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Growth, Stagnation or Retrogression? On the Accuracy of Economic Observations, Tanzania, 1961–2001

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Abstract

Statistics on African economic growth are widely known to be inaccurate, but the extent and nature of these inaccuracies and their implications for the users of the data have not been rigorously assessed. This article investigates measurement issues of economic growth in post-colonial Tanzania. It is shown here that conclusions on Tanzania's development performance are conditioned by selection of the source of growth evidence. The article argues for an agnostic perspective on Tanzanian economic growth. Modelling efforts of African growth are more sophisticated than the quality of the data justifies. The policy implications are clear. For producers, there needs to be stronger investment into data collection in African economies, and for users, greater caution utilised in quantitative macro studies.

JEL classification: O11, O47, N17

1. Introduction

Statistics on African economies are widely known to be inaccurate. On 8 August 2009, *The Economist* reported that growth and income estimates from poor economies—especially those from Sub-Saharan Africa—are considered so 'dodgy' that researchers have instead utilised satellite data

on light emissions from human settlements to estimate 'growth from outer space' (Economist, p. 63 referring to Henderson *et al.*, 2009). This research followed another recent attempt to eliminate measurement error through the use of data on rainfall in the hope of identifying the variation in the growth data which was related to physical production (Miguel *et al.*, 2004). Dawson *et al.* (2001) have claimed that the relationship between output volatility (measured as the standard deviation of annual growth rates) and slow growth is a product of measurement error. Johnson *et al.* (2009) found that this volatility is inherent in the methodology of the most frequently used data set for economic research: the Penn World Tables (PWT). Still, in the *Handbook of Economic Growth*, Durlauf *et al.* (2005, pp. 574–75) highlighted output volatility as a defining growth characteristic of developing countries, a point that was re-emphasised by Arbache and Page (2010) as a specific feature of African growth, using data from World Development Indicators (WDI). More recently, in a think piece concerning the future agenda for development economics, Deaton (2010, p. 14) concluded that 'the basic facts of economic development, such as the growth rates of GDP, come from measures that ought to be much more deeply debated than is the case.' In short, while concern does currently exist regarding errors in African growth data, their causes and extent have not been established.

Such concerns about the quality of African data are not new. In 1994, in connection with a trend towards econometric treatment of development issues and the increasing use of data from the PWT and WDI for research, a special edition on data issues was published in the *Journal of Development Economics*, which was based on a conference held in 1992 at Yale on 'Data Base for Development Analysis'. As Srinivasan wrote, 'Researchers either are not aware of or, worse still, have chosen to ignore the fact that the published data, national and international, suffer from serious conceptual problems, measurement biases and errors, and lack of comparability over time within countries and across countries at a point in time' (1994, pp. 4–5). These concerns are addressed here with regard to the case of Tanzania.

Since African economies gained their independence, Tanzania has become one of the most intensively studied countries in the whole of Sub-Saharan Africa, particularly by scholars interested in economic development.[1] The distinctive charisma of the first Tanzanian president, *Mwalimu* ('the teacher') Julius Nyerere, and the attractiveness of his ideas, usually summarised under the headline *Ujamaa*, 'togetherness' or

[1] The most notable competitors are Ghana, Nigeria and Kenya.

'African Socialism', meant that from the 1960s on, Dar es Salaam was an intellectual hub for development scholars. Similarly, the magnetism of Tanzania among donors in the 1970s and 1980s stimulated research that focused on the efficacy of aid and economic development policies. In post-Nyerere Tanzania, the anticipation of economic and political reforms, and a vested interest from both researchers and donors, has meant that the country has kept the attention of scholars until the current day. It is indicative of the scholarly interest in Tanzania that there are two published monographs on the informal economy in Tanzania—a subject lacking research and data for most other African economies (Maliyamkono and Bagachwa, 1990; Tripp, 1997).

