

## **Money Supply and Social Welfare: The Case of the 2008 Salary Adjustment in Cameroon**

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*The study is designed to investigate into the extent to which the 2008 salary and wage adjustments and reduction in the prices of basic commodities have simultaneously improved Cameroonians' welfare. Adopting the Vector Autoregression Regression (VAR) in ten system equations, we observe that the policy mix is a water Loo. That is, the results reveal that the adjusted salaries, wages and prices could only trigger consumption than investment in favour of foreign goods. In addition to "Primary and Secondary production inward Looking Policy" investment in Cameroon can be accomplished by adjusting the basic salaries and wages of Cameroonians by 83% of the current value at all levels as simulated in the study. While in the short run, this adjustment will be inflationary due to the inelasticity experienced in the agricultural sector; this will peter out before 2009. These are justified by the various speed of adjustment in our different equations.*

**Field of Study:** Monetary Economics

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### **1. Introduction**

The economy of Cameroon has faced a lot of challenges since its independence in the 60s. The government of Cameroon has equally put in place, series of economic measures to overcome the emerging challenges.

While some of the measures are observed to be imposed on the economy of Cameroon together with those of other CEMAC and Sub-Saharan African countries, some are observed to have originated from post independence indigenous leaderships. Important to note among the various policy thrust include: The Structural Adjustment Programme (SAP) of 1988-1989 designed to stimulate domestic production and broaden the supply base of the Cameroon economy. Furthermore, SAP aimed at adopting a realistic exchange rate policy for Cameroon and those of the other CEMAC countries with the rest of the world, curtailment of government expenditure, advocated for privatization of public sector enterprises, adopting of appropriate pricing policies and reducing administrative controls of the economy through the heavy reliance on market forces.

Streamed from the SAP policies in 1988/1989 was the Austerity Program, which was partly to reconstitute public savings and restore budgetary balance. This was followed in 1993 by the contractionary monetary policy (reduction of the salary of civil servants) for about 60% by the government of Cameroon as a means of reducing public sector wage

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bills and excessive import demand. In 1990, the government embarked on trade liberalization by reducing the tariffs below the levels agreed upon by the Central African Custom Union. Furthermore, Cameroon eliminates all forms of quantitative trade restriction measures with all her trading partners. In an attempt to limit Capital Flight from the Franc-Zone in August 1993, the convertibility between the Franc-Zone and France was suspended in 1994 between BEAC and BCEAO. Then, came the devaluation of the FCFA by about 50% on the 13<sup>th</sup> of January 1994 vis-à-vis the French Franc with the principal objective of making goods produced in Cameroon and other CEMAC zones cheaper compared with those of other countries. The objectives of the proceedings policy thrusts were to realize a general fall in domestic prices, significant decline in the level of unemployment and substantial increase in the level of economic growth and development.

This was followed by the Poverty Alleviation Program launched in 2000 aimed at reducing poverty in Cameroon by 80% in the year 2010. This was accompanied by the National Good Governance Program (NGP) launched in 2000. As a support to the Millennium Development Goal, the Operation Declaration of Assets (ODA) of 2006 and the admission of Cameroon into the Heavily Indebted Poverty Countries (HIPC), Initiative in 2000, and Cameroon finally met with the completion point decision in 2006. The fights against corruption since 2000 among others are ongoing.

Statistics provided by the World Bank 2009 show that as by January 2008, the economy of Cameroon performed very poorly as compared with its 1960 to 1970 situations. While between 2000 and 2006, the slogan was that Cameroon will provide its citizenry with the best social welfare packages after Cameroon must have attained the completion point of the HIPC Initiative, all hopes were dampened in 2008 when the welfare situations of the majority of Cameroonians measured using the basic needs requirement, inequality index and the consumer price index were worse-off compared to their 2000 situations.

The fight against poverty and the entering of more Cameroonians into the core poverty class remains a big challenge not only to Cameroonians but also to World Bank and IMF policies put in place to fine tune the economy to high growth rate and development hence alleviate poverty. Statistic provided by the Ministry of Economy and Finance sponsored by the World Bank(2009) revealed that the proportion of the poor in the total population of Cameroon has increased in recent years for over 20% in spite of the rich natural and human resources, which the country is blessed with. Studies have been conducted in Cameroon to justify how the resources of the country are wasted. These studies are too many to be listed here. However, they have equally advanced different remarks. Most of these recommendations have been subjected to criticisms attributed to the methods used, coverage, and the ability to gain insights from related studies. These have necessitated this study among others reasons presented below.

The hardship that threatened the country in 1990 that led to the launch of the “operation Ghost Town” in May 1991, which lasted for over six months caused the country a lost of about 700billion FCFA was seen coming back on the 7<sup>th</sup> of February 2008 when the taxi drivers’ strike in Cameroon was hijacked by Cameroonians to protest against high cost of living, high levels of unemployment, wide gap between the poor and the rich and in all, high level of poverty and low standard of living. Expansionary monetary policy (Salary

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increase), which was observed impossible by the 2008/2009 parliamentary session was reviewed upward by a presidential degree as a means to calm the protesting Cameroonians. On March 7, 2010, the head of state signed two decrees; one adjusting the salaries of the civil servants by 20% of the basic salaries in the month of April 2008. This adjustment was by implication 40% short of the real status of Cameroon civil servants in 1992 that is before the salaries and wages cuts. The second decree anchored on the prices of the basic commodities such as rice, fish, and flour, sugar, cement and iron rods, which were also reduced by more than 20% on the average. This was also calculated to be short of 45% of the true standard of living measured in terms of consumers' price index in Cameroon before 1993. While the salaries have increased as announced by the degrees of the head of state, prices of the basic commodities among others have instead increased. It is therefore, observes from the above that the government of Cameroon has put in place several measures aimed at improving the welfare of Cameroonians to no avail. The implication is that either a partial solution has been provided, or the root course(s) of low standard of living in Cameroon is still to be identified and solved. Little or nothing has been done in Cameroon in this area in the direction of research and most of the studies in this area in other countries are conducted on cross-sectional primary data of firms of different sizes. Therefore, this work on macroeconomic time series data has laid the foundation on which subsequent studies could be conducted in Cameroon and beyond.

