing legitimacy of the NPC and other federal state institutions. While the 1991 and 2006 censuses were problematic, in relative terms they can be viewed as successes. This is probably due to the deliberate efforts of the NPC and the federal administration, but the move towards transparency and democracy in Nigeria more generally has likely also contributed to this development.

The negative perspective is that, for the purpose of estimating population growth, this evidence cannot be taken at face value. This has implications for the validity of most national income estimates, in which population and population growth is the variable most resorted to when other data are missing.

Measurement is not simply a technocratic exercise; the political economy in which the "facts" are embedded does matter. There is a clear trend of discontinuity in terms of census taking, from the colonial problem of

evasion to the postcolonial race for inclusion. It is also a stern reminder of the importance and difficulty of getting "levels" right, and further, that the measure of change can be severely distorted when the levels are biased.

Agricultural Production

In *Planning Without Facts,* a book on Nigerian development planning published in 1966, William F. Stolper wrote that "the neglect of the subsistence production can lead to serious misunderstanding of the process of development and therefore to inappropriate policies and plans to accelerate development."[25] The problem of course was that information on this sector—agricultural productivity in particular—was inadequate, or entirely lacking. Because data on factor inputs and outputs (meaning how much labor, seeds, etc. were put in, and how much was actually produced) are not generally available to development planners and national statistics compilers, the aggregate data they report are usually generated using assumptions and projections, often depending on proxies such as population growth.

The most suspect part of the first national income estimates for Nigeria was food production. The data in the national accounts prepared for 1950–1957 were based on agricultural surveys conducted during 1955–60.[26] In these surveys "no one area was covered more than once," and "in no one year were areas in more than one region covered."[27] The surveys provided average yields and average acreage based on sampled households, which were then aggregated based on the population estimates.

These scanty data were then projected backward and forward in time based on agricultural officers' subjective reports, which varied in detail: "An occasional officer ventures a guess at the total acreage and yield since the previous year. Others guess at the percentage changes in acreage and yield since the previous year. Most restrict themselves to such remarks as 'average', 'no change', '1952 plus', '1954 minus', or even 'very poor.'"[28] In the words of Pius Okigbo, a Nigerian economist, who prepared the Nigerian national accounts for 1950–57 on request by the Nigerian Federal Government, "It is impossible to overstate the arbitrariness of the process of 'quantification.'"[29]

Three decades later, in 1988, Paul Collier examined available datasets on food production in Nigeria with the starting point that in the 1970s and 1980s "a combination of complex events and weak data" had yielded incompatible analysis. Data on food crops for the country were, at this time, supplied by four sources. Of these, the only source that was based directly on field surveys was the data published by the FOS. But Collier noted that these series are "frequently incredible," especially in that they often were contradicted by data from agricultural development projects.[30]

Table 3. Production of Major Food Crops, 1970–82 (Annual % Growth)

	FOS	CBN	USDA	FAO
Sorghum	–0.9	1.3	–0.5	–0.5
Yam	–3.5	–1.3	1.6	...
Millet	–0.1	2.1	–0.1	0
Cassava	–8.5	–6.5	0	2.1
Palm Oil	2.4	2.4	2.4	2.4
Maize	–6.3	–4.3	2.5	2.5
Rice	–0.1	2.1	6.9	5.1

Source: Collier, P. (1988), "Oil Shocks and food security in Nigeria," *International Labour Review* 127(6), p. 764, from World Bank, 1985.

The data Collier obtained from the Central Bank of Nigeria used the same field surveys but reported higher yields (see Table 3). They "rather arbitrarily [scaled] up the FOS series for the more commercial crops by up to 30% in the belief that the FOS estimates for these crops are biased downwards."[31] The other two data sources at the time of Collier's analysis were the Food and Agricultural Organization (FAO) and the United States Department of Agriculture, both of which made indirect estimates, taking into account "perceived trends in demand and imports, yielding production as a residual." While noting that although the data are "not being firmly based on observed production," Collier concludes without justification that "these series provide the best guide to long-term trends in food production."[32]

Both the recent rate and the trend of growth in Nigeria's agricultural sector have been issues of controversy. In "Policy Making without Facts," an article on structural adjustment policies published in 1992—the title referring to Stolper's book published almost three decades earlier—Paul Mosley wrote that the lack of data had "if anything increased in relevance."[33]

According to one dataset on agricultural production, approved by the Federal Office of Statistics and based on field surveys, there was negative growth in food production after structural adjustment programs. Another dataset, approved by the FAO and the Central Bank of Nigeria, showed very rapid growth in food production. See Tables 4 and 5. The policy implications are completely opposite; the first dataset implied that structural adjustment policies did not work, while the second implied that they were indeed effective. The problem is further compounded in that both conclusions could make sense economically through two different interpretations. One could plausibly argue that a liberalization of internal food

Table 4. Total Food Crop Production (% Growth)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CBN		—	—	—	—	—	14.8	1.6	9.4	1.3
FAO	1.1	4.6	–19.5	29.9	6.7	7.0	–8.0	0.7	60.0	—
FOS	–0.4	9.1	10.6	–10.9	47.9	15.9	–35.4	41.4	5.7	—

Source: Mosley, P. (1992), "Policy-making without facts: a note on the assessment of structural adjustment policies in Nigeria, 1985–1990." *African Affairs,* 91, pp. 227–240.

Table 5. Total Cash Crop Production (% Growth)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CBN	—	—	—	—	—	–6.4	9.0	30.1	2.4	8.8
FAO	–1.7	–2.2	–22.4	14.9	7.6	–2.1	18.8	17.7	–1.6	—

Source: Mosley, P. (1992), "Policy-making without facts: a note on the assessment of structural adjustment policies in Nigeria, 1985–1990." *African Affairs,* 91, pp. 227–240.

prices, together with less competition from imports, led to a positive supply response. Another equally plausible interpretation would be that the removal of fertilizer subsidies caused a negative shift in production.

Mosley and Collier's study of the 1980s shows that there is considerable doubt regarding data on crop production, in particular food crops. These problems have not been resolved. When compiling the dataset for this article, the author discovered a major discrepancy in the crop statistics reported for one and the same year (1993/94). A comparison of the data reported in the 1995 Statistical Abstract and in the 1999 Statistical Abstract is shown in Table 6.

