Journal of
African Studies and Development

Academic
Journals

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ARTICLES

Full Length Research Paper

Reasons for low birth registration in Sudan

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The birth registration environment in Sudan is mature but confused. This study was undertaken on the birth registration practices in Sudan with a view to ascertaining the causes and effects of low birth registration. The registration of births is not improved with time, there is no progressive procedure in the registration application and the registration system effect according to sex ratio, number of women in the reproductive age (MWRA) and number of health facilities. To test these hypotheses, we proceed by considering regression model for which time series and cross-section as statistical tools for analyzing data are available by applied fixed effect model.The overall situation of birth registration in the country is characterized by limited coverage and unclear coordination between institutions both at central and local levels; and some geographic and financial barriers and birth registrations affect the number women in the reproductive age (MWRA), number of health unit which provides registration services and sex ratio. To improve the birth registration environment in Sudan, first, increase awareness of the importance of birth registration; secondly, birth registration infrastructure of capacity building support is needed at all levels of birth registration system.

Key words: Birth, registration, fixed effect model.

INTRODUCTION

Registration may not be seen as important by the society at large, by a government facing severe economic difficulties, by a country at war, or by families struggling with day-to-day survival. It is often considered to be no more than a legal formality, unrelated to child develop-ment, health, education or protection. Major factors that influence the birth registration levels in a country include: the magnitude of national commitment to birth registration as a priority; the value that individuals and families place on birth registration; the existence of an adequate legislative framework; the existence of sufficient infra-structure to support the logistical aspects of registration;

and the number of barriers that families encounter during registration.

A boy or a girl whose birth is not fully registered and who is not provided with a birth certificate is denied the right to a name and nationality, a situation that may also lead to barriers in accessing other rights including health care, education, or social assistance. Later in life, identity documents help protect children against early marriage, child labor, premature enlistment in the armed forces or, if accused of a crime, prosecution as an adult. Registration also enables the individual to access further identity documents, including a passport. The value of

birth registration as a fundamental human right is often overlooked due to the continuing lack of awareness that registration is a critical measure to secure the recognition of every person before the law, to safeguard his or her rights and to ensure that any violation of these rights does not go unnoticed.

Birth registration has been an issue which received attention of international community since some time. International Covenant on Civil and Political Rights (ICCPR) states, "Every child shall be registered at birth …" (ICCR article 1966).

The1986 United Nation (UN) Convention on the Rights of Child (CRC) specifies, "The child shall be registered immediately after birth and shall have the right to have a name, the right to acquire a nationality ….." (CRC article 1986).

Despite the great efforts made by international organizations and UN in particular, the situation of birth registration is not improving in many developing countries. According to UNICEF Report of 1998, about 40 million newborn children did not receive birth registration; 10.5 million of them were in Africa. Same organization report of 2002 showed that the number of unregistered children in 2000 reached 50 million (41% of births worldwide).

Reasons for no registration

There are many reasons for the lack of birth registration in all countries around the world Caretakers of children that have not been registered were asked: "Why is (name's) birth not registered?" The reasons coded for analysis were: (UNICEF report of 2005).

1. Costs too much
2. Must travel too far
3. Did not know child should be registered
4. Late and did not want to pay fine
5. Does not know where to register
6. Does not know why the child was not registered
7. Other reasons.

Data related to the reasons why a child were not registered were available for 48 countries. Unfortunately, across several countries a large percentage of responses were coded as "other reason" or "don't know," potentially hiding commonly encountered reasons for not registering a child. Based on the remaining number of responses that fall within the pre-coded reasons for non-registration, it is possible to ascertain some of the major reasons for non-registration by ranking the responses.

The most common reason cited in (20) countries was that birth registration cost too much. Households in (14) countries were most likely to find the distance to the registration centre to be the primary barrier to the registration of their children. In eight countries, not knowing

that the birth should be registered was the most common reason given by caretakers for not registering their child. While incurring a late fee was the most common reason for non-registration in only two countries, it was the second most common reason in five additional countries. Lack of knowledge of where to register was the most common barrier in Sierra Leone and Venezuela, and the second major reason in five additional countries (UNICEF Report 2005).

Birth registration in Sudan process

History of official birth registration dates back to1900 during the colonial era, though an act by the office of the Governor General. Birth registration was started at limited number of urban center (e.g. Sudan, Atbra, and Wadi Halfa). The main users of this service were foreigners residing in Sudan (British, Syrians and people from other nationalities), who were using available health facilities for deliveries of their children. Nationals due to many factors had very limited access to birth registration, due to multiple factors like very high level of illiteracy, remoteness of birth registration facilities and unawareness about the importance of birth registration. In 1929, a law regulating birth registration was enacted, but nationwide access to birth registration remained limited. Registration of birth as a vital event was the responsibility of Ministry of Health through its Health Information Department in coordination with Central Bureau of Statistics (CBS). Birth registration system was centralized until 1993. All birth registration data were gathered at the Birth Registration Office under the (CBS). With the introduction of Federal System of governance in Sudan in 1993 the birth registration also was decentralized, and each State established its own birth registration database. Although, state's offices are obliged to send regular reports to the head office of Civil Registry to maintain national database.

Administrative system for birth registration

Generally, the birth registration process is conducted at three levels: National, State, Grassroots level (Table 1). According to administrative regulations in the country, the birth registration from the first day of birth up to three months of age is the responsibility of health institutions (Hospitals, Health Commissions at localities etc). Children older than three months and up to fifteen years of age are registered at the Civil Registry Office in their area. Registration of children older than three months at Civil Registry Office requires a notarized court resolution. Unregistered children older than fifteen years will be referred (with a letter of non-registration from the Civil Registry) to the Medical Commission Functioning based on a law issued in 1974) for age estimation. No feedback

Table 1. The Sudanese administrative system for birth registration.

Administrative level	Competent authorities
National Level	Civil Registry./ Ministry of Health (MOH)
State level	Civil Registry Office / MOH
Locality level	Health Commission /Health Statistician.
City level	Health institutions / Midwives.
Grassroots level (village and mobile communities).	MOH staff (MD, Midwives) or entrusted people at areas where there no health facilities.

Source: Study- secondary data.

system from the Medical Commission to Civil Registry exists. The only link between the Civil Registry and Medical Commission is that the Civil Registry issues a letter of non-registration for those who are older than 15 years, and present to them for issuance of a birth certificate if their birth registration data are not found in the birth register. Age estimation has its negative impact on different spheres of life, because it never reflects the exact age.

Machinery of birth registration

Despite the fact that Civil Registry law was issued in 2001,The official start of Civil Registry was in the 1st of January 2005 under the Ministry of Interior. The functional infrastructure of Civil Registry still not in place due to preparatory works needed to be done. A special committee was established to design a work plan .After studying the relevant experience of civil registration in other countries; the committee developed a work plan for introduction of civil registry in Sudan. Since its official establishment, the Civil Registry opened Offices at all States of the country starting to deal with birth and death registration and other civil affairs. Its activities relating to birth registration at present are limited to late registration (after three months and up to 15 years of age), and issuance of birth certificates (Official Extract from the General Birth Register) and letters of non-registration. The main constraints and barriers facing the immediate implementation of planned activities are related mainly to lack of financial resources and trained personnel. Activities relating to timely birth registration are still carried out by staffs of Ministry of health MOH and report about birth events are sent to the Civil Registry on monthly and yearly bases.

   At present birth registration is carried out at three levels.

Grassroots level

Notification of birth event is done most of the time by midwives, who usually attend births at home or at rural health establishments. If birth of the child occurred at home the concerned midwife has to register this vital

event in her own book (ordinary exercise book).
The following information is required for registration:

1.Name of the child.
2.Sex of child.
3.Time and date of birth.
4.Father's name (full four names), age, occupation, Religion, and place of residence
5.Mother's name (full four names), occupation and place of residence.
6. Name of informer.

Information registered by a midwife should be delivered to the nearest health facility in her area to make a notification about the event of birth within a period of maximum one week. The concerned entity in the health facility (usually the health statistics staff member or entrusted health worker) enters the information in the prescribed register (Birth Register book No.1) i.e. a book with preprinted columns and numbered pages, and then issue a birth certificate after payment of fees (that may differ from one place to another); variations in fees depend largely on service fees put on the issuance of birth certificate by local authorities, which depends on local estimations. No clear provision in the law, that fixes the fees for certificates issuance. This birth certificate should be received by one of the child's guardians but sometimes the notifying midwife receives the certificate and delivers it to the child's family. The study observed that there are no supervisory or corrective measures exerted by authorities for control of birth certificate fees.

Locality and city level

Each locality has to have a health commission within its structure. This health commission is supposed to be responsible for entry of birth data received from midwives or other notifies in (Birth Register Book No 1), which an official document is issued by the Federal Ministry of Health – National Center of Health Information. The book has a serial number for each page (original and one copy). After registering the data in this book the responsible person at health commission issues a birth certificate. On monthly basis the locality sends a copy of

filled register (Book 1) to the MOH or sometimes to Civil Registry authorities, where they are stored for future use and issuance of birth certificate for late presenting people.

National level

It is essential that there is a central (National) unit with full-time staff for the birth registration in the country to be in charge of legislative changes, co-ordination, standardization of forms and practices, the management of central database and data processing. This Job is still carried out by the National Health Information Center (NHIC) at the Federal Ministry of Health (FMOH). This center coordinates its birth registration activities with the newly established Civil Registry.

Up to 1993, legislation and data management of the birth registration system in Sudan was centralized. All data about birth registration were sent from different parts of the country to the NHIC and CBS, where they are processed, disseminated and stored. Birth registration data in combination with other vital data are used by relevant authorities for developing national indicators (e.g. Analysis of fertility and mortality rates by age, and development of projections of demographic change) and planning of development policies, particularly in health, education, housing, water and sanitation and other services. According to the head of Civil Registry Office Sudan "the last vital statistics report done was in 1968 (Figures 1 and 2).

METHODOLOGY

A pool data (cross sectional/times series) is a statistical method, widely used in social science, epidemiology, and econometrics, which deals with two-dimensional. The data are usually collected over time and over the same individuals and then a regression is run over these two dimensions. Multidimensional analysis is an econometric method in which data are collected over more than two dimensions.

Data were collected mainly from secondary sources (Reports, books etc). There are not accurate estimates for birth registration rates in the country due to rudimentary system of birth registration, data collection, transfer, and processing. An important consideration for the accuracy and completeness of birth registration system is the number and distribution of local registration facilities and their accessibility to the public. Large geographic area, difficult terrain, lack of transportation, low population density and civil unrest in some areas of the country may make it difficult and not feasible to locate registration facilities in remote areas. For these reasons timeliness, accuracy and coverage of birth registration often varies significantly cities, towns and rural areas and even among states.

Pooling data

These are data which variables vary both over time and across cross-sectional units. We will always refer to the units as i = 1, 2 ..., N, and to the time points as t = 1, 2, ...T . The total number of observations (i.e., lines of data in the worksheet) is equal to NT.

Some general conventions for naming these kinds of data are:

1. Panel data generally refer to data which are cross-sectionally dominated; that is, where N is significantly larger than T. Examples are the NES panel studies (N = 2000, T = 3) or the Panel Study of Income Dynamics (N = large, T = 12 or so). Such data usually have a fixed T, so that these data's asymptotic are in N, which is important.
2. Time-series cross-sectional (TSCS) data usually means data in which either T is dominant, or N-T. These data are common in comparative politics. But, it can also refer to data where N is dominant, but T is larger than in panel data (e.g. all-dyads all-years IR data, with N = several thousand and T = 50 or more). Here, N is usually fixed, and the asymptotic are in T; moreover, if we have enough data, we can say something about the time-series properties of the data as well as the cross-sectional part (Galwey, 2006; Muller and Stewart, 2006; Long, 2009).

