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The Time Change of the Consumer Price Index Response to the Supply Chain Management in the Supply of Money in the Iraqi Economy

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Abstract-**The broadly acknowledged notion on inflation is that it is a money related event. Henceforth the decrease of expansion is to a great extent the domain of financial approach. This investigation is carried out with an objective to determine the direction and significance the relationship among money supply and inflation. Consumer price index is used as proxy of inflation while M2 is used to determine money supply in the country. We applied ARDL model to investigate long run relationship among the variables. The data used for this estimation is ranging from 1960 to 2017. Results of the study describe a unidirectional relationship from money supply to inflation. Therefore, a significant and positive long run relationship has established in Iraqi economy. Hence, monetarist point of view is prevailed in Iraqi economy. It is recommended that Iraqi government should tighten its monetary policy to control inflation within an acceptable range.**
Keywords- Supply Chain Management, Inflation, Money Supply, ARDL, Granger Causality Test

1.   Introduction

Many economists have defined inflation in variety of ways in different disciplines, but the basic concept is common. Generally inflation is referring as a rise in price levels [1]. The definition of inflation can further reconcile by explaining the inflation as the continuous trend of rising price levels [2]. Inflation can also be defined as a sustained and substantial increase in general price levels. The concept of Inflation is a very broad measure, for instance overall rise in living cost in an economy. It noteworthy to mention that inflation severely affects the standard of living in a country in negative way.

The broadly acknowledged notion on inflation is that it is a money related event. Henceforth the decrease of expansion is to a great extent the domain of financial approach. The most widely accepted school of thought of inflation is a monetary phenomenon; therefore, reducing inflation is mainly fall in the scope of monetary policy. Therefore, Inflation is always associated with changes in the relative supply of money as per quantity theory of money. The economic and financial situation of a country depends to a large extent on the monetary policy being implemented by the country's central bank. It is widely accepted that monetary policy can promote sustainable growth by maintaining price stability [3].

The increase in overall prices due to inflationary trend reduces the buying power of consumers, hence, the money losses its value in per unit. Consumer price index is a common measure to evaluate the inflation level in an economy within a certain time period. Negative impacts of inflation incorporate an high opportunity cost of holding cash, vulnerability over future inflation rate which may affect future investment projects. A shortage of products as buyers start storing out of worrying that costs would increase later on. Further, the impact of money supply on inflation is more significant in hyperinflationary time period.

The fiscal policy is based on two concepts either expansion or contraction as referred by monetary theories. An expansionary arrangement builds on the policy that aggregate supply of cash in the economy should be expanded. While contractionary approach grows the cash supply gradually than expected [4]. It not necessary that the cash supply expansion causes Inflation. Therefore, low or medium inflation rate is not associated with money supply but referred as due

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to other related factor like demand and supply. However, a persistent upward inflation rate over a long time is the consequence of money supply expansion.

Economists are agreed on the point that an increase in money supply may prompt a quick increment in inflation. Subsequently, this concept implies that cash supply ought to be kept within an acceptable range to keep inflation on acceptable level. Regardless of its long history and the considerable proof, the anticipated relationship among inflation and money supply stays debated [5]. There is an absence of accord on the connection between speed of cash supply and inflation. Some studies have reported a positive association among money supply expansion and inflation whereas, some research asserted that the relationship among money supply and inflation is insignificant [6], [7]. Thus, it is important to look at the connection between cash supply and expansion in Iraq and revisit the scenario in an emerging economy.

2.   Literature
Review

A sustained increment of inflation in an economy is caused by the intemperate rate of money supply in the supply chain management. Therefore, a casual relationship between supply chain management and inflation has discussed by many researchers. At the same time, it is contended that the inflation is a result of excessive cash supply in an economy particularly more significant for underdeveloped economies as asserted by [19]. Hence, there is no convincing hypothetical contention for either a positive or a negative affiliation and directional causal connection among inflation and monetary development. Therefore, the literature is expanding on this phenomenon to settle the propositions contentions yet there is no much agreement on the connections between cash supply and inflation. In the conceivable connection between supply of cash and fiscal policy; it has been seen that diverse outcomes were obtained which are dependent on either model, financial circumstance of nation or observational terms.

The association between financial supply and expansion in the six European economies has examined by [8] and found that the role of money

supply in inflation changes barely been noticed. In the same course of action, [9] contended that the money supply just impacts costs for the short run and there is no long run association among the investigated the long run causality relationship among money supply and inflation using Grander causality test. They found a significant positive relationship among money supply and inflation. Similarly, a positive association among inflation and supply of money has been investigated in south Asian countries by [10]. A long run casual relationship from money supply to inflation has been found in south Asian countries. A bi-directional relationship between money supply and inflation has reported in Pakistan using co-integration technique [11].