Although the discrepancies might not mean that much in the aggregate national income estimates, they are huge in physical terms. Fourteen million tons of cassava and seven million tons of yams would make a difference and would leave a mark on the transportation, distribution, and retail sectors in the country—not to mention on the diet of the population.[34]

The FOS has been supplying data on crop production since independence. These are based on an estimate of acreage harvested multiplied by a yield estimate for each year, reportedly based on annual sample surveys. As shown in Table 6, between the publication of the 1995 and the 1999 Abstract, there was an upward revision in output data. Interestingly, the yield and acreage data were not adjusted accordingly. In fact, the yields were adjusted downwards while the acreage harvested remained the same, thus

Table 6: Different Estimates for 1993–94 of Major Agricultural Crops in Nigeria (thousands of tons)

	Millet	Guinea Corn	Groundnut	Beans	Yam	Cotton	Maize	Cassava	Rice	Melon	Coco Yam
SA 95	3595	5413	2008	1946	15861	263	4505	17261	1303	490	2100
SA 99	4738	6145	893	1463	22709	214	6816	31005	2943	108	1164
% change	31.8	13.5	–55.5	–24.8	43.2	–18.6	51.3	79.6	125.9	–78.0	–44.6

Sources: Statistical Abstract 1995; Statistical Abstract 1999.

leaving only the totals adjusted. While the yields multiplied by the acreage did match up with the totals in the 1995 Abstract, they were far from doing so in the 1999 Abstract. Total physical production of all crops was revised upwards 42.8 percent, a substantial addition of more than 23 million tons of produce. As noted, the tubers, yam and cassava, which are notoriously difficult to measure, accounted for 90 percent of this increase. Because this change was done from one Statistical Abstract to another, without note, it is difficult to assess the rationale for the downward and upward adjustments.

This review of different data, claims, and assumptions on agricultural production in Nigeria finds a notable shift in the postcolonial period when data on food production increasingly become available. For the 1980s, there are even several competing, yet contradictory datasets. For periods before 1950 we only have export data, but even it suggests that our knowledge of accompanied domestic economic change is still a matter of guesswork. As noted here, in cases where physical production data were available, these survey data were rejected by Collier, who preferred a series based on assumed relationships between food production, income, and imports. This choice of evidence lent support to the thesis that removing price controls and subsidies was a policy move with positive effects. It might have been better to remain agnostic about the direction of change in the face of contradictory evidence.

Measuring Income in Nigeria

Some preliminary attempts to estimate national income in Nigeria were made by Margery Perham et al. before the Second World War[35] and later in an unsuccessful and unpublished attempt by Isaac Dina. Beyond these "tentative and contentious exercises," the earliest estimate of Nigerian national income was made by Prest and Stewart in 1952–53 for the year 1950–51.[36] Their methods may be summarized as ambitious, building up an estimate using the output, expenditure, and income approach. The data were far less sophisticated than the theoretical blueprint, and 86 percent of the total estimates remained "unclassified" income.

Uncharacteristically for colonial estimates, Prest and Stewart made special allowances for the subsistence sector. They also noted problems with the application of "Western" concepts and even attempted to adjust these to better fit the Nigerian conditions: "For a start, the distinction between production and living, the distinction between working and not working, is something reasonably tangible in the 'West'; it is often nebulous in Nigeria."[37] A striking diversion from conventional methods was that intra-household services were included in the estimates. Prest and Stewart were even calculating the value of the service of procreation, as provided

by wives to husbands. Data on bride wealth was used to proxy the market values for this intra-household service.

Equally striking, when the World Bank prepared estimates for the Nigerian Economy for 1952–53 and for 1956–57 they used the methods of Prest and Stewart.[38] S. Job points out the oddity of this at a time when the 1952 United Nations Standard of National Accounts was the methodology of choice.[39]

In 1962, national accounts for Nigeria were published for the period 1950–57 based on a study by Okigbo. These accounts were extended to 1962–63 by the FOS and published in the National Development plan. Okigbo estimates GDP more than 15 percent lower than the estimates of Prest and Stewart.[40] As seen in Table 7 this was caused mainly by the different valuations of forestry and building production, while the controversial "intra-household services" component did not have a major effect on the aggregate.

Gerald Helleiner wrote in 1966 that "the Nigerian national accounts remain in a sorry condition," and that the changes in the estimation procedures made comparisons for the early years "unsuitable." Nevertheless, he concluded, with a touch of positive spin, that "the estimates inevitably involve so wide a margin of error that the lack of consistency in the aggregates need not to be viewed so seriously."[41]

No revisions to the methods and data basis were made before a team led by Professor O. Aboyade finally completed a revision; their report was published in 1981. The report noted that when the *Second National Development Plan 1970–74* was drawn up, the latest income estimates available for the planners were for the year 1966, just before a destructive and long civil war.[42] The primary purpose of this development plan was supposedly to address the consequences of this civil war—a difficult task considering the dearth of data on the national economy post-civil war.[43] Aboyade observed that "a number of critical estimates were based on highly tenuous assumptions," and that, for instance, the estimate for the contribution of transport and trade was "based on the long standing but unverified assumption that distributive activities always account for one-eighth of Nigeria's gross domestic product."[44] The report recounted some improvements and inherent weaknesses but stressed that an inherent weakness of this revision and of earlier ones was that it was an *ad hoc* revision; the team recruited to complete it would likely disperse, and with it the value of the work contributed.[45] The final paragraph of the official report is worth quoting in full, because it is uniquely candid about the shortcomings of statistical methods:

> Our experience has shown that in a setting where weights and measures are amorphous and in a highly variegated landscape with contrasting political

Table 7. Two Sources' Estimates of GDP in Nigeria, 1950 (£Million)

	Prest-Stewart	Okigbo
Agriculture	295.9	285.7
Livestock products	30.5	37.9
Forest products	74.9	7.5
Fishing	6.3	6.3
Transport and communications	22.9	24.9
Minerals	7.8	5.5
Manufactures	0.8	2.7
Public utilities	1.6	0.6
Craft industries	8.6	15.8
Building and civil engineering	41.6	8.1
Banks, insurance and other professions	0.9	0.7
Missions	2.2	3.4
Domestic service	2.9	2.6
Miscellaneous services	6.4	0.7
Government	19.2	10.8
Marketing Boards	35.5	
Ownership of buildings	5.1	5.9
Intra-household services	4	
Land clearance by peasants	3.5	
Distribution	65.1	54.2
Total	**596.7**	**512.3**

Source: Gerald K. Helleiner, Peasant Agriculture, Government and Economic Growth in Nigeria (Homewood, IL: RD Irwin, 1966).