Data structure

In panel or TSCS data, we have multiple lines of data for each unit of observation. Such data are arranged as follows (Table 2).
When analyzing such data, its good practice to -sort- the data on the N and T identifier variables periodically (Galwey, 2006; Muller and Stewart, 2006; Long, 2009).

General time-series cross-sectional TSCS regression issues

A general regression model for cross-sectional data:

$$Y_i = \propto + Bx_i + \mu_i \qquad (1)$$

This model assumes several things:

1. All the usual OLS assumptions, plus
2. That the constant term is constant across different
3. That the effect of any given variable X on Y is constant across observations (at least, to the extent that non-constancy is not specified in the model, e.g. through interaction terms).

We can write a similar model in the TSCS context as follows:

$$Y_{it} = \propto + Bx_{it} + \mu_{it} \qquad (2)$$

Note that this model assumes the same things as the earlier one, especially about the effects of constants and covariates.
In any regression context, the two assumptions mentioned are critical; violating them leads to a form of specification bias. In the TSCS context, these two assumptions are often going to be problematic. This is because, since we are observing multiple units over time, there is usually some reasons to believe that there may be differences in either α or β over either i or t. (Galwey, 2006; Muller and Stewart, 2006; Long, 2009).

Pooled model estimation

There are a number of ways that you can use information about the structure of your pooled data in estimating an equation. You might estimate a fixed or random intercept model, or perhaps a model with selected variables that have different coefficients across cross-sections, as well as separate AR (1) coefficients. On the other hand, you could estimate a separate equation for each cross-sectional unit.
The class of models that can be estimated using a pool object can

1. Birth at Home:

| Birth Event | Registration Of child's data by midwife | Notification About newborn to the nearest health facility | Entry of child's birth data in Registration Book No.1 | Issuance of birth certificate |
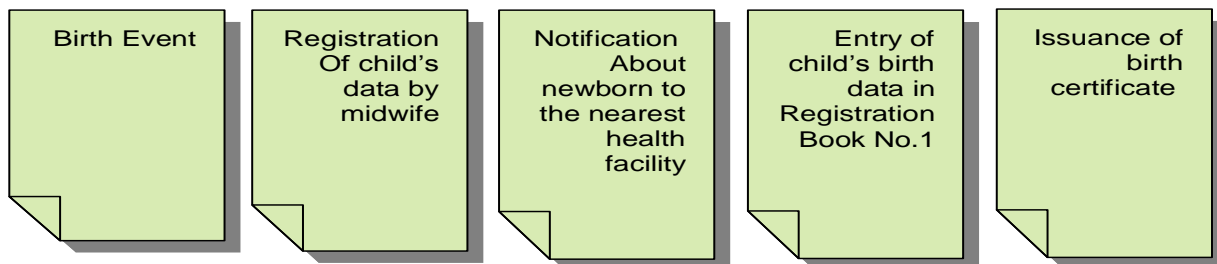
2. Birth at health facility:

| Birth Event | Notification about birth by birth attendants (through registration in a book at delivery room | Entry of child's birth data in Registration Book No 1 | Issuance of birth certificate |
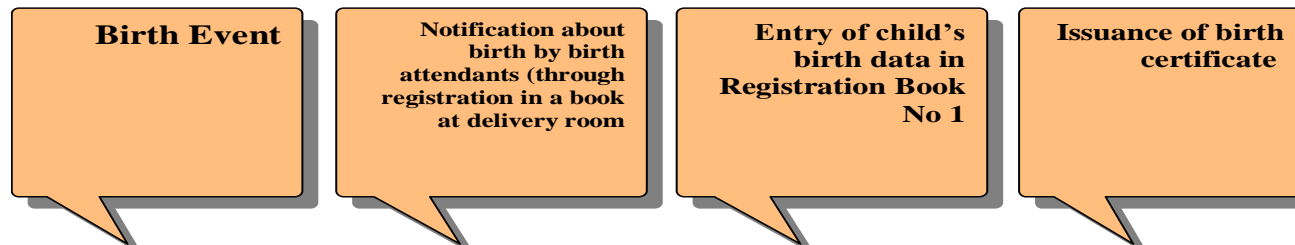
Figure 1. Birth registration. * constructed by researcher.

FMOH (NHIC)

State level State Ministry of Health (SHIC)

Health area level (Statistician of Health team)

- Local Community level
- Locality administrative unit.(Statistician of health services)
- Rural Hospitals, Urban health centers (Statistician Clerk)
- Dispensaries and rural health centers.(Health workers carryout the

Figure 2. Level of birth registration and data flow. *Source: constructed by researcher.

Table 2. Arrangement of multiple lines of data for each unit of observation.

ID	T	Y	X_1	...
1	1	250	3.4	...
1	2	290	3.3	...
...	...	...	...	...
...	...	...	...	...
2	1	160	4.7	...
2	2	150	4.9	...
...	...	...	...	...
...	...	...	...	...

be written as,

$$Y_{it} = \propto + Bx_{it} + \varepsilon_{it} \tag{3}$$

Where Y_{it} is the dependent variable, and x_{it} and Bx are -vectors of non-constant regresses and parameters for i = 1, 2 , ... , N cross-sectional units. Each cross-section unit is observed for dated periods t = 1, 2, ... T .
While most of our discussion will be in terms of a balanced sample, we can view these data as a set of cross-section specific regressions so that we have N cross-sections equations:

$$Y_i = \propto + Bx_i + \varepsilon_i \tag{4}$$

Each with observations, stacked on top of one another, we will refer to the stacked representation:

$$Y = \alpha + \beta + \varepsilon \tag{5}$$

Where α, β and X are set up to include any restrictions on the parameters between cross-sectional units. The residual covariance matrix for this set of equations is given by:

$$\Omega = E(\varepsilon\acute{\varepsilon}) = \begin{pmatrix} \varepsilon_1^{\;2} & \varepsilon_1\varepsilon_2 & ...... & \varepsilon_1\varepsilon_N \end{pmatrix} \tag{6}$$

The basic specification treats the pool specification as a system of equations and estimates the model using system OLS. This specification is appropriate when the residuals are contemporaneously uncorrelated, and time-period and cross-section homoscedastic:
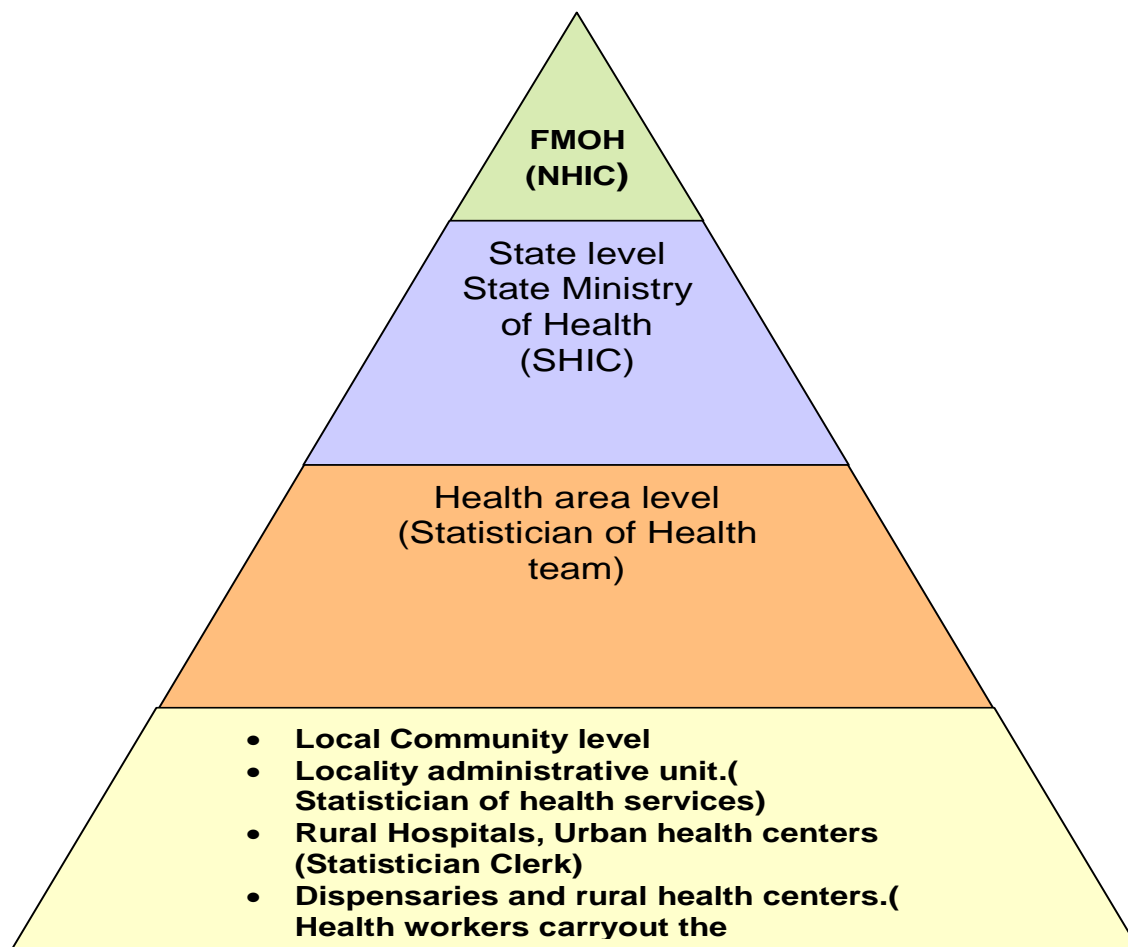
$$\Omega = \sigma^2 I_N \otimes I_T \tag{7}$$

The coefficients and their covariance's are estimated using the usual OLS techniques applied to the stacked model (Galwey, 2006; Muller and Stewart, 2006; Long, 2009).

Fixed effects

The fixed effects estimator allows α_i to differ across cross-section units by estimating different constants for each cross-section, computes the fixed effects by subtracting the "within" mean from each variable and estimating OLS using the transformed data:

$$Y_i - \bar{Y}_i = (Xi - X\bar{i})\beta + (\varepsilon_i - \bar{\varepsilon}_i) \tag{8}$$

Where

$$\bar{Y}_i = \sum_t {Y_{it}}/{T} \;,\; \bar{X}_i = \sum_t {X_{it}}/{T} \;,\; \text{and} \; \bar{\varepsilon}_i = \sum_t {\varepsilon_{it}}/{T} \tag{9}$$

The coefficient covariance matrix estimates are given by the usual OLS covariance formula applied to the mean differenced model:

$$\text{Var}(b_{FE}) = \hat{\sigma}^2_{\;w} \left(\tilde{X}\tilde{X}\right)^{-1} \tag{10}$$

Where $\tilde{X}$ represents the mean differenced X, and

$$\hat{\sigma}^2_{\;w} = \frac{e'_{FE'}\, e_{FE}}{NT - N - K} = \frac{\sum_{it}\left(\tilde{y}_{iy} - \tilde{x}_{it}^{'}\, b_{FE}\right)^2}{NT - N - K} \tag{11}$$

Where $e_{FE}\, e_{FE}$ is the SSR from the fixed effects model. If the pool is unbalanced, NT is replaced by the total number of observations excluding missing values. The fixed effects themselves are not estimated directly. We report estimated fixed effects computed from

$$\hat{\alpha}_i = \sum_t (\bar{Y} - \bar{X}'\, b_{FE})/N \tag{12}$$

Standard errors are not reported for the fixed effects coefficients. If you wish to obtain standard errors for the fixed effects, you should re-estimate a model with no intercept, including the constant term as a cross-section specific regressor. You should note that estimating the cross-section specific constant regression model with a large number of cross-section units may be time-consuming, and may result in estimates that are less accurate than those obtained using the fixed-effects option (Galwey, 2006; Muller and Stewart, 2006; Long, 2009).

