Full length research paper

A case of the missing link- An analysis of the potential contribution of the transport and communication sector in the economic growth and development process: A case study of Zimbabwe (1980-2013)

Mhazo Simabarashe[1]

[1]Department of Banking and Finance.Faculty of Commerce Bindura University of Science Education; Email: simbamhazo@gmail.com

The research focused on analysing the Transport and communications sector potential contribution to economic development and how this can translate into addressing adverse socio-economic issues like unemployment, access to better health care, nutrition, clean water and sanitation, spread of HIV/AIDS and other social amenities. The target population was the Transport and Communications sector. Multiple regression analysis was used to come up with a model that best fits the time series data. The model results indicate that the sector is operating at about 35% and the partial elasticity of GDP to Transport sector output is 0.42, meaning that a 1% increase in agriculture output results in a 0.42 % increase in GDP. This implies that at full capacity, the sector can increase GDP by US $2.703 billion dollars. We expect this to translate into public expenditure on capital and social welfare projects. It will also increase the households' disposable incomes which will induce demand for key services like health care, education and others. We also expect investment expenditure to increase leading to job creation and improved domestic production which means less dependence on imports and hence more savings at home.

Keywords: Differencing, Dollarization, elasticity, Gross Domestic Product (GDP), Purchasing Power Parity (PPP), stationary data, and value addition.

INTRODUCTION

The Transport sector plays a pivotal role in the development of economies through movement of goods and passengers within local, regional and international markets. The land locked nature of the country gives it a strategic position as a gateway to markets within the SADC region and beyond. The decade long recession has impacted negatively the potential of this critically due to lack of adequate maintenance of the infrastructure and due to shortage of funds. This study analyses how this has affected the sector's potential contribution to the country's development; in terms of economic growth (gross domestic product, (GDP) and the socio-economic welfare of the broader rural communities within the Zimbabwean context, given developments in other developing economies (in the region and abroad).

The globally accepted measure of how well an economy is performing (economic development) is not only in terms of such statistics as the Gross domestic product (GDP), inflation, interest rate, exchange rate, Balance of payments (BOP) position and so on. These statistics must be linked/connected to the critical issues pertaining to the socio-economic well-being of the general population in terms of key demographics like: life expectancy, literacy level, GDP per capita,

1

unemployment, mortality rates (infant and maternal), access to clean water and sanitation, housing, transport, education, agricultural services and infrastructure. Other critical aspects include prevalence of such diseases as cancer, diabetes and HIV and AIDS.

After a decade-long recession, the Zimbabwean case shows that, comparatively, current figures on most of these variables are significantly lower than both regional and global averages. For instance life expectancy for men is 50 and 47 years for women (up from 37 years (2006), compared to the global average of 62.2 years (World Bank Report, 2011). The improvement from 1996 has largely been due to accessibility of health care, better nutrition, and HIV and AIDS therapy over the past two to three years (the dollarization phase).

Given the background of the study, it is therefore necessary to evaluate the sector's economic potential and analyse the possible impact (if any) on population livelihoods as defined by some of these key demographic variables outlined in section.

LITERATURE REVIEW

Theoretical literature review

According to Cooper (1980), a literature review uses as its data base, reports of primary or original scholarship, and does not report new primary scholarship itself. Saunders *et al.* (2000), say that literature review is carried out to generate and refine one's research ideas, demonstrate awareness of current state of knowledge in one's subject and its limitations.

Dependency theorists argue that poor countries have experienced economic growth with little or no development due to the fact that they have functioned mainly as resource providers to industrialised countries over a long period of time. According to analysts, this has largely been a result of dependence on outdated economic models that are based on "accumulation and exportation of raw materials at the expense of value addition".

An opposing argument is based on the proposition that economic growth will lead to development by increasing the average level private income, which means an increase in disposable income which will induce expenditure on human development aspects like education, health, nutrition and so on. According Ranis *et al.* (2000), economic growth and human development is a two way relationship. Concisely, the relationship between human development and economic growth can be explained in three ways. Firstly, an increase in disposable income leads to better access to health care, nutrition,

education and other social amenities (*Capability expansion through economic growth*). Secondly, reduced poverty levels lead to improved social outcomes (welfare) (*Capability expansion through poverty reduction)* and finally, social outcomes can significantly improve as a result of better access to health care, education, communication, transport and so on (*Capability expansion through social services).*

John Joseph Puthenkalam's research aims at the process of economic theories that lead to economic development. The existing capitalistic growth-development models need to be modified to incorporate issues that are becoming more and more topical like freedom, Human rights, democracy etc.