> geography, the more mundane nuts and bolts approach of the economic anthropologist may advance the course of development of economic statistics more than the sophisticated discourses of the systems designer and sampling theorist.[46]

A further report, on the 1990 revision, was published in 1992. It recounted the methods which most likely are representative of current practices at the FOS. Agricultural estimates relied on annual survey data, while the export data were compiled with figures from the Central Bank.[47] Estimates for manufacturing were made using a physical output index multiplied with the estimate for 1981. On the transport sector, it was cryptically noted that "a number of assumptions are made to arrive at each of these components."[48] Regarding the estimates prepared for the wholesale and

retail sectors, the assumptions were made clear: it was assumed that for consumer goods the sector increased value added by 100 percent, for capital goods 50 percent and for passenger cars 90 percent.[49] Apart from these notes on methods, no evaluation was made regarding the general validity of the estimates, its weaknesses or the quality of the underlying data.

A note in a statistical review from 1989 is symptomatic of the data problems of the period and, in particular, the difficulty of obtaining incontestable real data on production. The 1989 report had an accompanying nine-page analysis of the economy; the first seven and a half pages were focused on a discussion of the exchange rates, prices, and the stock market. Under the headline "Real Production," the report begins by saying that "we have painted a reasonable picture of the price domain of the economy" but that for the "real domain, especially on current economic conditions our data base is weak. Efforts to drastically improve the situation at FOS are now being developed. But by implication the real economic situation can be examined by relating the various discussions on prices and rates presented above to growth rates on some key GDP components."[50] The report subsequently fails to mention any concrete data on the real economy, merely addressing the growth of the petroleum and public sector in general terms.

Table 8 shows the availability of constant price series for the Nigerian economy in the postcolonial period. The national accounts can be compiled on current prices for every year, but measure 'real growth', increases should not include price increases, and therefore GDP is accounted for in constant prices. There are a number of ways of doing this. The typical manner in which it was done in low-income countries was to choose a "base year" for which one had the most exhaustive information and then make use of more sparse data, indicators, and proxies to estimate growth in the different sectors of the economy from the base year onwards. These series could be extended for a decade or two, before they were changed. When base years are unchanged for a longer period of time biases in measurement can get quite serious—this may arise from very different price developments in the economy and if new sectors of the economy grow in importance.[51]

According to the information gathered on a visit to the FOS in 2010, the base year for the constant price series is still 1990, and the 1993 Standard of National Accounts was still to be implemented. There was a recent revision of the basic data undertaken during 2004 in collaboration with the IMF: "We did some compilations with some copious data and compared it with the 2003 estimates. There was a huge jump from 2003 to 2004."[52] The national accountants were advised by the IMF consultant to smooth the series and, rather than accepting a break in the series, to splice the upward

Table 8. Available Constant Prices Series for Nigeria, 1962–2006

Base Year	Years Covered
1962	1958/59–1966/67
1962	1962/63–1973/74
1973	1973/74–1977/78
1977	1973/74–1981
1984	1981–1990
1990	1980–2006

Source: National Bureau of Statistics Nigeria, *National Accounts,* (Various Editions).

revision in backwards. Following this advice, the FOS series gives an impression of growth for the period up to 2004 that may be not justified, and there is no report confirming that these data were added. Thus, the method for revising the estimates is wholly nontransparent. In order to complete these kinds of revisions, the FOS is dependent on funds from donors, a situation which they conceded was unfortunate.[53] Alan Heston suggested, in a survey of national income problems in 1994, that "often officials who use national accounts for growth purposes . . . may resist improvements in level estimates of output because it will introduce breaks in national accounts series."[54] Here the present author found that the revision of the level estimate had been approved, but rather than accepting a break in the series, smoothing was applied.[55]

In 2014, the change of the base year for the National Account series in Nigeria was finally implemented. When the base year was changed from 1990 to 2010 the size of the economy increased by over 80%.[56] The series was subsequently only revised backwards from 2014 to 2010, leaving the recent history of economic growth in Nigeria in serious doubt.

Depending on when and how these changes are implemented, these revisions in GDP estimates cause changes in the different databases at different times. The changes in growth rates can be observed be comparing old and new editions of the same database. Since 2014, World Development Indicators (WDI) has archived older versions of their own database, allowing one to observe this difference more easily. Figure 1 plots the growth series in Nigeria as published in April 2014 and as published in April 2015. In the figure we can see how changes in reported growth rates occur as a result of the WDI having accepted Nigeria's statistics revised to reflect the new base year.

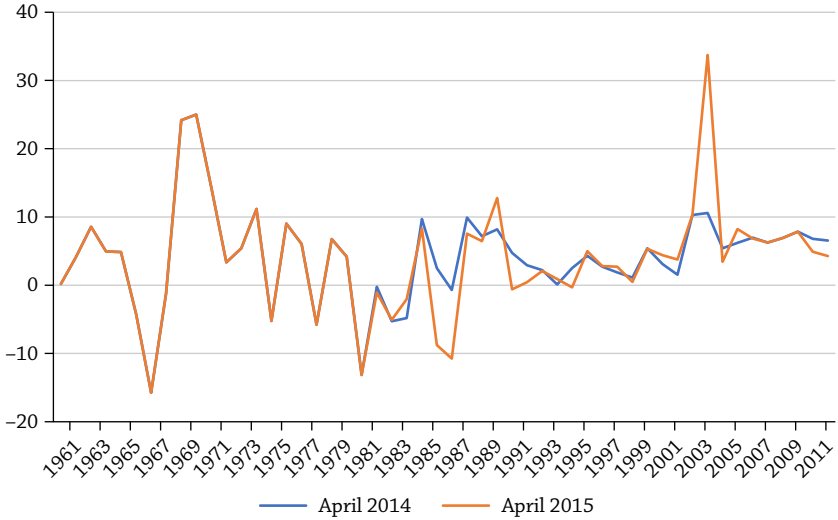

Figure 1. GDP Growth in Nigeria According to the 2014 and 2015 Series.

The graphs make clear that most of the upward revision in GDP has resulted in a huge apparent watershed in economic growth for 2004 (a wholly implausible 34 percent) which was not there before (when growth was recorded as an already robust 10 percent). Altogether, the average picture of growth in Nigeria has not changed much on average since 1960 (4.2 percent versus 4.1 percent). It is the distribution of growth over time that has changed. The new series reports an 8.2 percent growth rate on average since 2000 (compared to a 6.5 percent growth rate in the old series) and in the period between 1980 and 2000 the growth rate has more than halved, from 2.2 percent to 1% percent.