DATA ANALYSIS RESULT AND INTERPRETATION

Eview *outputs* for estimating the model by using Fixed Effects are as follows (Table 3):

1. The parameters, women in the reproductive age, number of health unit which provide register services and sex ratio are significant since the probability is less than *5%*, except the literacy rate; so that means the birth registration is affected by the number of women in the reproductive age, number of health unit which provides registration services and sex ratio .
2. R-squared is 0.91, which is good for predicting the values of the dependent variable and R-squared adjusted is 0.89 which is goodness of fit of the model.
3. Durbin-Watson statistics is 2.06, in which there is no serial correlation problem in the model among errors.
4. F-statistics is 209.62 and F- Probability is 0.000, which is less than 1%*;* so the model is significant and the alternative hypothesis is accepted that birth registration is affected by the number of women in the reproductive age, number of health unit which provides registration services and sex ratio.

Table 3. Outputs of the fixed effects model analysis.

Variable	Coefficient	Std. error	t-Statistic	Prob.
LITRACY?	-74.7485	278.6194	-0.26828	0.7894
UNIT?	-462.296	138.7324	-3.33228	0.0015
MWRA?	-33.2464	16.45521	-2.02042	0.0478
SRATIO?	1036.822	292.503	3.544652	0.0008
Fixed Effects				
_SDN--C	105927.6			
_GEZ--C	45580.86			
_WNIL--C	-51666.2			
_BNIL--C	-92145.5			
_SIN--C	-67987.3			
_RNIL--C	-14272.9			
_NORT--C	-48864			
_KAS--C	-54028.2			
_GAD--C	-56952.7			
_RED--C	-80846.8			
_NKOR--C	-60646.1			
_SKOR--C	-65063.8			
_WKOR--C	-75577.1			
_NDAR--C	-70809.7			
_SDAR--C	-70890.5			
_WDAR--C	-85800.8			
R-squared	0.912899	Mean dependent var		15913.99
Adjusted R-squared	0.885318	S.D. dependent var		30077.78
S.E. of regression	10185.78	Sum squared resid		6.23E+09
F-statistic	209.6197	Durbin-Watson stat		2.061749
Prob (F-statistic)	0.000000			

5. Fixed effect model: BIRTH_SDN = C(5) + C(1)*LITRACY_SDN + C(2)*UNIT_SDN + C(3)*MWRA_SDN + C(4)*SRATIO_SDN

Substituted coefficients

BIRTH_SDN=105927.6007-74.7484782*LITRACY_SDN-462.2955202*UNIT_SDN-33.24636714*MWRA_SDN+1036.821537*SRATIO_SDN

According to the results shown in the Sudan equation above we find that C(5) is the intercept of the model and C(1) , C(2), C(3) and C(4) represent the model coefficient of the variable literacy, health unit, married women in reproductive age and sex ratio affecting the birth registration in Sudan; the model fit of R-square 91% explains the change in birth registration process by literacy, health unit, married women in reproductive age and sex ratio. The model is significant and the alternative hypothesis is accepted that birth registration is affected by literacy, health unit, married women in reproductive age and sex ratio since F- probability is of significant value.

Conclusion

The two models agree with the variables in the model coefficient, which are literacy, health unit, married women in reproductive age and sex ratio. These factors affect the birth registration process in Sudan and this finding is approved by UNCIF 2005 Report and Sudan Household Health Survey (SHHS I & II) 2006 and 2010 shows that is registration rate is low.

Implementation of birth registration system through a civil registry is a slow process, which requires an intensive, continuous follow-up and long-term commitment of the government. It will take some time to develop a common understanding of the key functions of such a system and its importance. The overall situation of birth registration in the country is characterized by limited coverage and unclear coordination between institutions both at central and local levels and some geographic and financial barriers. There are many areas that still need to be studied in-depth (e.g. geographical and cultural specificities…) to develop a clear legal frame and coordination mechanism between all authorities related to birth registration, Civil Registry, MOH, MOE, NCCW, CBS and strategic planning entities. Areas that need immediate

attention are: promotion and awareness raising, capacity building of birth registration system and increase of its coverage to reach the remote areas and specific groups of populations (nomads, street children etc), involvement of civil society, grassroots organization and community leaders and activists, statistical analysis of the data of children who are likely to be registered at birth. In general, the data in this study show that:

1. People who live in rural areas have limited access to health care, are not registered at birth.
2. People like to register males than females.
3. Rural poverty may negatively affect numbers of registered children
 4. Improving mother's knowledge and education might benefit birth registration rates
5. No programming to increase birth registration rates.

Conflict of Interests

The author has not declared any conflict of interests.

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Full Length Research Paper

Real wages and labour productivity in Tanzania: How do they link?

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Using data from national level surveys, the present paper undertakes an empirical analysis of the linkage between labour productivity and real wages in Tanzania. After making tabular presentations of growth in labour productivity and real wages by industry and sector (public and private), regression analysis is undertaken to examine the factors that influence incomes. Granger causality test is applied to examine the nature of the relationship between real wages and productivity for manufacturing industries. The paper finds no clear pattern in the link between real wages and productivity. Real incomes in the private sector have registered negative growth while the opposite has been the case in the public sector. In addition to education, age, occupation, and location are found to be important determinants of income. Real wages have significant impact on productivity in the manufacturing sector, thus lending support to the efficiency wage hypothesis.

Key words: Labour, productivity, real wages.

INTRODUCTION

Background

The fact that labour productivity and real wages of workers have certain economic linkage that influences labour market performance has been a subject of interest for scholars, policy makers and labour unions. This is based on the assumption that a well-functioning labour market performs at least two main functions of matching workers with firms and setting wages. The first function of labour market efficiency requires the labour market to be able to allocate workers to firms or industries with the highest productivity or the best future prospects while the

second aspect of the labour market efficiency is to determine wage rates. In a situation where the labour market functions with minimal frictions and information asymmetry, we expect labour markets to set wages or remuneration of characteristics at their productivity contribution; otherwise, workers are not provided with proper incentives to invest in human capital characte-ristics, such as schooling or tenure (Biesebroeck, 2003). However, the nature and extent of the working of this linkage and its impact on the growth-poverty reduction

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linkage can differ from one labour market to another. Also, studies on the nexus between economic growth, employment and poverty in various economies show that a high rate of economic growth is a necessary condition for poverty reduction, but not sufficient. Productive employment and the employment intensity of growth play an important role in translating the benefits of economic growth into poverty reduction (Khan, 2007; Krongkaew et al., 2006). And, it is not only the quantity of employment but also the returns from work that is important from the point of raising the incomes of individuals and households.

On the other hand, basic economics tells us that the interaction between wages and productivity in a competitive economy determines the standard of living of the employed population as well as the distribution of income between labour and capital. The linkage is used as basis and justification for setting minimum wages. The standard prescription is to restrict wage increases above the rate of productivity growth, an action which is also sought to increase the level of employment in the economy. For instance, an attempt is being made in Europe, following the imbalances brought by the global financial crisis in 2008, to establish the link between wage and labour productivity as a mechanism to stabilize labour market performance in the region so as to influence pro-employment growth. Furthermore it has been indicated that balanced trade would require wages to grow in line with national productivity and a targeted inflation rate. Otherwise, countries with relatively higher growth in labour cost would systematically lose market share and build up a trade deficit. However, how wages are linked to labour productivity and the way this link influences employment growth presents mixed stories in various economies, and it is not well established in many, especially in developing countries. As a result, most development plans and policy frameworks do not take into account this important aspect.

In the context of Tanzania, wage employment may not appear to be very substantial if one looks at the share of such employment in total employment[1]. But it needs to be noted that on the one hand this share is increasing, and on the other, wage employment is an important source of income although it may not be mentioned as a person's main occupation in a labour force survey. Some data may help to illustrate this point. One study (Morisset and Wane, 2012) mentions that one-third of the workers in Tanzania report earning a wage for their labour, and that this proportion is increasing. Moreover, according to the National Panel Survey (NPS) data, the percentage of farm households earning income from off-farm activities increased from 58 per cent in 2008/09 to 69 per cent in 2010/11, and the share of wage employment in that sub-sector increased from nearly 37 per cent to over 45 per cent. Hence, wage employment and earnings from such

employment can be very important from the point of view of total incomes. And it is essential to devote attention to what has been happening to real wages of workers engaged in various sectors, the link between real wage and productivity, and factors that influence wages. The justification for research in this area becomes stronger in view of the paucity of studies on the topic. This paper utilises sets of data from Tanzania National Panel Survey, Integrated Labour Force Surveys, Employment and Earnings Surveys and Economic Surveys to explore the link between real wages and productivity in the context of Tanzania economy. It also explores whether the link has any significant contributions to economic growth and poverty reduction.

Objectives of the study and hypotheses to be tested

The general objective of this paper is to examine the linkage between real wages and labour productivity in Tanzania and the way the established linkage influences employment growth. Specifically, in this study we intend to:

(i)   Review the relevant literature to set out the theoretical and empirical evidence that explains the linkage between real wages and labour productivity and its influence on employment growth;
(ii)   Use the available national datasets to reflect on the link between real wages and labour productivity in the context of Tanzania economy; and
(iii)   Provide policy recommendations on issues related to wages and productivity and setting of minimum wages based on the analysis.

In line with the objectives mentioned above, the following hypotheses are tested:

1. Real wages and incomes and their growth in Tanzania do not reflect growth of labour productivity;
2. Incomes are determined not just by education and skills but also by other factors like age, occupation and location;
3. While standard economic theory suggests that real wages should reflect labour productivity, the causation could run the other way as well – wages influencing productivity of labour.

LITERATURE REVIEW

This section presents the results from a survey of the relevant literature focusing on key issues that emerge from the literature surveyed rather than on a chronological account of who said what. As already mentioned above, there is a paucity of studies on the link between wages and productivity in Tanzania. So, the basic purpose of the review of the literature is to provide

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[1] According to the Integrated Labour Force Survey of 2006, the share of "paid employment" in total employment was only ten per cent in that year.

a summary of the received knowledge on the theoretical and empirical understanding of the link between labour productivity and real wages. The literature review also identifies gaps in knowledge in this area that would provide a basis for the research questions to be addressed by the present study.

A review of the theoretical literature

This part discusses economic theories that explain the linkage between real wages and labour productivity and its impact on employment outcomes. There are three schools of thoughts that attempt to explain this phenomenon: the basic economic theory, the efficiency wage theory and the contract theory. The passages below describe the theories.