Given the above, this work is out to provide scientific answers to the following questions.

-Why has poverty in Cameroon consistently on the increase alongside the prices of basic commodities after the 2008 decreases aimed to reduce them?

-What level of current money supply (salary expansion) would have yielded the expected trickling down effects on investment, reduction in unemployment and improve social welfare in Cameroon? These among other questions are expected to be answered by the end of this work.

To answer the above questions, the following specific objectives are designed: They are to: investigate into the determinants of poverty and assess the extent to which the 2008 salary increment and reduction in the prices of some basic commodities have assisted in the improvement of social welfare in Cameroon; evaluate into the extent in which increase in money supply brings about increase in capital formation, reduction in poverty; reduce the rate of unemployment and in all, better welfare for all Cameroonians. This paper is therefore, organized into five sections. Haven gone through section one of this study, section two dwells on the theoretical issues associated with policy mix (monetary and fiscal) as applied in Cameroon in 2008. Section three which is the methodology presents the diagnostic tests, which are employed to present a more realistic and reliable results. While section four discusses the error correction results based on the Vector Autoregressive methodology, section five draws the work to logical conclusion through summary of major findings, policy remarks and conclusion.

### 2. Literature Review and Theoretical Framework

#### 2.1 Literature Review

*Salary disparity and welfare performance have long been an important topic that has streamed a lot of research. While some studies have focused on incentives as the foundation for an origination to have a positive link between salary dispersion and welfare performance, others observed that employees will prefer leisure if there is more money to be earned. As formulated by Levine (1991), the pay equality hypothesis predicts that greater salary dispersion motivates jealousy and mistrust among workers and as such reduces performance. In Cameroon, salary dispersion is a reality especially between the private and the public sectors employees. Even within the so called special cores, rewards are highly dispersed. Good examples are the higher education and the military cores in Cameroon for the public employees and private school teaching and petroleum company workers in the private sector.*

The Keynesian Theory distinguishes between voluntary and involuntary unemployment and holds that full employment cannot be attained because of rigidity of real wages. Wage rates are sticky downwards because unions resists wage rate reductions, more so that minimum wage laws place floor wage rates. Anyanwu and Oaikhenan (1995) believed that flexible wage and price would cause more problems than they solve.

Theories regarding money supply are central to macroeconomics. They are also the subject of debate between Keynesians and monetarists (economists who believe that growth in the money supply is the most important factor that determines economic growth). The classical or pre-Keynes view was that the interest rate leads to a balance between savings and investments, which in turn will cause equilibrium in the goods market. Keynes disagrees and believes that the interest rate was largely a monetary phenomenon; its chief function was to balance the unpredictable supply and demand for money, not savings and investment. The view explains why the amount of savings was not always correlated with the amount of investments or the interest rate.

As put forward by Fry 2000, the goals of money supply includes price stability, maintenance of balance of payments equilibrium, high employment, output growth, exchange rate stability, poverty reduction and sustainable development. However, there appears to be a lot of conflict in results obtained from empirical study such as those of Nyong 2005 in Nigeria in which none of the objectives of the monetary policy was achieved with monetary adjustment; Christiano 2003 observes that in China and Kenya respectively, increase in money supply resulted to fall in general prices through increase in output contrary to previous studies which view increase in money supply as inflectional. Sambata 2010 estimated the liquidity effect of monetary policy in the countries of CEMAC zone using quarterly data based on VAR methodology and obtains a non consistent result. While study by Tata 2005 on macro-economic data in Cameroon shows that low inflation is instrumental for sustainable growth, those of Klamp and Junda 2006 explain that price volatility reduces economic growth in Ghana, Nigeria and Kenya in his cross sectional analysis. Ohale 2007 in Nigeria on wages and salaries variation observes that money illusion is often realized as standard of living in Nigeria is sometimes worsened when they are upward reviewed. Studies on salaries and wages

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adjustment are considered under fiscal policy since it is strongly related to the tax policy of the country concerned. As advanced in this work, the argument is not on the cost of wages and salaries but on the volume of money in circular and implication on social welfare accorded to government actions.

### 2.2 Theoretical Framework

The intension of the Cameroon government in 2008 to simultaneously increase salaries/wages and reduce prices of basic commodities can be discussed under policy mixed, which is here seen as the combination of monetary and fiscal policies to achieve the best welfare for Cameroonians. Money supply in this context is seen as the total amount of money (currency and demand deposit) in circulation in a country at any given time. In Cameroon two categories of money supply can be identified namely narrow and broad money supply. While narrow money supply refers to the assets which represent immediate purchasing power in an economy, (that is  $M_1$ ) which is the combination of coins and notes in circulation (C) and demand deposits with commercial banks (D)), broad money on the other hand include  $M_1$  and in addition those assets which have the quality of liquidity defined as  $M_2$ . Good examples include savings (S) and time (T) deposits with the commercial banks. Also called quasi-money supply  $M_2 = C + D + T + S$ . While the narrow money supply strongly influences medium of exchange in Cameroon, the broad money supply influences both the medium of exchange and all the activities associated to deferred payment. The medium of exchange can be rapidly converted to transactional and speculative demand for money. Therefore, the 2008 salaries and wages increase, were expected to have had an expansionary effects on the purchasing power of Cameroonians.