Consequently, one would expect that the record of growth and development since independence in Tanzania should be fairly well established. That is not the case. It will be argued here that our knowledge about the development trajectory of Tanzania is indeed quite limited. In this paper, different economic growth data are compared. It is concluded that the disagreement concerning economic growth in the different sources is large enough to condition conclusions on economic development in Tanzania. A short interpretation of the production of national income statistics is presented, and sources of data unreliability are explored. Finally, it is shown how scholars have misinterpreted Tanzanian economic development through misunderstanding the growth evidence. Data issues are sometimes dealt with using large data sets to run robustness and sensitivity tests. In this paper, a more 'hands-on' approach is taken. This approach enables us to trace the measurement problems back to data collection and compilation methods at the statistical office and then to relate these to important changes in the political economy of Tanzania.

2. On the accuracy of economic observations: Tanzania, 1961–2001

There are many types of economic growth data, measuring changes in GDP or similar national income derivates. Estimates prepared by the national statistical offices are the primary source for this metric. These data are usually accessed by scholars indirectly through other data providers such as the World Bank (published as the World Development Indicators, WDI), the data from the International Comparison Project (usually referred to as the Penn World Tables, PWT) or the data collected by Angus Maddison. These data are all based on national accounting files;

in the case of Tanzania, these are provided by the Central Bureau of Statistics (CBS) in Dar es Salaam.[2]

Deaton and Heston (2010) offer a comparative review of the different methods employed in all the data sets used here, while Johnson *et al.* (2009) review the differences between different versions of the PWT data.[3] Consequently, a full review of the technical discussion of different methods is unnecessary, but a short explanation of the implications for the data user is in order.

As mentioned, the data sets all take the national account files as a starting point as provided by the appropriate statistical agencies. Therefore, the data sets necessarily inherit all data quality problems originating in the country from where they are collected. The difference between national or official data and international income and growth data is that the latter are expressed in international prices. The growth rates reported in data sets provided by the PWT and WDI differ because different formulas to calculate the international price estimates are used. The difference between one PWT data set version and the other is accounted for by revisions of the price data. The Maddison data are expressed in international prices for one base year, and subsequently national growth rates are used between base years. The growth rates from the Maddison data set and the official national data may still differ. This is because the constant price growth time series provided by the national statistical agencies are subject to revisions which affect growth rates. Furthermore, there are various official series with different base years covering the same years.[4] As will be reviewed here, the data provider has a multitude of national accounts data to pick from; therefore, the process of splicing various series together involves some discretion on the part of the data set compiler. The actual process of picking and harmonising the series is not accounted for in a specific and transparent manner in the data descriptions accompanying the published data sets.

As a litmus test of how these methods affect reported growth rates, a correlation matrix of derived annual growth rate data between 1961 and 2001 from the Tanzanian official data, PWT and the Maddison data sets is reported in Table 1. The most current data set from the World Bank does not report growth statistics earlier than 1987. The WDI data are

[2] Previous to this, statistics and reports on Tanganyika were prepared by the East Africa Statistical Department in Nairobi, Kenya.

[3] Jerven (2010a) discusses data sets for a sample of African economies.

[4] For a study on how this affects income-level estimates, see Jerven (2010b).

therefore excluded from this test. Although the official data series does not cover the whole period, a series can be produced using the growth rate from different constant price series.

The lack of agreement on annual growth rates in these sources is striking. Between the most commonly used source for economists, the PWT, and the annual growth rates published by the national statistical office, there is so little agreement that one would be forced to describe the two sets, supposedly describing the same phenomenon, as having no relationship with one another. Similarly, the Maddison data and the PWT are seemingly unrelated. The agreement between Maddison and the official statistics is better, but remains far from convincing. To get closer to patterns of variation, the annual highest and lowest growth rates across the three data sources are plotted in Figure 1. The difference between the highest

Table 1: Estimated Correlation Matrix of Annual Growth Rates for Tanzania, 1961–2001

	Tanzania	PWT	Maddison
Tanzania	1.00	0.23	0.75
PWT	0.23	1.00	0.26
Maddison	0.75	0.26	1.00

Sources: Tanzania: National Account Files; WDI (2003); PWT; Heston *et al*. (2006, Chain Method) and Maddison (2009).

