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Socioeconomic Context of Reproductive Health Outcomes in Nigeria

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Abstract

This research empirically investigates impact of some selected socioeconomic factors have on reproductive health outcomes in Nigeria. Specifically, the impact malaria prevalence rate income inequalities, public resource misappropriation and literacy rate have on both maternal deaths and under age five under-five infant mortality in Nigeria. The data set used is annual data from 1986 to the year 2015 from the World Development Indicators and the Central Bank of Nigeria Statistical Bulletin (2015). The technique used to analyze the data includes Descriptive Statistics, and the Vector Autoregression econometric procedure. Following the technique above, dynamic simulations in generalized impulse response function and forecasting error, Variance Decomposition were estimated; this made it possible to decipher the degree of linear interdependence between the variables. It was discovered that Malaria prevalence rate, income inequalities, literacy rate and public resource misappropriation significantly affect both maternal deaths and mortality of children under the age of five. The analysis concludes that reproductive health in Nigeria is not entirely affected by biological and behavioral risk factors; hence there is a social dimension to illness in Nigeria. Therefore, strategies to improve health production in Nigeria should be all inclusive. Furthermore, the coverage of antenatal services should be broadened for women. Guidelines should be put in place to aid even distribution of health facilities and health workers between rural and city centers. Intervention programmes that favour the poor especially in the subsidization of health services for the poor rural women should be initiated. Finally, efforts should be put into activities which increase educational opportunities for women.

Key Words: Reproductive Health, Socio-Economic factors, Maternal Mortality, VAR and Nigeria

JEL Classification: C4, C1, I1, I2, I3

Paper Classification: Research Paper

Introduction

The overall health performance and outlook for Nigeria is among the worst in the world. There is a high prevalence of avoidable diseases. HIV aids and Tuberculosis are among the list of diseases that plague the country. Nigeria's maternal health issues account for about 14% of the

world's total (Idowu, 2013; Nigerian Health Market Study Report, 2015; Onumere, 2010; Ogundipe & Adeniyi, 2011). Presently, the maternal mortality rate is put at 1 mother's death per every hundred deliveries (National Demographic and Health Survey, 2013). This rate is very alarming. Both under-five and newborn mortality rates remain very high. Recently, the under-five mortality rate is approximated to 128 in every 1,000 live births (NDHS, 2013; UNICEF, 2010; Federal Ministry of Health, 2011), a noticeable difference from 2008 based on the same report. Available evidence also shows that a wide variation exists in the health indicators across the geographical areas in Nigeria.

In order to achieve a better health status and a decrease in the occurrence of diseases, various administrations in Nigeria have setup several children and maternal health programs and initiated several health policies (Revised National Health Policy, 2004; National Reproductive Health Policy, 2004). Also improvements have been recorded in medical sciences. Notwithstanding, reproductive health outcomes remain in the parlous condition. The fact that improvements in medical services and health spending have not resulted in increased health status implies that apart from the medical causes of poor reproductive health outcomes, there are intermediate and intervening factors militating against reproductive health benefits.

For sometimes, the socio-economic determinants of health have gained increased attention in the health literature. The WHO dedicated a special issue of its bulletin in 2000 to aspects of socio-economic determinants of health (Erinosho, 2014). In 2008, WHO setup a commission to look at the social determinants of health and by 2011, a global conference on these social determinants congregated delegates from 125 member countries to ratify these social determinants. The WHO (2000) posits that deficient social policies, unjust economic arrangements and bad politics are the cause of health inequality. According to the Center for Disease Control and Prevention (2010) of the United States of America, socio-economic determinants of health refers to the prevailing socio-economic conditions and circumstances under which people live, the condition of our environments, genetics, our income and educational level and our human interactions with friends, family, and usage of health services.

Literature has established that there are both macro and micro dimensions to socio-economic determinants of health. However, studies on socio-economic determinants health in Nigeria are usually more oriented towards the micro-economic measurements. These studies somewhat looked into the impact of demographic factors on health (see Erinosho, 2014; Idowu, 2013; Ibrahim, 2016). Macro-sociological determinants of health border around good governance, economic arrangements, income distribution etc. This research therefore, addresses an important gap by analyzing the impact of macroeconomic factors, such as disease prevalence, resource misappropriation, income inequalities and literacy, on reproductive health status in Nigeria

Health Outcomes and Socio-Economic Characteristics in Nigeria

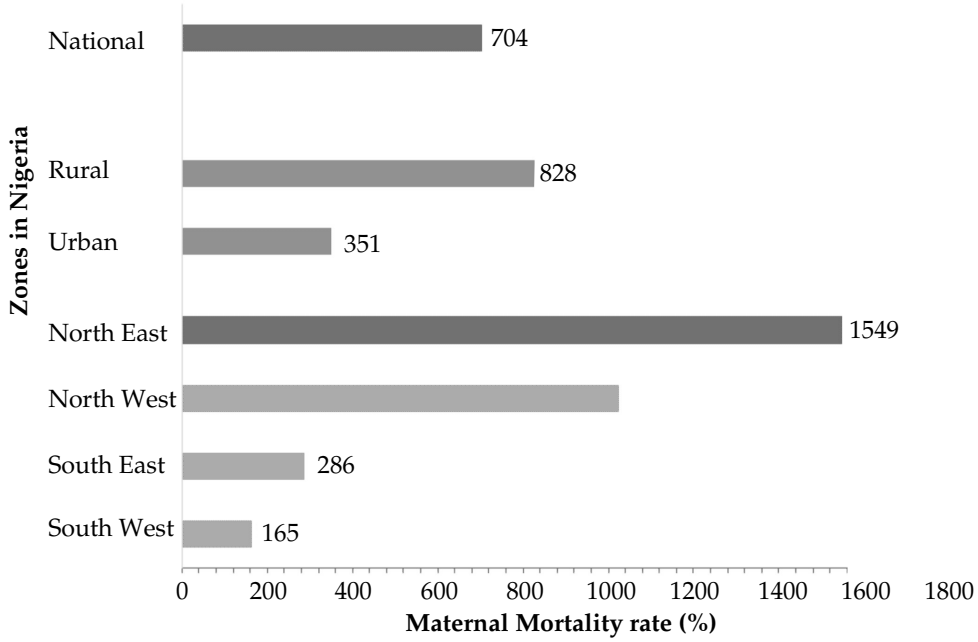
From available proofs, these are three health indicators (maternal death rate, infant death rate and Under-five deaths) are highly affected by socioeconomic characteristics. For example, both child death rate and under-five death rate in cities is consistently less than those in rural areas. Infant death rate is 43 per cent higher in rural areas (86 fatalities per 1000 live births) than in cities (60 deaths per 1,000 live births) (NDHS, 2013). The Urban-Rural variations are even more pronounced in the case of under-5 deaths. The disparity in health outcomes among the regions may easily be explained by the fact that individuals in rural areas may not have the ability to provide for their medical needs and medical facilities are not evenly allocated among the several regions (Sede & Ohemeng, 2012). Again, there are zonal differences in newborn and under-5 death

as well. Under-5 death ranges from a minimal of 90 deaths per 1,000 live births in South West to 185 deaths per 1,000 live births in North-West of Nigeria. Under-5 death is also relatively high in the North East and South East (NDHS, 2013; Ogundipe & Adeniyi, 2011; Oluwatoyin, Folasade & Fagbeminiyi, (2015). The zonal dissimilarities in the health indicators are derived from the fact that most individuals in the northern part of Nigeria are both poor and illiterate; hence they may not be good producers of health. The substantial illiteracy in these regions has led to poverty and deplorable health conditions.