The drop in the growth rate in the 1980s is caused by the new series reporting growth in 1986 and 1987 to be –9 percent and –11 percent, whereas the old 2014 series reported 3 percent and –1 percent respectively. It is difficult, based on the sparse information that is available on how this data series was updated, to see why it is that the changes happen so far in the past. The new GDP series in Nigeria as published by the Nigerian Bureau of Statistics (NBS), and which is now based on 2010 rather than 1990 prices, however only extends back to 2010. Meanwhile, the GDP series at 1984 fixed prices as published by the NBS in 1999 indicates growth of 3 percent in 1986 (thus agreeing with the 2014 series, but is 12 percent off the 2015 series from the World Bank) and then reports zero growth in 1987 (thus agreeing with the 2014 series; though it is 11 percent off

the 2015 series from the World Bank). It is difficult to tell from the data provided from the World Bank what the source of these differences are. It is hard to believe that assigning different sectoral weights (such as the Nigerian economy being less petroleum and more tertiary sector dependent in the 2010 base year as compared to the 1990 base year) only having an impact in these years. The changes we see in the series appear in order to reconcile past levels deriving from an old series and present levels deriving from a new one. For most years, growth rates are intact, but in other years, there are adjustments.

In 2010, at the Federal Office of Statistics in Abuja, Nigeria, the national accounting team was confronted with copies of both Mosley's article and Stolper's book, which claims that data users were "without facts." Their response was to suggest that data users often complain about a lack of availability without knowing what data are available. Asked to comment on the availability of competing facts, it was noted that the desirable situation would be "one data for one country," and that recently Central Bank of Nigeria, the Ministries and the Federal Office of Statistics, have been collaborating to ensure this in practice as planned in the National Strategy for the Development of Statistics.[57]

What do the aggregate growth patterns in Nigeria look like according to the available sources? Studies of growth estimates across various sources have shown significant inconsistencies in the case of other countries. I have previously show showed that interspatial and intertemporal comparisons of growth and income depend on which data source is used.[58] Simon Johnson et al. reveal that there are large differences between versions of the Penn World Table.[59] Antonio Ciccone and Marek Jarocinski demonstrate that this variation affects which growth determinants turn out to be statistically significant.[60] At the aggregate level, there are a range of data providers. Figure 2 shows the aggregate growth reported by Penn World Tables, Angus Maddison, World Development Indicators, and the various series published by Nigeria's Federal Office of Statistics.[61]

The sources agree to some extent. The underlying population data and choice of time series data has led to disagreements among reported data on economic growth.[62] The level of discrepancy between population estimates and agricultural productivity in Nigeria would lead one to expect disagreements between datasets on economic growth. The sheer importance of the Nigerian economy to sub-Saharan growth comparisons might mean that there has been more rigor in ensuring coherence among datasets on national income in the databases. Most importantly though, the aggregate growth rate refers to the total economy. The population growth rate does not figure directly in the measure reported here. Finally, the importance of

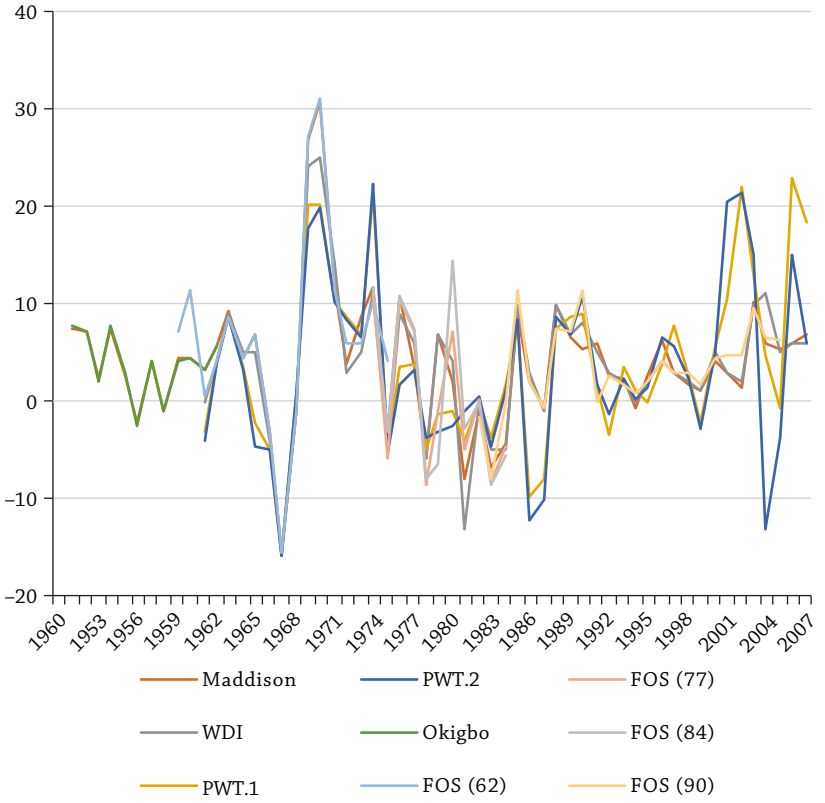

Figure 2. Aggregate growth in Nigeria, 1950-2007 (annual percent growth in GDP).
Sources: FOS, Nigeria National Account Files; World Bank, World Development Indicators 2010; Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.2 (Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, 2010); Angus Maddison, The Maddison Project 2009 Version (2009); Okigbo, Nigerian National Accounts.

crop data on yams and cassava might be important for policy decisions, but for the aggregate growth rate in Nigeria what matters is petroleum. There are of course problems of measurement relating to petroleum as well. An IMF report prepared in 1998 commented extensively on accounting for the changes in the oil prices in the national accounts and recommended adjustments.[63] One major problem is to deflate the values of the exports correctly—or to express it in constant prices. It would be misleading to have growth reflect changes in prices. That is, if produced quantity is stagnant, but prices double, it would appear that growth is rapid, whereas in fact there is no growth. At the same time, accounting for growth at constant prices may mask that the petroleum economy, and therefore the national economy, is in crisis when prices are actually falling.

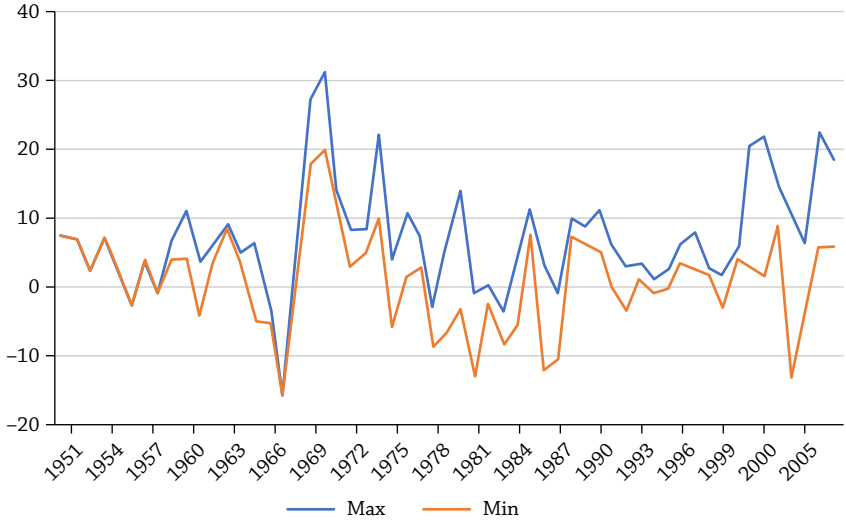

Figure 3. Minimum and Maximum Annual GDP Growth Rates Reported for Nigeria (%), 1950–2007.

