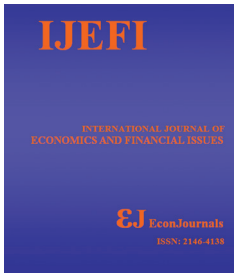

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The Relationship between Inflation and its Uncertainty: Evidence from Jordan

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ABSTRACT

There are many harmful impacts of inflation and inflation volatility in any economy, which includes increasing the risk premium, costs of hedging, and consequently leads to re-distribution of national income between strata of society unfairly. Therefore, this study came to test the relationship between inflation and inflation uncertainty for Jordan from 1976 to 2013. For that purpose we employing two different methodologies generalized autoregressive conditional heteroscedasticity (GARCH) process, and the granger causality technique. The results of the GARCH model support the hypothesis of Friedman and Ball through Indicating strong support for the presence of a positive relationship between the inflation rate and its uncertainty. The Granger causality results report supporting hypothesis of Cukierman and Meltzer in 1986, and also Granger causality test running in the both ways.

Keywords: Generalized Autoregressive Conditional Heteroscedasticity Model; Granger Causality Test, Inflation, Inflation Uncertainty
JEL Classifications: C1, D8, E31

1. INTRODUCTION

The inflation concept is one of the most important economic phenomena has been and remains the dilemma for any economic system. At the present era it is uneasy to find any country in all worlds does not suffer from specter of the inflation, and this is prompting many researchers to conduct a number of theoretical and applied studies to address the effects of this phenomenon. Inflation defined as the continuing growth in the general price level, while inflation uncertainty refers to the situation is not predictable in terms of future price, and the investor are unable to predict while the inflation rate will rise or fall. The all economists agree that the inflation ruin the economy. Loss of ability to predict, and delayed investment decisions and lower purchasing power (and therefore demand).

For both the cause and result of the inflation is the inflation uncertainty. The process of determination the costs resulting from inflation relatively easy, but when the inflation rising the interpretation of the costs resulting from uncertain inflation increasing difficulty, and that most interpretations depend on the degree of monetary policy response to the inflation itself.

Inflation is one of the topics that the debate still exists about the causal factors and appropriate policies to curb it, but we can say in general that inflation is affected by a number of internal and external factors, and vary the degree of importance of these factors, depending on the nature of the economy and the degree of openness of the country to the outside world. In a small open economy such as the Jordanian economy, external factors play a crucial role with increasing the degree of openness. Jordan has suffered from high rates of inflation in the past decades and continues to this day.

We present in this paper two contributions on the literature. Firstly, in fact it is the first time in Jordan to investigate the impact of inflation on inflation uncertainty, and this effort outcome may be valuable for the monetary authority in Jordan to adopt monetary policy more efficient. Secondly, amongst inflation rate which is accelerated in Jordan; this effort has greater policy relevance.

So that our study came to test the relationship between Inflation rate and it's uncertainty in Jordan by using monthly data from 1976 to 2013. We employing two different methodology generalized autoregressive conditional heteroscedasticity (GARCH) process, and granger causality technique.

The rest of this paper: Section 2 present the review for the literature, the methodology used in this study presented in Section 3, Section 4 provides the empirical results, and finally conclusion presented in Section 5.

2. LITERATURE REVIEW

The relationship between the inflation rate and inflation uncertainty have been presented firstly by Okun (1971), Friedman (1977), and Ball (1992). Okun (1971) first pioneer pointed to the positive relationship between inflation and inflation uncertainty, concerning the prediction of monetary policy will be more difficult during periods of elevated inflation. Friedman (1977) was display the suggestion that high inflation could lead to inflation uncertainty, and in 1986 Cukierman and Meltzer display that when degree of inflation uncertainty increased the optimal inflation rat will be increased.

The results achieved by Ball in 1992 supports the hypothesis of Friedman (1977), debating that during the periods of high inflation, there is greater uncertainty about the future of the monetary policy. In the contest of supporting the finding of Friedman and Ball hypothesis Grier and Perry (1998) presented an evidence for a positive relation between inflation and its uncertainty employing ARCH and GARCH models. In another side Baillie et al. (1996) find for insignificant relation between inflation and inflation uncertainty.