Other researchers believe that there is a need for some building blocks to be in place for growth and development to occur, key being the need to address property rights issues. This will ensure that the informal sector is included in the mainstream economy with the same opportunities as rest of the players.

According Hanushek and Woessmann (2008), a country's economic development is related to its human development, which encompasses, among other things, health care and education. These factors are however closely related to economic growth so that development and growth go together.

In the broadest sense, economic development covers key areas like price stability, job creation, sustainable growth and provision of affordable housing, health care and so on.

A number of studies have been done to establish the how economic growth has addressed the population social welfare; the following have been chosen for consideration.

Empirical review

Empirical evidence from other studies show that there is generally no positive relationship between economic growth and economic development. For most developing countries, it is increasingly emerging that translation of economic growth into development has been elusive for a long time now. The following are examples that have been chosen for consideration on.

The case of India

According to the World Bank group report (2011), the case study of India shows that as a result of economic liberalisation in 1991, the country's GDP has been growing in leaps and bounds, averaging 7.4% per year

between 2000 and 2011. However, these growth figures have not been translated into transforming the livelihoods of the general population. Unemployment is still very high, 86% and children under the age of 14 years constitute 3.6% of the labour force.

Environmental degradation is another sticking area. Out of the country's 3 119 cities and towns, only eight have got full water treatment facilities, 209 have partial treatment facilities, 144 of them dump raw sewage in the river Ganges (WHO, 1992). Air pollution levels are much higher than permissible global average 75µg per cubic meter. This has had serious effect on the ecosystem such that exotic species have emerged resulting in disease e.g. the cholera outbreak of 1992.Prevalence of HIV/AIDS is on the increase with at least 1.6% per 2.8 million people.

The case of Nigeria

According to the research by Ekpo *et al.* (2010), during the per-oil boom, the country's GDP grew at an average of 3.2% rising to 6.1% during the oil boom period. Over this period, official statistics indicate that unemployment was estimated at an average of 5%. The Agriculture sector also suffered from depressed commodity prices and the oil-boom which lured labour from the rural sector to urban centres.

The case of South Africa

According to the World Bank Report (2011), the South African economy is considered the largest in Africa, contributing approximately 24% of the GDP in terms PPP. It is among the four upper-middle class economies in Africa, the other three being Botswana, Gabon and Mauritius. The country's economy is quite diversified, having shifted from primary and secondary to tertiary sector in the mid-twentieth century.

Notwithstanding these developments, South Africa's unemployment rate remains high at over 25% and the poor cannot access the economic opportunities and services available. This has pushed crime levels up. Crime is ranked by 30% of South African businesses as one of major constrains on investment ease of doing business.

South Africa fairs well compared to other emerging economies on affordability and availability of capital, financial markets sophistication, business tax rates and infrastructure. However the country fairs poorly on the cost of labour, educational levels and the use of technology   and   innovation. This has largely been

attributed to political background of the country which was characterised by inequality. Although the country's infrastructure is the best on the continent, it suffers severe   bottlenecks,   power   shortages   and   needs upgrading.

In April 2011, South Africa officially joined the BRICS group of five emerging economies; Brazil, India, China and South Africa. This is a significant development indeed. However, there is need for concerted effort to address the population welfare issues at home.

The Zimbabwean case

The Zimbabwean economy has been undergoing a decade-long recession, (since year 2000), that has disturbed operations most sectors of the economy resulting   in   distortions   of   both   economic   and demographic variables. The transport sector has not been spared.

This situation makes it important for us to take stock of these distortions and evaluate the potentially ideal situation taking into account the economic capabilities of the country's main productive sectors. This involves determination of an appropriate GDP growth model whose impact translates into an aggregate expenditure (AE) model. It is from this information that we can deduce the effect on the demographic variables of interest.