Despite the fact that, there is a strong positive association among cash supply expansion and inflation, the importance is more grounded in developing economies [12]. Moreover, an investigation concentrating on long run relationship find that inflation is the response of financing of money related insufficiencies, particularly from banks and money institutions. Further the inflationary as time goes on and more noteworthy in hyperinflationary eras.

It is contended that there is a bi-directional causality between the money supply and the inflation [13]. Accordingly, a long run relationship of rate of development of money on inflation found a positive relationship [14]. Correspondingly another examination has declared positive and critical connection between development in cash supply and inflationist short run and long run [15]. GARCH model is considered to investigate money supply and Inflation relationship based on monthly data series in Tanzania. The study demonstrated that, a current change in cash supply would have effect on inflation rate in the seventh month ahead. [16] Has asserted that there is a unidirectional casual relationship among inflation and money supply. Hence, a balanced and controlled fiscal policy is significant to control inflation within acceptable range over long period.

There is inconclusive literature on the endogenous or exogenous effect of cash supply on inflation [16], [17].Thus, it is important to consider the connection between these factors without making endogeneity and

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erogeneity characteristic. Disclosure on the subject matter is uncertain up 'til now and need to revisit the issue. Therefore, this study hypothesize that in Iraqi money supply has significant role in inflation.

3.   Methods and Material

This study utilized secondary data from year 1960 to 2017. The data is collected from multiple sources including work bank open data source and central statistical organization of Iraq. The variables included in the model are consumer price index (CPI), M2 Money Supply. Following basic function is used to express the model:

CPI= f(M2)

CPI is usually to utilize to measure inflation based on aggregate prices of consumer goods in an economy. A particular point when the costs of various goods shift by different rate, CPI is used to record movement in prices over the period of time.M1 is a proportion of cash stock proposed principally for use in exchanges. It comprises of cash held by people in general, checks, demand drafts and other instruments. M1 is referred as a medium of trade, with demand deposits and current accounts the most generally utilized trade mediums following the ATMs and debit cards. It excludes monetary resources like investment accounts. It is the cash supply metric most oftentimes used by business analysts to reference how much cash is available for use in a nation.M2 is a proportion of the residential cash supply that incorporates M1 in addition to Quasi-cash (reserve funds and time deposits), medium-term

repurchase claim, and individual currency accounts. Generally, M2 incorporates cash that can be immediately changed over to M1. M2 cash is utilized as cash supply and estimated to measure supply of money in an economy. Hence, this study utilized M2 as a proxy of money supply in Iraq.

The basic focus of empirical analysis is the symbol and size of the relationship coefficient between CPI and M2. The investigation uses ARDL system to appraise the long run relationship among the basic variables [18].This is the most appropriate co-integration technique in small samples and different integration sequences. The ARDL technique likewise gives fair results for long run relationship, regardless of whether some variables are endogenous [20]. Before ARDL estimation, a co-integration test is used to confirm that stationary among series. We used Augmented Dicky Fuller (ADF) and Philip Perron (PP) unit root tests to achieve robust results because each test had some statistical flaws. Further, break points can provide misleading results, we also took advantage of the zivot-Andrews Static test (ZA). Table 1 shows the results of PP, ADF and ZZ unit root tests. The ADF and PP tests results indicated that both independent and dependent variables coordinated at first level I(1). It fulfills the precondition of [18] to apply ARDL approach that variable of interest must be stationary at first difference while repressors may be at I (0) or I (1).The ZA test proposes that the invalid of unit root is additionally dismissed at level of 1%. Moreover, none of the arrangement is observed to be coordinated at second order.