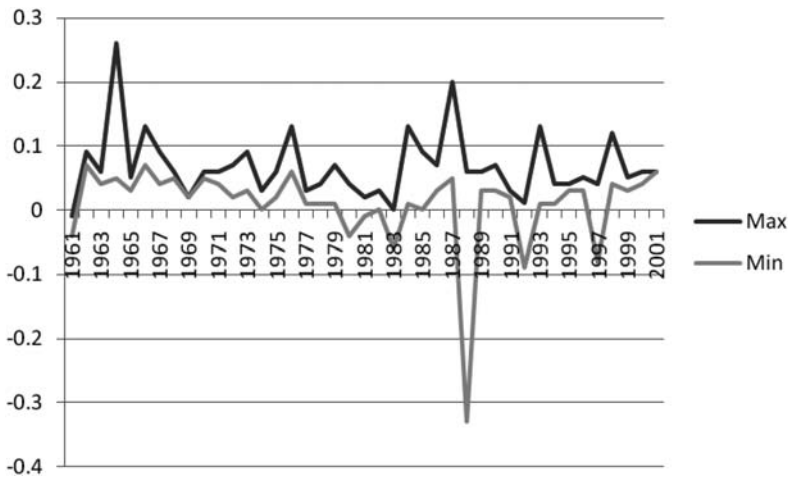

Figure 1: Annual Range of Disagreement in GDP Growth Rate, Tanzania 1961–2001. *Sources*: Tanzania: National Account Files; WDI (2003); PWT; Heston *et al*. (2006) and Maddison (2009).

(max) and the lowest (min) reported growth rates represents the annual range of disagreement.

The average annual disagreement between 1961 and 2001 is 6%. It is not evenly distributed; there is serious dissonance regarding growth in Tanzania in the 1980s and 1990s. According to the PWT, the Tanzanian economy grew 20% in 1987. The following year, the PWT recorded a negative growth of 33%. Table 2 shows how these differences map out if averages are calculated for different time periods. Averaging fails to purge the data of uncertainty entirely. With the exception of the 1970s, throughout which all data sources agree that the Tanzanian economy was growing quickly, there is significant disagreement between the sources. Indeed, it is entirely dependent on the data source whether one finds that Tanzania experienced stagnation or rapid growth following independence in 1961. Similarly, it is open to speculation whether the 1980s were a period of modest growth, stagnation or outright retrogression.

For longer time periods, the error ranges between the average growth rates reported for the Tanzanian economy are smaller. In per capita terms, however, it still depends on which data source is chosen whether the overall average growth in per capita terms was negative or positive. In conclusion, for the purpose of analysing periodic economic growth, the international database evidence remains inconclusive. For some years and periods, each of these different sources reports data that would raise contradictory conclusions. In order to get a better understanding of the actual growth record in Tanzania, this article turns to the national account files prepared since independence by the CBS in Dar es Salaam.

Table 2: Accuracy in Growth Reporting, Tanzania 1961–2000

	WDI	Tanzania	PWT	Maddison
1961–1965	—	3.4	8.4	4.6
1966–1970	—	6.0	5.8	6.0
1971–1975	—	4.6	3.8	4.2
1976–1980	—	3.2	4.4	3.0
1981–1985	—	0.8	4.2	0.4
1986–1990	—	5.6	0.2	3.8
1991–1995	1.8	2.2	2.2	2.0
1996–2000	4.2	4.6	3.2	3.0
1961–1979	—	4.3	6.1	4.6
1980–2000	—	3.3	2.1	2.2
1961–2000	—	3.8	4.0	3.4

Sources: Tanzania: National Account Files; WDI (2003); PWT; Heston *et al*. (2006) and Maddison (2009).

As pointed out previously, the national accounts are primary sources. The data available from international series such as the WDI, PWT or Maddison data have all passed from respective governments and statistical bureaux before being modified—harmonised to fit the purpose of the data retailer and its customers. These alterations create problems, and a comparative judgement on economic performance might well depend on which source of growth evidence was used. It is unsatisfactory to work with data where no proper sources are given and where there is no immediate indication as to why the different sources disagree.