Holland (1993, 1995) presents that inflation uncertainties maybe decrease the inflation rate. A number of empirical works have examined the relation between inflation rate and inflation uncertainty, by employing different methodologies, and present mixed evidence. For example, (Balcombe 1999; Grier and Perry 2000; Fountas et al. 2001; Kontonikas 2004; and Zeynel and Mahir 2008) employed GARCH methodology.

Through constructing a version of ARCH model Evans (1991) found that the inflation impact on inflation uncertainty in the long run. Neyapti and Kaya (2001), reporting the same results by using GARCH model. By using two different methodologies the Granger causality test and GARCH model Nas and Perry (2000) examine the relation between inflation and inflation uncertainty, and their empirical findings support the evidence, that the increasing in inflation rates causes increases inflation uncertainty.

Ajevskis (2007) inspect the causality test between inflation and inflation uncertainty for the period span from 1994 to 2007 in Latvia, by employing GARCH-M model. The results confirmed bi-directional relationship between inflation and inflation uncertainty.

Rizvi and Naqvi (2009) finding confirm that inflation causes inflation uncertainty in Indonesia, Pakistan, Thailand, and India. Whereas the others countries in the tested sample provide an evidence for bi-directional causality between inflation uncertainty and inflation.

Through our reviewing the literature, enormous empirical studies present evidence on relationship between inflation rate inflation uncertainty for developed and emerging markets. We didn't find out any study covering our country Jordan, therefore, this study came in specific to fills the gap through investigating these relationship in Jordan, by using a long monthly data set from 1976-2013. We employed two different methodologies to inspect this relation generalized autoregressive conditional heteroscedasticity GARCH process, and granger causality technique.

3. DATA AND METHODOLOGY

Firstly, we should mention that we considered in our empirical analysis consumer price index (CPI) to measure the inflation rate in Jordan, and the "data source is represented by central bank of Jordan "Statistics database." Out test period for monthly data span from 1976:1 to 2013:12 for 456 observations. The CPI was used to measure the inflation in this study. We calculated inflation rate as the log difference of monthly CPI" Ananzeh et al (2014).

Recently in the empirical work the GARCH methodology become more common i for investigating the relationship between the rate of the inflation and inflation uncertainty, and comparing to the two-step procedures it present a more advanced process in estimating time-varying uncertainty.

Inflation is measured as follows:

$$INF_t = Ln(CPI_t / CPI_{t-1})*100 \quad (1)$$

INF_t: represent the inflation rate or level in the month t, CPI_t consumer price index for the month t in Jordan. In inflation specification, we used an kth order autoregressive process, AR (k):

$$IF_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i IF_{t-i} + \ell_t \quad (2)$$

Where IF_t refer at time t to the rate of the inflation, α is explanatory variable, k is lags number, ℓ_t refer at time t to the error term. Here, inflation has an autoregressive expression at the k lag length to account for the impact of auto correlated errors, and we suppose that ℓ_t has a zero mean and time changing variance of δ_t^2. In the process of modeling time varying variance, the pioneer Engle in 1982 used ARCH model, in which the conditional variance for the inflation equation given follows:

$$\delta_t^2 = \alpha_o + \sum_{j=1}^{q} \alpha_j \ell_{t-j}^2 . \quad (3)$$

Bollerslev in the 1986 extended the work of Engle (1982) to the generalized autoregressive conditional heteroscedasticity model GARCH (p,q).

$$\delta_t^2 = \varphi_o + \sum_{i=1}^{p} \alpha_i \delta_{t-i}^2 + \sum_{j=1}^{q} \beta_j \varepsilon_{t-j}^2 + \eta IF_t \quad (4)$$

$$\sum_{i=1}^{p} \alpha_i + \sum_{j=1}^{q} \beta_j < 1$$

The last two equations, equation (3) represent the equation of conditional mean, and the equation (4) also shows (conditional variance) the uncertainty.