First is the basic economic theory that originated in the series of works by classical economists Adam Smith (1776 – 1789), Ricardo (1772 -1823) and Thomas Malthus (1836) who suggested clear relationship between wages, productivity and employment growth (Stirati, 2010). The theory suggests that the market price of labour (wage) is determined by the market forces of demand and supply and that wages increase as a result of increased productivity of the firm. The theory tells us that in a competitive environment, a worker's wage should be equal to his/her marginal productivity (MPL), because otherwise, the firms would have an incentive to vary the number of workers they hire, and through that process of adjustment, wages and productivity should fall in line. For example, if wages are lower than MPL, it will be profitable to hire more workers which would create an upward pressure on wages. In addition, due to diminishing returns, there will be downward pressure on productivity. The result of the work of these two forces would be equalization of wages and productivity. A similar process would work when wage is higher than MPL, a situation that would create condition for shedding labour which in turn would engender a process of arriving at the equilibrium where wage would come in line with productivity.

   This theory is based on a number of assumptions, and its validity would depend on the validity of the underlying assumptions. The basic assumption behind the theory is that of perfect competition. Unless firms operate in a competitive environment, the need for adjustment through hiring and productivity may not be there. The price deflator that is used in converting money wages into real wages is also important from the point of view of the existence of a strong link with productivity. In measuring and comparing productivity at two points in time, the prices for products are used. On the other hand, real wages are often compared by deflating money wages with consumer price indices, in which case the price deflator will be non-comparable, and real wages may move in a direction that would depend on the price index

rather than on real productivity[2]. Also the theory assumes that the relationship is delivered from profit maximization behaviour of the firm which is not always the case especially with public firms whose motive is not profit maximization. On the other hand, the classical economic theory does not take into account the substitution effects in a long run whereby with increased productivity of the firm labour can be substituted for capital. Despite these criticisms, the theory posits a clear relationship between wages growth and labour productivity growth in the short run, with wages adjusting to changes in productivity; and therefore the theory can be used to justify wage-setting rules, aiming to ensure that wage growth does not exceed productivity growth so as to generate full-employment (Meager and Speckesser, 2011). A key assumption of such simple models is that productivity developments are exogenous, and wages adjust to productivity.

   The second is the efficiency wage theory developed by Alfred Marshall. The model argues for payment of higher than market wages as a rational choice for firms to influence productivity as such wages have to be set at a certain level to achieve a particular productivity (Katz, 1986). The theory further argues that low wages have negative effects and that workers' productivity depend positively on their wages. It follows that efficiency wages are paid to reduce shirking levels by employees, lower turnover cost, and attract higher quality of labour force, improve employees' morale; facilitate team work; generate feeling of loyalty by workers to the firm and bring industrial peace. However, efficiency wage theory applies only when there is no shirking workforce, whre there are unemployment benefits and where employment creation is not a primary motive of macroeconomic settings. Shapiro and Stiglitz (1984) supported the argument by advocating for payment of wages above the market level to stimulate productivity and output and dismissing any worker who is detected with inadequate performance. The theory supports wage differentials and it introduces the concept of labour market segments one with higher wages and the other with low pay. The theory is criticized for its assumption that workers' productivity depend positively on real wages and that by setting wages above the market clearing rate firms get healthier and productive workers.

   The third theory is the contract model. This model was advanced by Fischer in 1977 who argued wage setting to be the result of bargaining power between workers as individuals or through their collective bargaining unions and employers, and not purely dependent on the productivity gains of the firm. Setting of wages under this category is negotiated in such a way it accommodates some future events and it is specified in contracts (Newbery and Stiglitz, 1987). It is also advocated that long term contracts between firms and workers set wages

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[2] This point has been eloquently expressed by Gregory Mankiw in his blog. See http://gregmankiw.blogspot.com/

in advance and are negotiated on a staggered basis. Holmström (1979) and Taylor (1979) supported the contract theory by insisting on the use of employment contracts that accrue wages as an increasing function of output. Also Bailey (1974) and Azariadis (1975) modified the theory and came up with the implicit contract idea which entails wages contracts as mutual agreement between risk neutral firms and workers to specifying how much labor is supplied by the worker and how much wage is paid by the employer under different circumstances in the future. Implicit contract theory advocates that firms and workers can reach an implicit understanding that wage will be kept stable over the business cycle. This is further explained by Baily (1976) who argues that contracts are made because workers are aware that they cannot forecast well the future; they adopt a practice of seeking compensation for what happened in the past, and that practice works out reasonably well because of the long –lasting attachments that mark a contract world.

Note however that the contract model of wages seems to neglect some important realities. The first issue not considered is the fact that contracts between employers and workers do not predict the future in its totality; they work only in the short run of the life span of a worker and therefore subjected to amendments. On the other hand, the claim in the theory of motivation by Abraham Maslow that human behavior is not random starts to operate (Maslow, 1943). Therefore human behavior is directed towards achieving a set of goals/needs which are in hierarchy whereby once certain level of needs is satisfied another level of needs arises. It is not therefore surprising that, work contracts do not eliminate demands for wage increase by employees in future. This situation is experienced mostly during the period of tight market conditions especially when inflation is rising and during the period of increased productivity of a firm. It should also be understood, that this model fails to acknowledge the reality that the relationship between employers and workers is always formalized by explicitly or implied contracts. Therefore in a real sense even when market forces are left to regulate wages at aggregate level, still contracts are entered between firms and individual workers.

A review of the empirical literature

Scholars have been making various attempts to establish the economic linkage between real wages and labour productivity in the first place and the way this linkage influences employment growth and poverty reduction. The main observation from the analysis of literature on this subject indicates the existence of different forms of linkages between the two variables. The paragraphs below explain the various accounts of linkages observed.

In the first place, we observe literatures with mixed results on the direction of the linkage between the two variables which do not show any clear pattern explaining the linkage between labour productivity and real wages. Meager and Speckesser (2011), in their study on wages, productivity and employment in Europe for the period between 1995 and 2009 using GDP per hour as a measure of labour productivity, observed a greater variation of labour productivity with an increase ranging from 3 per cent in Italy to 128 per cent in Estonia over the period though wages did not increase as much as productivity did. An evidence of clear relationship between wages and productivity was said to be possible only in a long run.

The study further proposed that wages growth need not to exceed productivity growth so as to facilitate employment growth. It is argued that growth of wages above productivity growth would force firms in the market to reduce output levels and employment in order to survive or they may adopt employing more capital and reducing labour so as to raise productivity an action which is likely to affect negatively the labour market by reducing labour absorption capacity of the economy. The study therefore suggested alignment of wages below the rate of productivity growth a measure proposed so as to maintain high employment growth levels. On the other hand, empirical evidence from the study showed that wage moderation may increase employment in the medium and long run, although the relationship appeared to be fairly weak with numerals exemptions. However, the study did not indicate the level and extent of wage moderation so as to be really a successful mechanism to increase output and employment in the long run. An evidenced in UK and USA where less wage moderation was applied showed improvement of production and employment outcomes than in German which has high wage moderation policies. Also, wage moderation may reduce innovation hence resulting in lower productivity growth in a long run. While indicating this, the study also posed measurement complications related to labour factor cost (labour compensation). It was observed from the study that, a choice of wage as unit of measurement would underestimate and exclude from the analysis important aspects of labour factor costs which are not reflected in the definition of wage. For instance incorporated payments made by firms in relation to workers like overtime payments, bonuses and gratuity; employer's contributions to statutory schemes and insurance, social earnings in respect of dependents, payment made to workers because of illness, injury, and maternity leave if excluded biases measurement of labour cost. Others identified compensations which were not included in the analysis are related to vocation training, other welfare cost (canteens, transports, workers clothes, recruitments and other specific costs). To overcome this measurement complication, they used total labour compensations which included some of the statutory payments by the organization and information.

This was available in most countries.

On the other hand, the ILO wage report 2013 acknowledged that when wages rise in line with productivity increase, they are both sustainable and create incentives or stimulus for further economic growth by increasing household purchasing power though when this linkage was examined in different regions various stories were observed across nations. The report indicated that many developed countries experienced a period of growth in both real wages and productivity and in countries like Denmark, France, Finland, United Kingdoms, Romania and Czech Republic a closer relationship between wage and productivity growth was observed. In Greece and Iceland wages grew ahead of productivity while in Spain and Italy labour productivity declined but wages did so only marginally (Italy) or not at all (Spain). In the US, Japan and German wages growth trailed behind productivity growth. In German average wages declined in spite of positive labour productivity growth. In Eastern Europe and Central Asia before the crisis productivity gains was accompanied by higher real wages increase of more than 10 percent a year on average in many countries. With the exception of few countries , between 2008 and 2011, productivity grew more slowly though remained largely positive, and real wage growth became more closely aligned with productivity growth. The growth of productivity and real wage in Asia contradicted sharply with other regions as wages continued to grow at higher rates indicating the influence of China in which wages more than tripled over the decade (2000 – 2010). The report did not show empirical evidence of the linkage in Africa due to unavailability of statistics in most of African countries. However, the observed links have to be interpreted with cautions in most of developing economies because the average earnings reflect earnings of paid employees who are less than 50 percent of all employed people while productivity measures the GDP of all employed people (paid and self). Also a study by Mistral (2009) found a disconnection between productivity gain and real wages increase as a common feature among major economies since the 1990s. This result was in line with that of Soest and Stancanelli (2010) who indicated that real wages per capital in German and Japan remained flat between 2000 and 2008 while productivity increased by 10 percent during the same period. Productivity severely hit in 2009 and strongly recovered in 2010 while real wages remained flat significantly increasing the wage-productivity gap.

The second category of empirical literature involves studies that established a clear linkage between labour productivity and real wages. Done (2011) in the study that explored the correlation between wages and labour productivity in Romania found a positive relationship between wages and employment front. The share of income as gross wages and other labour rights was found to have increased from 38.5 per cent in 1999 to 52.1 per cent in 2008, leading, in turn, to the increase of the share of income funds in the total household income from 70.4 percent in 1999 to 83.1 percent in 2008. This structural change is based on the increasing proportion of employment and also on reducing the status of self-employed and unpaid family workers from 40.8 per cent in 1999 to 31.2 per cent in 2008. Also Sharpe et al. (2008) used Cobb-Douglas production function to estimate the empirical relationship between labour productivity and real wages growth in Canada and found that median real earning of Canadian to have barely increased between 1980 and 2005 at the same time noting very high rise in labour productivity by 37.4 per cent. This study raised a lot of concerns as it contradicted with other studies especially the increase of labour productivity by 37.4 per cent while real wages failed to increase significantly. The author explained this results based on measurement and definition of key variables especially real wages, increase in earning inequality, decrease in labor's terms of trade and decline in labours' share of the national income. It was therefore concluded from the study that business cycles have impact on the relationship between labour productivity and real wages. This is as a result of lags in adjustment and imperfect competition in product and labour markets at least in the short term though business cycles are not a major determinant of the relationship between labour productivity and real wages in the long run, which is of greater interest.