Since more than 80% of the wages and salaries of government workers in Cameroon are paid through financial houses, it is possible to depict that;

$$M^s = \frac{1 + C}{rd + V_t^t + e} R \dots\dots\dots(2.1)$$

Where  $M^s$  is broad money supply, C is the desired currency ratio determined by the non-bank public, rd is the reserve requirement as a percentage of demand deposit,  $V_t$  is the reserve requirement as a percentage of Commercial bank time deposit, t is time deposit, e is the desired excess reserve ratio and R is the quantity of total reserves of all the Commercial banks.

Note should be taken here that Cameroon has no independent monetary policy and as such, R,  $v_d$  and  $v_t$  which are expected to be controlled by Central Bank were expected to be constant. Practically, this is not true. The reality is that these rates are not the same in all the financial houses neither in Cameroon nor within the CEMAC monetary union. Subjecting equation 2.1 to high powered money and money multiplier process then, the 2008 salary increase was to create more money in Cameroon as follows;

$$M_1 = Cu + DD \dots\dots\dots(2.2)$$

$$\text{But } HP_m = MB = R + CU \dots\dots\dots(2.3)$$

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Where  $HP_m$  = high powered money, MB = Monetary base and R = reserved requirement.

But  $C_u = cDD$  ..... (2.4)

Where C = currency in DD

That is  $C = \frac{C_u}{DD}$

Similarly  $R = rDD$  where  $r = R/DD$  ..... (2.5)

Where, R is the reserved requirement. That is the amount of money that the Commercial Bank keeps to meet the unforeseen contingences. This is a fraction of demand deposit (DD).

Thus  $M_1 = CDD + DD$  ... (2.6) ,  $M_1 = (C+1) DD$  ..... (2.7)

Also

$HP_m = rDD + CDD = HP_m = (r + c) DD$  ... (2.8),  $HP_m = \frac{DD}{r + c}$  .....(2.9)

If we substitute (2.9) into (2.7) we have

$M_1 = HP_m (C + 1)$  or  $M_1 = \frac{HP_m}{r+c}(C + 1)$

That is,  $M_1 = \frac{C+1}{r+c} HP_m$  ... (2.10)

In a country such as Cameroon, which ought to have no independent monetary policy it means that

$\frac{C + 1}{r+c} = \text{constant.}$

Thus,  $M_1 = m_r HP_m$  Where  $M = \frac{C + 1}{r+c}$

Since  $M_1 = MHP_m$  ..... (2.11)

Where;  $M_r$  is money multiplier. Equation (2.11) is called multiplier approach to money supply determination. Given Cameroon data, c and r are not fixed meaning that CEMAC is still at low level of monetary integration. Therefore,  $\Delta M = f_1 \Delta C + f_2 \Delta r$  ... (2.12), called the behavioural expression. That is what happens to Commercial banks when credit (C) and bank reserve ratios change. From equation (2.2) to (2.12) the narrow money supply equation can be presented as

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$M_1 = \alpha_0 + \alpha_1 HP_m + U_1 \dots \dots$  (2.13) where,  $\alpha_0$  and  $\alpha_1$  are the parameters to be estimated while  $U$  is the stochastic error term with its assumed normality. Expanding this to include the broad money supply we have

$$M_2 = Cu + DD + SD + TD \dots \dots \dots (2.14), \text{ Since } R = r (DD + SD + TD)$$

$$M_2 + CDD + DD + SDD + tDD \dots \dots \dots (2.15)$$

Where  $C = \frac{CU}{DD}$ ,  $t = \frac{TD}{DD}$  and  $S = \frac{SD}{DD}$

$M_2 = DD (C + 1 + s + t) \dots \dots (2.16)$ , But  $HP_m = Cu + R$  and  $R = r (DD + SDD + DD)$   
Then; after all necessary adjustment,

$$DD = \frac{HP_m}{C+r+rs+rt}$$

$$\Rightarrow M_2 = \left( \frac{C + 1 + S + t}{C + r + rs + rt} \right) HP_m \dots \dots (2.17)$$

The implication is that increase in monetary base e.g. the 2008 salary adjustment, the amount of money will be increased based on the prediction of the parameters in the coefficient of  $HP_m$  in equation (2.17).

Linking equation 2.17 with the Keynesian monetary transmission mechanism in an open economy at equilibrium that is when money supplied is equal to money demanded, an indirect channel is observed to exist between money supplied and economic growth. That is in this process, changes in money supply affects instead the rate of interest and aggregate income is shaped by the public's demand for money for investment in plant, equipment and capital goods. In this direction, investment is seen to be inversely related to rate of interest also known as the cost of capital.

Based on the above Keynesian's predictions, the expansionary monetary policy of the government of Cameroon in 2008 would have resulted to the fall in interest rate  $\text{\textcircled{R}}$ . The fallen interest rate is expected to stimulate investment, given businessmen's expected profits, expressed as the marginal efficiency of investment (MEI). Given the above scenarios, welfare of the individual will increase since increasing gross domestic product means, falling general price level, reduction in unemployment, gap between the poor and the rich, the level and incidence of poverty.

Again, an in-depth investigation of the macroeconomic aggregate in Cameroon since 2008 revealed that the growth of the GDP is infinitesimal. This is accompanied by high level of unemployment among others. This explains that probably, the Keynesian transmission mechanism was not fully respected. From the monetarists' standpoint, increase in money supply as it was the case of the salary increase will eventually decompose itself as increase in the cash balance of the various individuals and economic agents in the society. Thus, the linkage between money supply and the GDP is direct.

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Secondly, in 2008, the government of Cameroon did not only increase the salaries and wages of workers, but also reduced the prices of the so call basic commodities among which were rice, fish, sugar, cement, iron rods and flour. Again this physical measure, which was accompanied by fiscal policy (increase in government subsidies in the importation of these basic commodities), was expected to trigger two effects; that is, the substitution effect and the income effect in the economy of Cameroon. This is with the assumption that the Cameroonians' consumption function is well behaved.