RESEARCH METHODOLOGY

The case study research design was used in this study. This type of research explores a single entity or phenomenon bound by time and activity and also collects detailed information by using a variety of data collection procedures over a sustained period of time. According to Thomas (2011), case studies analyse "people, events, periods, projects, policies, institutions or other systems that are studied holistically by one or more methods".

Research population

According to Zikmund (2003) population is any complete group of elements, people, companies, hospitals, stores, or college students that share some common set of characteristics. The research population for this study is the Agriculture sector. The *Secondary sector* (Mining and Quarrying, Manufacturing and Electricity and water), and the *Tertiary sector* (Transport and communications, Distribution and Tourism, Education and Health) constitute '*Others'* (referred to in the data analysis section below).

3

Table 1: Industry performance (US billion dollars) - (1985-1999).

Industry	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agriculture	0.99	0.99	1.01	1.12	1.17	1.3	1.21	0.79	0.96	1.02	0.97	1.27	1.27	0.97	1.10
Mining	0.27	0.28	0.31	0.33	0.35	0.35	0.32	0.27	0.25	0.28	0.31	0.32	0.31	0.24	0.25
Man	1.7	1.30	1.41	1.60	1.72	1.80	1.71	1.47	1.37	1.4	1.34	1.67	1.61	1.14	1,17
Electrwt	0.11	0.13	0.18	0.20	0.23	0.22	0.19	0.16	0.13	0.15	0.15	0.16	0.16	0.11	0.12
Finsure	0.32	0.34	0.38	0.47	0.50	0.55	0,44	0.48	0.51	0.54	0.61	0.56	0.44	0.45	0.52
Distribution	0.8	0.91	0.96	1.12	1.16	1.34	1.31	1.05	1.00	1.06	1.06	1.15	1.34	1.33	1.08
Education	0.34	0.40	0.44	0.48	0,50	0.52	0.48	0.41	0.40	0.40	0.42	0.51	0.56	0.41	0.44
Health	0.09	0.10	0.12	0.14	0.14	0.13	0.13	0.11	0.14	0.14	0.14	0.14	0.10	0.07	0.08

Source: ZIMSTAT, Zimbabwe Compendium of Statistics, 2000. IMF Report, 2010.

Data collection procedure

The study was carried out using primarily secondary data collected from the main economic stakeholders; RBZ (Reserve bank of Zimbabwe) and ZIMSTAT (formerly the Central Statistical Office (CSO)) and IMF reports.

Personal interviews were also carried out with key personnel to get expert their opinion on the quality and reliability of the data.

Data analysis

Analysis of the data was based on the economic theory of National output as measured by the GDP. The GDP measures the total value of goods and services produced in the economy over a given period of time, normally a year.

Theoretical framework

In order to determine the relationship between GDP and economic growth, a theoretical model of the form outlined below will be used based on the following Cobb-Douglas production function as shown below:

$$Y = AK\ L\ e^{\mu} \ldots\ldots\ldots\ldots (1)$$

Where Y is the national output, K is capital and L is labour and A is total factor productivity efficiency of production.

Empirical model to be estimated

The time series data in Table 1 below was transformed and regression analysis performed to establish the *GDP growth model based* on the relative contribution of *Agriculture* sector and *Other* industries, defined as follows:

$$Log(GDP) = log\ +\ _1log(Transcomms) +\ _2log(Other) + \mu$$

Where: *Log(GDP)* is the natural logarithm of gross domestic product; *Log(Transcomms)* is the natural logarithm of agricultural sector; *Log(Other)* is the natural logarithm of other sectors; $\beta_1 ,\beta_2;$ are parameters to be estimated. They measure the (partial) elasticities of GDP to marginal increases in either sector and; μ is the error term or the random residual term. It is composed of two components which are errors of sampling and purely disturbance random error (other factors which affect the dependent variable but not included in the model). Inclusion of logarithms also helped to reduce the variability on the minimum and maximum values of the variables.

In order to address issues of validity and reliability, the time series data was tested and transformed (*differenced*) to ensure that it is *stationary*. In time series econometrics, a time series is said to be stationary value if it's mean, variance and auto covariance (at different time lags) are constant (or the same). If the data is not corrected for *stationarity*, the estimated model will be incorrect and hence produce spurious results.