4. EMPIRICAL RESULTS

Our investigation started with some basic descriptive analysis as shown in Table 1 for the inflation rates. According to the statistics of skewness and kurtosis refer that the distributions in general are not normal, and to the right being skewed. We conduct Jarque–Bera test to test the normality inflation rate series, and the result confirms deviation from the normality. The ARCH effects are proved by the Q-statistics significance of the squared-deviations of the inflation rate series from the sample means and the Lagrange Multiplier LM (12) statistics**.**

In order to examine the stationarity of inflation series we employ two Unit Root statistics, augmented Dickey-Fuller (ADF) test developed by Dickey, and Fuller (1979); and the Phillips and Perron (1988) (PP) test which presented in Table 2.

Table 2 represents the results of unit root tests, the ADF, and PP tests statistics reject the null hypotheses, which mean that the inflation is a stationary series.

The results of two unit root tests confirm that inflation rate series are stationary at 1%.

The Table 3 reported the estimation parameter of GARCH model and the results as its appeared support the presence of a positive relationship between various levels of the inflation and its variability (uncertainty). In all situations, the parameters reported in the level of inflation and variance equations are significant with high degree and of the hypothesized signs. In the same line of non-negativity of the variance the conditional variance equation intercepts is positive. The summation the coefficients of the ARCH and GARCH $\alpha+\beta$ is less than 1 equal to (0.81) which is consistent or harmonious with the conditional variance of inflation level being stationary, and in the covariance equation the parameter η is positive and significant at 1% which mean that if inflation goes by one unit the conditional variance rise up by 0.005.

Our results proof of a co integrated relationship between inflation rate and uncertainty of inflation.

We applied GRANGER CAUSALITY test after the uncertainty measures are getting. From Table 4, we reject the first null hypothesis for the "inflation rate does not Granger-cause inflation uncertainty" at the level of significance 1%, in other words, and Granger-causality test verify also that increasing in inflation has a positive effect on inflation uncertainty. First finding support the Friedman-Ball hypothesis for a positive relationship between inflation and inflation uncertainty. They express that when the inflation level increasing the monetary authority response is unpredictable and unreliable, and generates uncertainty about the future level of inflation because we cannot predict the growth of money supply.

For the second hypothesis that inflation uncertainty Granger-causes inflation, we reject the null hypotheses at level of significance 1%, and suggesting a positive causal relation from inflation uncertainty to inflation. Our finding support the hypothesis of Cukierman and Meltzer (1986).

Table 1: Summary statistics for monthly inflation rate

Mean	0.004454
Median	0.002958
Maximum	0.136232
Minimum	–0.139725
Standard deviation	0.022561
Skewness	1.407822
Kurtosis	14.26773
Jarque-Bera	2564.352
Probability	0
Observations	456
Q-Stat (12)	126.79*
LM (12)	113.35*

Note: Q (12) denotes up to 12 lags for Ljung-Box statistic. *,** and ***refer to 1%, 5%, and 10% significance levels, LM: Lagrange multiplier

Table 2: Unit root test statistics for inflation rate

Test statistic	ADF	PP
Test result	–11.90202*	–20.47195*

Note: Lag length is chosen on the basis of the Schwartz (BIC) in the case of ADF, the Newey-West criterion in the case of the PP, ADF: Augmented Dickey-Fuller, PP: Phillips-Perron, BIC: Bayesian information criterion, *: ???

Table 3: Report GARCH (p,q) model for inflation and inflation uncertainty

Dependent variable: IF Method: ML - ARCH				
Sample: 1976:01 2013:12 Included observations: 456				
Convergences achieved after 202 iterations				
Variables	**Coefficient**	**Standard error**	**z-statistic**	**Probability**
GARCH	41.65593	4.771437	11.77996	0
C	–0.01909	0.002113	–6.16057	0
Variance equation				
C	2.61E-05	3.75E-06	6.43083	0
ARCH (1)	0.043233	0.003741	16.40742	0
GARCH (1)	0.767128	0.010221	76.08327	0
INF	0.005334	0.001135	14.46824	0

GARCH: Generalized autoregressive conditional heteroscedasticity, LM: Lagrange multiplier

Table 4: Causality test for inflation rate and inflation uncertainty

Pairwise granger causality tests Sample: 1976:1 2013:12 Lags: 2			
Null hypothesis	**Observation**	**F-statistic**	**Probability**
INF does not granger cause infuncertanity	454	336.347	0.00000
Infuncertanity does not granger cause INF		1.7E+17	0.00000

5. CONCLUSION

This investigation is the first attempt to examine the relationship between inflation rate and inflation uncertainty in Jordan, by using monthly data from 1976 to 2013. The results of the GARCH model support the hypothesis of Friedman and Ball through Indicating

strong support for the presence of a positive relationship between the inflation rate and its uncertainty.

