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An Examination of Reliability and Adequacy of Macroeconomic Data on Ghana: A Case of inflation rates on Ghana.

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Abstract

This study sets itself to assess and examine the quality of macroeconomic data published in Ghana with respect to reliability, timeliness; adequacy and inconsistencies in inflation rates in Ghana.The objective of this study is to assess the quality of official macroeconomic data produced in Ghana pertaining to reliability and consistency. The following was observed: The test of reliability indicates that inflation data produced in Ghana are reliable. The F test used to find the overall significance also indicated that the level of significance was consistently low for 1960/69 and 1980/89. The 1970/79 and 1990/2000 data however, showed a high level of reliability and consistency. We therefore conclude using the test of reliability results and the F test, to draw an inference that inflation data are reliable. However, the level of significance is low. Users must therefore check for these discrepancies before using them for research or policy analysis. The study recommends that GSS, the Universities and private agencies as well as data users should join hands to produce quality data.Researchers must also evaluate the quality of data they use and make recommendations for improvement.GSS must endeavor to produce complete, timely and accurate statistics.

Keywords: Examination, Reliability, Macroeconomic Data, inflation rates, Ghana

INTRODUCTION

This study was necessitated by the notion that data generated in Ghana does not reflect the reality or what is actually happening in the economy. Recent research findings have also highlighted inconsistencies among data series for almost all African countries.

The importance of accuracy and adequacy of data in any economy cannot be over emphasized since any development depends on data. Planning and development will be meaningful and effective if there is enough data which will enable development to spread to where people need it most. For example in a developing country such as Ghana, there is the need to provide infrastructure in areas where majority of the inhabitants will benefit. If the district need schools, but the size of the population is small, it may not qualify for such facility. To overcome such difficulties, the Statistical Service do everything possible to provide accurate and adequate data to enable planners do effective work, by sending development to all parts of the country where needed.

An implicit assumption underlying this study is that the data from official sources especially inflation data, expenditure data, population data etc. are reliable. This assumption is based on the fact that the agency that collects and process data in Ghana, Ghana Statistical Service (GSS) has approved procedures based on UN conventions for collecting reliable data. The service mandate is to collect, collate and process raw data for public consumption and we expect them to do same. In 1985, the Statistical Service Law [PNDC Law135] established the GSS and its Board which raised the status from a government department to an autonomous Statistical Service within the Public Service of Ghana. The functions of the new service [GSS] include; data collection, compilation, analysis and publication of regular statistical information in the following areas among several others: Agriculture, mining, prices, national income accounting, public finance and public debts, education and trade [Statistical Service Law [1985].

 For instance a low inflation may mean a higher purchasing power, that is, we can buy more goods and services with our present level of income. This means low inflation is preferable since price levels will go down, interest rate would be expected to fall as well as the cedi appreciating making our import cheaper.

However some observations and concerns have been expressed recently by the general public. Most of these concerns are about lack of confidence in GSS data especially the inflation rate. A section of the public thinks that GSS prepares data to suit government's aspirations and how to achieve its political objective.

The implication of this assertion is that it raises some policy- related problems. For instance, if an incorrect inflation rate is declared people expectation will be higher especially if the low rates do not reflect in their living standard. Low inflation may mean to some people low rate in borrowing leading to more investment and economic growth. In the absence of these workers as well as unemployed will be dissatisfied since many of them will be deprived of having access to goods and services produced in the country. In addition, if inaccurate data is used by planners and other researchers, divergent results would be obtained leading to wrong conclusions.

GSS over the years has been under constant criticism by the public especially other political divide as well as official data users that:

i.   A section of the public argue that the sample chosen by GSS for the surveys are usually not representative enough to enable the findings to apply to the whole country. For example, the report presented by GSS on Ghana Living index [GLSS3] which was to be used to improve the minimum wage in Ghana was rejected by the government. The reason for the rejection was that the sample size was not a representative of the labour force. [Statement made by Ag. Government Statistician at Training section for GLSS3]

ii.   Users of official data argue that the data published by the service are not reliable because the sources of collection are not reliable. Some argue that, because sometimes the respondent do not cooperate with the enumerators, and at times refuse to respond , the interviewers sometimes do 'cook' answers themselves.

iii. Publicity is a problem because of insufficient funding of most surveys. The consequence is that the public is not well informed, especially those who are illiterate and sometimes even the literate do not see the need to provide information about themselves. Such attitude affects the quality of information given by the respondents.

iv.   Other concern expressed by some members of the public is the low level of remuneration given to the interviewers and inadequate data.

This study set itself to:

i. assess the reliability, consistencies and timeliness of inflation rates in Ghana.
ii. examine the level of adequacy of other macroeconomic data in Ghana for socio-economic development.