## DATA ANALYSIS AND KEY FINDINGS

The Population data

The target population for the study was the Agriculture sector. Time series data pertaining to the performance of the Agriculture and *other* sectors for the period 1980 to 2005 is given in Table 1.

Table 2. Regression analysis on the transformed data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.667314	0.744632	0.896166	0.3827
TRANSCOMS-2	0.422934	0.478440	0.154257	0.26461
OTHERS- 2	0.552242	0.439369	0.962594	0.3492
R-squared	0.794285	Mean dependent var		4.195510
Adjusted R-squared	0.770083	S.D. dependent var		0.239340
S.E. of regression	0.114763	Akaike info criterion		-1.35442
Sum squared resid	0.223898	Schwarz criterion		-1.20506
Log likelihood	16.25442	F-statistic		32.81932
Durbin-Watson stat	1.997846	Prob(F-statistic)		0.000001

Dependent Variable: GDP-2; Method: Least Squares; Date: 11/15/13   Time: 13:42; Sample: 1982 1999; Included observations: 18 after adjusting endpoints.
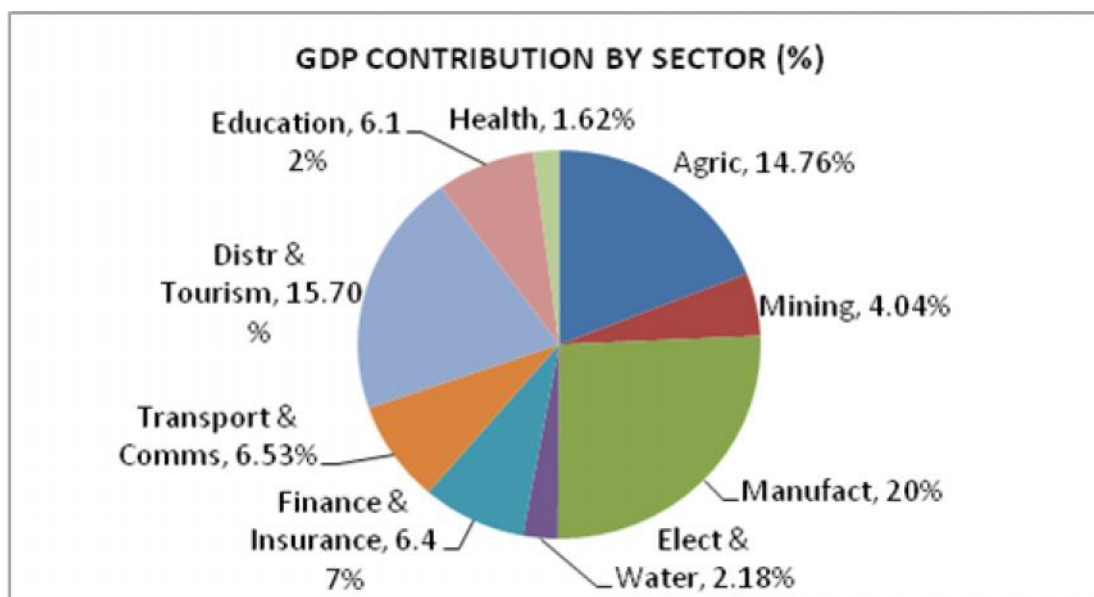
Figure 1: Contribution to GDP by sector (%). Source: ZIMSTAT, Compendium of Statistics, 2000.

Data analysis.

Regression analysis on the transformed data gives the results shown in table 2.

GDP contribution by Industry

From the time series data above, the average contribution to GDP by each sector is illustrated in figure 1 below. The Transport and Communications sector contributes an average of only 6.53% (see Figure 2 below).