The growth evidence in the databases bridges years where no official data were available, using different base years and alternative methods of comparing growth across time and place. The only way that both the effect of data inconsistencies and the effect of revisions can be dealt with satisfactorily is to consult the primary source. The advantage of using the national accounts is that they come with guidelines and commentaries. When the underlying methods or basic data for the assembly of the accounts are changed, these changes are reported. The disadvantage of using evidence from national accounts is one of inconvenience: they are not readily downloadable. The publications have to be manually collected before the process of data entry and interpretation. This study is based on a research visit to the statistical office where national account files and reports on methodology were collected.

3. The Tanzanian growth evidence

The first published series of Tanganyika Gross Domestic Product was prepared in 1955 for the Royal Commission of East Africa.[5] Following independence, in 1968 the CBS, with the assistance of the UN Technical Assistance Programme, embarked on a detailed and comprehensive revision of the National Accounts.[6] The central problem was

[5] The series was published as *The Gross Domestic Product of Tanganyika 1954–1957*, followed by the *National Accounts of Tanganyika 1960–62*, published in May 1964. In addition, a study was undertaken by Peacock and Dosser published as *The National Income of Tanganyika, 1952–1954* (1958). For a review of how that early estimates compared with the ones prepared after independence, see Van Arkadie (1973). Tanganyika refers to the mainland, which was joined with Zanzibar to form Tanzania in 1964.

[6] The work done in this regard was published in *National Accounts of Tanzania 1966–68*, *National Accounts of Tanzania 1966–68 (Sources and Methods)* and *National Accounts of Tanzania 1964–70, 1966–1972, 1966–74, 1966–1976, 1966–1980* and *1970–1982.*

the availability and reliability of the basic data, specifically for agriculture, small-scale industries, transport and internal trade. The CBS acknowledged that, despite the importance of agriculture to the national economy, 'the available information on crop acreage, output etc. is very meagre' (Tanzania, 1966–68, p. 2). For crops grown primarily for export purposes, comprehensive and fairly reliable statistics did exist. For the remaining crops, primarily grown for 'subsistence' consumption, 'only inadequate and somewhat unreliable statistics are available' (Tanzania, 1966–68, p. 2). The Ministry of Agriculture was the main source of information concerning subsistence crops, while data on export crops were collected from the National Agricultural Products Board. The marketing board supplied data on the volumes purchased at the prices set by the marketing board. For non-export crops, the Bureau of Statistics compiled quarterly averages of prices paid to growers. These averages were then combined with observations on crop production from the periodic crop reports of the Regional and District Agricultural Officers, which themselves were 'mainly based on eye observations and market reports' (Tanzania, 1966–68, p. 2).

Between 1980 and 1985, the Bureau of Statistics, again with the assistance of a UN-sponsored National Accounts expert, embarked on a detailed and comprehensive revision of the national accounts series with the aim of changing the base year from 1966 to 1976.[7] This second constant price series coincided with a revision of sources and methods, and it was warned that 'in the light of this change the revised series, 1976–84 is not strictly comparable with the earlier series prior to 1984 both at current and constant prices' (Tanzania, 1976–84, p. 1). The new estimates were based on data collected for the Household Budget Survey, 1976–77; Input–Output Table of Tanzania Mainland, 1976; Population Census 1978; Industrial Census 1978 and Analysis of Parastatal Enterprises, 1972–82. The data on trade, finance and industry were drawn largely from parastatal enterprises, while data on crops were drawn largely from state marketing boards. Over time, these data sources became increasingly unreliable, and in 1997 a new revision was made using 1992 as a base year.

[7] The results of this exercise can be found in the following publications: *National Accounts of Tanzania 1976–1984: Sources and Methods*, *National Accounts of Tanzania 1976–1984, 1976–1986, 1976–1987, 1976–1988, 1976–1989* and *1988–2001*.