DEFINITIONS AND CONCEPTS

Inflation is variously defined by many economic writers, for example, Mishkin F., 2004, defined inflation as a continual increase in the general price level, that affects individuals, businesses and government. The quantity theory tells us that in order to translate an increase in the general price level into a sustained inflation, the supply of money must be on sustained basis.

Many countries have experienced high inflation but have managed to reduce it, because low inflation is always one of the main macroeconomic objectives of most countries, that is, how to stabilize prices to make the citizens have a good living. Mugur Isarescu 2008, the Governor of Romania National Bank, stated that between 2000-2007 Romania managed to obtain an annual average 5, 8% disinflation rate while maintaining price stability through a appropriate mix of macroeconomic policies. This success was due to the independence of the national bank that enabled the governor and his/her team to solve the problem.

Turkey another developing country fought to bring inflation down. Between 1996-2006 committed to program with IMF to reduce inflation and improve economic situation of Turkey (Telli, Voyvoda, Yeldan, 2009). This is an indication that a government performance is appraised higher if it achieves a low inflation.

Ghana's recent inflation rates since 2010 are still higher but far better than previous years especially during PNDC and NDC first and second civilian rule. The rates increased from 8.5% in October 2011 to 14% in February, 2014 a rise of 5.5% using the new base year of 2012. Ghana Statistical Service attributes the high inflation to recent reduction in utility subsidies by the government. The government has consistently cut subsidies on fuel, water and electricity to consumers. This has pushed inflation up, for example there has been price rises in housing, gas, fuels that has affected transport fares and clothing. This is making life unbearable to government workers, those in the private sector who are employed and those unemployed making it difficult to commute to and from their work places. Considering the effects of inflation on the living standard of the people and how Ghanaians expect low inflation to reflect in their condition of living which they don't see it is important that these data be relied on. The writer do not doubt the integrity of the service but want to test the reliability of reflation rate to ascertain and build confidence in its use by the public.

Cecchetti, S. G. stated that reliability is composed of both "true" score which is unknown and the "error" in the measuring processes. The true score is essentially the score that a person would have received when an instrument measure the same object or individual repeatedly under the same conditions. He argued that an absence of reliability can have serious effects on

all types of scientific inquiries, and that if a procedure which is assessed to produce a reliable data, is applied to a different population under the same conditions the second score must also be valid.

Literature available indicates that research design constitute the blue print for the collection measurement and analysis of data. Hence, the overall quality of research is measured by the extent to which it enhances the reliability of data and the validity of the findings and that most researchers hardly give adequate thought to this desirable attribute, but mainly assumed the reliability of data being used. Even the limited attempt to evaluate the quality of data has focused on sample surveys on specific matters such as income distributions [Rajaraman,1976]. This implicitly assumed the absence of problems with secondary data available from published sources.

The severity of the problem of data inconsistency was brought out clearly by the World Bank sponsored conference held in Kenya in June, 1991. Participants expressed serious concern about the low degree of reliability of published data upon which applied research workshop was based. In a similar conference held in May 1991 members observed wide discrepancies in identical data series for the same country.

Finally Ariyo and Adenikinju (1996) demonstrated the importance of data reliability, as a necessary condition for meaningful macroeconomic modeling and planning in Nigeria. The study found significant inconsistencies in the level of exports and external debts.

The problem of data inconsistency should be of much concern because of its implications for planning and policy related issues. To a large extent, the real problem of reliability is how to identify the sources of measurement error.

THE CONCEPT OF INFLATION

The main macroeconomic data used was inflation rate published in Ghana since 1980. The sources of data collection were investigated; these include GSS sample design which is the population, the instrument used in data collection and the mode of data collection. We also compared the method used in estimating inflation with standard methods approved by UN. The main variable used in estimating inflation is the consumer price index (CPI). The CPI is a measure of the overall price level bought by consumers for the various goods and service. Retail price information is gathered on each type of product and then weighted according to its importance in the overall consumer spending in the construction of the CPI. GSS gather

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information on 242 items commonly purchased by consumers in the economy. The 242 items are categorized in the following sub-groups:

1. Food and non-alcoholic beverages

2. Alcoholic beverages & tobacco

3. Clothing and footwear

4. Housing, water, electricity, gas, and others

5. Furnishings, household & equipment

6. Health

7. Transport

8. Communications

9. Recreation &culture

10. Education

11. Hotels, cafes & restaurants

12. Miscellaneous goods and services

More important and common purchases like food, and housing carry more weight in the index.