Sources: FOS, Nigeria National Account Files; World Bank, World Development Indicators 2010; Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.2 (Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, 2010); Angus Maddison, The Maddison Project 2009 Version (2009); Okigbo, Nigerian National Accounts.

Figure 3 shows the highest and lowest growth rate reported by any source for each year. This tempers the impression of consensus on Nigerian growth somewhat. With the exception of a few years with large discrepancy, the data from Angus Maddison track the FOS national accounts data extremely closely until the 1970s. Similarly, the data from the World Bank and those reported by the FOS are close in the early period, while there is disagreement in the 1980s. A similar pattern is repeated with the Penn World Tables; however, the very large discrepancies in the last decade are driven by abnormally high reported growth rates in the Penn World dataset. From the 1970s onward disagreement is the rule, and often the difference between maximum and minimum growth rates observed are in double digits.

The comparison of growth between sources and the difficulties of getting proper international price parity estimates for levels may be very important.[64] Yet, in the case of Nigeria, to focus on these problems would be to sidestep the main issue; that is, how well the physical data observations relate to the actual patterns of economic change in the country.

This review has already shown that two things we know very little about in Nigeria are population and agricultural production.[65] Indeed, the answer to factual questions regarding total size and/or rate of growth will critically

depend on subjective judgments or the origin of the dataset used to answer the question. The numbers that support analysis of these trends are malleable, and the facts that are available are often more an expression of assumed relationships rather than raw data that can be used to test assumed relationships.

Moreover, all observations are subject to errors. These can be due to incompatible theoretical definitions with Nigerian actual economic conditions, insufficient economic resources and personnel to accurately survey economic data, and finally political bias and pressures on those supplying facts for development. Patterns of economic change in Nigeria are subject to controversy. A recurring lament in development economists' work on the economy of Nigeria has been the lack of facts. We have seen that the problem is not this simple; indeed, there is a cacophony of numbers and competing interpretations of them. According to Maddison, the leading scholar on historical national accounts, "quantification clarifies issues which qualitative analysis leave fuzzy."[66] Nigeria might very well be a case where the opposite is true.

Comparing Colonial and Postcolonial Output: Suggesting a Method of Estimating Long-term Changes in Income

The first part of this article established the extent of our knowledge regarding economic change in colonial and postcolonial Nigeria. It has been argued here that, due to measurement problems and contradictory data, the most prudent course of action may be to plead ignorance regarding population growth and agricultural productivity. This has far-reaching implications. It means that the most important indicators for assessing the evolution in living standards are missing. It further implies that any level estimates, as measured in per capita income, are futile and most probably grossly misleading.[67]

In this part of the article it is therefore suggested that, since there are relatively reliable data on exports, imports, and government expenditure/revenue for the whole period, the best option for quantitative analysis is to create a consistent dataset of these measures across the twentieth century. What is suggested is a measure of the rate of change in formal markets. The advantage of this method is that it explicitly takes the data limitations into consideration. Based on the information in the first part of this article, it can be argued that the conventional indicator of development—per capita income—is unreliable and unsuitable. Any level estimate would be subject to a range of obscure assumptions, and the data basis for the level estimates is changing over time, thereby biasing the change estimates.

In the available official GDP estimates, whether those published by governments or those available in international datasets, it is only the information on government expenditures, large commercial firms, and imports and exports that is available and reliable. The remainder is subject to assumptions and *ad hoc* measures. In those published estimates it is not transparent what these assumptions are, whether they change over time, or whether they are consistent from country to country. One component in the national accounts, most often referred to today as the "informal economy," is largely unrecorded. Indeed, while there are many competing misnomers for this sector, such as "subsistence" or "traditional" in addition to "informal," the best definition of this economic activity is that it is not recorded and thus not taxed or otherwise monitored by the state. One should hasten to add that "unrecorded" does of course not only relate to small scale activities—the scope of illicit or untaxed activity in large companies has gotten much attention recently. Unrecorded does of course not mean unimportant or insignificant to historical arguments of economic change. In the estimator suggested here, this important part of the economy will be treated as an unknown quantity, "X."

What can data on exports, imports, and government expenditure/revenue tell us about development? It is probably best conceived as a measure of the state's capacity to capture economic rents, and the ability of producers to participate in external markets.

Data and Method

This exercise has two aims. It presents some preliminary, pioneering steps toward creating a growth time-series covering the entire twentieth century for a sub-Saharan African economy. Thus, the first tangible and useful outcome for other future studies in African economic history is an overview of the availability of consistent time series data. Of course, it is not immediately obvious that the issues highlighted here are directly relevant to all other African countries, but some of the features of the data reporting and data weaknesses are recurring.[68] The second aim is to illustrate the type of bare-bones growth estimates that can be created from a rather limited data basis. The method has been devised to rely as far as possible only on "recorded growth" and to minimize the assumptions while making these as clear as possible.

The most obvious option is to use the "expenditure approach," given the structure and the availability of the colonial data in the Blue Books. Therefore, *GDP = household consumption expenditure + government expenditure + gross capital formation + exports of goods and service – imports of goods and services.*

However, neither household consumption expenditures nor gross capital formation data are available. Estimates can therefore only use direct data for government expenditure, exports, and imports. To neglect capital formation will introduce a considerable negative bias in the growth indicator. We could estimate gross capital formation, using some components of imports.

For household consumption expenditure we will assume that food is the most important item, and while food expenditure was certainly supplemented by imported commodities, the lion's share was probably either self-produced or purchased in domestic markets in economic activities not recorded by colonial nor postcolonial governments. In this indicator, growth arises either as an increase in export quantities, or a relative decrease in quantities imported. Is this an appropriate measure of growth? The relationship we are measuring would indicate the extent to which export volumes continued increasing and whether there was a reduction in imported goods for domestic consumption as there exists a successful import substitution or whether there was a shift in emphasis in the import bill towards capital goods versus consumption goods. We are not picking up any growth resulting directly from food production for domestic consumption unless it indirectly (and proportionally) results in visible corresponding changes in imports.