Needless to say, a mother's education is inversely related to a child's risk of dying. Under -5 death among children delivered to mothers without education (180 fatalities per 1,000 live births) is nearly twice as high as those of children born to mothers with secondary education (91 fatalities per 1,000) and about three times as high among children of mothers with more than secondary education (62 deaths per 1,000 live births). The benefit of education to mothers is evident in all child fatality categories. A general consensus in literature is that education is a social resource which affects the health of children and the future population.

Furthermore childhood death generally diminishes as wealth rises (NDHS, 2013). This is a verified conclusion from studies that show intricate associations between poverty, education, employment, teenage births and the health of mothers and their children. Available statistics show that sixty per cent of children delivered into poor households have at least one chronic disease (Ward, undated).

Fig. 1: Comparison of maternal death ratios nationally and by zones in Nigeria



In Fig.1 above, there exist noticeable variations in the mortality rate of rural and urban dwellers. The countrywide maternal loss of life is 704 in every 100,000 births, in the rural regions; there is a stunning 828 deaths in every 100,000 births. In the metropolitan region, it is 351 maternal deaths in every 100,000 births. The huge disparity in maternal loss of life between the rural and urban area dwellers reflect inadequacy of basic amenities in the rural areas. Besides, most

individuals residing in the rural areas are poor and illiterate, hence are not effectively producing health Grossman, (1972). The disparity in maternal health between residents of the southern and northern regions of the country, mirror the inequitable distribution of health facilities, which is tilted towards the south as a result of lot of private health facilities being in the south Sede & Ohemeng, (2012). Furthermore the availability of medical personnel is positively skewed towards the southern areas of the country.

Socioeconomic signals from Nigeria and Selected African Countries

There is evidence from literature that the poor suffer more health issues. In Africa, Nigeria inclusive, poverty is common and continues to influence Reproductive Health. Erinosho, (2014). The problem in Africa becomes more glaring when poverty interacts with formal education.

It is a proven fact that a strong relationship exists between per capita income and reproductive health. For example, poorer countries tend to have higher fertility rate, lower contraceptive prevalence rate and a disproportionate chunk of both maternal and child fatalities Gyepi-Garbach, (1997).

Table 1: Sexual Reproductive Health and Economic Indicators for selected African Countries

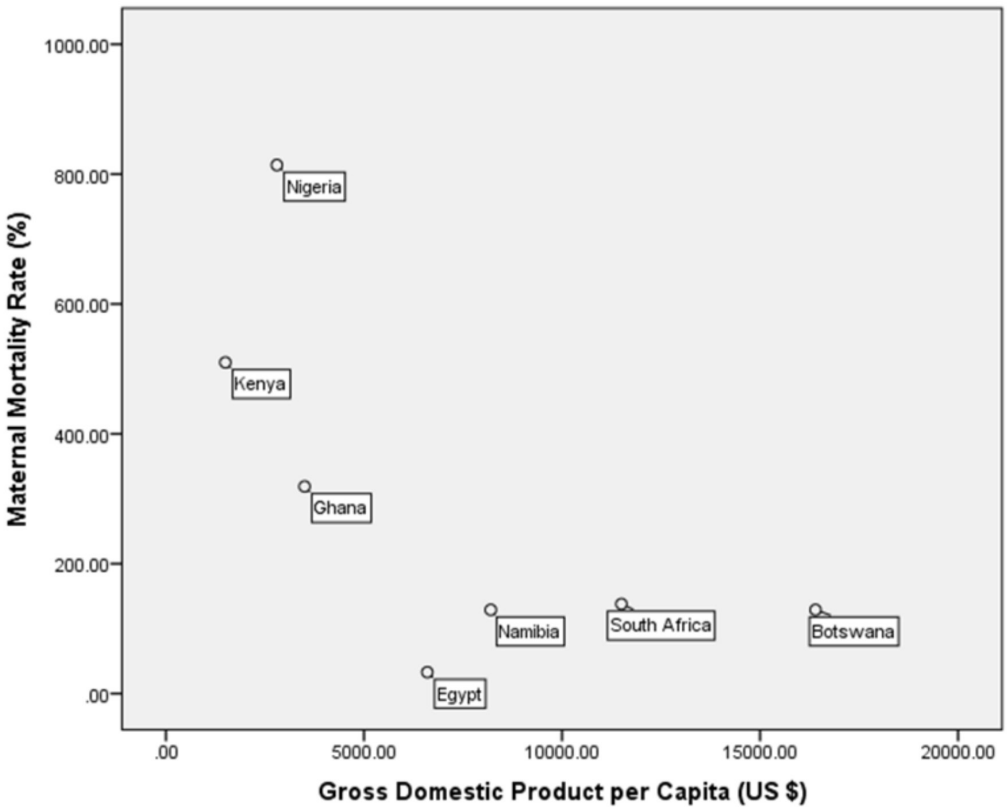
Indicators	Nigeria	Ghana	Kenya	Egypt	Botswana	S/Africa	Namibia
Total Fertility Rate	5.7	4.2	4.3	3.3	2.8	2.4	3.5
Contraceptive prevalent (% of women aged 15-49)	15	34	46	60	53	60	55
% of birth Attended by skilful Health personnel	39	57	44	79	94	91	81
% infants with low birth weight	11.7	10.7	77	13	13	15	16
Infant death rate (death/1000 live births)	69.4	42.8	35.5	20.3	34.8	33.6	32.8
Under-5 death rate (Death /1000 live births)	108.8	61.6	49.9	24	43.6	40.5	45.4
Condom use at the last high-risk sex	24(W) 46(M)	33(W) 52(M)	25(W) 47(M)	Na Na	75(W) 88(M)	20(W) Na	48(W) 69(M)
Maternal death rate (death per 100,000 live births)	814	319	510	33	129	138	265
Adult literacy rate for women and men	W(41) M(61)	W(65) M(78)	W(67) M(78)	Na Na	W(89) M(87)	W(93) M(95)	W(89) M(90)
GDP per capita US $	2,800	3,500	1,500	6,600	16,400	11,500	8,200

Source: Authors computation (2017)
Notes: W, M and Na respectively represent women, men and Not available.

In Table 1, there is a strong indication that, there is a relationship between health, education and economic development of the chosen African countries. This offers insight on the type of relationship that exists between Reproductive Health, poverty and education in Africa. First it can be observed that those countries with high per capita income have low fertility rate. Countries like Botswana, South Africa, and Namibia with high per capita income relatively have low fertility rate in comparison to Nigeria, Ghana, Kenya and Egypt which have low per capita income and high fertility rates. Furthermore, countries with high literacy rate female sub-group or overall attract low fatality rates. For example, Namibia, Egypt, South Africa and Botswana with high adult literacy rates have lower maternal and fatality rates in comparison to Nigeria, Ghana and Kenya. This portends that the socio-economic conditions of specific families as well as their educational attainment are critical determinants of Reproductive Health production.