CPI is stated in a particular base year which changes every few years. The first base year was 1960. In 1970 and 80 respectively a new base year was introduced after a household survey. The next base year took almost 17 years, that is, 1997 after that 2002 and currently 2012. Normally, the base year have an arbitrary value of 100 while the basket of goods is updated as and when necessary. Changes in the weighted index are what is referred to as a measure of the overall price index. If for example in 2011 the annual rate is 111.5% then using the 2002 as the base year the overall price index has increased by 11.5%

RESULTS AND DISCUSSIONS

This section reviews the major findings of the research through the synthesis of the results. The findings relate to the main objectives, namely the need to assess the quality of inflation published in Ghana in respect of, reliability, and timeliness in production.

RELIABILITY AND TIMELINESS OF PUBLISHED DATA

The study used Osterlind S.J. model of testing validity and reliability. To confirm the result we used the reliability methods by European Safety Reliability and Data Association [Esreda 1992]

These techniques used the intra-class correlation coefficient, and product moment correlation coefficient. The value of the coefficient must lie between $1 \le r \le 1$. Any value outside this range indicates that the data is unreliable.

Table 1. Summary of result of the Correlation of both inflation data. Correlation Matrix

Sample data-inflation GSS [1980-2010]	Value of "r"	Mean
	1.000	0.9918
Confidence inter.	0.9979	

All the four sets of test conducted on inflation data on the average yielded the same result. Since "r" value did not deviate from the standard set, the data is assumed to be reliable.

The study then made a further test by adding data published by a private agency (CEPA) to see if both data would be reliable. We did this because the intra-class correlation can only be used when the data is coming from two different sources. The result showed no significant change.

Table 2 Correlation Matrix

	GSS	CEPA		
GSS	1.000			
CEPA	0.9999			
N. of cases	10			
0.0000	0.9999	0.9999	0.9999	0.0000

The final test was done by combing both the intra-class correlation coefficient (ICCC) and product moment correlation coefficient (PMCC)

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Table 3. Summary result of PMCC & ICCC using GSS/CEPA rates of inflation

INFLATION RATES	YEAR	PMCC	ICCC
	1980-89	0.9999	1.0000
	1990-99	1.0000	I.0000
	2000-2010	0.9999	0.9999
	OVERALL ESTIMATE	0.9918	0.9958

When we combined the PMCC and the ICCC to test for reliability, the results showed that the rate of inflation estimated in Ghana is reliable since both results are close to each one. However, we cannot conclude that they are reliable, unless we take the measurement error into consideration. Taking a critical look at the results, one can say that the measurement error is around 0.1% of the observed variance. The result shows a vast improvement in the reliability level. We can then conclude that during that period, the inflation rate was reliable.

A test for the overall significance of the reliability.

The study estimated 'r' as the sample estimate of the correlation coefficient, and depending on the test, concluded that inflation in Ghana can be reliable, 'r' as a statistical estimate is subject to error and need to be tested for variability. We used the F test to test for the overall significance difference. The results are presented below.

Table 4. Summary statistics of analysis of variance using 'F' test

Year	Computed f test	Theoretical F test critical value95%	99%
1980-1989	0.736	5.32	11.26
1990-1999	0.199	5.32	11.26
2000-2010	0.822	7.71	21.20
1980-2010-overall estimate	0.223	4.125	7.44

Sample Source –Inflation rates

The overall estimate has 'F' computed as 0.223, with a critical value of 5%, a 1% level of significance of 4.125 and 7.44. Since 'f '<$F_{.05}$ and 'f' < $F_{.01,}$ we discard the notion that, the rates are

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different, while the contrary is true. This means the two rates are the same. This result indicate that the two 'r's are statistically significant at both 95% and 99% levels of significance. The 'r' is therefore consistent.

We further found out whether over the past thirty years the reliability of the estimated inflation rate has been consistent. To achieve this we divided the thirty years into three groups of 10 and tested each group separately.

Within the period of 1980-1989, the computed 'f' was 0.736 and that of $F_{.05}$ and '$F_{.01}$ and $F_{.05}$ from the table were 5.32 and 11.26 respectively. At both alpha levels, 'f' falls within the accepted zone, we therefore accept and confirm the reliability of inflation rate.

Lastly in the period of 2000-2010 the computed 'f' was 0.822 and that of $F_{.05}$ and '$F_{.01}$ and $F_{.05}$ from the table were 5.32 and 21.20 respectively. At both alpha levels, 'f' falls with the accepted zone, we therefore accept and confirm the reliability of inflation rate.

From the analysis of the variance test conducted, we conclude that the 'f' test was significant, and it confirms that the inflation rates are reliable. However, this reliability is not consistent with all the years under consideration. A critical look at the result indicates that the coefficients are not consistent. Even though the 'r' is found to be significant in all the three year groups, the 'f' test shows that 1990-1999, the overall estimates are low since low rates indicates a weak relationship between observations. We conclude that the inflation rates published within the period above were less reliable. The inflation rates were more reliable and consistent between 1980-1989 and 2000-2010. The conclusion drawn from the above test is that the consistency of the reliability of the inflation data published within the last thirty years had been fluctuating.