This series at 1992 prices included a new emphasis where 'strong efforts were made to determine what is the story behind the figures, whether the data applies to what is experienced as happening in the industry. This has not been emphasised earlier' (Tanzania, 1987–96, p. 1). These new estimates incorporated the 1993 Standard of National Accounts. According to the revision, the decline of the formal economy and a growth in the informal economy were not reflected in the available statistics, resulting in an underestimation of value added. 'Estimates of the size of this deficiency ranged from 30 percent to as much 200 percent of GDP' (Tanzania, 1987–96, p. 1), and this increase in the coverage was commented upon: 'From the perspective of the national accounts staff, this revision was an ad hoc adjustment as the methodology from that revision was not fully incorporated into the estimation procedures' (Tanzania, 1987–96, p. 1). The new level estimates also included fresh surveys of transport, trade and construction. 'Not all the revisions have increased the level of the estimates – the agriculture growth rates have been drastically reduced' (Tanzania, 1987–96, p. 3).

It was noted that, in comparison, in the previous series based in 1976 prices, the 'private sector was under covered – sometimes not covered at all – and the growing informal sector was not generally accounted for' (Tanzania, 1987–96, p. 3). The new data came from 'Survey of Construction, Trade and Transport, Tanzania 1994', which surveyed ten of the most important regions, covering an estimated 85% of output in the sector. It was aimed at a sample of 50% of enterprises employing five to nine persons and 100% of larger businesses (Tanzania, 1987–96, p. 3). The 1991/92 Household Budget Survey provided new benchmark levels of agricultural production, housing, household health and education expenditure and total household consumption. In 1991, a study of the informal sector was undertaken. Based on that study and on the 1995 *Informal Sector Survey of Dar es Salaam*, new estimates were made for this sector. The surveys increased the level of the old informal sector estimate threefold. A time series was developed by extrapolating these trends and, contrary to earlier assumptions, assuming that the informal sector would increase when the formal sector was in decline, rather than move with it.

This issue is relevant to most African economies, but it is particularly well illustrated in the case of Tanzania. Starting in the 1960s and continuing through the 1970s, the Tanzanian state and parastatal companies were

increasingly in control of the marketing and transport of agricultural production, usually referred to as 'formal' marketing. Hit by external shocks that constrained public revenues and expenditures, the state's capacity to maintain control over marketing of agricultural products was weakened. Official prices were set too low and peasants turned to alternative markets. Initially, the growth of parallel and informal markets was strongly resisted by the state (Maliyamkono and Bagachwa, 1990). An IMF-sponsored Structural Adjustment changed Tanzania's policy stance towards markets and initiated a trend towards liberalisation. This resulted in a large structural shift from formal to informal activities, occurring at the same as the administrations were strapped for resources. The statistical office, and later the database assemblers, faced a choice. They could either report a dramatic reduction in overall economic activity as the formal sectors declined, or they could assume that an increase in the informal sectors compensated for the reduction in formal activity. Until 1997, the statistical services in Tanzania had neither the data nor the resources to adjust to these new economic realities.

Thus, the growth effect from parallel/informal markets is largely missing in the official statistics before the 1997 revision. Collier *et al.* (1986, pp. 134–35) reported, 'The country's informal economy has claimed much of the produce of the predominantly peasant agricultural sector. Peasants appear to have shifted from export and non-food crops to food crops for their own subsistence and for local informal trading.' Tripp (1997) emphasised the growth of the urban informal economy during the same period, while Maliyamkono and Bagachwa (1990, p. 133) estimated that, in 1990, the unrecorded economy had 'reached some 30 per cent of official GDP.'

The post-colonial growth record of Tanzania is covered by four different series of gross domestic product at constant prices.[8] The combined effect of changing base years and accounting methods can be observed by comparing estimates for the same years from different time series as displayed in the following table:

[8] The first series was based in 1964 prices and covered the period 1962–82. The second series was based in 1976 prices and covered the period 1976–93. The third series was based in 1985 prices (not described in a methodology report) and provides annual estimates from 1964 to 1995. The fourth series was based in 1992 prices and covers the period 1987–95.