Interesting information that can be gained from Table 1 is that there surely exist interplay between the percentage of child delivery by skilled workers and newborn and maternal loss of life. Countries with a higher proportion of child delivery conducted by trained medical personnel have lower newborn and maternal fatality rates. Countries with a higher contraceptive prevalence rate in Table 1 are Egypt, Botswana, South- Africa and Namibia and these countries likewise have higher literacy rates and lower maternal and newborn fatality rates. There also appears to be an interaction between condom use at the previous high-risk sexual relation and adult literacy rate side by side with per capita income. Thus, poorer women marry earlier and also show a lower contraceptive use, which accounts for higher fertility rates among low income earners in comparison to high income earners Porter & Copete, (2002); Greenaway, Leon & Baker, (2013).

Fig.2: Maternal Death Ratio by GDP per Capita



Note: Based on data in Table 1

In Fig. 2, an inverse relationship can be seen between GDP per capita and maternal death rate. Countries with high per capita GDP have low maternal death rate. This shows that a solid interaction exists between macroeconomic performance and health status; hence policies designed to boost health outcomes must enhance the socio-economic conditions.

Theoretical Literature

Several theories make clear the impact of socio-economic determinants on health outcomes. Dominant among these theories are the Income Inequality theory, Deprivation theory, Modernization theory. Below are assessments of these theories.

The Income Inequality Theory

This theory presents a direct negative influence of inequality on health generally. Several mechanisms may account for this impact. The first pertains to trust and social cohesion which is referred to as social capital. An environment with large disparity between the rich and the indigent could hinder social cohesion and erode social capital and all these will result in negative health outcomes Durkheim 1897; Putnam, (2000). An alternate mechanism is the social comparability and the psychic disutility associated with being situated on the lower rung of the income ladder. The less privilege in climes with income are susceptible to stress and nervousness. Meanwhile stress and concerns are at the root of most illnesses.

Deprivation Theory

This theory illustrates the role of poverty in deteriorating health conditions. In the literature, it is established that poverty and health are inseparably associated (WHO, 2008). It is an unarguable fact that poverty manifests in a number of forms of deprivation that result in even worse health state. This theory stresses the material conditions under which people live. These conditions include availability of resources, usage of the amenities of life, quality of available food, housing conditions, and access to sanitation and others. The materialistic justifications for an individual's living conditions alongside the social determination of health that constitute the living conditions influence his / her health. The strategy allows that the prosperity of a country be a strong indicator of the populace's health. However, within every nation, socio-economic status of a person is a robust predictor of health. An individual's social ranking is an indication of any maternal advantage or disadvantage over the lifetime Graham, (2007).

The Modernization Theory

The theory facilitates the belief that industrialization and economic development will favorably impact health. Economic progress will foster improvement in education, housing, nutrition, healthcare, sanitation and different public services. This will eventually impact positively on health outcome. The reasoning is, higher per capita income and employment generation associated economic progress brings about improvement in living standard, which ensures sufficient care for mothers results in a decrease in both under-five deaths and infant death rate. This theory is backed by demographic trends that show that developed countries have declining infant death rates which can be credited to an improving quality of lifestyle, urbanization and better health care that derives economic transformation Aluko and Aluko, (2017).

Empirical Literature

This empirical literature followed chronological review to x-ray works done in relation to social economic determinants of health. Our Empirical studies examined both studies on Nigeria and other countries. The analysis however reviewed works on social economic determinants of health such as Idowu (2013), Ogada (2014) and Ibrahim (2016) etc. The results from the reviewed studies served as guide to this research, in determining areas where attention is needed to become a healthy nation which is in line with the policy stance of Nigeria's vision 20: 2020 and the National Health Policy.

Okaro et al (2001) conducted a retrospective comparative analysis of maternal deaths at the University of Nigeria Teaching Hospital Enugu for two ten-year periods (1976-1985) and (1991-2000), with the purpose of investigating the influence safe motherhood initiatives have on maternal death in the hospital. It was discovered from inception that, with safe motherhood

initiatives in practice, maternal death increased by five-fold and those factors such as institutional delay and deterioration in the standard of living of Nigerians were among the factors accountable for this. During the period under review, the health sector experienced a great deal of crisis which amongst others included perennial underfunding, incessant strike actions by medical professionals, policy inconsistencies and the mass exodus of medical personnel from the public sector to either the private sector or foreign countries. This study among other things recommended that efforts be put into preventing frequent strikes in the health sector, promote retention plans and increased financing for the health sector.

Ujah et al (2005) conducted a facility-based research in north-central Nigeria to examine the magnitude, trends, causes and characteristics of maternal deaths before and after the safe motherhood initiatives in Jos, with a view to recommending strategic interventions to lessen maternal deaths. The case file of all women who died during their pregnancy and childbirth in the maternity section of the University Teaching Hospital in Jos was examined. The data gathered analyzed for socio-biological factors including age, booking status, educational level, parity, ethnicity, mode of delivery, duration of stay at the hospital and factors responsible for maternal deaths. Over the period of the study, there were about 38,768 deliveries and 267 maternal deaths placing the maternal fatality ratio at 740 per 100,000 live births. The trends fluctuated between 450 in 1990 and 1,010 per 100,000 live births in 1994. The average age of maternal death was 26.4 (SD8.1 years). The most prominent risk of MMR was among adolescent mothers whose age is15 years and older mothers whose age is at least 40. Maternal death rate was highest among grand multiparous, unbooked and illiterate women. The immediate causes behind maternal death were haemorrhage (34.6%), sepsis (28.3%), eclampsia (23.6%) and unsafe abortion (9.6%). The indirect causes of maternal death are hepatitis (18.6%), anesthetic death (14.6%), anaemia (14.6%), meningitis (12.0%) and acute renal failure (8.0%). Seventy-nine per cent of maternal deaths occurred within 24 hours of admission. The study suggested that region-specific programmes be implemented in order to lessen the high rate of maternal death.

Alves and Belluzo (2005) estimated a static and panel data model using census data from Brazil between the period of 1970-2000 to research the determinants of newborn death rates. The results of their findings indicate that poor child health (in terms of death rates) in Brazil can be described by the degree of education, sanitation and poverty. Paxson and Scady (2005) demonstrated that infant death spiked during the Peruvian turmoil coincidence with a 30 per cent fall in per capita GDP between 1987 and 1990. They proved that public health expenditure dropped by 58 per cent in this era, its budget share from 4.3 to 3 per cent. They, therefore, concluded that this, as well as, a possible decrease in private health expenses is a likely explanation for the surge in infant death in this era.

Kawachi, Fujisawa and Tako (2007) looked into the reason why income inequality was bad for health. The authors used an experimental technique to examine the relationship between health disparity and life expectancy. A survey design to review the mechanism through which income inequality harms health was used by the study. It also used factorial ANOVA and t-test. The study included a survey that contrasted the health of Japan with that of America. The conclusion was that income inequalities were not only related to worsening health outcomes but that it could damage social capital.

Koch et al (2012) examined the impact of education, income per capita, fertility rate (TFR), birth order, clean water, sanitary sewer and deliveries carried out by skilled health professionals on maternal death. The study used the Autoregressive Moving Average modeling for a 50-year period, The MMR reduced from 293.7 per 100,000 to 18.2 per 100,000 live births, a decrease of

93.8%. In the model, every year of maternal education resulted in a reduction of MMR of 29.3 per 100,000 live births. The study recommended that an upsurge in women's education is important in minimizing maternal death and modulating the impact of several factors on maternal health.