Possible reasons for lack of consistency may be explained as changes in the basket of goods. The baskets of goods have been changed two times since 1960. This was done to reflect the economic situation and to take care of changes taking place within the economy. The change may affect the collection of data since it will increase the volume of work which may affect efficiency of work if not properly supervised.

In conclusion, the study revealed that much needs to be done if quality data is to be produced. The test of reliability however, proved to be positive.

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CONCLUSION AND RECOMMENDATIONS

The study set itself the following objective; to assess the quality of official macroeconomic data produced in Ghana with respect to reliability and consistency. The following were observed:

The test of reliability indicates that inflation data produced in Ghana are reliable. The F test used to find the overall significance also indicates that the level of significance was consistently low for 1990/99. The 1980/89 and 2000/2010 data however, showed a high level of reliability and consistency. We therefore conclude by drawing inference that data on inflation is reliable.

The Ghana Statistical service seems to enjoy a monopoly over the production and publication of data and therefore we are of the view that the GSS should collaborate with other organizations in compiling specific data for the country.

The study also realized that there is paucity of the informal sector data which makes planning and development very difficult for policy makers. We must encourage the participation of private organizations who desire to enter the production and publication of data.

The government can help GSS to establish a database for the country, by bringing all private organizations' publications under GSS. This will render easy accessibility of information to users. Since GSS provides the bulk of the nation's data, the budgetary allocation to that sector should be increased to meet the demand of the users.

The creation of a data base, must take into consideration some of the serious economic indicators such as unemployment, underemployment, national income, external debt and domestic debt must be sufficiently provided.

Ghana Statistical Service collects information from the public and compiles them for its users. The Statistical Service Act must be applied so that those who refuse to give information to the service would be dealt with in accordance with the law. With proper publicity and education, the public will see the need to give information about households, employment, and many other facts to help establish a data base for Ghana. There is therefore the need for GSS to co-ordinate the activities of all units that produce data to ensure that the data produced are of good quality.

REFERENCE

Ariyo and Adeniran A 1996 Quality of Macroeconomic Data on Africa, Nigeria As A Case Study, AERC Publication.

Arlene, Frank   : The Design of Sampling Survey, Saga Publication, Thousand Oaks, London and New Delhi, 1995.

Arnold, Fred   ; Assessment of the Birth History data in Demographic and Health Surveys. In an assessment of DHS 1 data quality.

Bolurnstedt, George (1969) "A quick method for determining the reliability and Validity of multiple- item scale" America Sociological Review No. 34.

Boughton James M., William H., Branson, 1991, "commodity prices as a leading indicator of inflation in Kalal Lahiri and Geoffery H. Moore edn. Leading Economic indicators: New Approaches and Forecasting Records, Cambridge Universoty Press.

Bowerman, Bruce, Applied Statistics Involving Business Process. Irwin series, 1997.

Caldwell, J.C. (1960) Study of Age of Misstatement among young children in Ghana Demography 3 21.

Clower, and Associates Growth without Development, North Western University Press, Evanston, 1996.

Cureton, E. E. (1965) "Reliability and Validity: Basic assumption "and experimental design" Educational and Psychological Measurement.

Crocker L., Algina J. 1986, Introduction to Classical and modern test theory. Orlando, FL; Harcuort Brace Jovanovick 1-52ff

Cecchetti,S,G, Chu RS &C. Steindel 2000, The unreliability of inflation indicator, current issues in economics and finance 4/6. Frederal Reserve Bank of New York.

Economic Journal   Model of Economic Growth, Dec. 1977.

Epstain G., Yeldan E., 2009, Beyond inflation targeting, assessing the impacts and policy alternatives, Edward Elgar Publishing Ltd

Ewusi K.   "The Determinants of Price Fluctuation in Ghana" ISSER. Discussion Paper, Legon, Dec., 1977.

Foster, Philip Zolberg, A. R. Ghana and Ivory Coast Perspective on Modernization University of Chicago Press, 1971.

Granquist, L. and Kover (1996) "Editing of survey Data" How much is enough. Reported in the Survey Statistician No. 34, 1996.

MishkinF.,2004, The economics of money, banking and financial markets 7th edn. Pearson Addison Wesley.

Telli C, &Voyvoda E & Yeldan E. 2009 "A general equilibrium assessment of twin targeting in Turkey". In Beyond inflation targeting: G   Beyond inflation targeting, Edward Elgar Publishing Ltd. 203-227

Vitesh G,. Subrina H., 2004, Relationship between inflation and Economic Growth, working paper 2004/04 pg8 htt/www.reserve bank gov't /doc/2004 wp pdf.

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