These are embodied in the Slutsky and the Hicks theorems. The fundamental understanding in each of these theorems is that when the price of a good changes, it triggers two effects namely substitution and income effects. The Slutsky equation explains that changes in Prices and income will normally alter the consumer's expenditure pattern. If  $M = X_1P_{X_1} + X_2P_{X_2}$  (2.18) where;  $M$  is income of the consumer,  $P_{X_1}$  and  $P_{X_2}$  are prices of commodity  $X_1$  and  $X_2$ , then the utility function could be obtained as  $f(X_1, X_2)$  where  $X_1$  and  $X_2$  are array of goods in the goods baskets. The desire of the consumer to maximize his utility subject to the budget constraint requires that we form the Lagrangian multiplier function as:  $\mathcal{Y} = f(X_1, X_2) + \lambda (M - X_1P_1 - X_2PX_2)$  (2.19) where  $\lambda$  is the undetermined multiplier. The income and prices change will generate income and substitution effects which the new consumption pattern are expected to satisfy the 1<sup>st</sup> order condition of equation 2.19. To find the magnitude of the effect of price and income changes on the consumer's purchases, allow all variables to vary simultaneously. This is accomplished by the total differentiation of equation (2.19).  $f_{11}dX_1 + f_{12}dX_2 - PX_1d\lambda = \lambda dPX_1$  (2.20),  $f_{21}dX_1 + f_{22}dX_2 - PX_2d\lambda = \lambda dPX_2$  (2.21)  $-PX_1dX_1 - PX_2dX_2 = -dm + X_1dPX_1 + X_2dPX_2$  (2.22). Solving the system equation for the three unknown  $dX_1$ ,  $dX_2$  and  $d\lambda$ , employs the adoption of the Bordered Hessian determinant and the Cramer's rule not presented here due to space.

The net result is that a change in the commodity price changes the Consumer's level of satisfaction since a new equilibrium is established which lies on a different Indifference Curve.

With all necessary adjustment and manipulation of (2.20), (2.21) and (2.22), the Slutsky equation is obtained as;

$$\frac{\frac{\partial X_1}{\partial P_{X_1}}}{\frac{\partial X_1}{\partial M}} \Big|_{u=constant} - X_1 \left( \frac{\partial X_1}{\partial M} \right) \Big|_{prices=constant} \quad \text{--- 2.6}$$

$$X_1 \frac{\partial X_1}{\partial M}$$

Is the income effect which states the rate at which the consumer's purchases of  $X_1$  would change with changes in his income.  $\frac{\partial X_1}{\partial M}$  the term is the rate at which the consumer substitutes  $X_1$  for other commodities when the price of  $X_1$  changes along a given indifference curve. The sum of the two rates gives the total rate of change for  $X_1$  and  $P_{X_1}$  as it can also be applied to  $X_2$  and  $P_{X_2}$ . This will be used to examine our subjects above.



### 3. Analytical Methodology

#### 3.1 Scope of the Study

This study covers two distinct periods. That is three years before the salaries and wages adjustment and three years after. In all, this study is designed to employ quarterly data within the period of six years as such having “n” equal to 24 as its overall sample size. Thus, the study covers the period 2005 to 2010 inclusive. This is because it is within this period that the data needed for this study especially in quarterly form are available. Where only annual data could be obtained, such annual data are subjected to quarterly adjustment. This is also the period within which the policies we are out to investigate were actually enacted. This study also required substantial amount of statistical information that were extracted from Quarterly Budgetary Reviews, the Ministry of Economy and Finance, Department of Statistics and National Accounts (DNCS), International Monetary Fund Government Finance, Statistics Yearbooks, ECAM documents, Budgetary speeches, Central Bank for Central African States (BEAC), African Development Indicators, various issues, African Economic Research Consortium and Financial Bill Yearbook 2010. The regressions and the regressors are converted to real variables measured in constant (2005) Fcfa. The reasons for this adjustment are that the nominal values of the parameters do not reflect changes in the regressions caused by price fluctuations. Furthermore, the real values are measures of aggregate output especially in the welfare equation that eliminates the effect of price dynamics on the economy. Therefore, this study relies on intensive library study and depends much on secondary data as such an ex post facto research design is adopted.

#### 3.2 Estimation Techniques and Validation

The structural models consist of 29 variables, 10 of which are endogenous while 19 are predetermined. The system is complete in that it contains 10 equations in 10 endogenous variables and one identity equation. Since changes in the variables in the structural equations are very much influencing each other, adopting the simultaneous equation approach will help reduce the incidence of multicollinearity and eliminate the effect of simultaneous equation bias. The structural models also have one to one relationship with the expected outcome from salary and wage adjustments with the macroeconomic performance or welfare situations in Cameroon. Chosen as a technique for data analysis is the Vector Autoregressive (VAR) technique that is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impacts of random disturbances on the system of variables. The VAR methodology avoids the imposition of potentially spurious a priori constraints that are employed in the specification of structural models.

Also, since fewer restrictions are placed on the way in which the system variables interact, this method is well suited for examining the channels through which a variable operates. Furthermore, the VAR approach side steps the need for structural modeling by modeling the endogenous variable as a function of its lagged value. Since only lagged values of the endogenous variables appear on the right hand side of the equation, there is no issue of simultaneity. In effect, the strength of the VAR model lies in its ability to incorporate the residual from the past observation into the regression model for current

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observation. The approach also has the advantage of being easy to understand, generally applicable and easily extended to non-linear specifications and models that contain endogenous right hand side variables. In addition, the non-linear least squares estimates of these methods are asymptotically equivalent to the efficiency observed with the maximum likelihood technique.