The Granger causality results report supporting for Cukierman and Meltzer (1986) hypothesis, and the Granger causality running in both ways. For an emerging market like Jordan, the economic costs for inflation may be higher than those in developed economies if the inflation is still higher than desired.

This effort may help the monetary authority to formulate healthy policies in order to control inflation so that minimizing the degree of uncertainty in the future.

REFERENCES

Ajevskis, V. (2007), Inflation and inflation uncertainty in Latvia. Bank of Latvia, Working Paper No. 4/2007.

Baillie, R.T., Chung, C.F., Tieslau, M.A. (1996), Analyzing inflation by the fractionally integrated ARFIMA-GARCH model. Journal of Applied Econometrics, 11(1), 23-40.

Ball, L. (1992), Why does high inflation raise inflation uncertainty. Journal of Monetary Economics, 29(3), 371-388.

Bollerslev, T., Chou, R.Y., Kroner, K.F. (1991), ARCH modeling in finance: A review of the theory and empirical evidence. Journal of Econometrics, 52(1-2), 5-59.

Cukierman, A., Melizer, A. (1986), A theory of ambiguity, credibility, and inflation under discretion and asymmetric information. Econometrica, 54, 1099-1128.

Dickey, D.A., Fuller, W.A. (1979), Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Stattitical Association, 74, 427-431.

Engle, R.F. (1982), Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica, 50, 987-1007.

Evans, M. (1991), Discovering the links between inflation rates and inflation uncertainty. Journal of Money Credit and Banking, 23(2), 169-184.

Fountas, S. (2001), The relationship between inflation and inflation uncertainty in the UK: 1885-1998. Economics Letters, 74, 77-83.

Friedman, M. (1977), Nobel lecture: Inflation and unemployment. Journal of Political Economy, 85, 451-472.

Grier, K., Perry, M. (1998), On inflation and inflation uncertainty in the G- 7 countries. Journal of International Money and Finance, 17(4), 671-689.

Grier, K.B., Perry, M.J. (2000), The effects of real and nominal uncertainty on inflation and output growth: Some GARCH-M evidence. Journal of Applied Econometrics, 15(1), 45-58.

Holland, S.A. (1993), Comments on inflation regimes and the sources of inflation uncertainty. Journal of Money, Credit, and Banking, 25, 514-520.

Holland, S. (1995), Inflation and uncertainty tests for temporal ordering. Journal of Money, Credit and Banking, 27, 827-837.

Kontonikas, A. (2004), Inflation and inflation uncertainty in the United Kingdom: Evidence from GARCH modeling. Economic Modeling, 21(3), 525-543.

Nas, T.F., Perry, M.J. (2000), Inflation, inflation uncertainty, and monetary policy in Turkey: 1960-1998. Contemporary Economic Policy, 18, 170-180.

Neyapti, B., Kaya, N. (2001), Inflation and inflation uncertainty in Turkey: Evidence from the past two decades. Yapi Kredi Economic Review, 12(2), 21-25.

Okun, A.M. (1971), The mirage of steady inflation. Brooking Papers on Economic Activity, 2, 485-98.

Phillips, P.C., Perron, B.P. (1988), Testing for a unit root in time series regression. Biometrika, 74, 535-547.

Rizvi, K.A., Naqvi, B. (2009), Inflation Volatility: An Asian Perspective. University Library of Munich, Germany, MPRA Paper No. 19489.

Zeynel, A.O., Mahir, F.L. (2008), On the inflation-uncertainty hypothesis in Jordan, philippines and Turkey: A long memory approach. International Review of Economics and Finance, 17, 1-12.