	GDP for 1966 (percentage Sector Share) according to constant prices:		GDP for 1976 (percentage Sector Share) according to constant prices:		
	1966	1985	1966	1976	1985
Agriculture, hunting, forestry and fishing	47	54	37	41	47
Mining and quarrying	3	1	1	1	0
Manufacturing	7	11	10	11	14
Electricity and water	1	0	1	1	1
Construction	3	4	4	4	4
Wholesale and retail trade and restaurants and hotels	12	16	11	12	14
Transport, storage and communications	7	6	10	7	9
Finance, insurance, real estate and business services	10	4	9	8	4
Public administration and other services	11	4	18	10	8
Imputed bank service charges	−1	−1	−1	−2	−1
Gross domestic product	100	100	100	100	100

	GDP for 1982 (percentage Sector Share) according to constant prices:		
	1966	1976	1985
Agriculture, hunting, forestry and fishing	33	42	47
Mining and quarrying	1	1	0
Manufacturing	5	6	11
Electricity and water	2	2	1
Construction	4	4	4
Wholesale and retail trade and restaurants and hotels	9	9	13
Transport, storage and communications	12	6	8
Finance, insurance, real estate and business services	10	10	6
Public administration and other services	25	16	11
Imputed bank service charges	−2	−3	−2
Gross domestic product	100	100	100

(*continued on next page*)

Continued

	GDP for 1985 (percentage Sector Share) according to constant prices:		GDP for 1992 (percentage Sector Share) according to constant prices:		
	1976	1985	1976	1985	1992
Agriculture, hunting, forestry and fishing	45	51	49	52	48
Mining and quarrying	1	0	1	1	1
Manufacturing	9	10	8	8	8
Electricity and water	2	1	2	1	2
Construction	2	3	5	6	5
Wholesale and retail trade and restaurants and hotels	11	14	11	13	16
Transport, storage and communications	6	7	6	6	5
Finance, insurance, real estate and business services	13	6	12	6	10
Public administration and other services	15	11	11	10	9
Imputed bank service charges	−3	−2	−4	−2	−4
Gross domestic product	100	100	100	100	100

Note: The difference between estimates for any year reveals the magnitude of the effect of revisions.
Sources: National Accounts Tanzania (various editions).

The valuation of the agricultural sector varies across the period. In particular, there is disagreement between the 1966 and 1985 series, which is apparent in the 1966, 1976 and 1982 estimates. In the estimates for 1976, the contribution of the sector to GDP varies between 33% at 1966 prices, 42% at 1976 prices and 47% at 1985 prices. At 1966 prices, the agricultural sector accounted for about half of the economy in 1966, but it accounted for only one-third in 1982. At 1985 prices, there was no significant structural change over the period. In growth terms, a hypothetical 10% increase in agricultural output would raise the total GDP growth between 3 and 5 percentage points in a year. The 1985 series gives a larger weight to manufacture, with the estimated contribution varying from 5% at 1966 prices and 11% at 1985 prices in the estimates for the year 1982. The 1985 series also gives a larger weight to the trade sector, while the relative share of finance and government is radically smaller.

Depending on which of the four series one reads, the government constituted a quarter, one-seventh or one-tenth of GDP in 1982. Interestingly, when accounted for in current prices (i.e., 1976 in 1976 prices), the government share of GDP remains stable at 10% throughout the period. This can

be explained. In Tanzania, the government sector was deflated by an index of public sector wages. Famously, such wages did not follow prices within the rest of the economy. While prices rapidly increased in all other sectors of the economy, public sector wages lagged behind, and the government sector appeared to be growing. Thus, the constant price series of Tanzania significantly overestimates the growth of the public sector. According to Young (1994, p. 6), this represents 'a little noted, but important distortion in national-income accounts'.