Idowu (2013) examined the socioeconomic determinants that precipitate the medical proximate determinants of maternal death for four local government areas of Lagos state from November 2011 to January 2012. The study engaged 1,362 respondents to whom structured questionnaires were administered. Furthermore, 20 key informants were interviewed and four case studies were examined. It was discovered in the study that age, education, profession, income, faith, marital status and type of marriage all significantly affect maternal health. Regarding age, it was discovered that younger women are less inclined to suffer pregnancy-related problems. Furthermore, the working condition of women and cultural beliefs significantly affect maternal health. Social support does not have any significant effect on maternal health. The study recommends the utilization of multi-pronged and multidimensional strategy to curb maternal fatality in Nigeria.

Ogada (2014) examined the impact of socio-economic determinants on under-five death count in three metropolitan areas in Nairobi, Kigali and Dares-Salaam. Multinomial logit Regression method was employed in analyzing the secondary data obtained from the National Demographic Health Survey. The study revealed that the consequences of socio-economic determinants on under-five death count rates are indirect. They work through the proximate determinants. Again, higher delivery order and mother's age has no significant effect on under-five death count for mothers within high prosperity quintile. However, both restroom and use of private health facilities significantly predicted under-five death count. The study suggested that socio-economic conditions should be upgraded in order to cut down on under-five death count.

Fatukassi and Ayeomoni (2015) evaluated the impact of income inequalities, per capita income, educational level and cost savings level on health indications proxied by loss of life and life span rate in Nigeria using vibrant ordinary Minimum Square (DOLS) method. The research employed time series data extracted from the International World Economic Outlook from 1980-2014. The analysis revealed that income inequality comes with an inverse influence on death count. However, income equality and life span rate have a direct relationship in the model. The research concludes that the indicators of health are highly affected by income inequalities, per capita income, educational level and cost savings in Nigeria.

Ibrahim (2016) examined the socio-economic determinants of maternal loss of life in rural areas of Oyo State, Nigeria and employed the use of descriptive survey research method. For the sampling procedure, the study initially selected nine out of the eighteen existing local governments in the state using the purposive sampling technique. Subsequently, the study used the systematic random sampling method to randomly select 63 communities from the previously selected nine LGAs and the simple random sampling method was used to choose 2,200 women that fall within the child-bearing age group from the selected areas. The research data gathered were evaluated and analyzed using descriptive figures, multiple regression and content analysis. The study revealed that educational status, closeness to health facilities, income level and purchasing power has a significant effect on health outcomes. Based on these findings, the research recommends that extensive maternal healthcare awareness and campaign should be embarked upon. Also, initiatives should be targeted towards the adoption of modern health procedures to redress maternal loss of life.

Theoretical Framework

The health production function is adopted as the theoretical foundation for this research. The health production function is derived from the idea of production that creates a connection between end-result and inputs from a production device given the fundamental technology (Arthur, 2015). In this particular framework, general well-being is the sole output of the health system. As a result, the model considers the manner in which health inputs such as general public health expenditure affects health outcomes. Several studies such as Filmer and Pritchett (1999), Anyanwu and Erhijiakpor (2009) and Nixon and Ulman (2006) (Arthur, 2015) have utilized the health production function.

Filmer and Pritchett (1999) provided the health production explicitly as:

$$HS= (T\ HE/N)B_1X\ (NHE/N)B_2\ X\ (NHI/N)\ X\ eA \quad (1)$$

Formula (1) expresses the health production function in the practice of the Cobb-Douglas standards as provided by Filmer and Pritchett (1999). HS is a proxy for health outcomes, THE in the formula is Total health costs, NHE symbolizes non-public Health costs and NHI is a proxy for national income. N signifies the size of the population and e is the natural exponential function. A symbolizes the factor for technical progress.

Dividing both numerators and denominators by the GDP and then taking the logarithms of formula (1), we obtain formula (2).

$$LnHS =B_0+ B_1\ Ln\ (HE/N)+ B_2Ln\ (NHE/N) +B_3Ln\ (NHI/N) + A \quad (2)$$

In Formula (2) health outcomes is expressed as a function of public health expenditure share of the GDP, private health costs share of the GDP, per capita income and country-specific factors. The researchers assume A depends on a couple of observable and non-observable socio-economic factors that are country-specific and affect health outcomes (Arthur, 2015). Therefore, formula (2) is re-specified:

$$Ln\ HS = B_1Ln\ (THE/GDP) + B_2\ Ln\ (GDP/N) +L\ (xi) + e \quad (3)$$

Formula (3) expresses the nationwide log of health outcomes as a function of the log of Total Health expenditure as a share of the GDP, the log of per capita income and group of socio-economic factors. To avoid complications and aid simplicity, let's expunge both per capita income and the percentage of health costs in the GDP. It, therefore, implies that health status depends upon socio-economic factors which in this research are governance, income inequalities, education and disease prevalence (Malaria).

Model Standards, Data and Econometric Results

Health indicators and Socio-Economic variables: A VAR Model

Lately, researchers have begun to examine the interrelationship among macroeconomics factors by utilizing the powerful techniques of vector auto-regression (VARS) pioneered by Sims (1980a). The VAR approach is attractive as it facilitates the analysis of the interrelationship among time series variables, dealing with all as endogenous. VARs has been established to be powerful for time series forecasting, for the evaluation of short-run and long-run dynamics, impulse response functions and forecasting blunder variance Decomposition. This research will, therefore, utilize this adaptable tool to explicate the intricate links between socio-economic determinants and

reproductive health outcomes in Nigeria. This research will perform unit roots of all series in the study and test of co-integration. Furthermore, Forecast Variance Decomposition and Impulse Response Function are employed to examine the powerful interrelationships between the parameters in the VAR system. This research posits a six-variable VAR model where Under-five death count, maternal death count, per capita income, malaria widespread rate, Gini index and corruption perception index are concurrently interrelated. To be able to obtain more significant insights, logarithmic change of the parameters was utilized.

Thus, the VAR model given is:

$Vt = \alpha + \sum AiVt\text{-}I + Ut$

Vt = (U-5 MR, MMR, MPR, GINI,CPI), the vector of the logarithm of Under-five death rate, maternal death rate, per capita income, malaria prevalent rate, Gini index and corruption perception index).

α = Intercepts of autonomous variables

Ai = Matrix of coefficients of all the variables in the model

Ut = Vector of the stochastic error terms.

Data Issues

Sourcing dataset from the Statistical Bulletin of the Central Bank of Nigeria, World Development Indicators and Transparency International website this study utilizes gross annual time series data on seven macroeconomic parameters, namely, under-five death count (U-5 MR), Maternal death count (MMR), Malaria widespread rate(MPR), corruption perception index(CPI) and Gini index(GCI) from 1986 through 2015.