On the other hand, wages and productivity are said to grow at similar paces only in the early years in employment and from there productivity continues to increase while wages remain almost constant. Maximum contribution to the productivity of a worker is said to be reached at the age of 50 – 54 years. Skirbekk's (2008) found the maximum contribution to be at the age of 50 years old. Also a study by Cardoso et al. (2010) used administrative longitudinal employer- employee data to measure the link between labour productivity and real wages at individual level in Portugal covering workforce in the manufacturing and service sector for more than 20 years and involved estimation of productivity functions and wage functions at the plant level and then comparing the estimated coefficient across equations. This study concluded that, wages and productivity increase in similar paces only in early years in employment and thereafter as prime-ages approaches, wage increases lag behind productivity gains. This implies that older workers are worthy of their pay as their contribution to the firm level of productivity exceeds their contribution to wage bills. Productivity was found to increase up to the age of around 50 – 54 years while wages peak at 40 – 44 years. This contradicts with the study by Medoff and Abraham (1980 and 1981) who found that more senior workers have higher wages but not productivity. Related to this, Frazis and Lowenstein (2006) in their study that examined the relationship between wages and productivity in US using subjective measures of workers from

employment and opportunity pilot project (EOPP) data showed that workers' productivity grew substantially during the early part of the employment relationship. However, after two years productivity is on average eighty percent higher than at the start of the job. The study further indicated that productivity growth occurs at the very start of the job with 64 per cent of growth taking takes place during the first three months. The study concluded that during the early year's variation in productivity was only partially reflected in wages indicating that worker's productivity in early years of employment is folded into the starting wage if wage revisions are not instantaneous. This study contradicts the human capital theory which indicates that workers accumulate human capital over time and therefore earn more as they grow older. The study also did not say anything related to the linkages between wages, productivity and employment growth.

Again, Barkery (2007), in a brief that aimed to identify the gap between wage growth and productivity in Washington DC for the period between 2001 and 2006, noted an increase of productivity by 17.9 per cent on average – or 3.2 per cent per year. However, real wage was found to have barely moved up over the period with the average hourly wage for production and non-supervisory workers increasing just by 1.2 per cent - an average of annual growth of just 0.2 per cent. This is explained by redistribution from wage to capital incomes and that productivity was measured against gross output, while incomes must come from net output which excludes depreciation. Related to this, another study on new approach for measuring wage gap in Japan by Kodama and Odaki (2012) found that the gap between workers marginal productivity and wage was not so large. The productivity of male high school graduates was lower than their wages during early stages of their career, higher during the mid-stage and again lower during the years prior to retirement.

Unsurprisingly the productivity of 4-year college graduates almost equals their wages throughout their careers. Wages of women correspond with their productivity. Wages of women almost equal their productivity in the early stages of their careers but exceeded productivity during later stages. Part time workers' wages in Japan equal productivity in manufacturing industries but are lower in service industries.

A comparative study by Serneels (2005) indicated that productivity and wages depend on the level of economic development of a country. Wage increase associated with more education significantly exceeded productivity gains brought by the increased wages in least developed countries while, returns to education privately and to the employers found to be highest in most developed countries. On the other hand poor countries tend to reward the general skills (experience and schooling) more than firms specific skills (tenure and training)[3]. Also

this same study in Ghanaian manufacturing sector found that wage profiles do reflect productivity profiles on average when a wide range of human capital variables are controlled.

We also observed empirical evidences in this debate from a study by the ILO in 2012 on wages which identified two economic regimes namely wage-led economic regime and profit-led economic regime indicating that increases in wage growth may have a positive effect on productivity growth if either firms react by increasing productivity led investments in order to maintain competitiveness or if workers contribute to the production process improves because of enhanced workers' motivation. This supports the theory of efficiency wage or Webb effect. On the other hand profit led productivity occurs if an increase in wages discourages productivity-led capital investment and as result, the growth of labour productivity slows down. The OECD (2007) established that in a market economy, the compensation of labour is determined by the interaction of demand and supply in each labour market. The shift in either labour demand or labour supply can produce changes in wages. The conflicting interest of employers (demand) and workers produce a market wage. Employers offering wages below the market equilibrium wage experience high quite rates and difficulty in recruiting, while those offering above the equilibrium wages experience high application rates and high production costs. Therefore the actual path of relative wage differential depends on the specific changes in relative demand and supply that occurs in each economy. However, this study established that wages and productivity have different determinants; the degree of unionizations in the firm and the firm size matters. The degree of unionization in the firm affects productivity but not wages while the firms' size affects wages but not productivity.

The above study on OECD countries also shows that productivity is much influenced by labour market policies. The study observed that growth in GDP per capita can be decomposed into labour utilization and labour productivity. In OECD, per capita growth of GDP during the 1990s was observed to be highly contributed by labour productivity. During this period labour productivity contributed at least half of the GDP per capita growth in most OECD countries and considerably higher proportion in many of them. Key conclusions that can be drawn from the above study include: although employment growth tends to be associated with lower average measured labour productivity growth, it does not mean that higher employment causes productivity of individual workers to fall. This can be explained by the influence of some policies to increase employment for low skilled workers, generate diminishing returns to labour input, expand labour intensive activities which exert downward pressure on average measured labour productivity. Increase in the ratio of minimum wages to median wages appears to have positive impact on the aggregate level of measured productivity. In the long run, increasing this ratio by 10

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[3] Study undertaken in Zimbabwe, Tanzania and Uganda

percentage points could increase average labour productivity by 2 percentage points.

The above review of the empirical literature may be concluded by highlighting and carrying forward a few important points for analysis in this paper.

1. There is empirical evidence showing the existence of linkage between real wages and labour productivity, and if this link is well managed, it can facilitate employment growth and, therefore, inclusive growth. However, the link is not uniform; it varies from one period to another and from one economy to another. The observed variation may be explained by data complications and measurement issues, segmentation of labour markets, and the way labour market functions.

2. It is proposed that wages growth should be aligned with labour productivity growth. Raising wages alongside productivity increase is sustainable and creates incentives for further growth by increasing household purchasing power. Productivity and real wages are linked in the short run; but in the long run productivity increases although wages tend to remain constant, thus indicating that older workers are worth of their pay, contribute much to productivity and less to wage bill.

3. Labour market policies determine the competitiveness of the labour market and therefore have an impact on the movement of wages.

In most of the analyzed literatures, measurement complications were observed. The first of these is a focus on wages rather than total compensation. There are many other work related benefits and other non-cash payments which affect consumption patterns of a worker. It is important therefore to compare the productivity rise with the increase of total compensation rather than with the increase of the narrower measure of just wages and salaries. The second measurement problem is the way in which nominal output and nominal compensation are converted to real values before making the comparison. Although any consistent deflation of the two series of nominal values will show similar movements of productivity and compensation, it is misleading in this context to use different deflators for measuring productivity and real compensation.

The theoretical and empirical discussions above have informed research questions guiding this present study. Specifically, this study seeks to answer the following questions:

1. Have real wages in Tanzania kept up with labour productivity growth? Or to what extent is labour productivity growth reflected in real wage growth?
2. How do changes in the wage share or in real wages affect productivity growth in Tanzania?
3. Is there any robust empirical evidence on the wage growth/productivity growth/employment growth triangle?

Of course, given the present state of the availability of data, all the above questions could not be addressed in the present study which is considered to be a first step towards a better understanding of the dynamics of labour markets in Tanzania.

METHODOLOGIES AND SOURCES OF DATA

Sources of data

It might be noted at the outset that data on wage rates in Tanzania, especially for sectors like agriculture; rural non-farm activities, construction, etc. are not available. This paper used raw data from the integrated labour force survey, economic surveys, employment and earning survey, national panel surveys and UNIDO database for the manufacturing sector which was further investigated as a case study sector. However, integrated labour force surveys are carried out only periodically. Moreover, they usually do not collect data on output. With such limitations of data, it is difficult to estimate labour productivity. Even if data from different sources are pieced together, given the availability of employment data only for a few years, it is not possible to prepare a full-fledged time series for this variable. Thus, it was difficult, if not impossible, to apply rigorous methods (e.g., statistical and econometric methods). However, still some work was done as explained in the following paragraphs.

The ILFS provided data on incomes of "paid employees" which is the total of wages paid in cash and kind. The household part of the questionnaire of the National Panel Survey (NPS) of 2010/11 includes a section on labour and employment with specific questions on wages based on which wages/incomes of paid employees were estimated. The ILFS were carried out in 2001 and 2006, and the NPS in 2008/09 and 2010/11. However, it was possible to get the total number of workers and their breakdown by industry, sector (viz., public and private), and location (viz., rural and urban) for only 2001 and 2006 and not for 2008/09 and 2010/11 since the industrial classification was not uniform for the ILFS and the NPS. Likewise, an estimate of incomes of paid employees was possible for two years. Data on output (total GDP) and its breakdown by industry groups were taken from the Economic Survey of the Ministry of Finance. So, output per worker for two years was calculated. But in undertaking the above exercise, care was taken to use output figures in constant prices and to deflate the wages/incomes of 2006, 2008/09, and 2010/11 by using a suitable deflator.

Second, primary data from the 2010/11 NPS were used to undertake an analysis of wage/earnings differential at the individual, industry and sector levels. The starting point of such an analysis was to test the basic Mincerian model[4] of earnings determination using age (to represent experience) and education as explanatory variables in the earnings function. However, it is by now well known that education by itself does not enhance the chances of an individual either to get employed or to earn higher wages/salaries/incomes. Therefore, the basic model (if data permits) was extended to allow for the types and levels of education, location, size of the enterprise where the individual is employed, and where there is degree of unionization, etc.[5]

Third, using data from the Employment and Earnings Survey (EES) 2002 and 2011, a picture was depicted about the growth of wages over this period in the formal sector (because the survey covers only formal sector establishments). It was possible to work

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[4] This has its origin in the famous work by Mincer (1974) which has later been used and expanded by a number of economists. There is a large body of literature on this.

[5] In the analysis of wage-productivity link in three countries of sub-Saharan Africa, viz., Kenya, Tanzania and Zimbabwe, Van Biesebroeck (2003) takes into account factors other than education and experience.

out the growth of wages and earnings over the period for (i) establishments as a whole, (ii) major industries (e.g., agriculture, industry, construction, etc.), (iii) public and private sectors. In some cases, gender breakdown was possible. In order to do so, it was necessary to deflate the figures of 2011 by using an appropriate Consumer Price Index (CPI)[6].

Primary data from the EES were used to examine the differences in the composition of the public and private sectors by size of firms and their industry composition. This provided some indication of the observed difference between wages in the two sectors. Given the nature of the data above, the analysis based on EES will remain descriptive. It may be noted that the EES are establishment surveys, and as such do not provide data on individual workers/employees. Hence no analysis of differences in earnings between individuals became possible. Likewise, they do not provide any output data; so, it was not be possible to link the wage data to output or productivity.

Fourth, data on output, employment, wages and capital in manufacturing industries in Tanzania were obtained from UNIDO covering the period between 1966 and 2010. But this seems to be the only source from which time series data (even though for one sector only) needed to examine the link between real wages and productivity available. The data were deflated using the GDP deflator. Moreover, given that labour data are available in the form of number employed, labour productivity was measured only as output per worker (not as output per hour which would be more desirable).

Measurement of key variables

Labour productivity and real wages are the two basic variables that were estimated in this study to be able to draw certain conclusions.