Figure 2 summarises the aggregate growth rates according to the four different time series. It is particularly difficult to harmonise the different series with regard to economic performance from the late 1970s' decline in Tanzania. The difference between these estimates derives from the different ways of taking into account agricultural output that is marketed outside of official channels. Conversely, the difference in estimates for the late 1980s to early 1990s' revival period in growth depends on how sensitive such estimates are to recording 'new' output versus 'old' output in formal marketing channels. Moreover, the extent and timing of the decline in the 1970s vary considerably, leaving the comparative economic performance of Tanzania across time in uncertainty.

4. Misunderstanding the Tanzanian growth evidence

A World Bank publication records that the national accounts methods were modified in 1995 and that a revised series was published in 1997 (Ndulu and Mutalemwa, 2002, p. 51). As pointed out above, these revisions went back to 1987, which meant that the World Bank decided not to report growth data for the earlier period. The PWT, trying to reconcile the conflicting estimates, left the discrepancy in their data series. This has led to erroneous conclusions by data users. In the *Handbook of Economic Growth*, Durlauf *et al.* (2005, p. 574) argued that negative 'output' shocks are a typical phenomenon among low-income countries. To illustrate their point, Durlauf *et al.* compiled a 'top ten list' of output collapses. Not realising it was purely a statistical shock, they included Tanzania (1987–90) in their list. When economic development experts are not country experts, the road from fact to fiction is short.

The recently published *Political Economy of Economic Growth in Africa 1960–2000* is the most comprehensive and technically sophisticated study of African economic growth to date (Ndulu and O'Connell, 2008; Ndulu *et al.*, 2008). The first volume consists of a discussion of the findings from the aggregate growth literature, while the second volume

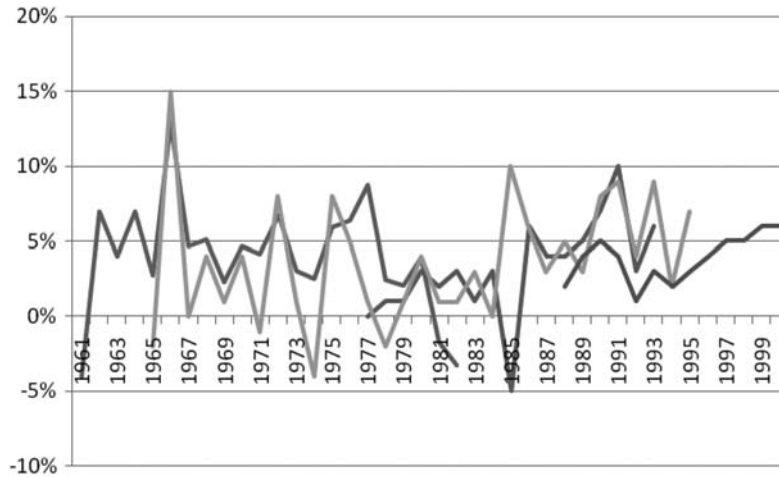

Figure 2: GDP Growth at Constant Prices, Tanzania 1961–2001. *Sources*: National Accounts Tanzania (various editions).

complements this with a range of country case studies. In these case studies, different country experts have identified episodes of growth and have associated them with periods of policy change. The volumes largely support the orthodox interpretation of African growth, one that associates economic control and distortion of prices with slow growth, while predicting a positive growth effect from the liberalisation of economic controls.

In Ndulu *et al.* (2008), Mwase and Ndulu place Tanzania under the heading of four decades of episodic growth. The authors find that there was early success during the first ten years of independence, while 'Tanzania's growth experience during the control regime period was low, largely on account of economic mismanagement' (2008, p. 427). According to Mwase and Ndulu, this 'strong control regime' existed between 1970 and 1985. Furthermore, they hold that there was a shift towards liberalisation 'accompanied by a strong revival in growth' during the last decade and a half. While this summary neatly coheres with the picture of liberalisation causing growth (and conversely, controls causing slow growth), its consistency with the growth evidence is questionable. First, there is an element of confusion concerning their identification of the periods of the 'control regime' and its associated growth episodes. In Section 1, Mwase and Ndulu refer to a ten-year period of growth following independence (i.e., 1961–71). Later, when average growth rates are calculated for the control regime, it is instead defined as 1970–85; thus, a few years are overlapping. However, later on in the same text, 'early growth'

Table 3: Tanzania 1985–95: Sharp Recovery in GDP Growth?