Econometric Estimation Results

Descriptive Statistics

Table 2: Summary of Descriptive Statistics

Variables statistics	LMMR	LU5MR	LMPR	LLITR	LCPI	LGINI
Mean	1107	158.67	3850775	58.8	1.89	0.48
Minimum	819	120.9	1171363	53.0	0.69	0.40
Maximum	1867	197	6757961	68	2.70	0.60
Std. Dev	365.95	27.87	1171363	53	0.69	0.40
Skewness	1.26	0.12	0.19	0.93	-0.35	0.65
Kurtosis	2.95	1.27	1.51	3.01	2.17	2.23
Jarque-Bera	4.74	2.28	1.78	2.61	0.90	1.72
Prob	0.09	0.32	0.41	0.27	0.64	0.423

Source: Author's Computation (2017)

The mean value of maternal death count for the time frame under study is 1107 which is above the SSA' average of 560 as well as for developing countries put at 400 per 100,000 (Ibekwe & Mojekwe, 2012). For the time frame, the utmost and minimum values of maternal loss of life are respectively 1,867 and 819. The standard deviation of 365.95 implies that maternal loss of life

shows extensive fluctuation during the period under review. The mean value of under-five death count during this time period is 158.67, which really is not in any way close to the MDG's goal target of 30 per 1,000 live births. The utmost and minimum values of under-five loss of life rates are respectively 197 and 120.9 per 1,000 live births.

Unit Root Tests

Since the research uses economic time-series data, it is highly recommended to begin by verifying the time series properties of the series employed. To be able to test for the stationarity of the series used in the analysis, unit root tests of all macroeconomic variables was completed using both Augmented Dickey-Fuller (ADF) and Phillip- Perron (P-P).

Table 3: Summary of Unit Root Results at 5%

Variable		Tests		Conclusion
	Order of Integration	ADF	PP	
LCPI	Level	-0.9277 (-2.9679)	-0.8826 (-2.9678)	I (1)
	1st DIFF	-5.9156 (-2.9719)	-6.2824 (-2.9719)	
LMPR	Level	-1.5384 (-2.9810)	-1.5890 (-2.9763)	I (1)
	1st DIFF	-5.7448 (-2.9810)	-5.7448 (-2.9810)	
LU-5 MR	Level	-1.9727 (-2.9698)	-1.5178 (-2.9678)	I (1)
	1st DIFF	-4.9869 (-2.9719	-4.9869 (-2.9719)	
LGINI	Level	-1.9797 (-2.9763)	-2.2078 (-2.9763)	I (1)
	1st DIFF	-5. 1258 (-2.9810)	-5. 1258 (-2.9810)	
LMMR	Level	-4.3651 (-2.9719)	-2.5857 (-2.9678)	I (0)
	1st DIFF	-5.2505 (-2.9981)	-5.2505 (-2.9719)	

Source: Author's computation (2017)
Note: ( ) represents the Mckinnon critical values.

A listing of the unit roots result is provided in Table 3 above. The results do not consider the pattern in variables. The explanation for this is that an explicit test of the trending design of the time series is not completed. The results show that at levels all the series have ADF figures that is significantly less than the Mckinnon critical values at 95%, however, initially difference, the ADF figures is bigger than the critical values, hence the macroeconomic variables employed in this research are included of order one written when as I (1). Since the order of integration is not I(0) the implication is that the alternative available method is the Vector Error correction mechanism VECM. This is the reason for the adoption of VECM instead of VAR in this study. The next stage in the analysis is to take on co-integration evaluation to calculate the relationship that exists among the variables, so long as the technique chosen permits the possible joint endogeneity of most seven macroeconomic variables as recommended by Guest and Swift (2008).

Co-integration Test Outcomes

The Engle and Granger two-step method is utilized for the test of co-integration. The consequence of the co-integration test is summarized in Table 4.

Table 4: Co-integration Test Results

Variables	ADF Test – Statistic	95% critical value	Remarks
Residual Vector	-5.4428	-3.0522	Stationary

Source: Author's Computation (2017)

Utilizing the Engle and Granger (1987) co-integration method from Table 4, the null hypothesis of no co-integration among the list of parameters at 5% level cannot be accepted. This is because the complete value of the ADF test statistic is higher than the 95% critical value. This again means that the residual is stationary and therefore, the parameters are co-integrated and there is a long-run significant relationship between the dependent and independent variables.

Results of Forecasting Error Variance Decomposition

To further look at the short-run strong properties of the log of Under-five death count, maternal death count, malaria widespread rate, Gini index, and Corruption Perception Index; in Table A1 (Appendix), we present a listing of the variance Decomposition for the five variables. By description, the variance decomposition shows the percentage of forecast variance for every single variable that is due to own innovation and also to development in the other endogenous variables.

A study of the variance decomposition of LMMR in Appendix 1 Table A1 demonstrates that a significant part of the variance experienced by LMMR is related to own shocks. The contribution of own shock was 97% in the first period and comes to 71.8% by the end of the ten-period horizon. Besides, LU-5MR and other variables made an extraordinary contribution to the variance decomposition of LMMR. The contribution of LCPI began with 1.78% by the first period. Its contribution, however, retained an upward surge through the tenth period until it stood at 7.5168% by the tenth period. The contribution of LGINI started out with 0.44% by the first period. It, however, constantly rises until it peaked at 7.78% by the tenth period. LLITR and LMPR also made a commendable contribution to the variance parts of LMMR. Their influences on that have been 0 .47 and 0.00% respectively: They constantly rose by the first 12 months until they peaked at 6.28 and 6.39% respectively by the tenth period.

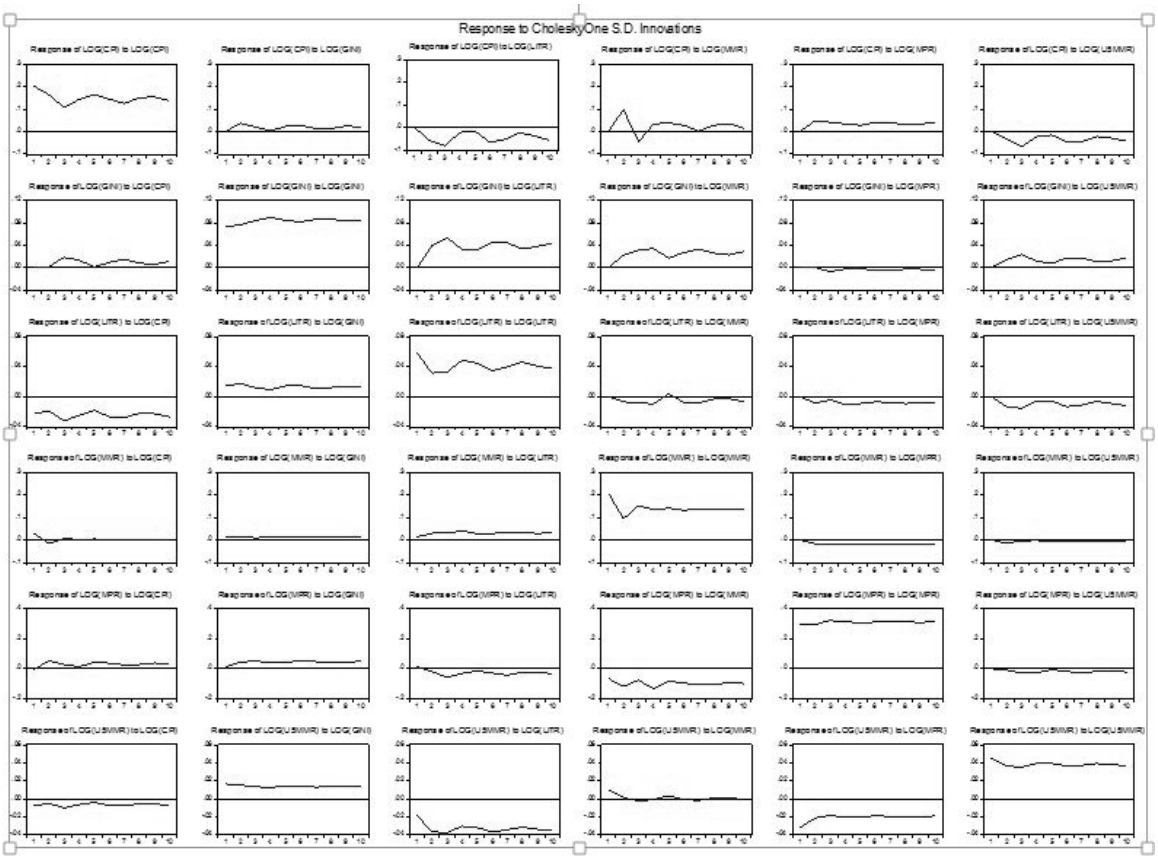
Furthermore, a study of the variance decomposition of LU-5MR demonstrates own shocks constitute the predominant bases of variation in LU-5MR. However, other socio-economic factors made an extraordinary contribution to the variance of LU-5MR. Specifically, LGINI, LCPI and LMPR impressively influenced the variance of LU-5MR. Summarily, we conclude that the predominant bases of variation in both LMMR and LU-5 MR are credited to own shocks; however socio-economic factors like malaria widespread rate, Gini index, corruption perception index and literacy rate all significantly have an effect on these health indicators.