The VAR model implies univariate Auto Regressive Moving Average (ARMA) models for each of its components. The advantage of considering the components simultaneously, unlike in any system estimation approach is the fact that the model may be more parsimonious with the inclusion of fewer lags, and that more accurate forecasting is possible because the information set is extended also to include the history of the other variables.

In a VAR, each variable is explained by its own lagged values and the lagged values of the other variables in the system. Each dependent variable is completely explained by exogenous variables. The term autoregressive is due to the appearance of the lagged value of the dependent variable on the right-hand side and the term vector is due to the fact that we are dealing with a vector of two (or more) variables. For example if any two of the variables in our structural model is subjected to the VAR procedure, the outcome could be presented as shown below.

$$M_{1t} = \alpha + \sum_{j=1}^k \beta_j M_{1t-j} + \sum_{j=1}^k \gamma_j R_{1t-j} + \mu_{1t}$$
$$R_{1t} = \alpha' + \sum_{j=1}^k \phi_j M_{1t-j} + \sum_{j=1}^k \gamma_j R_{1t-j} + \mu_{1t} ,$$

Where  $M_{1t}$  and  $R_{1t}$  are any two variables. The error terms in a VAR are referred to as impulse responses. A shock to the  $i^{\text{th}}$  variable does not only directly affects the  $i^{\text{th}}$  variable but is also transmitted to all of the other endogenous variables through the dynamic (lag) structure of the VAR. An impulse response function traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables. The issues of causality can also be addressed in the VAR system.

To validate our estimated results, a series of diagnostic test will be conducted. These include; the tests of the stationarity of the specified parameters in our models. Since there is the general tendency for time series data to contain unit roots, an attempt is made in this work to render the non-stationary variables stationary based on the Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), Sargan-Bhargava Durbin-Watson (SBDW) and the Phillips-Perron (P-P) tests. However, the Kwiatkoski-Phillip- Schmidt Shin test Statistic, Elliott-Rothenberg-Stock test statistic and Ng-Perron test statistics are also conducted to overcome the seasonal shocks, which have frequently influenced macro-economic variables in Cameroon. They also provide adequate solutions to the power and size limitations, which the traditional unit root tests are abided by. In this work, we have used the Augmented Dickey-Fuller and the Phillips-Perron test based on their accessibility and flexibility. Furthermore, we use the P-P approach to test for stationarity of the variables because P-P test statistics, which is a modification of the ADF, takes the

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less restrictive nature of the error process into account. Moreover, this replaces the use of lags in the ADF test, which has been criticized for being arbitrary (Nyong, 2003)

To estimate our results, we have also employed the co-integration theory, which is the error correction mechanism (ECM) because of data instability arising from the instability in the Cameroon's economic terrain within our period of study. With frequent political, social, economic changes, there is need to difference the time series data so as to separate the non-economic occurrences from pure economic occurrences as induced by economic policies. This therefore, guarantees meaningful economic results as the problem of spurious correlation are eliminated. The order of integration ascertained the number of times a variable will be differentiated to arrive at stationary results. This decision rule states that the t-statistic on the coefficient of the lagged independent variables, which are expected to be negative, should be significantly different from the critical values at both 1 percent and 5 percent for any given sample size if the null hypothesis is to be rejected. While the ADF test attempts to capture additional dynamics left out by the DF test, it also ensures that the error term is white noise through the inclusion of additional lag length. Also, the PP test in particular, tests for the presence of any structural break in the time series data.

The Johanson (1988), Johansen and Juselius (1990,1992) co-integration procedures are carried out in this work in order to generate the error correction model (ECM) that is the test of stationarity of the residuals generated from running a static regression in levels of one or more regressors on the regressians. The co-integration is accepted when the residuals from the linear combination of non-stationary 1(1) series are themselves stationary, 1(0). This acceptance of ECM means the model is best specified in the first difference of its variables. The Johansen approach enables us to search for co-integrated vector to confirm the co-integrated relationship. Also, this Johansen procedure has all the variables endogenous since it is based on the vector auto-regression (VAR) modeling of Sims (1980). As such it always yields results that are invariant with respect to the direction of normalization. Furthermore, it provides estimates of all the co-integrated relationships that exist within a system of variables and provides a test statistic for determining their numbers.

A Vector Error Correction (VEC) is an error correction model applied in the context of a restricted VAR designed for use with non-stationary time series that are known to be cointegrated. It has cointegration relations built into the specification so that it restricts the long run behaviour of the endogenous variables to converge to their cointegrating relationship while allowing for short run adjustment dynamics. In order to specify the VEC, one has to run the cointegrating tests (Johansen) first, only when the series are established to be cointegrated can the VEC is specified. Example of a simple VEC model:

$$\Delta y_{1t} = \alpha_1(y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{1,t}$$

$$\Delta y_{2t} = \alpha_2(y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{2,t}$$

The VEC model has coefficients  $\alpha_i$  and  $\beta_j$ , which define the speed of adjustment.

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We have also chosen to log the structural equation because log form linearised the models' parameters and permits a direct estimation and interpretation of the associated coefficients of the models as elasticities. Given the above conditions, our structural models become:

### Poverty Equation

$$LPOV_t = A_0 + A_1 LINFLA_t + A_2 LUNEMP_t + A_3 LGOVR_t + A_4 LGOVE_t + A_5 LRWAGE_t + A_6 LBMS_{2t} + A_7 RPCGDP_t + U_1 \text{-----} (3.1)$$

A priori,  $A_1 > 0$ ,  $A_2 > 0$ ,  $A_3 > 0$ ,  $A_4 < 0$ ,  $A_5 < 0$ ,  $A_6 < 0$ ,  $A_7 > 0$

### Inflation Equation

$$LINFLA_t = B_0 + B_1 LUNEMP_t + B_2 LRPCGDP_t + B_3 LTAXF_t + B_4 LBMS_{2t} + B_5 LFISDY_t + B_6 LEXDDT_t + B_7 LIMPY_t + U_2 \text{--} (3.2)$$

A priori,  $B_1 < 0$ ,  $B_2 < 0$ ,  $B_3 > 0$ ,  $B_4 > 0$ ,  $B_5 > 0$ ,  $B_6 > 0$ , and  $B_7 > 0$ .