Labour productivity is defined as the ratio of output to labour input (NEP 2008). It helps to reveal key economic indicators especially dynamic measures of growth, competitiveness and living standards within an economy. It balances economic growth and social development[7]. The main variables in measuring labour productivity are the output and labour input. At the aggregate level the value measure of output is the GDP while labour input is measured by either looking at total average hours worked by person employed or by looking at the number of employed persons to the total output. The measure of labour input by looking at total number of hours worked in a year is more appropriate for the analysis of real wages and labour productivity, because it represents a more precise measure of labour input than persons employed or weeks worked[8]. However, each of the two approaches

for measuring labour productivity has its own limitation. While the measure of productivity per workers may not reflect the reality since it hides some important issues like variation of working hours with time caused by overtime workers, absence from work, or shift in work hours, the measure using average hours worked has it is own limitations. It may lead to biased conclusion since in other countries policies may be developed to reduce the number of hours to absorb many people in work. This may result in an increase in labour productivity of time. However, the two measures do not address the quality measure and skills level of the work force engaged. This paper used the output figures from economic surveys and total employment figures from the ILFS for 2001 and 2006. This measure was selected because of the difficulties in obtaining figures for working hours for various sectors. On the other hand, real wages were determined from the nominal wages of the relevant years by deflating to 2001 prices using GDP implicit deflators of particular year. Nominal wages in the context of the data used included incomes in cash and in kind received by the household members in the exchange of labour for service or production.

Techniques of data analysis

The analysis of the data involved the estimation of descriptive statistics and econometric measurements. Descriptive statistics were computed using excel whereby labour productivity, annual compound rate of growth in income and productivity and annual rate of growth of income in formal sector were computed. Regression analysis was done to determine the relationship between wages and selected variables.

RESULTS OF THE STUDY

Real wages and productivity: A preliminary empirical investigation

The purpose of this section is to present a broad picture of the growth of real wages/incomes and productivity and examine their variation between industries and sectors. Before looking at the data a few points may be noted. First, although income data are available from the ILFS as well as the NPS, the latter does not enable tabulation by using the same industry classification as the ILFS. So, data for 2009 and 2011 cannot be compared with that of 2006 and 2001. We, therefore, restrict ourselves to a comparison between 2001 and 2006 (using data from the ILFS). Second, although the NPS provides data on some aspects of labour, the data are not comparable with those of the ILFS. This is illustrated by a simple comparison of total employment figures obtained from the two surveys. The figure from NPS of 2009 is lower than the figure provided by the ILFS for 2006 (11.43 million in 2009

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[6] It may be mentioned here that Wage Indicator Foundation, an organization based in Amsterdam in the Netherlands, in collaboration with the University of Amsterdam and the University of Dar Es Salaam conducted a survey of wages in Tanzania during 2011-12, the results of which are available in Tijdens and Kahyarara (2012). While the report provides an interesting picture of wages in Tanzania, the survey remains a one-shot exercise and covers only the urban areas. More details from this survey will be reported in the review of literature section of the proposed study.

[7] OECD (2008), *Labour productivity indicators; comparison of two OECD databases productivity differentials & the Balassa-Samuelson effect pg 1-3*

[8] CSLS(2008): The Relationship Between Labour Productivity and Real Wage Growth in Canada and OECD Countries

compared to 16.63 million for 2006 as provided by the ILFS).

It is possible to make a simple comparison of income figures provided by the Employment and Earnings Surveys of 2002 and 2011, although this survey covers only the formal sector. Moreover, this survey does not provide output figures, thus making comparison with labour productivity impossible. Furthermore, being esta-blishment based surveys; they do not provide data on individual workers/employees, thus making statistical analysis of variables influencing incomes impossible. However, this is possible from the data provided by the NPS.

Growth in real income and productivity of workers: Variation between industries

Moving on to the data let us first look at growth in productivity. On this, a few points emerge clearly. First, while output per worker for the economy as a whole registered an annual growth of 4.66 per cent during 2001-2006 (Table 1), there is enormous variation between industries. In fact, a number of industries, viz., mining, manufacturing, hotels and restaurants, transport and storage and communications, and public administration suffered declines in productivity during that period. Financial intermediation and health and social service are at the other extreme with double digit growth in productivity.

Second, decline in productivity cannot be ascribed to a lack of growth of output in the respective sectors. In fact, all the sectors showing negative growth of output per worker registered positive growth of output during the period. It is the inability of those sectors to grow at rates commensurate with the growth of employment in them that has led to negative growth in productivity.

Third, and a point that supplements the second point mentioned above, in most of the sectors (viz., mining, manufacturing, transport and communication, and public administration) characterized by negative growth of labour productivity, employment growth has been very high. It would appear that it has been easy for people to get into some activity in these sectors, thus driving productivity downwards.

Fourth, there are cases, viz., financial intermediation, real estate, health and social service, where it is decline in employment that has made possible the high growth in output per worker that is observed. This simply implies that although labour force has grown during the period, it has not been possible for people to get into these sectors.

When one compares growth in incomes with that of productivity, a few points emerge. First, growth in monthly income as a whole exceeds that of labour productivity, thus casting doubt on the standard theory that growth in real wages should reflect growth in labour productivity. But when one goes beyond the overall figures into variation by industry, more interesting details emerge.

There are industries, viz., transport and communi-cation, and community and personal services, where incomes have registered positive growth despite negative growth in productivity. At the other end, there is at least one case, viz., construction where there has been negative growth in income despite positive growth in productivity. In mining and manufacturing, while produc-tivity growth has been negative, incomes have declined at higher rates than productivity. Thus, employment growth in these sectors may not have contributed much to raising the level of living of those engaged in these sectors. This is somewhat worrisome because develop-ment theory (as well as experience from successful examples) postulates that structural change of an economy is essential from the point of view achieving economic growth that would also enable the absorption of surplus labour available in the traditional sectors. It does not seem that the economy of Tanzania is achieving a structural change that could enable it to make its growth more inclusive in the sense of enabling people to benefit broadly from growth.

Growth of real income in the formal sector

Like most developing countries, Tanzania has also adopted a strategy of pursuing economic growth mainly through the private sector. Hence, from the point of view of attaining the goal of poverty reduction through economic growth, what happens to real wages and incomes in that sector becomes important. Unfortunately a full-fledged analysis of this issue is not possible because of lack of data on wages of workers. Apart from the ILFS the last year when that was carried out was 2006, the other source of income data is the Employment and Earnings Survey which covers only the formal sector of the economy. As the poor are likely to be mostly in the informal segment of the economy, data covering only the formal sector would not provide a good pointer to what has been happening to the earnings of the poor. However, even within the formal sector, there are industries where a large number of the poor (or at least low income people) may be employed. Hence, it may be useful to look at the trends in the earnings of people engaged in that sector. Data for 2002 and 2011 with annual compound rates of change during that period are presented in Table 2. Several points emerge from this set of data.

First, while real income as a whole has registered positive growth for those engaged in the public sector, it has declined in the private sector[10]. Second, within the public sector, there is considerable variation in the growth of real incomes between various industries with very low growth in the electricity, gas and water and transport and communication sectors. Real income has actually

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[10] Another study (Morriset and Wane (2012) reported that between 2008/09 and
[10] Another study (Morriset and Wane (2012) reported that between 2008/09 and

Table 1. Growth of monthly incomes of paid employees and productivity of workers, 2001-2006 (in prices of 2001).

Industry	Annual compound rate of growth 2001-2006 (%)	
	Income	Productivity
Agriculture, hunting, forestry and fishery	12.59	3.47
Mining	-11.34	-6.44
Manufacturing	-6.85	-3.24
Electricity, gas and water	25.25	2.38
Construction	-0.26	7.82
Wholesale and retail trade	14.91	2.83
Hotels and restaurant		-2.75
Transport, Storage and communication	5.37	-7.17
Financial intermediation	5.73	19.79
Real estate, renting and business activities	n.a.	7.31
Public administration and defence	n.a.	-3.73
Education	n.a.	1.67
Health and social service	n.a.	15.61
Other community/social and personal service	1.21	-6.12
Total	7.10	4.64

Notes and sources: The figures for this table are calculated from Annex Tables A-1 and A-2.

Table 2. Annual rate of growth of monthly real wages/incomes between 2002 and 2011 (by industry and sector).

Industry	Annual rate of growth (%) between 2002 and 2011		
	Private	Public	Total
Agriculture, hunting, forestry and fishery	-1.32	7.60	4.00
Mining	-3.81	4.90	-4.34
Manufacturing	-2.71	5.26	2.51
Electricity, gas and water	-5.73	4.07	0.26
Construction	-1.00	8.15	4.01
Wholesale and retail trade	3.74	7.35	6.20
Transport, Storage and communication	2.48	-1.32	0.32
Financial intermediation	0.72	4.83	2.95
Other community/social and personal service	-1.61	5.28	2.71
Total	-1.42	3.81	1.65

Note: The figures for 2002, as well as 2011 were converted to 2001 prices by using the GDP deflator.

declined in one industry, viz., mining.

As for the private sector, real incomes have declined in most of the industries, and positive growth has been registered only for two industries, viz., wholesale and retail trade and transport and communication. Real incomes have declined not only in production related sectors like agriculture, manufacturing, mining, but also in a sector like construction. The latter is a bit surprising because in a growing economy, this is expected to be a growth sector, and at some point in the process, wages tend to start rising. This does not appear to have happened in Tanzania. In fact, the overall decline in real incomes in the private sector is indicative of the substantial slack that exists in the labour market. Even the high growth that has been attained by the economy over more than a decade has not been able to exert an upward pressure on wages and incomes.

One factor that is perhaps responsible is the slow growth of employment compared to that of output. As there is no recent employment data (the last labour force survey, the usual source of data on employment) conducted in 2006, it is difficult to say anything with confidence on employment growth in recent years. However, one exercise (Islam and Kinyondo, 2014) shows that the elasticity of employment growth with respect to output growth (for the period 2006-11) for the economy of Tanzania as a whole has been rather low (0.53). It is also found to be particularly low (0.59) in manufacturing[11]. With such slow growth of employment, and the availability of labour, it is quite natural for employers to be able to hire workers without raising the wage too much.

At the present state of data availability, it is not possible to speculate and raise questions as to what may have been the reasons for the decline in real wages/incomes in the private sector. Several explanations for the observed difference between the trends in the public and private sectors are possible. For example, the composition and firm size of the two segments in the survey could be different, which in turn could lead to differences in the composition and characteristics of the workers engaged in them. But even if that were the case, the rates of change in incomes could be different. The reasons for the overall direction of real wages being negative in the private sector need to be examined.

From the point of view of standard economic propositions, it would be important to know whether the decline in real wages/incomes in the private sector simply reflects a decline in labour productivity or is it because of failure of money wages to adjust sufficiently to the rise in prices. An associated factor is the relative strength of workers in bargaining with employers in the two sectors. It needs to be seen whether the decline in real incomes

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[11] The comparable figure for Bangladesh (which is also an LDC with surplus labour) is over 0.7. Likewise, several countries of East and South East Asian countries had such high levels of employment elasticity during their early stages of economic development.

reflects, at least partly, a decline the bargaining power of the workers.

Analysis of the determinants of income

The analytical framework used

In order to analyze the determinants of income, the Mincerian human capital model was used as the starting off point. In that model, education plays a major role in determining the earnings of an individual. Experience of a worker is also inserted into that model by using the proxy of age. However, as already mentioned earlier, they are not the only factors that influence earnings, especially in developing countries. Other factors like gender, location (e.g., rural versus urban or small towns vs metropolitan areas), ownership (i.e., public versus private) and size of enterprises may play important roles in influencing incomes of individuals. In fact, the explanatory variables may operate differently for males and females. Incomes are expected to be higher in urban areas compared to rural areas, and also in large cities compared to smaller cities. However, given the data, we could only test the difference between rural and urban areas. Likewise, received empirical knowledge indicates that incomes are higher in the public sector than in the private sector. The size of the enterprise where an individual is employed could also make a difference to his/her earnings with larger ones providing a greater probability of higher earnings.