Impulse Response Function Analysis

Over time, the impulse function simulates the effect of the one-time shock in a single formula on itself and on other formula in the whole formula system; hence it is utilized to detect relationships among variables. Results of the predicted generalized impulse response functions (IRF) are summarized in Fig.2

From Fig. 2 below it could be noted that the graphs for LMR and LU-5MR with regards to the recognized shocks are regular with the results of the variance decomposition evaluation.

Fig. 2: Impulse Response Functions



VECM results are presented in Table A2 in the Appendix. Remember that all coefficients estimations are elasticity. A study of the results reveals that the single most significant determinant of LMMR is its one-time lagged value. The elasticity of LMMR regarding its lagged value is 2.5524. LMPR, LGINI and LCPI are also important determinants of LMMR. The elasticity of LMMR regarding onetime lagged value of LMPR, LGINI and LCPI are respectively 1.0876, 0.1311 and 0.0983. While onetime lagged value of LLITR is not significant, the two time-lagged values are significant and also negative by indication. Again, an in depth examination of the formula for U-5 MMR reveals that its significant determinants are LMMR, LMPR and LGINI. The elasticity of LU-5MMR regarding LMMR, LMPR and LGINI are respectively 0.0103, 0.0331 and 0.0296.

Discussion

Both variance decomposition and VECM estimations disclose that malaria is a burden to both maternal and child health. This conforms to existing knowledge that malaria poses severe obstetric difficulties. In regions of high or steady transmission such as Nigeria, malaria during pregnancy is usually asymptomatic as maternal immunity reduces the chance of severe health problems, however, the harmful results on both mother and newborns are mentioned (Enato,2015; Fatusi,

(2005). The unwanted effects include anaemia, low birth weight of newborns, preterm birth, early delivery and perhaps maternal death. Available evidence demonstrates that approximately 20% of most deaths among children especially for the under-5 are credited to malaria (Enato, 2014). In Nigeria, epidemiological research of disease burdens reveals that malaria is responsible for 11% of maternal death during the period of pregnancy. This finding, therefore, reminds us of the necessity for the execution of preventative treatments for malaria during pregnancy.

Income inequalities significantly influence under-five and maternal death count for the time under study. However, this is not surprising due to the yawning income inequalities in Nigeria. Adegoke (2013) posit that Nigeria is one of the thirty unequal countries on the globe with the poorest half of the population retaining only 10% of the national income. This finding conforms to those obtainable in other geographical areas Almas, (2004); Juan, (2013); Wen, Browing and Cagney, (2003). In Nigeria, a research by Fatukasi and Ayeomoni (2015) discovered that income inequalities for Nigeria have grave implication for both life span rate and death rates. This research, therefore, portends that the increasing account of income inequalities in Nigeria and its own attendant challenges over time has resulted in a rise in both maternal and under-five death count.

As evidenced in its contribution to both their variance decomposition, literacy rate significantly influences both under-five death count and maternal death rates. This, therefore, demonstrates that enhancing education will provide a way of improving on reproductive health outcomes in Nigeria. This finding corresponds with Grossman (1972) theory of demand for health which posits that knowledgeable people are better in health production. This makes instinctive sense since education is a marker for several other factors that influence health-seeking behaviour. It is therefore reasonable to dispute that educated mothers have the chance to acquire health-protection information and own a level of health literacy that affects their health-seeking behavior in comparison to less educated mothers. Furthermore, children of informed parents are less vulnerable to under-five Newborn death.

Conclusion and Recommendations

Utilizing gross annual time series data for the time under study - 1981-2015 and the research method of Vector Error Correction Models (VECM), this research has demonstrated that Reproductive Health in Nigeria is not totally dependent on medical and natural factors, but that socio-economic factors interplay with natural causes to affect health outcomes in Nigeria. The research, therefore suggests that antenatal treatment and attention coverage be broadened for women. A blend of Intermittent Preventive Treatment using Sulfadoxine -Pyrimethamine (IPT-SP) and Insecticide Treated Nets (ITNs) should be utilized to safeguard both pregnant women and their newborns. Pro-poor programs that subsidize healthcare services should be promoted. The problem of corruption should be tackled by putting accountability systems in place. Finally, education opportunities should be broadened for women.

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Appendix Table A1: Data for Regression

Obs	CPI	GINI	LITR	MMR	MPR	U5MMR
1986	1.363321	0.390000	50.50000	923.0000	1121412.	211.5000
1987	1.363007	0.390000	50.60000	950.0000	2138542.	209.6000
1988	1.377706	0.380000	51.60000	965.0000	3142196.	208.9000
1989	1.394088	0.420000	51.80000	945.0000	2131214.	209.5000
1990	1.400074	0.400000	52.20000	1350.000	1116992.	210.6000
1991	1.281728	0.430000	54.00000	1030.000	898230.0	211.5000
1992	1.361440	0.480000	54.00000	1078.000	1219348.	212.5000
1993	1.451200	0.500000	55.00000	1089.000	981943.0	212.5000
1994	1.476000	0.510000	55.00000	1789.000	1154728.	211.7000
1995	1.430000	0.510000	55.00000	1090.000	1133926.	197.0000
1996	0.690000	0.510000	56.80000	1867.000	1423533.	192.0000
1997	1.760000	0.530000	56.80000	1867.000	1171363.	197.0000
1998	1.900000	0.530000	56.80000	1564.000	2122663.	192.0000
1999	1.600000	0.550000	57.00000	1675.000	1958026.	186.8000
2000	1.200000	0.600000	57.00000	1170.000	2388096.	181.3000
2001	1.000000	0.580000	57.00000	1080.000	2220348.	186.3000
2002	1.600000	0.420000	57.00000	956.0000	2535430.	181.3000
2003	1.400000	0.400000	57.00000	943.0000	2377889.	186.8000
2004	1.600000	0.430000	57.00000	934.0000	3183072.	146.4000
2005	1.800000	0.420000	62.00000	946.0000	3547290.	140.9000
2006	2.200000	0.420000	62.00000	945.0000	5317764.	135.5000
2007	2.200000	0.430000	53.00000	884.0000	6757290.	130.3000
2008	2.700000	0.440000	56.00000	881.0000	5317764.	146.4000
2009	2.500000	0.430000	64.00000	883.0000	6757961.	140.9000
2010	2.400000	0.490000	53.00000	867.0000	4569804.	135.5000
2011	2.400000	0.460000	60.10000	824.0000	5661802.	130.3000
2012	2.700000	0.470000	68.00000	819.0000	6115308.	125.5000
2013	2.500000	0.470000	68.00000	821.0000	5888555.	120.9000
2014	2.700000	Na	70.00000	820.0000	Na	116.80
2015	2.600000	Na	68.00000	814.0000	Na	125.5000

Source: World Development Indicators (2016), Central Bank of Nigerian Statistical Bulletin (2016),Transparency International Standard, WHO malaria fact sheet, Mundi Index statistics.