In principle, data on government expenditure (and revenue) should be easy to come by, and is usually considered to be the data with the highest reliability in African countries. Yet, it is indicative of data issues for Nigeria that World Development Indicators does not report any data at all on government revenue or expenditure for that country. The secondary literature, statistical abstracts, and colonial reports are often in conflict with each other. Revenue and expenditure data are often subject to wide ranging revisions and are sometimes noted as provisional or revised in the publication. As recently as the period 1996–2002 the Federal Office of Statistics was unable to give a total for revenues for some years. Equally problematic is that, with the long perspective of a time series, a multiplicity of data sources/providers has meant that the categorization for revenues and revenue sources does vary considerably. These data need to be deflated. Price and wage data are used to create a consumer price index that spans across the whole period.

For imports and exports, physical data can be obtained and so we can estimate constant prices for any given year. Quantities for imports have been difficult to obtain, particularly after 1975. Symptomatic of the issues relating to economic governance in African states in the 1980s, Statistical Abstracts cease to be available between the early 1980s and the late 1990s.

Estimating "X"

The weakest part of the estimation is that growth arises—by definition—from growth in formal markets, while we are not certain of the opportunity cost of growth in such markets. How should the relationship between the formal or recorded sectors of the Nigerian economy be interpreted? Addressing this issue in 1966, Stolper wrote, "The absence of a Malthusian problem makes it illegitimate to neglect the so-called subsistence sector and to assume that any increase in output by 'modern' sectors is a net addition to total product."[69] Is this claim valid, and for the whole period? It is precisely these questions that need addressing before we can interpret the figures which express formal/recorded or "modern" economic growth in Nigeria. For more recent times there are household budget surveys available, which would give a fairly reliable estimate of the level of consumption, but still changes in production patterns are a matter of guesswork.

Thus, these measured changes in the formal economy need to be complemented by qualitative analysis. The economic history, development, and anthropology literatures on Nigeria have typically focused on two relationships. One is that between export growth or modern sector growth and how they relate to changes in food, while the latter is how changes in production have related to population growth and migration. There is not room to do the whole of the literature justice, but some of the most important arguments relating to specific times and areas in Nigeria are considered below.

Specifically, the literature has examined the extent to which classic economic models such as the vent-for-surplus and/or unlimited supply of labor applies to places like Nigeria. These debates are directly relevant as they either explicitly or implicitly discuss whether the assumption of unlimited supply of labor applied and thus whether rural marginal productivity of labor was approaching zero or whether the opportunity cost of export growth was close to zero, as in the vent-for-surplus model.

A study by S. M. Martin of the Ngwa in south-east Nigeria offers a long-term perspective (1800–1980) on economic change relating to palm production for export. According to the trade statistics, there was a massive expansion in exports of palm products during this period. It is reported that exports of palm oil rose from 112 tons in 1807 to 23,467 tons in 1847.[70] In the study's appendix, annual exports of palm kernels and oil are reported as increasing from 85,624 and 45,508 to 327,174 and 139,204 tons between 1900 and 1948.[71] Martin says that "there was no switch from planting yams to planting palms" and that the palm production was carried out when labor was not required in food production. Furthermore, she writes, "we have no evidence of the kind of changes that would indicate strain."[72] Thus by 1900, an essentially yam- and hunting-based economy had been

supplemented by a surplus of palm production. This surplus, however, was not easy to maintain.

By 1920, the combined effect of increased colonial taxation and deteriorating prices meant that Igbo farmers were struggling to maintain their real incomes even with rapid increases in volumes. The expansion in production volumes was matched by increases in food imports and labor inflows to the region. Increasingly, as Martin reports, palm savings were invested outside the palm trade. Until 1950, population pressure in the region had been low, but from this point on, land for palm production was increasingly in competition for land with yam production. With the growing importance of petroleum in the Nigerian economy and demand from growing towns, food production, especially cassava, became a potential cash source. This potential could only be exploited by peasants with access to surplus land. Essentially, Martin argues that in eastern Nigeria the vent-for-surplus model applies in the nineteenth century, perhaps until as late as 1920. From 1950 onward, there is a land scarcity and a gradual turn from production for the external to the domestic market.

Hill gives us a picture of developments in the rural, northern parts of Nigeria, comparing two villages—one densely and one sparsely populated—in rural Kano, between 1900 and 1970. "Past statistical records and documentary material are lacking" and therefore we are left to trace certain trends based on Hill's judgement.[73] In 1900, the rural economy of Kano was based on farm slavery and cash crop production for long-distance trade over a wide area in Central Sudan. The end of slavery probably meant depopulation between 1900 and 1930. The arrival of the railway meant a decline in textile production and increase in groundnut production for exports. Economic inequality and land scarcity varied hugely across locations, but in both places land was scarce, as evidenced by prices for it, which increased throughout the period. The implied structural changes meant that the colonial statistics on exports through the ports will overestimate economic change in the North in the aggregate, while ignoring structural change and the costs associated with this change in the domestic rural economy in northern Nigeria.

Sarah Berry offers a study of economic change relating to cocoa production in western Nigeria.[74] In particular, she emphasizes the role of factor flows, labor, and savings within the cocoa economy. Again, *if* the population censuses had been reliable, one could have assessed the role of migration. The census figures from 1953 and 1962 imply migration away from provinces with the largest urban centers and toward the areas which were predominantly rural. This is probably an error, as it is widely recognized that the basic pattern has been rural-to-urban migration.

> "In the light of the evidence that I found of substantial migration to the eastern parts of the cocoa belt during this period however, it seems that the censuses may not, after all, give such a distorted picture of changes in the geographical distribution of the population—however inaccurate their measurement of its over-all rate of growth."[75]

Berry notes that pressures on land had so far been mitigated by migration to areas where land was available, but that land would soon become a constraint on agricultural expansion. Berry's study stresses, in particular, the role of savings in linking urban and rural economies. The measures of formal economic growth do not pick up this source of capital formation.

Taking a classic economic position, Gerald Helleiner explores economic growth in the first half of the twentieth century in Nigeria, from the starting point that "the Nigerian areas" in the late 1900s were engaged primarily in "traditional" activities.[76] In his view, the Nigerian economy was essentially "static," and the "traditional" output can be assumed to follow a secular trend in line with population, subject to variation due to weather, pests, and other diseases.[77] It was the external stimulus of the market that increased per capita incomes, according to these assumptions. Between 1900 and 1929, export volumes grew with an annual compound rate between seven and 5.5 percent. Still, Helleiner asserts that the traditional economy accounted for 85 percent in 1929, while export growth "provided incentives for a slight expansion of domestically consumed traditional output." In addition, there was growth due to population increases. "It is generally assumed that Nigerian population was stationery during the first 25 years of this century, and then began to increase at a rate of about 0.6% for the next 15 years." Consequently, "it has been postulated that the traditional output increased by 10% at best."[78] Obviously, to agree with this conclusion one would have to accept both the one to one relationship with food production and population growth as well as the colonial population data.