Regression analyses were done using log-linear technique in such a way that the relationships between wages and variables are examined separately for females and males (Tables 3 and 4 respectively). The importance of using a log-linear model is twofold. Firstly, such a model is crucial when handling situations where there is a possible non-linear relationship between independent and dependent variables. In such a situation, logarithmic transformation helps to make the relation non-linear while retaining the linearity of the relationship. Secondly, logarithmic transformation is important as it allows for normalization of highly skewed variables. While age is quantified in terms of years, the rest of the variables are represented through dummy variables. The results and the interpretation of the regression analysis are discussed in the following sub-section.

Interpretations of regression results

The results of regression exercise conform to most of the a priori expectations regarding the direction of influence of the explanatory variables. Education and age exert positive influence on earnings, thus lending support to the Mincer's human capital model. However, other variables, viz., location, and ownership are also found to be statistically significant, indicating the importance of going

Table 3. Log-linear regression for wages of females.

Log-Linear regression						
Log wage female	Coefficients	Std. Err.	T	P>t	[95% Conf. Interval]	
age	0.0071027	0.0028138	2.52	0.012	0.0015801	0.0126252
location dummy (1 if urban, otherwise 0)	0.35025	0.0776956	4.51	0.000	0.1977614	0.5027386
government dummy (1 if one works for the government, otherwise 0)	0.4912249	0.1312879	3.74	0.000	0.2335537	0.7488962
Never attended school	-0.0166678	0.1211563	-0.14	0.891	-0.2544542	0.2211186
completed primary school	0.694047	0.1020764	0.68	0.497	-0.1309348	0.2697442
Secondary school and above	0.7467982	0.1395579	5.35	0.000	0.472896	1.0207
elementary occupations	0.9114653	0.1836743	-4.96	0.000	-1.271952	-0.5509784
technicians and associate professionals	-0.111691	0.2036134	-0.55	0.583	-0.5113111	0.2879292
vocational occupation	0.6334	0.1732278	-3.66	0.000	-0.9733841	-0.2934159
constant	11.26999	0.2360846	47.74	0.000	10.80664	11.73334

Number of observation = 897; F(9, 1610) = 53.76; Probability > F = 0.0000; R-squared = 0.2902; Root MSE = 0.98455.

beyond the basic human capital approach. Some more detailed discussions of results follow below.

Age is an important determinant of wage for both males and females in Tanzania though, as expected, the results are somewhat different for females and males. For instance, while there is a positive link between age and wages for males and females, a unit increase in age, is expected to improve the wage of women by about 0.7 per cent; whereas the same would increase males' wage by 1.5 per cent which is almost double that of women. This implies that wage differentials are still very significant across gender divide in Tanzania. The observed positive influence of age on earnings/income of a worker complies with results of some other studies though there is a general agreement that earnings increase with ages but after a certain age the increase becomes smaller and can even switch in a limited decrease at the older ages (Gelderblom, 2005).

Segmentation of the Tanzania labour market between rural and urban areas in terms of income is clearly coming out of the regression results. While location is also a significant factor in determining wages across gender, the result indicates that both females and males in urban areas get higher wages as compared to their counterpart in rural areas. Indeed, women living in urban places are found to earn 41.9 per cent higher wages than their rural counterpart. Similarly, a man working in urban area is expected to earn 47.2 per cent more than his rural counterpart. This result confirms the general understanding that jobs in urban areas are more paying as compared to jobs in rural areas for both female and males. Also it explains that there are few employment

Table 4. Log-linear regression for wages of males.

Log wage male	Coefficients	Std. Err.	t	P>t	[95% Conf. Interval]	
Log-Linear regression						
Age	0.0153599	0.0021864	7.03	0.000	0.0110714	0.0196484
location dummy (1 if urban, otherwise 0)	0.3865007	0.0540828	7.15	0.000	0.2804206	0.4925807
government dummy (1 if one works for the government, otherwise 0)	0.4658043	0.0948187	4.91	0.000	0.2798234	0.6517853
Never attended school	0.0009318	0.0976203	0.01	0.992	-0.1905444	0.192408
completed primary school	0.2980876	0.083693	3.56	0.000	0.1339289	0.4622463
Secondary school and above	0.7453881	0.1038409	7.18	0.000	0.5417105	0.9490657
elementary occupations	-0.4487243	0.138978	-3.23	0.001	-0.7213211	-0.1761276
Professionals	0.0098607	0.171974	0.06	0.954	-0.3274557	0.3471771
vocational occupation	0.3741144	0.128378	-2.91	0.004	-0.62592	-0.1223088
Constant	11.06641	0.1745835	63.39	0.000	10.72397	11.40884

Number of observation = 1620; F(9, 1610) = 50.07; Probability > F = 0.0000; R-squared = 0.2331; Root MSE = 1.0129.

opportunities in rural areas as compared to urban areas.

Again, wage differentials are also observed between males and females working for the government and those in the private sector. The results show that the wage gap between women working for the government and those working elsewhere is higher as compared to that of men working for the government and those working elsewhere. Women working for the government receive 63.4 per cent higher wages than their counterparts working elsewhere. Interestingly, on average men working for the government receive wages which are 59.3 per cent higher than their counterparts in private sector. This results confirm the fact that while in some areas the private sector provide the highest available wages in the market, the significant wage differential between senior and junior employees within the sector makes it less attractive compared to government compensations which while relatively smaller, are on average comparable across various positions.

Also, the issue of education provided some interesting results. Indeed, firstly, regardless of gender, people who never went to school had no chance of improving their wages. But this was where the similarity between men and women ended. Firstly, while the possession of primary education improves wages of males by 34.7 per cent, the same level of education does not improve wages of women at all. This of course could partly be explained by the fact that men are more likely to get employed to unskilled jobs that require stronger physical capacity. Gender bias could also be a case as men have of late more and more taken jobs (e.g. cooking in hotels) that were traditionally dominated by women. Interestingly, secondary school level of education and higher exerts almost the same level of influence to women and men. Also, women with secondary level and above are bound to increase their wages by 11.1 per cent compared to women who do not, while men with the same level of education increase their wages by 10.7 per cent. This suggests that possession of higher level of education in Tanzania narrows significantly wage differentials between men and women. This implies that an important way to raise the incomes of women and men, and by implication, improve their (and families behind them) level of living is by imparting them with higher education.

Lastly, the occupation category of a worker makes a difference on wages. The result shows that only vocational and elementary occupations exert influence on wages of working females and males (though the intensity and direction of the influence differs across gender). Indeed, while women in elementary occupations receive 48.8 per cent higher wages than women without this opportunity, males in elementary occupations get
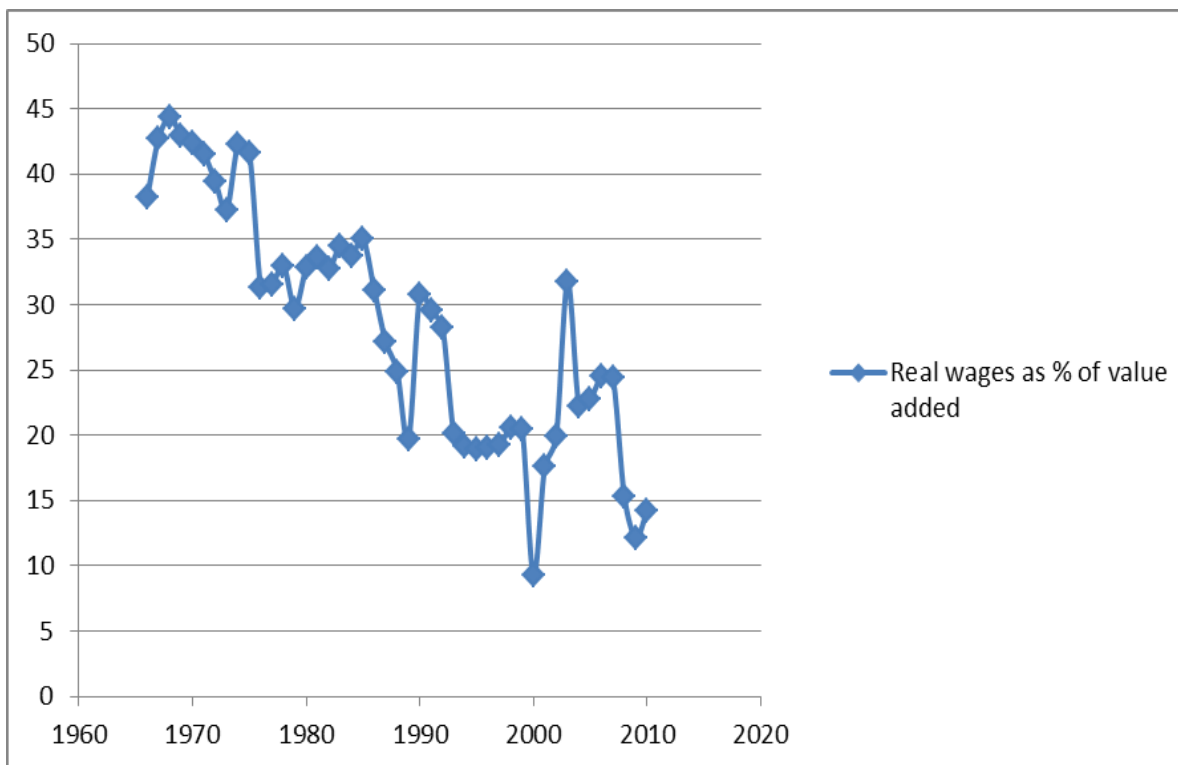
Figure 1. Real wages as percentage of value added.

56.6 per cent less wages compared to males working in other occupations. This suggests that women are so disadvantaged in the labour force in Tanzania that even as lowly paying occupations as elementary ones improve their income standing. Interestingly, women with vocational occupations get 88.4 per cent higher wages than those without while males with vocation occupations improve their wages by 45.4 percent as compared to males in lower occupations. This implies that vocation training for women has higher impact in increasing wages of females than it does for males. It follows from this result that getting more women in vocational training institutions would be a wise move as working for vocational entities seems to significantly improve their incomes. Note also that the insignificance of technicians and associate professionals occupation variable could be attributed to the socioeconomic characteristics of the sampled population as very few respondents identified themselves in that occupation category.

Real wages and productivity in manufacturing

Overview

This section is based primarily on data from UNIDO and examines the question of the linkage between real wages and productivity of workers in Tanzania's manufacturing

sector. The data in question provide a rich time series stretching from 1967 to 2010.

Figure 1 presents the trend of real wages as share of value added in the manufacturing sector. An important point that emerges from this point is the decline in the share of wages in total value added in manufacturing from nearly 38% in 1967 to a little over 14% in 2010. This is a substantial secular decline, although there has been some year-to-year fluctuation. Clearly, the share of labour in value added in manufacturing has declined considerably. This unfortunate state is reflected by Wangwe et al. (2014) who observe that the share of manufacturing sector to GDP and its growth rate has pretty much stagnated over the last decade.

