

## CHAPTER- VIII

### Summary and Conclusions

#### 8.1 Summary

**8.1.1** The first chapter of the present study has focused on a brief introduction of the basic feature of Nepalese economy. Analyzing the characteristics of Nepalese economy, current trend and tendencies of macroeconomic variables of the economy have been presented. A glance on global economy for the comparison with Nepalese economy has also been mentioned. Objectives of the study, theoretical background of Rational Expectation hypothesis and plan of the study have also been included in this chapter.

**8.1.2** In the second chapter, Literature Survey for the present work has been presented. In this process, the conclusions of several works related to the present study in developed and developing economies have been reviewed. Reviewing those works, it has been found that the invariance proposition of Rational Expectations hasn't been applicable in all the countries. Even though the policy ineffectiveness theorem has been applied in some of the developed economies, this proposition hasn't been applicable in most of the developing economies.

**8.1.3** The third chapter has focused on the methodological issues as well as data and variables of the present study. The introductions of several econometric tools like Testing for stationarity, Cointegration test, Vector Error Correction Modeling, Granger Causality

Test, Unrestricted vector auto regression modeling, ARIMA structure of the variables and Chow Breakpoint Test have been presented.

**8.1.4** The fourth chapter is related to the analysis of the nature of macroeconomic variables which are used in the present work. Testing for stationarity of the variables has been presented for identifying the nature of variables. For this purpose unit root tests, Correlogram of the variables and nature of line graphs have been presented. Testing for unit root has been conducted on the basis of Augmented Dickey-Fuller, Phillips-Perron, DF-GLS, KPSS, ERS Point optimal and Ng-Perron modified unit root tests. It has been found from these tests that all the variables i.e. real output, nominal output, narrow money supply (M1) and broad money supply (M2) are non-stationary at level whereas they are stationary at first differences.

**8.1.5** The fifth chapter is related to the cointegration test, vector error correction modeling, unrestricted vector auto regression modeling and conventional Granger causality test. The cointegration test has been applied with the help of Durbin-Watson test, Engle-Granger's method and Johansen's cointegration test. The Durbin-Watson test (CRDW) has provided the result that there is no cointegration between real output and both forms of money supply but the long run relationship has been found between nominal output and both money supplies. The Engle-Granger's method of cointegration, which is based on the stationarity test of the residual series from the OLS regression equation between two variables, has provided mixed findings from the different cases. The ADF unit root test on the residual between real output and money supplies with exogenous as constant shows that there is no cointegration between these variables even

though there is cointegration between nominal output and both level of money supplies. The same unit root test with no exogenous provides the result that there is cointegration between the real output and money supplies (M1 & M2). The Phillips- Perron unit root test on residual with constant as exogenous provides the finding that there is cointegration between real output and narrow money supply (M1) at 5% level of significance but there is no cointegration between real output and broad money supply. The same unit root test on residual with no exogenous presents the finding that there is cointegration between real output and both level money supplies. The residual is stationary at 1% level for real output and M1 while it is stationary at 5% level for real output and M2. The Johansen's method of cointegration test is quite different method than earlier two methods. It is based on trace statistic and max-eigen statistic. Comparing these statistic values with critical values, the finding shows that there is long run relationship between real output and both money supplies (M1 and M2).

Vector Error Correction modeling and Conventional Granger Causality test provided the result that there is unidirectional causality from money to output. The unrestricted vector auto regression (UVAR) modeling has provided the finding that the real output has been affected by first lag of both money supplies. The broad money supply has also been affected by its own second lag. In the case of nominal output and money supplies, the narrow money supply (M1) has been influenced by first lag of nominal output and its own second lag at 10% level of significance. Again nominal output has been affected by first lag of broad money supply (M2) at 1% level and M2 has also been influenced by first lag of nominal output (at 5 %) and its own second lag (at 1%).

**8.1.6** The anticipated and unanticipated parts of both money supplies (M1 & M2) have been estimated in sixth chapter. These parts have been identified on the basis of relevant ARIMA structures. The equation based on OLS method taking real output level as dependent variable with anticipated and unanticipated parts of money supply, it has been found that the anticipated part of both money supplies has significant role to influence the real output level while this level has not been affected by unanticipated part of money supply during the period of study (1959-2003).