### Unemployment Equation

$$LUNEMP_t = C_0 + C_1 LINFLA_t + C_2 LPOP_t + C_3 LRWAGE_t + C_4 LRUMR_t + C_5 LTAXF_t + U_3 \text{---} (3.3).$$

A priori,  $C_1 < 0$ ,  $C_2 > 0$ ,  $C_3 < 0$ ,  $C_4 > 0$ ,  $C_5 > 0$ .

### Government Revenue Equation

$$LGOVR_t = D_0 + D_1 LDCG_t + D_2 LRPCGDP_t + D_3 LDUTY_t + D_4 LGTAXDG_t + U_4 \text{----} (3.4)$$

A priori,  $D_1 > 0$ ,  $D_2 > 0$ ,  $D_3 > 0$ ,  $D_4 > 0$ .

### Government Expenditure Equation

$$LGOVE_t = E_0 + E_1 LRPCGDP_t + E_2 LPOP_t + E_3 LGDVR_t + E_4 LEXDEBTS_t + U_5 \text{-----} (3.5)$$

A priori,  $E_1 > 0$ ,  $E_2 > 0$ ,  $E_3 > 0$ ,  $E_4 > 0$

### Welfare Equation

$$LRPCGDP_t = F_0 + F_1 LEXPINFLA_t + F_2 LBMS_{2t} + F_3 LTANSF_t + F_4 LNORB_t + F_5 LGTAXDG_t + F_6 LUNEMP_t + U_6 \text{-----} (3.6)$$

A priori,  $F_1 > 0$ ,  $F_2 > 0$ ,  $F_3 < 0$ ,  $F_4 < 0$ ,  $F_5 < 0$  and  $F_6 < 0$ ,

### Real Wage Equation

$$LRWAGE_t = G_0 + G_1 LRPCGDP_t + G_2 LLABS_t + G_3 LUNEMP_t + U_7 \text{-----} (3.7)$$

A priori,  $G_1 > 0$ ,  $G_2 > 0$  and,  $G_3 < 0$ .

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## Gross Domestic Investment Equation

$$LGDI_t = H_0 + H_1LASOPC_t + H_2LPROFIT_t + H_3LEXINFLA_t + H_4LSR U_{8...} \quad (3.8)$$

A priori,  $H_1 > 0$ ,  $H_2 > 0$ ,  $H_3 < 0$  and,  $H_4 < 0$ .

$$LCON_t = I_0 + I_1LRPCGDP_t + I_2LINFLA_t + I_3EXRINFLA_t + I_4LFAWATH_t + I_5INRAT_t + I_6DEPR_t + U_9 \dots \dots \dots \quad (3.9)$$

Where  $I_1 > 0$ ,  $I_2 < 0$ ,  $I_3 > 0$ ,  $I_4 < 0$ ,  $I_5 < 0$ , and  $I_6$

## Import Equation

$$LIMPOD_t = J_0 + J_1LASOPC_t + J_2LRPCGDP_t + J_3LEXINFLA_t + J_4LSR U_{10...} \quad (3.10)$$

A priori,  $J_1 > 0$ ,  $H_2 > 0$ ,  $J_3 < 0$  and,  $J_4 < 0$ .

**LBMS<sub>t</sub> = MD<sub>t</sub>**-----Identity: Where; **POV** is poverty based on head count ratio; **INFLA** is consumer price index used as proxy for measuring inflation; **UNEMP** is unemployment; **GOVR** is government revenue; **GOVE** is government expenditure; **RGDP** is real gross domestic product; **RWAGE** is real wage rate; **BMS<sub>2t</sub>** is broad money supply ( $M_1 + M_2$ ); **TAXF** is official urban taxi charges; **FISDY** is fiscal deficits GDP ratio; **EXDD** :excess demand ( $y - [C+1+G]$ ); **IMPY** : export less import GDP ratio as a measure of openness; **POP** is population growth rate; **RUMR** is rural urban migration; **DCG** is domestic credit to the government sector; foreign exchange earnings; **LGTXDGD** : taxation on domestic produce goods; **EXDEBTS** is external debt servicing; **EXPINFLA** is expected rate of inflation based on rational adaptive hypothesis; **TANSF** is changes in transportation changes, official rates; **NORB** is official road checkpoints; **LABS** is labour supply (that is active population increase rate; **DEPR** is dependency ratio; **RPCGDP** is real per capita income; **GDI** is gross domestic investment; **ASOPC** is absorptive capacity of the economy; **EXINFLA** is expected rate of inflation; **SR** is structural rigidity; **PROFIT** is Profit or returns on investment. Ts' subscripts denote the expression of the parameters in current periods; Ls' attached to the various parameters are logarithmic notations. **A<sub>1</sub> to J<sub>4</sub>** are the structural parameters for the various equations (i.e. equation 3.1 to 3.10), and **U<sub>1</sub> to U<sub>10</sub>** are the stochastic error terms for equations 3.1 to 3.10 with their assumed features of normality.

## 4. Presentation and Discussion of Empirical Results Based on Co integration Error Correction Procedures.

Before presenting the parsimonious error correction results of the various models specified above, we start by testing for the stationarity of the variables specified in our models. This is done firstly by examining the graphs of the variables to ascertain whether the non-stationary variables are with trend or without trend. Also we investigate if any trend exists, such trend exhibits random walk with drift or without drift. Since the graphs are too many, they are not presented in this work due to space. However, the graphs showing the trends of the variables within our period of study (2005-2010). From the graphs, no particular trend is observed. Further observations reveal that the variables are random walk with drift.