The results from ordinary least squares

Multiple Regression analysis was performed based on the fact that GDP growth is dependent on the performance of the Manufacturing sector and other key industries outlined above.
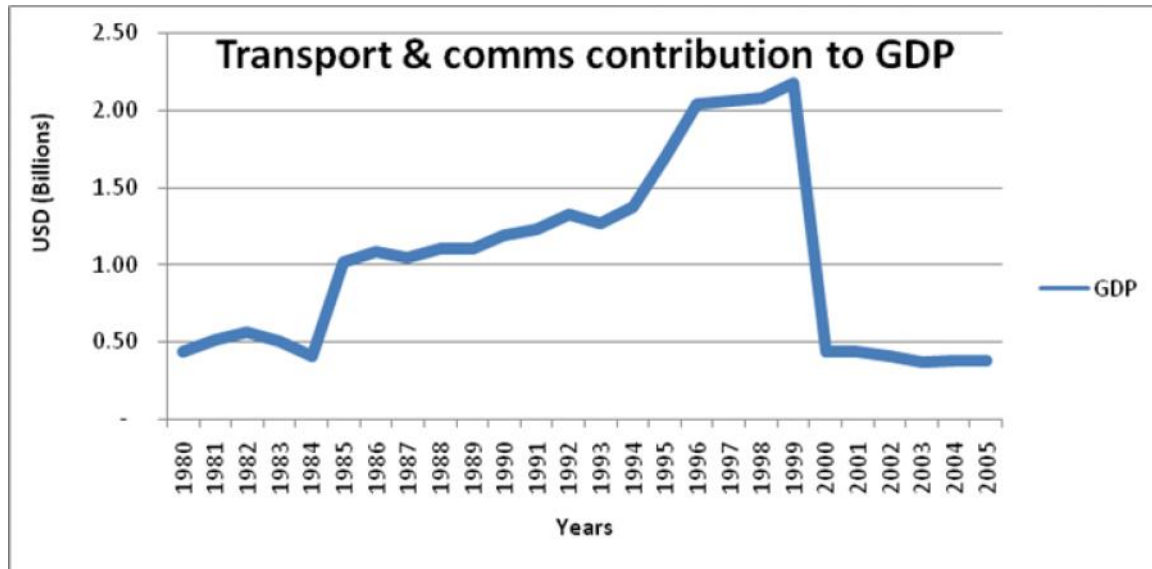
5

Figure 2: Transport & Communications sector contribution to GDP (%) Source: ZIMSTAT, Compendium of Statistics, 2000; IMF Report,(2005).

Table 3: Unit Root test using ADF Test at second difference I (2)

Independent	Difference	Stationarity	ADF Test	Critical	levels		Decision
Variable		Process	Statistic				
(industry)				1%	5%	10%	
TRANSCOMS	2	Intercept	-5.123997	-3.9228	-3.0659	-2.6745	Stationary
GDP	2	Intercept	-4.465602	-3.9228	-3.0659	-2.6745	Stationary
Others	2	Intercept	-5.163762	-3.9228	-3.0659	-2.6745	Stationary

Source: Raw data

After the second level differencing, the data was tested for *stationarity* using the Augmented Dickey-Fuller test statistic (ADF) and the results are presented in table 3.

Analysis of the results

It can be deduced from the *t-Statistic* results that both coefficients of the independent variables are significantly different from zero. In other words, GDP growth is explained by performance of the manufacturing sector and *other* industries. In fact the coefficient of

determination(*R-Squared)* suggests that approximately 79% of the changes in GDP are explained by changes in output of Transport and communications sector and the *other* industries.

The estimated GDP equation, in (ii) above, can then be stated as follows;

GDP- 2 = 0.67+ 0.42 (*Transcomms-2)* + 0.55 (*Other-2)………………………………..* (iii)

This means that a 1% increase in agriculture sector output, *holding other sectors constant,* will result in a 0.42 % increase in GDP.

The current operating capacity of the Transport sector

The decade long of economic downturn, has eroded the country's transport sector as a result of cash flow constrains and an inconsistent investment policy framework regarding that sector. As a result, the sector has experienced serious disinvestment and capital flight over the years. Key infrastructure for the sector is in a state of disrepair due to lack of scheduled maintenance. The current performance of the sector is estimated at approximately 35%.