In her study of Nigeria, Sheila Smith explicitly challenges the utility of the vent-for-surplus model. She summarizes some economic history studies of economic change in the nineteenth and early twentieth centuries—in particular, the relationship between the export economy and the domestic economy. Smith emphasizes the structural change that created the possibility of massive expansion in agricultural production for export. There was a contraction in indigenous manufacturing activity, and an urban-to-rural migration took place. The instigating factors were the advent of cheap European manufactures, the investment in infrastructure (in particular, the arrival of the railroad to Kano), and finally, the push factor of the colonial

introduction of a hut tax. Thus, Smith concludes, we cannot interpret the export growth as gaining "something for nothing."[79]

Conclusion: Patterns of Continuity and Discontinuity in the Nigerian Colonial and Postcolonial State

Patrick Manning, in a review of Ekundare's monograph on the economic history of Nigeria, wrote that the book was only valuable as a "compendium of official data on British intervention in the Nigerian economy" and that the accompanying analysis was a "celebratory narrative" of that intervention. "The only interpretative lines drawn out of the data presented are the assertion that the British government was the main stimulant of Nigerian economic growth."[80] When using these data on exports, imports, revenues, and expenditure, we are measuring the growth of international trade and of government—neither of which should automatically be equated with development. Moreover, the most important question—how the growth of markets and states affects economic development—remains unanswered.

A strengthening of the state in terms of revenue and expenditure has in sub-Saharan Africa been directly related to external markets, as captured in Frederick Cooper's phrase "the gatekeeper state."[81] Colonial Nigeria relied on earnings from its principal export commodities: palm kernels and oil, groundnuts, cocoa, and tin ore. Between 1916 and 1938, these commodities cumulatively accounted for more than 80 percent of all export earnings, and kernels and oil from palm alone accounting for almost 50 percent of the earnings. There has been continuity in export dependence, but the relative importance of different commodities has changed. In 1958, crude oil exports commenced, and they soon came to dominate the export earnings. Apart from the appearance of more numerous and sophisticated capital goods, there is no clear trend to be observed on the import bill. Export earnings from petroleum boosted imports of foodstuffs, capital goods, and government expenditure from the 1960s onward, with a recession from the late 1970s to 1990s. The dominance of petroleum coincides with the arrival of the agricultural crisis. Using the data sources presented here, it would seem possible to document how the Nigerian state has been able to pursue and temporarily succeed in bringing about some modernization, development, and economic growth. The "X" in our dataset is of course the crucial factor in estimating whether this has led to lasting improvements for the population at large.

There are some obvious discontinuities in measurement and data from the colonial to the postcolonial period, and some of these seriously constrain comparison through time, particularly regarding the population

growth data. The change from a colony mainly focused on a net wealth transfer to the colonial power to an independent state focused on increasing government expenditure and imports of capital goods is both borne out in the data presented here as well as indirectly affecting the data recording itself.

This paper suggests a minimalistic method to measure change through the colonial and postcolonial periods. The method might strike the reader as crude or even misleading, as it does not include agricultural production other than indirectly capturing the export of agricultural commodities and the import of food commodities. So, what questions can it answer?

The method suggested here has obvious limitations. Rather than answering the question "did Nigeria develop?," the indicator suggested here measures development in a very particular sense, not 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 Nigerian's ability to export and import, and thus to participate in the formal economy and the world economy. The advantage of this indicator is that it makes explicit the existing data limitations. It also establishes that in the twentieth century the Nigerian state, colonial or postcolonial, has overseen a massive growth in formal markets and increases in development expenditure.

This is a first exploratory paper in a research project aiming to create measures of economic growth across the twentieth 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 derivatives are only available back to 1960. This neglect of earlier periods is increasingly seen as a weakness, because it does not allow an analysis of the historical roots of poverty or 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 Anthony Hopkins.[82] 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 datasets 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.

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Notes

1. Patrick Manning, "The Prospects for African Economic History: Is Today Included in the Long Run?," *African Studies Review* 30, no. 2 (1987): 49–62.

2. Anthony G. Hopkins, "The New Economic History of Africa," *Journal of African History* 50, no. 2 (2009): 155–177.

3. For recent reviews, see Morten Jerven, "African Growth Recurring: An Economic History Perspective on African Growth Episodes, 1690–2010," *Economic History of Developing Regions* 25, no. 2 (2010): 127–154; Gareth Austin, "The 'Reversal of Fortune' Thesis and the Compression of History: Perspectives from African and Comparative Economic History," *Journal of International Development* 20, no. 8 (2008): 996–1027; Hopkins, "New African Economic History;" and James Fenske, "The Causal History of Africa: A Response to Hopkins," *Economic History of Developing Regions* 25, no. 2 (2010): 177–212.

4. It is vying for first place with South Africa, and while a recent GDP revision put Nigeria at the top in 2014, it has recently been overtaken again by South Africa. See Morten Jerven, "For Richer, For Poorer: GDP Revisions and Africa's Statistical Tragedy," *African Affairs* 112, no. 446 (2013): 138–147.

5. The work of R. O. Ekundare, *An Economic History of Nigeria, 1860–1960* (London: Methuen, 1973) and Toyin Falola, *Economic Reforms and Modernization in Nigeria, 1945–1965* (Ohio: Kent University Press, 2004) deserve particular mention in this respect.

6. Like for instance in Eric L. Jones, *Growth Recurring: Economic Change in World History* (Oxford: Oxford University Press, 1988), or Daron S. Acemoglu, Simon

Johnson, and James A. Robinson, "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics,* 117, no. 4 (2002): 1231–1294.

7. Morten Jerven, "Random Growth in Africa? A Report on the Quality of the Growth Evidence in East-Central Africa, 1965–1995," *Journal of Development Studies* 46, no. 2 (2010): 274–294; and Morten Jerven, "Users and Producers of African Income: Measuring the Progress of African Economies." *African Affairs* 110, no. 438 (2011): 169–190.