Therefore, testing for stationarity of the variables and order of integration without trend but with drift strongly support the hypothesis that the variables used in our models are

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non-stationary. However, the results show that the variables are all stationary after their first difference. The residuals obtained from the non differenced results of the various models are not also stationary but subjecting them to our unit root tests show that they are all integrated in the order one  $1(1)$ . Since the non-stationary residuals achieve stationarity after their first differencing, it means that the variables specified in our models are co-integrated (Johansen and Juselius, 1990, 1992). In other words, long-run equilibrium relationships exist between the regressions and the regressors with the elimination of the equilibrium errors of the various models. Note that the unit root test results are not represented in this work because of space.

The used of VAR estimates for our 29 variables in 10 equations expanded the variables to a total of 107 taking into consideration the various lags and the inclusion of the ECM. Because of the fact that quarterly data were thoroughly employed in this study, no lag-length was introduced. Therefore, we have to scrutinize the over-parameterized error correction models to obtain the parsimonious (preferred) models presented below based on the VAR estimate arrived at based on the admixture of the statistical test of significance of the individual coefficients in the autoregressive distributed lag (ADL) models. Further diagnostic test such as the correlation matrix test, the Jarque Bera test, the Kurtosis test, the test of Skewness, Durbin-Watson test, the Cusum test, the Susum residual squares tests are equally conducted in this work. Also the language multiplier (LM) test for higher order autocorrelation, the white heteroscedasticity, the autoregressive conditional heteroscedasticity test and the probability value test were conducted to select the parsimonious error correction models as presented below.

The role of money supply in the case of salary and wage expansions cannot be studied with a single equation especially in an opened economy like that of Cameroon. To achieve this based on the 2008 salary and wage adjustments in Cameroon, we specify and estimate 10 models presented as equation 4.1 to 4.10 above. The parsimonious error correction results for the 10 models presented on table 4.1 reveal good fit for all the regressors. Based on the adjusted  $R^2$  values, standard error of regression (SER), Akaike information criteria (AIC) and the Schwarz (an information criterion (SCIC), the inflation model (4.2) is the least performed model, while consumption model is the best performed model. Other test such as the Durbin-Watson (DW) statistics, Jarque Bera (JB) statistics, F-statistics, Autoregressive conditional heteroskedasticity (ARCH) and the General Autoregressive Conditional heteroskedasticity (GARCH) are in agreements within 5 and 1 percent with their theoretical status quo in this study.

The error correction terms which enable us to gauge the speed of adjustment of the various models to their long-run equilibrium paths is the highest in the case of the real per capita GDP (93.6 percent) and the lowest in the case of the inflation equation (24.1percent). In all, they show feeble persistence of the regressions thereby suggesting the existence of weak speed of adjustment (below 50 percent). Poverty, government revenue, government expenditure, real GDP, consumption and import demand models, satisfied the condition of high speed of adjustment. From the above, the 2008 salary and wage adjustment with the reduction of prices of some basic commodities have higher propensity to reduce poverty, increase consumption, reduce import demand among others, through increase in real GDP.

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However, the adjustment is slow or weak in the Gross domestic investment model, inflation model, unemployment model and real wage model. Given the fact that all the variables are in agreement with their theoretical a priori, the inability of the 2008 composite policies to achieve their expected goals extracted from our results are as follows.

**Table 4.1: The Parsimonious Error Correction Models for Salaries/wages Adjustment and Welfare Performance in Cameron.**

Equation	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
Variables	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
ΔLINFLA(-1)	0.0436	0.9614	0.4311						0.642	
ΔLUNEMP	0.9463	0.241				-0.8411	-0.2411			
ΔLGOVR	0.4461									
ΔLGOVE(-1)	-0.7164									
ΔLRPCGDP	0.6693	-		0.3946	0.4693		0.4631		0.8964	-0.8423
		0.2376			4					
ΔLTAXF(-1)		0.463	0.443							
ΔLBMS <sub>2</sub>	0.4793	0.1165				0.7431				
ΔLFISDY(-1)		0.236								
ΔLEXDDT		0.1383								
ΔLIMPY		0.0219	0.865							
ΔIPOP(-1)			-0.647		0.6931					
					4					
ΔLRWAGE			0.0049							
ΔLRUMR			0.764							
ΔLDCG(-1)				0.6431						
ΔLDUTY				0.0961						
ΔLTAXDG										
ΔLEXDEBTS					0.4689					
ΔEXPINFLA						-0.2614		-0.946	0.4391	0.3326
ΔLTFNSF						-0.6431				
ΔLNORB(-1)						-0.7319				
ΔLGTAXDG				0.0043		0.6431				
ΔLLABS							0.2431			
ΔLGDI(-1)										
ΔLASOPC								0.0014		0.6674
ΔLPROFIT								0.01291		
ΔLSR								-0.669		0.9866
ΔLFAWATH								0.64211		
ΔLINRAT									0.0243	
ΔLDEPR								-0.9643		
ECM(-1)	-0.695	-	-0.294	-0.5012	-0.564	-0.936	-0.396	-0.244	-	-0.5462
		0.2411							0.5491	
Adj.R <sup>2</sup>	0.8836	0.6983	0.874	0.9081	0.9243	0.843	0.9146	0.756	0.958	0.8623
SER	0.00687	12.042	0.809	0.339	1.632	1.360	2.016	2.046	1.104	1.5322
D.W	2.1743	2.0961	2.390	2.9642	2.223	2.0481	1.896	2.431	2.461	1.9923
Akaike IC	0.0231	20.613	0.036	17.356	2.637	0.907	4.079	3.6106	0.009	3.9851
Schwarz IC	0.0096	20.611	0.214	17.605	2.885	1.154	4.144	3.688	0.004	3.9851
F-Statistics	61.32	221.06	63.339	224.3	259.9	89.47	37.66	59.62	162.33	45.765
ARCH (-1)	0.133	0.485	0.042	0.4178	0.455	0.145	0.118	0.140	0.254	0.4361
GARCH (-1)	0.906	0.486	0.0319	0.8436	0.146	0.0421	0.870	0.3001	0.3006	1.07653
Jarque Bera	4.003	1.752	0.416	2.381	1.461	4.818	0.068	2.477	4.8101	3.44353