Performance of the Transport sector

From the estimated equation (iii) above, it can be noted that 1% increase in agricultural output results in 0.42% increase in GDP. Given that the sector is operating at an estimated capacity of 35%, it implies that at full capacity we expect GDP to increase by approximately (65 x 0.42%) = 27.3%. Given the current (2013) estimated GDP of US9.9 dollars, we would expect GDP to increase by 43.6% which is (0.273 x US9.9 dollars) = US2.703 billion dollars. We expect this to translate into generation of goods and services within the three main GDP aggregate expenditure categories explained below.

Implications on aggregate expenditure

This increase in GDP has got several implications on the expenditure patterns, especially at an aggregated level. On a national level, there are three GDP expenditure categories identified in economic theory namely: Total consumption, Gross capital formation and International trade sector.

According to the *Government of Zimbabwe and IMF estimates,(2012)*, *Total consumption* which is the sum of public (Government) consumption (13.07%) and private (household) consumption (75.33%), which accounts for 88.4% of expenditure. On the other hand *Gross fixed capital* formation which is made up of public investment (16,7%) and private sector investment (0.3%) which accounts for 17%. The *international trade sector* is concerned with net exports of goods and services (-5.4%).

FINDINGS

From the analysis in the previous section we can deduce that the agricultural sector has a potential to increase the

GDP by approximately US2.703 billion dollars. This is expected to result in the following possible aggregate expenditure scenarios:

Public consumption increases by US $0.353 billion dollars. We expect this to result in more social security and welfare projects, pension payouts and improved remuneration in the public service.

Private consumption will increase by US 2.04 billion dollars. We expect that with higher disposable incomes, households will direct the bulk of their expenses towards health and education. We also expect this to translate into more demand for other key services like reliable transport and communication infrastructure, access to better accommodation and living conditions, nutrition, security, water and sanitation. As a result, this will have an impact on other demographic variables like life expectancy, infant mortality rate and prevalence of HIV/AIDS. Overall, we would expect a marked improvement in these socio-economic indicators to levels comparable to regional and global benchmarks.

Gross capital formation will also increase by US0.460 billion dollars. Expenditure on investment both public and private projects is expected to double. This means job creation, which will go a long way in reducing the level of unemployment, officially pegged at 90% (the highest in the SADC region so far). It also means more local production, which will reduce dependency on food imports thereby enhancing domestic savings.

CONCLUSION

In light of the findings discussed above, the country's Agricultural sector presents huge potential for economic growth which can lead to significant improvement in the socio-economic welfare of the local population through addressing adverse demographic issues, (which are poorest by regional standards so far), like unemployment, high numbers of economic refugees regionally and abroad, high prevalence of disease especially HIV and AIDs. The majority of the local population can hardly live on US $1.00 per day.

However, full operational capacity of the sector means that concerted efforts must made to attract the necessary investment through formulation of an enabling and consistent policy framework that is investor friendly enough to raise the necessary capital. It has been noted that generally international investors have been shying away from investing in Africa for reasons of political instability, violence and corruption. As a result, they have tended to concentrate on investing in the extractive industry where they bring their money and do whatever it takes to get their quick return in terms of gold, diamonds

and others, then leave. This form of investment tends to generate growth at a very aggregate level without significant job creation and hence excludes the broader needy rural communities.

There is need to concentrate on investing in small to medium enterprises and labour intensive operations to create more jobs. This is expected to even out income distribution. Investment in infrastructure and tertiary education is a critical part of the value chain since this is where innovation comes from.

References

Cooper AM (1980). The structure of knowledge synthesis, knowl. Soc. J. 1: 104-126 http://www.emeraldinsight.com/index.htm

Ekpo AH, Umoh OJ (2011). An overview the Nigerian growth and development. Community portal of Nigeria.

Hanushek EA, Woessman L (2008). The role of cognitive skills in economic development. Journal of Economic literature 46, no. 3 (September), pages 607-668.

Ranis G, Stewart F, Ramirez A (2000). Economic growth and Human Development. World Develop. 28(2): 197-219

Saunders M, Zewis P, Thornhill D (2000). Research Methods for Business Students, Gosport.

The World Bank Report, (2011).

Thomas G (2011). How to do your case study, Thousand Oaks, CA, Sage.

Zikmund WG (2003). Business Research Methods, Lifland et al. Bookmakers.