A comparison of growth in real wages with that of value added per worker shows that there is no clear pattern. In some years (2008 and 2009), the former lagged considerably behind that of value added per worker, while in others (2006 and 2010), they have exceeded it. Thus, no close correspondence is found between the growth of these two variables. This is somewhat surprising, especially considering that the UNIDO data are expected to cover the organized manufacturing sector where one would expect such correspondence. This perhaps corroborates findings and conclusions regarding the economy as a whole and various sectors as reported in section 5 of the present paper that labour productivity is not the only factor that influences real wages of workers
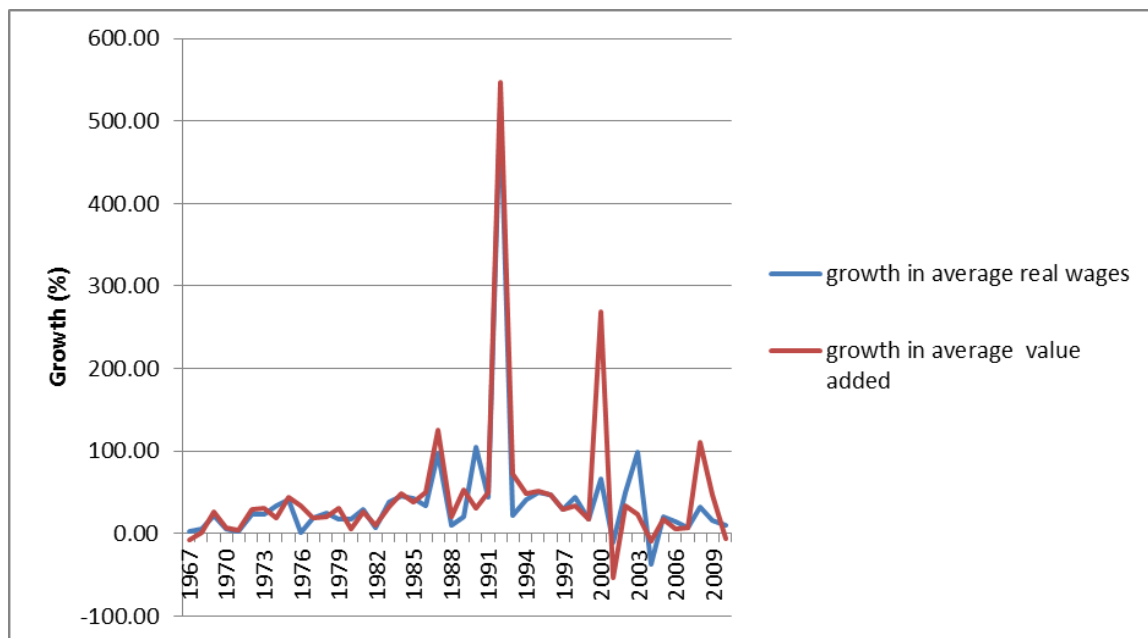
Figure 2. Growth of labour productivity and real wages in manufacturing (2003-2010). Source: Prepared using data from the UNIDO data base (see data in Table 6).

in the economy of Tanzania (Figure 2).

The linkage between real wage and productivity

Section two of this paper presented the theoretical and empirical discussion pertaining to the relationship between labour productivity and real wages and the way this linkage impacts employment growth as advanced by different scholars. This section seeks to establish the direction of causality between the two variables in question. Note that theoretically there is a positive relationship between real wages and productivity and this is hypothesized because of three reasons. First higher real wages increase the opportunity cost of job loss and stimulate greater work effort to avoid redundancy. Second higher real wages put upward pressure on labour costs and cause firms to substitute capital for labour, thereby increasing the marginal productivity of labour. The third reason is based on the concept that greater capital stocks increase the demand for labour, thereby increasing the real wage, and stimulating productivity (Wakeford, 2004).

Using real wage and productivity data from UNIDO for the period between 1967 and 2010, this study employed a pair wise Granger causality test to establish the presence, or otherwise, of causality between the productivity and real wages. A few preliminary tests had to be undertaken though in order to institute a test that is problem-free.

Firstly, we noted that the two variables were originally non-stationary. However, the variables become stationary upon first differencing. This was confirmed by the Dickey-Fuller test which provided results shown in Tables 5-6[12].

The second important test was done to check for normality of variables in question. Results, as Table 7 indicates, after first differencing, the two variables follow a normal distribution as their respective Jarque-Bera probability becomes zero.

Preliminary test was also conducted to establish if there is any association between productivity and real wages. As Table 8 shows, there seems to exist a strong positive relation between the two variables.

We are conscious of the fact that correlations do not imply causation. To establish the presence of causality between real wages and productivity, we had to invoke the pair-wise Granger causality test. Table 9 provides some more details to that effect.

As Table 9 above indicates, there exists causality between productivity and real wages. Specifically, the said causality runs from real wages to productivity. In other words, Real Wages, Granger causes Productivity in Tanzania for the examined time period (1967 – 2010). The result supports the argument underpinning the efficiency wage theory that higher wages are associated with factors that are compatible with attracting, retaining and motivating higher quality labour force which by impli-cation enhance higher productivity levels and ultimately higher living standards (Katz, 1986; Shapiro and Stieglitz, 1984). It is therefore incumbent on the government of Tanzania and private sector to improve wages they offer

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[12] Note that stationarity is established when the MacKinnon's approximate p-value approaches 0.0000

Table 5. Dickey-Fuller test for productivity.

	Interpolated Dickey-Fuller		
	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-6.492	-3.628	-2.950	-2.608

Dickey-Fuller test for unit root; Number of observations= 43MacKinnon approximate p –value for Z(t) = 0.000.

Table 6. Dickey-Fuller test for real wages.

	Interpolated Dickey-Fuller		
	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-6.438	-3.628	-2.950	-2.608

Dickey-Fuller test for unit root; Number of observations = 43MacKinnon approximate p – value for Z(t) = 0.000.

Table 7. Descriptive statistics for productivity and real wages variables.

	Productivity	Real wages
Mean	0.317066	0.294501
Median	0.274585	0.265081
Maximum	1.858372	1.814295
Minimum	-0.817589	0.482061
Std. Dev.	0.360931	0.312650
Skewness	1.310926	2.394032
Kurtosis	10.83652	14.61166
Jarque-Bera	125.1894	289.2197
Probability	0.000000	0.000000
Observations	44	44

Table 8. Correlation matrix of the two variables.

	Productivity	Real Wages
Productivity	1.000000	0.777016
Real Wages	0.777016	1.000000

to their employees if productivity is to be significantly improved in the country.

DISCUSSION

One of the key findings in the present study that motivates discussion is that real wages/incomes in the

private sector of Tanzania have declined during the period of its rapid economic growth and the standard economic theory that in a competitive situation real wages should reflect the marginal productivity of workers. But an examination of this theory would require matching data on the marginal productivity of workers and wages they earn, the kind that should ideally be obtained at the level of firms. However, the present study did not have the benefit of such data. Given the constraints inherent in working with large scale survey data like the ILFS, NPS, and EES, a limited set of objectives was set for the present study, viz. to (i) compare the growth in incomes of paid employees and productivity of workers (the latter measured as output per worker), (ii) examine the trends in real incomes of workers in the public and private sectors and in various industries within the two sectors, (iii) identify the factors that are responsible for variations in the earnings of employees, and (iv) using manufacturing sector datasets to determine the Granger causality between real wages and labour productivity.

The results of the study do not support the standard theory of real wages following the productivity of workers. Growth in real incomes during 2001-06 far exceeded that of the productivity of workers (with of course variation between industries). In some industries, growth in incomes has been positive even though productivity growth has been negative. The opposite has also been seen (i.e., negative income growth despite positive growth in productivity, as in construction). This clearly shows that wages and incomes are influenced by factors other than productivity of workers.

Data on manufacturing industries (provided by UNIDO from 1967 to 2010) corroborate the above finding. A Granger causality test showed that there exists a causality between real wages and productivity and that

Table 9. Pair-wise granger causality test.

Null Hypothesis	observations	F-Statistic	Probability
Real Wage does not Granger Cause Productivity	42	4.69603	0.01522
Productivity does not Granger Cause Real Wage		1.22364	0.30578

Pair wise Granger Causality Tests; Date: 09/01/14;   Time: 11:28; Sample: 1967 2010; Lags: 2.

runs from real wages to productivity, though no consistent pattern between the growth of real wages and of value added per worker (proxy for labour productivity) was established. A further observation is the secular decline in the share of workers in total value added in the industry. This has serious implications for the hope that economic growth would lead to growth in personal incomes and reduction of poverty.

Another important finding of the study which also has implications for the poverty reducing effect of growth is the decline in real incomes in the private sector during 2002-11. As this result pertains to the formal sector enterprises, one wonders what might have happened to workers engaged in the large number of enterprises and activities outside the formal segment of the economy.

An examination of the factors that influence incomes shows that, in addition to education, a host of other factors, e.g., age (used as a proxy for experience), ownership (government vs non-government) location and (urban vs rural) are important. Not surprisingly, incomes are found to be higher in public sector enterprises and those in urban areas. Experience also emerges as an important factor. Although preliminary, these results again indicate that factors other than productivity of workers are important in determining incomes in Tanzania.

CONCLUSION AND RECCOMENDATIONS

Before drawing any policy conclusions from the analysis presented in the paper, we would like to mention that the paper is a first attempt at understanding issues related to productivity and real wages in Tanzania and the way the interaction of the two impacts growth and poverty reduction. There are also some limitations regarding data that have already been mentioned. But despite the data limitations, it is possible to advance few issues that have important implications for policy.

First is a general point: a large part of Tanzania's labour force appears to be not only engaged in low pro-ductivity activities, but also, productivity is not growing. This, however, reflects the crowding of Tanzania's workforce into certain sectors where growth has been low. While it would be important to address this basic issue, a fundamental pre-requisite in this regard is to engender a process of structural change in the economy towards higher productivity activities. Policies are need-

ed to facilitate that process. It is the entire gamut of economic and other policies that have a bearing on the growth of such sectors that would be relevant in this regard.

Coming to individual productivity and incomes, human capital is clearly an important variable; and efforts must be made to bring in improvements in that sphere. While education is important, education per se regardless of quality often results in waste of resources as well as unemployment of the educated. Attention has to be given to the quality of education and training and their relevance to the labour market.

Also the granger causality results for the manufacturing sector suggests that wages have significant effect in influencing productivity in Tanzania though the growth of the two does not show any pattern. Therefore other factors held constant, raising of wages (or at least preventing a decline in real wages) would be a rational policy that is likely to influence increase in labour productivity and subsequently impact growth and poverty reduction.

The negative growth of incomes in the private sector and a growing divergence between incomes in the private and public sector should be taken seriously. The limited nature of the present study, however, does not enable one to say much on factors that are responsible for these observed phenomena. But they are sufficiently important to deserve further attention in terms of more refined data and analysis so that policy oriented conclusions may be drawn.

That brings one to the question of data. The gaps in data should have become obvious from a description of the data used in the present paper. There are two basic issues in this regard. First, there is no institutional arrangement for collecting data on wages of workers on a regular basis. The sources that currently exist are limited because of a variety of reasons. First, surveys like the ILFS and NPS are carried out at intervals, and thus do not provide a basis for a time series. Second, the ILFS has not been conducted since 2006, thus making it impossible to say anything on what has happened after that. While the NPS was carried out in 2009, data from that survey are not comparable to those of the ILFS. Furthermore, the EES is confined to the formal sector only, making it impossible to examine what has happened in the vast informal segment of the economy. Thus it was not possible to examine the situation in a large part of the private sector of the economy. Urgent

attention is needed to strengthen and update the data base on employment and labour force as a whole and on real wages and productivity of workers in particular.

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