*SOURCE: Selected by Author from the over parameterized results based the VAR results*

### **Failures of the adjusted prices of basic commodities, salary and wage to increase Gross Domestic Investment.**

Gross Domestic Investment (GDI) in this work is specified as a function of expected inflation, absorptive capacity (ASOPC), net profit, structural rigidity (SR), family wealth (FAWATH) and dependency ratio. While ASOPC, Profit and family wealth have reported

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significant infinitesimal increased in GDI within our period of study, EXPINFLA, SR and dependency ratio have reported significant negative explosive fall in GDI. The transmission mechanisms for these adjustments were expected to be through gross domestic investment, which of course was to accelerate real GDP. The finding in this study is that Cameroonians consume more than they produce. This is reflected on the nation marginal propensity to consume model which is estimated as (0.8964), hence very high. This high marginal propensity to consume is accountable for by high dependency ratio. Almost 96.43 percent of every household in Cameroon has more than six persons as dependants. The implication of this is that a greater percentage of the increase in salary and wages are directed to a larger extent towards consumption than investment. The sad part of our findings is that even in agriculture and extraction Cameroon is still having comparative disadvantage with more than 85% of its trading partners in the production of rice, fish, flour, cements and sugar, the basic commodities whose prices were reduced. This has not only induced adverse balance of payments between Cameroon and its trading partners, but, has also assisted in reducing investments in these units of agricultural sectors in Cameroon.

### **Failure of the adjusted prices of basic commodities, salaries and wages to reduce unemployment.**

Unemployment is specified in this work as a function of inflation (INFLA), tax on imports (TAXF), population growth (POP), real wage (RWAGE) and rural urban migration (RUMR). Precisely, while INFLA, POP, TAXF and RUMR reduce high rate of unemployment, unemployment is also retarded up to 22 percent by real growth of per capita income. Furthermore, social welfare measured by real per capita income is retarded by inflation (26 percent), unemployment (88 percent) and import demand (86 percent). It is clearly that while the policy mix could improve on Cameroonians welfare, excessive importation has placed Cameroonians worse than they were before the policy mix. As seen above, reduction in the prices of rice, flour, fish, sugar cement have little or no influence on domestic investment since greater percentage of these products are imported. They instead helped in boosting the external markets hence generating employment for these countries at the expense of the Cameroonian economy. The above results are in agreement with those of Ohale 2007, Christino 2003 but at the same time conflicting with those of Fry 2004, Tata 2005 and Klamp, and Junda 2006, all discussed in the literature.

## **5. Summary and Conclusion**

This work was designed to investigate into the role of money supply (salary expansion) and the reduction of prices of basic commodities on the standard of living of Cameroonians since 2008. Based on VAR and the Error Correction Modeling, it is observed that poverty, inflation, unemployment and domestic import demand are increasing. These have worsened the welfare situation in Cameroon. Therefore, the null hypothesis that increase in money supply and reduction in prices of basic commodities are not measures towards realizing better welfare for Cameroonians is hereby accepted. To reverse this, the real per capita income of Cameroonians must be increased. This ought to be achieved through the reduction in the rate of unemployment, encouragement of domestic savings, enactment of wages and salaries targeting investment, capital



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formation and improvement in the absorptive capacity of the economy. In this direction, private individual, non-Governmental organizations and the Cameroon government should target the production of the basic commodities in Cameroon.

Rice was formally produced in Plain de Mbo by SODERI in the Western Region, in Ndop by CEMRI in the North West Region and today while the former is no more in existence, Ndop rice has maintained stagnated output for more than a decade today. Therefore, for employment expansion targeting maximum welfare, structural rigidity must be eliminated. In addition to national rolling plan, development planning and perspective planning, adequate regional planning, strong central coordinating, effective local level organization and the participation of the rural population in planning and implementation process should be one of the greatest targets of the government.

Worse to mention is the frequency at which low quality and cheap Chinese goods has entered and destroyed prospects for the production of similar goods in Cameroon. For the economy of Cameroon to gain its lost glories in agricultural production and industrialization, master plan under visionary objective must be put in place. To achieve this, salary adjustment should target gross domestic investment and not consumption. In this regard, the 1994 salary scale with integrated inflation rate taking 1994 as the base year should be put in place.

Therefore, given the causality effects of the time value of money obtained from simulation on equation 4.1, 4.2, 4.3, 4.9 and 4.10, the adjusted wages and salaries were not substantial enough to trigger investment through savings. However the 2011 simulated salary rate for the various categories of civil servants is as presented on the tables below.

## 6. Conclusion

No economy grows in isolation. While economies are interrelated, the game of give and take motivates partners' growth. From our results, it is observed that until Cameroonians change their orientation from the consumption of what they cannot produce, any form of adjustment on salaries, wages and general price level will be immediately transferred to the improvement of the welfare situations of its trading partners. Still holding to the fact that the current wages and salaries of Cameroonians is consumption rather than investment induced, the current wages and salaries need to be increased by 83 % as simulated in this study but not presented owing to space. Primary and secondary production inward looking policies are also recommended.

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