Table1. Unit Root Test Results

Variables	ADF test		PP test		ZA test					
	I(0)	I(1)	I(0)	I(1)	Z d	Break	Z t	Break	Z d t	Break
ln CPI	-3.63	-6.330	-2.327	-2.548	-3.78	2001	-3.56	1998	-4.81	2009
lnM2	-4.744	-6.721	-4.721	-7.831	-6.72	2008	-3.72	2009	-5.82	2007

The ARDL looks at the presence of long run relationship by assessing an unrestricted ECM to test the significance of variables at lagged level. To investigate the connection among CPI and M2, we characterized the unrestricted ECM as;

$$\Delta CPI_t = \vartheta_1 + \vartheta_2 CPI_{t-1} + \vartheta_3 M2_{t-1}$$
$$+ \sum_{i=1}^{p} \vartheta_i \, \Delta CPI_{t-i} + \sum_{j=0}^{q} \vartheta_j \, \Delta M2_{t-j}$$
$$+ \mu_{1t} \qquad (2)$$

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In ARDL bound approach, the significance of lagged terms are tested utilizing F-test that has non-standard asymptotic distribution. In the event that the processed F-measurement falls underneath the lower bound, the hypothecation of no co-integration is acknowledged. Interestingly, if the F-measurement falls inside the limits, deduction would be uncertain.

Table2. ARDL Test Results

Specifications	Max. lag length	F-test	Lower-upper bound (1%)	Lower-upper bound (5%)	Lower-upper bound (10%)
Model 1. CPI/(M2)	3	7.89	5.19-6.84	3.62-4.91	2.91-4.10

The results in table 2 shows that the evidence is failed to reject the hypothesis of no co integration. Hence, there is a long run relationship among CPI and Money Supply (M2) is therefore confirmed. Further we redefine equation 2 to derive long run coefficients. Following equation is derived for ARDL mode;

$$(1 - \Omega_1 L - \cdots - \Omega_s L^s)CPI_t = \tau_0 + (1 - \tau_1 L - \cdots - \tau_u L^u)M2_t \quad (3)$$

Table 3. Coefficient Estimation

Independent	
M2	6.28**
	(-4.73)
Constant	82.29**
	(-3.76)
Adj. R²	0.82
F-statistics	82.64*

The results show that the long run relationship between CPI and M2 is positive. The result is also significant at 5% and 10% level of significance. The shows that the relationship between the variables is from M2 to CPI. The outcome of the test clarifies that cash supply changes significantly anticipating the estimations of inflation in the long run. The diagnostic test results indicated that the model fitness by proving that there is no normality, Heteroscedasticity, auto correlation and nonlinearity issues has been found.

Table4. Diagnostic Test Results

Further to specify causality among variables, Granger Causality test is applied using following equation;

$$\Delta CPI_t = C_0 + \sum_{i=1}^{p} C_i \Delta CPI_{t-i} + \sum_{j=1}^{q} C_j \Delta M2_{t-j} + \omega ECT_{t-1} + \mu_{4t} \quad (4)$$

An error correction VAR is utilized to determine long run casual relationship among variables. The results of Granger Causality test is reported in table 5.

Model	Normality	Arch test	Serial correlation	Heteroscedasticity test	Ramsey reset test
3	1.41	0.46	3.23	13.25	0.04
	(0.32)	(0.51)	(0.21)	(0.42)	(0.72)

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Table5. Long Run Causality Test

Dependent	
CPI	-0.77*
	(-6.34)

The estimations give solid proof about the long run one way causality running from money supply to CPI. These results affirm the bound test outcomes that set up long run connection among CPI and Money Supply of supply chain management.

In the long run the model shows a unidirectional causality from cash supply to inflation. The finding attributes that cash supply causes inflation suggests that the monetarist approach has prevailed in Iraqi economy. The monetarist contended that supply of cash will directly affect inflation and the inflation is not due to demand and supply prospect. This study is in line with current investigation found a significant long run relationship among inflation and money supply. Consequently, no reverse causation effect from inflation to CPI has been detected. Conclusively, it is said that government of Iraq has induced inflation in the economy due to its monetary policy.

4.   Conclusion

First, it complements and extends the literature on the impact of supply chain management on financial performance in terms of productivity, cost reduction and profitability. Second, it is the first study to provide empirical evidence about the impact of supply chain management on financial performance and responsibility accounting in developing countries. This investigation has endeavored to examine the causal relationship among cash supply and inflation in Iraqi economy. An ARDL (ECM) bound test approach has utilized to estimate the long run association among variables. The results showed that there is a long run relationship among supply of money and inflation. Further, Granger Causality test is applied to estimate the casual relationship among Money Supply and inflation. The results evident that there is a unidirectional relationship among underlying variable from money supply (M2) to inflation. The examination builds up that there is a positive long run equilibrium connection among expansion and cash

supply in Iraq. Therefore, a quick increment in cash supply prompts a sharp increment in inflation. Tight financial approach secured on M2money must be implemented by the Central bank of Iraq. This will empower the economy through the Central Bank to screen and adequately control inflation by overseeing money supply in the economy.

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