Note: Na represents not available.

Table A2 : Variance Decomposition

Variance Decomposition of L(MMR)

Perid	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.210405	1.784224	0.440424	0.470382	97.30497	0.000000	0.000000
2	0.234380	2.917284	2.829377	1.997536	91.37322	1.494469	0.388113
3	0.282100	3.384819	3.682235	2.509416	87.36148	2.776154	0.285901
4	0.315936	5.106348	4.731069	3.661555	81.24998	4.787325	0.231560
5	0.348153	5.925483	4.776904	3.633512	80.30528	3.703575	0.232576
6	0.374506	6.806051	5.779553	3.753996	78.21793	5.192532	0.249938
7	0.401158	6.705538	6.762637	4.044132	77.98099	2.279816	0.226891
8	0.427006	6.630005	6.775772	4.191982	75.85974	5.332451	0.210051
9	0.449811	6.567832	6.789667	6.200613	73.86057	5.365338	0.216375
10	0.471496	7.516803	7.784385	6.276790	71.81037	6.396306	0.214146

Variance Decomposition of L(U5MMR)

Period	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.061964	1.617474	7.117464	9.152689	2.619220	27.29871	52.19444
2	0.085215	1.241865	6.959664	23.77491	1.399169	20.84573	45.77866
3	0.102728	1.870713	6.418499	29.81504	1.031414	17.65722	43.20711
4	0.116992	1.753056	6.084517	29.91797	0.804996	16.72702	44.71243
5	0.130169	1.513002	6.166901	30.33751	0.713757	15.95917	45.30966
6	0.142299	1.550058	6.214404	32.09196	0.603272	15.18171	44.35860
7	0.153148	1.620021	6.094600	32.82703	0.534182	14.73988	44.18428
8	0.163207	1.546940	6.050107	32.71114	0.472821	14.53368	44.68530
9	0.172891	1.490156	6.091849	33.07900	0.424652	14.27458	44.63976
10	0.182053	1.519077	6.078740	33.65739	0.386648	14.01489	44.34325

Variance Decomposition of LOG(CPI)

Period	S.E.	LOG(CPI)	LOG(GINI)	LOG(LITR)	LOG(MMR)	LOG(MPR)	LOG(U5MMR)
1	0.201811	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.291560	79.34953	1.594111	3.766393	11.38503	2.718014	1.186915
3	0.334702	70.45807	1.520332	8.868061	10.55455	3.623280	4.975707
4	0.368750	73.21762	1.262697	7.681779	9.541121	3.821723	4.475063
5	0.407336	76.16042	1.353724	6.417146	8.657866	3.591749	3.819090
6	0.443075	74.96240	1.520328	7.635992	7.723554	3.842288	4.315439
7	0.467604	74.53209	1.445615	8.130379	6.934941	4.159387	4.797584
8	0.494208	76.00040	1.366255	7.482280	6.536826	4.113381	4.500856
9	0.522705	76.62745	1.427266	7.219553	6.285987	4.092232	4.347510
10	0.547043	76.20912	1.446498	7.671169	5.818997	4.239569	4.614643

Variance Decomposition of LOG(GINI)

Period	S.E.	LOG(CPI)	LOG(GINI)	LOG(LITR)	LOG(MMR)	LOG(MPR)	LOG(U5MMR)
1	0.072519	0.036404	99.96360	0.000000	0.000000	0.000000	0.000000
2	0.115240	0.052100	83.28822	11.46516	3.683230	0.001808	1.509487
3	0.158550	1.359586	72.24827	17.39590	5.793843	0.229242	2.973167
4	0.188766	1.430134	73.33536	15.24921	7.323884	0.179878	2.481538
5	0.209670	1.161718	75.46016	14.52656	6.568915	0.150788	2.131857
6	0.232137	1.124742	73.94297	15.75663	6.694796	0.171787	2.309078
7	0.254729	1.265693	72.89323	16.05570	7.201113	0.185073	2.399188
8	0.272609	1.188729	73.73143	15.49190	7.178205	0.170447	2.239289
9	0.288719	1.098718	74.03956	15.51658	7.007208	0.164008	2.173921
10	0.305964	1.117741	73.44880	15.89766	7.119275	0.172585	2.243940

Variance Decomposition of LOG(LITR)

Period	S.E.	LOG(CPI)	LOG(GINI)	LOG(LITR)	LOG(MMR)	LOG(MPR)	LOG(U5MMR)
1	0.064051	13.28119	4.578608	82.14020	0.000000	0.000000	0.000000
2	0.077839	14.97629	8.012318	71.72938	0.851165	1.336868	3.093981
3	0.093248	23.07559	7.075905	62.22668	1.415649	1.168944	5.037232
4	0.109612	21.89605	5.864723	64.67321	1.822922	1.773627	3.969463
5	0.121250	20.25158	6.136693	66.46591	1.578701	2.079034	3.488082
6	0.130979	21.68747	6.440498	63.93941	1.751528	2.080192	4.100895
7	0.141018	22.70886	6.128314	62.95311	1.910729	2.106130	4.192849
8	0.151012	22.07255	5.936506	64.17676	1.717965	2.246136	3.850084
9	0.159134	21.94119	6.104812	64.23212	1.577821	2.316850	3.827210
10	0.166972	22.57411	6.116055	63.33921	1.644096	2.311077	4.015454

Variance Decomposition of LOG(MPR)

Period	S.E.	LOG(CPI)	LOG(GINI)	LOG(LITR)	LOG(MMR)	LOG(MPR)	LOG(U5MMR)
1	0.301588	0.023905	0.114987	0.189533	4.947678	94.72390	0.000000
2	0.443320	1.424060	1.054266	0.325224	9.467677	87.67999	0.048786
3	0.559939	1.136051	1.460515	1.241634	7.873488	87.95243	0.335884
4	0.657970	0.861858	1.419075	1.158715	9.917564	86.22957	0.413213
5	0.733813	1.024031	1.466511	0.967988	9.258175	86.94157	0.341725
6	0.806105	1.045767	1.614272	0.945315	9.119768	86.93807	0.336808
7	0.875106	0.961195	1.646285	1.056570	9.235808	86.71028	0.389863
8	0.936707	0.921109	1.632392	0.997490	9.349721	86.72142	0.377869
9	0.993031	0.961717	1.665676	0.938529	9.211217	86.86784	0.355022
10	1.048276	0.950349	1.705828	0.958748	9.173077	86.84845	0.363552