8. The affected regions included Aba, Onisha, and Owerri.

9. Abraham Okolo, "The Nigerian Census: Problems and Prospects," *The American Statistician* 53, no. 4 (1999): 321–325.

10. Polly Hill, *Population, Prosperity and Poverty: Rural Kano, 1900 and 1970* (Cambridge and New York: Cambridge University Press, 1977), 18.

11. For a basic introduction to the political rivalry between "South" and "North" see Tom Forrest, *Politics and Economic Development in Nigeria* (Boulder, CO: Westview Press, 1993).

12. Toyin Falola and Matthew Heaton, *A History of Nigeria* (Cambridge and New York: Cambridge University Press, 2008), 168.

13. Falola and Heaton, *A History,* 186.

14. Okolo, *The Nigerian Census,* 323.

15. Babatunde A. Ahonsi, "Deliberate Falsification and Census Data in Nigeria," *African Affairs* 87, no. 349 (1988): 553–562.

16. Femi Mimiko, "Census in Nigeria: The Politics and the Imperative of Depoliticization," *African and Asian Studies* 5, no. 1 (2006): 14.

17. Federal Ministry of Planning Nigeria (hereafter FOS), *National Population Commission, Census Awareness Study* (Abuja, Nigeria, 2005).

18. Interviews at FOS and NPC, Abuja, Nigeria, 22–25 February 2010.

19. FOS, *Report on the Census 2006 Final Result* (Abuja, Nigeria, 2008).

20. Sandra Yin, "Objections Surface Over Nigerian Census Results," *Population ReferenceBureau,*2007,http://www.prb.org/Publications/Articles/2007/ObjectionsOverNigerianCensus.aspx.

21. Note that the losses of human life incurred during the Civil War, sometimes referred to as the Biafran War, 1967–70 were significant. According to Falola and Heaton, *A History of Nigeria,* 180, the excess deaths due to warfare and starvation may be between one and three million, with at least three million people displaced because of the war.

22. Hill, *Population, Prosperity and Poverty,* 18.

23. John C. Caldwell and Chukuka Okonjo, *The Population of Tropical Africa* (London: Longman, 1968).

24. Interviews at FOS and NPC, Abuja, Nigeria, 22–25 February 2010.

25. William F Stolper, *Planning without Facts. Lessons in Resource Allocation from Nigeria's Development* (Cambridge, MA: Harvard University Press, 1966).

26. As explained below the lack of overlap here means that data were projected backwards and forwards.

27. Gerald K. Helleiner, *Peasant Agriculture, Government and Economic Growth in Nigeria* (Homewood, IL: R. D. Irwin, 1966).

28. Pius N. C. Okigbo, *Nigerian National Accounts,* 1950–57 (Enugu: Government Printer, 1962), 63.

29. Okigbo, *Nigerian National Accounts,* 65.

30. Paul Collier, "Oil Shocks and Food Security in Nigeria," *International Labour Review,* 127, no. 6 (1988): 761–82.

31. Collier, "Oil Shocks and Food Security," 763.

32. Collier, "Oil Shocks and Food Security," 763.

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40. I. I. U. Eke, "The Nigerian National Accounts—A Critical Appraisal," *Nigerian Journal of Economic and Social Studies* 8 (1966): 333–359.

41. Helleiner, *Economic Growth in Nigeria,* 391.

42. The Nigerian-Biafran War, 6 July 1967–15 January 1970.

43. FOS, *National Accounts* of Nigeria, 1973–1975, 47.

44. FOS, *National Accounts* of Nigeria, 1973–1975, 47.

45. P. L. Arya, "National Accounts of Nigeria: An Analysis of the Official Data," *Canadian Journal of African Studies* 19, no. 2 (1985): 399–408.

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47. Aboyade noted that the milk production was guessed to be an average of 60 gallons of milk per annum "from an unknown number of milking cows" (in FOS, *National Accounts of Nigeria,* 1973–1975, 47). In comparison it is noted in FOS, *National Accounts of Nigeria—Sources and Methods* (Lagos, 1992), 4, that the per-cow estimate in the 1990s was changed to 300 pints. which "only" amounts to 37.5 gallons of milk per annum per cow.

48. FOS, *Sources and Methods,* 15.

49. FOS, *Sources and Methods,* 19.
50. FOS, *Statistical Review of the Economy* (Lagos, 1989).
51. For a full treatment of such issues, see Jerven, *Measurement and Performance.*
52. Interviews at FOS and NPC, Abuja, Nigeria, 22–25 February 2010.
53. Interviews at FOS, Abuja, Nigeria, 22–25 February 2010.
54. Alan Heston, "A Brief Review of Some Problems in Using National Accounts Data in Level of Output Comparisons and Growth Studies," *Journal of Development Economics* 44, no. 1 (1994): 37.
55. Similar approaches have been conducted in the case of Ghana and Botswana. See Jerven, *Measuring the Progress* and Morten Jerven, "Accounting for the African Growth Miracle: The Official Evidence, Botswana 1965–1995," *Journal of Southern African Studies* 36, no. 1 (2010): 73–94.
56. Morten Jerven, "Research Note: Africa By Numbers—Reviewing the Database Approach to Studying African Economies," *African Affairs* 115, no. 459 (2016): 342–358; Morten Jerven, Magnus Ebo Duncan, Yemi Kale and Moffat Nyoni, "GDP Revisions and Updating Statistical Systems in Sub-Saharan Africa: Reports from the Statistical Offices in Nigeria, Liberia and Zimbabwe," *Journal of Development Studies* 51, no. 2 (2015): 194–207.
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59. Simon Johnson, William Larson, Chris Papageorgiou and Arvind Subramanian, "Is Newer Better? Penn World Table Revisions and Their Impact on Growth Estimates." *NBER Working Papers No. 15455* (2009).
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64. Angus Deaton, "Price Indexes, Inequality, and the Measurement of World Poverty," *American Economic Review: American Economic Association* 100, no. 1 (2010): 5–34.
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67. A level estimate refers here to estimating GDP per capita in local or international dollars, as opposed to growth estimates, where we are measuring percentage annual change in production or income.

68. As discussed in Morten Jerven, *Poor Numbers: How We are Misled by African Development Statistics and What to Do About It* (Ithaca, NY: Cornell University Press, 2013); Morten Jerven, *Economic Growth and Measurement Reconsidered in Botswana, Kenya, Tanzania, and Zambia, 1965–1995* (Oxford: Oxford University Press, 2014).

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73. Hill, *Population, Prosperity and Poverty,* 96.

74. Sarah Berry, *Cocoa, Custom and Socioeconomic Change in Rural Western Nigeria* (Oxford: Clarendon, 1975).

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82. See Fenske, *Causal History,* for a full review of recent contributions by economists.