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Average
PWT 6.1	9	6	20	−33	5	3	3	−9	13	1	3	1.9
PWT Revised	9	6	20	Void	5	3	3	−9	13	1	3	5.4
Maddison	0	3	5	4	3	4	2	1	1	2	4	2.6
1976 series	−3	3	5	4	4	5	6	4	4			3.6
1985 series	7	7	6	6	2	7	6	4	4	3	5	5.2
1992 series				4	3	6	3	2	0	1	4	2.9

refers to the period 1961–67, while the period of strong control is defined as 1967–85. In other words, the purported relationship between slow growth and strong control is inconsistent.

While there was a revival of growth after 1985, it was not strong, and it was not associated with the whole fifteen-year period. There was a revival in growth compared with a prolonged period of decline, but it did not compare favourably with an interval between the Arusha Declaration (1967) and the first oil shock (1973). There is also uncertainty as regards the direction of causation. There was an increase in economic controls in the late 1970s, which was itself a direct response to the economic shocks. Moreover, these exogenous shocks constrained growth directly. Therefore, claiming a causal mechanism between controls and slow growth is daring but not laudable, especially when one considers the disagreements in the growth evidence itself.

In analysis of Durlauf *et al.* (2005, p. 574), the revision of statistical methods in Tanzania was treated as one of the top ten output shocks in the world. In the hands of country experts, one would expect a more careful treatment. Mwase and Ndulu are aware of the Tanzanian revision, and in a footnote to a figure (Ndulu and O'Connell, 2008), for the econometric analysis it is noted, '1988 is treated as a missing observation because the series shows an erroneous massive downward adjustment in that year.' However, simply treating 1988 as void is unsatisfactory. Furthermore, it does not solve the problems of the PWT series. The resulting evidence misleadingly strengthens the hypothesis of a sharp recovery in growth during the reform period (as shown in Table 3). In 1987, there is a massive growth in the PWT data, an increase that is not supported by any other growth evidence. This leaves the revised PWT series seriously overestimating post-adjustment growth in Tanzania. Before leaving the year 1988 void, the growth between 1985 and 1995 was measured as averaging less than 2%.

After the year 1988 is treated as void, the average jumps to 5.4%. For the year 1987, the PWT report 20% growth, while Maddison and the official data report 5%.

5. Conclusion

As demonstrated, there is considerable uncertainty and room for misinterpretation regarding the Tanzanian growth record. The data are seemingly malleable; thus, claims of causal relationships between policy variables and periods of economic growth should be treated with caution. The analysis of Tanzania's economic growth in the post-colonial period suffers from unreliable data. Moreover, these implications go beyond this individual, national case.

African economic development literature has concentrated on two serious and interrelated questions. The first concerns the relative importance of external shocks and economic policy in accounting for growth failure in the 1980s. The second concerns the merit of structural adjustment in bringing about renewed growth in the 1990s. As the preceding investigation suggests, the answers to these questions cannot be sufficiently addressed by a data set. Furthermore, the use of a specific data set may itself condition one's findings.

Both development agencies and scholars are well advised to pay more attention to the actual processes of data production. Since Lewis (1954), one of the central issues in development economics has been the marginal productivity of labour in the 'subsistence' or 'informal' sector, and development as such has been conceived as a process of structural change from the 'traditional' to the 'modern'. These are important questions, and they are questions that are settled at statistical offices. Before the 1997 revision of accounting methods, the Tanzanian statistical office operated under the assumption that the informal economy declined alongside the formal. Since the revision, this assumption has been reversed. When such assumptions are already made during the production of data, empirical testing is precluded, thus setting limits to the range of questions that we can expect data alone to answer.

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