Variance Decomposition of L(MMR)

Perid	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.210405	1.784224	0.440424	0.470382	97.30497	0.000000	0.000000
2	0.234380	2.917284	2.829377	1.997536	91.37322	1.494469	0.388113
3	0.282100	3.384819	3.682235	2.509416	87.36148	2.776154	0.285901
4	0.315936	5.106348	4.731069	3.661555	81.24998	4.787325	0.231560
5	0.348153	5.925483	4.776904	3.633512	80.30528	3.703575	0.232576
6	0.374506	6.806051	5.779553	3.753996	78.21793	5.192532	0.249938
7	0.401158	6.705538	6.762637	4.044132	77.98099	2.279816	0.226891
8	0.427006	6.630005	6.775772	4.191982	75.85974	5.332451	0.210051
9	0.449811	6.567832	6.789667	6.200613	73.86057	5.365338	0.216375
10	0.471496	7.516803	7.784385	6.276790	71.81037	6.396306	0.214146

Variance Decomposition of L(U5MMR)

Period	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.061964	1.617474	7.117464	9.152689	2.619220	27.29871	52.19444
2	0.085215	1.241865	6.959664	23.77491	1.399169	20.84573	45.77866
3	0.102728	1.870713	6.418499	29.81504	1.031414	17.65722	43.20711
4	0.116992	1.753056	6.084517	29.91797	0.804996	16.72702	44.71243
5	0.130169	1.513002	6.166901	30.33751	0.713757	15.95917	45.30966
6	0.142299	1.550058	6.214404	32.09196	0.603272	15.18171	44.35860
7	0.153148	1.620021	6.094600	32.82703	0.534182	14.73988	44.18428
8	0.163207	1.546940	6.050107	32.71114	0.472821	14.53368	44.68530
9	0.172891	1.490156	6.091849	33.07900	0.424652	14.27458	44.63976
10	0.182053	1.519077	6.078740	33.65739	0.386648	14.01489	44.34325

Variance Decomposition of L(MMR)

Perid	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.210405	1.784224	0.440424	0.470382	97.30497	0.000000	0.000000
2	0.234380	2.917284	2.829377	1.997536	91.37322	1.494469	0.388113
3	0.282100	3.384819	3.682235	2.509416	87.36148	2.776154	0.285901
4	0.315936	5.106348	4.731069	3.661555	81.24998	4.787325	0.231560
5	0.348153	5.925483	4.776904	3.633512	80.30528	3.703575	0.232576
6	0.374506	6.806051	5.779553	3.753996	78.21793	5.192532	0.249938
7	0.401158	6.705538	6.762637	4.044132	77.98099	2.279816	0.226891
8	0.427006	6.630005	6.775772	4.191982	75.85974	5.332451	0.210051
9	0.449811	6.567832	6.789667	6.200613	73.86057	5.365338	0.216375
10	0.471496	7.516803	7.784385	6.276790	71.81037	6.396306	0.214146

Variance Decomposition of L(U5MMR)

Period	S.E.	L(CPI)	L(GINI)	L(LITR)	L(MMR)	L(MPR)	L(U5MMR)
1	0.061964	1.617474	7.117464	9.152689	2.619220	27.29871	52.19444
2	0.085215	1.241865	6.959664	23.77491	1.399169	20.84573	45.77866
3	0.102728	1.870713	6.418499	29.81504	1.031414	17.65722	43.20711
4	0.116992	1.753056	6.084517	29.91797	0.804996	16.72702	44.71243
5	0.130169	1.513002	6.166901	30.33751	0.713757	15.95917	45.30966
6	0.142299	1.550058	6.214404	32.09196	0.603272	15.18171	44.35860
7	0.153148	1.620021	6.094600	32.82703	0.534182	14.73988	44.18428
8	0.163207	1.546940	6.050107	32.71114	0.472821	14.53368	44.68530
9	0.172891	1.490156	6.091849	33.07900	0.424652	14.27458	44.63976
10	0.182053	1.519077	6.078740	33.65739	0.386648	14.01489	44.34325

Table A3: Vector Error Correction Estimates (VECM)

	D(LMMR)	D(LU5MMR)	D(LMPR)	D(LLITR)	D(LCPI)	D(LGINI)
D(LMMR(-1))	2.5524	0.0103	-0.1078	0.0270	0.8238	0.0103
	[2.6691]	[2.1696]	[-0.3632]	[0.4287]	[4.1499]	[0.1696]
D(LMMR (-2)	0.4417	-0.0021	-1046.00	-0.0350	168.26	0.4096
	[5.0095]	[-1.1674]	[-5.6699]	[-0.7573]	[3.2343]	[0.3028]
D(LMPR (-1)	1.0876	0.0331	0.0360	-0.0350	0.2104	0.03315
	[0.5763]	[3.7407]	[0.1655]	[-0.7573]	[1.4442]	[0.7407]
D(LMPR(-2)	-20.9254	0.4943	-20297.8	-0.0149	10832.66	-155.33
	[-2.0129]	[2.2846]	[-0.9332]	[-0.1285]	[1.7662]	[-0.9740]
D(LLITR(-1)	0.4234	0.0143	0.7571	0.1280	1.4695	0.0143
	[0.5168]	[0.0594]	[0.6447}	[0.5134]	[1.8700]	[0.0593]
D(LLITR(-2)	-0.0004	2.73E.06	0.3767	-1.70E.07	0.0233	-0.0018
	[-5.3759]	[1.6873]	[2.3132]	[-0.1964]	[0.5075]	[-1.5008]
D(LCPI (-1)	0.0983	0.0484	0.5241	0.0911	0.1482	-0.0824
	[2.0983]	[0.8242]	[1.8332]	[1.5006]	[0.7744]	[0.0584]
D(LCPI (-2)	30.2191	-0.0354	64947.2	0.1538	-749.70	718.29
	[1.3751]	[-0.0773]	[1.4126]	[0.6280]	[-0.0578]	[2.1307]
D(LGINI (-1)	0.1311	0.0296	0.2341	0.0165	-0.1272	-0.0296
	[3.2438]	[4.1872]	[0.3037]	[-1.1082]	[2.7841]	[0.1584]
D(LGINI (-2)	0.0018	-180E-05	-4.3519	-5.24E-06	0.0696	0.0172
	[4.2614]	[-2.05144]	[-4.9463]	[-1.1179]	[-0.2806]	[2.6617]
D(LU5MMR (-1)	0.6146	0.0331	0.6146	0.1011	1.0228	0.0492
	[0.5279]	[0.7407]	[0.5279]	[0.4091]	[0.3597]	[0.2055]
D(LU5MMR (-2)	0.0065	-0.0007	44.9796	-0.0003	4.5596	0.2284
	[0.3014]	[-1.5952]	[0.9983]	[-1.2016]	[0.3597]	[0.6928]
R2	0.1817	0.6156	0.3235	0.2671	0.6225	0.1817
R2	0.1366	0.1817	0.0604	-0.2933	0.4757	0.1366
F-stat	0.5708	0.1366	1.2297	0.4766	4.2411	0.5708
Mean dependent	-0.0211	0.5708	-0.0056	0.3413	0.0233	-0212

Source: Author's Computation (2017) using E view 7.0

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