**8.1.7** The seventh chapter has presented the output-money supply relationship in different sub-periods. The different sub-periods have been identified on the basis of stability test and hence the structural breaks of the study period. The structural breaks have been identified using Chow Breakpoint Test. After identifying the structural breaks, the whole series have been divided into three sub-periods i.e. 1959-1973, 1974-1983 and 1984-2003. The anticipated and unanticipated part of money supply of each sub-period has been found using ARIMA modeling. Regressing the real output level for the first sub-period (1959-1973) separately with the first lag of anticipated and unanticipated parts of narrow money supply, the t-statistic of the coefficients of both anticipated and unanticipated parts are significant only at 10 % level of significance. However, the F-statistic of both cases shows that both parts of money supply do not affect the output level in this sub-period at 5 % level of significance but both parts have significant affect on the real output at 10% level of significance.

The first lag of anticipated part of broad money supply has significant role (at 1%) to influence the real output level in this sub period while the same lag of unanticipated part has no significant influence on real output. The relationship

between output level and anticipated as well as unanticipated parts of broad money supply with no lags has presented the findings that the anticipated part of money supply has affected the output level at 10% level of significance while the unanticipated part of money supply has affected the output level at 5% level of significance.

The output level at the second sub-period has not been affected by both parts of money supplies (M1 &M2). The same situation has been applied in the case third sub-period also. Both parts of money supplies (M1 &M2) have been ineffective to influence the real out in this sub-period.

## **8.2 Conclusions**

The following inferences can be drawn from the econometric study of the money-output relationship in Nepal.

**8.2.1** First, all the macroeconomic variables have generally been found to suffer from non-stationarity or random walk process when they are in level. The regression equations based on these variables in such a situation produce spurious relationship between the variables. Generally these variables are stationary at the first differences which is also called integrated at first differences and denoted by I (1). The relationship between these variables should be based on first differences of these variables.

**8.2.2** Second, even though the variables are non stationary at level, there may be long run relationship between the variables which is also called cointegrating relationship between the variables. Though there are several methods to find cointegrating relationship between the variables, Johansen's method cointegration test is more powerful method than other two methods (i.e. Engle-Granger method and Durbin-Watson method) which can express the cointegrating relationship between the variables in a better way based on cointegrating vector. This method has explained the cointegrating relationship between real output and both money supplies in the present study whereas the Engle-Granger method has expressed the cointegrating relationship between these variables only in some cases and CRDW method has unable to establish such relationship between these variables.

**8.2.3** Third, Conventional Granger Causality test, Vector Error Correction modeling and unrestricted vector auto regression model concluded that there is unidirectional causality from money to income. This means different lags of money supply have affected output level significantly but the effectiveness of output to influence money supply is nominal or insignificant.

**8.2.4** Fourth, the anticipated and unanticipated part of money supply can be estimated with the help of ARIMA structures of the variables. Since the predicted part (anticipated part) of money supply is more powerful to affect real output for the period of study (i.e. 1959-2003), it can be concluded that the policy ineffectiveness theorem or which is also called 'Invariance Proposition' of Rational Expectations Hypothesis, propounded by Lucas, Sargent and Wallace (also called LSW proposition) has not been applied in

Nepalese economy for the long period like other some developing economies. This means effective monetary policy can play a vital role to influence real output level for the long period.

**8.2.5** Fifth, however, the policy ineffectiveness theorem has not been applied for the long period in Nepalese economy; the case of short periods is slightly different. At the initial sub-period both parts (i.e. predicted as well as unpredicted parts) of M1 have significant role to affect real output level at 10% level of significance. The first lag of anticipated part of M2 has significant (1%) role to influence the output level while the unanticipated and anticipated parts (with no lags) have significant role to influence the real output at 5% and 10% level respectively. This means the effectiveness of M2 is more powerful than M1 to affect real output either from predicted part or from unpredicted part. The second sub period presents the complete different conclusion than the first sub-period, that is, both parts of money supplies (M1 & M2) have no role to affect output level. This mean the monetary policy losses its effectiveness to influence real variables and simultaneously the surprise part also losses its effectiveness. The same conclusion can be drawn for the third sub-period in the case of effectiveness of both money supplies.

**8.2.6** Finally, a developing country like Nepal's economic prosperity cannot be increased only by monetary policies. Though at the initial period of the development history of the country it had played a significant role to influence the output level from both anticipated and unanticipated parts but in the course of time it started to loss its effectiveness either from predicted or from unpredicted part. However, the effectiveness of M2 is more powerful than M1; it also cannot be taken as a powerful tool for the

development of the country. The Government should adopt other policies like fiscal policy effectively along with monetary policies for the economic prosperity of the country because the economic activities are not fully monetized in such a country like Nepal. In such a situation the effective monetary policy alone can not play a significant role for the economic development of the country.

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