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Is Core Inflation a Better Measure than Headline Inflation in Jordan?

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Abstract

The objective of this study is to compare the performance of headline inflation and core inflation in Jordan to determine which indicator interacts more with economic variables and which indicator is more sensitive to economic policies. This comparison will be done by measuring the extent of the impact of a number of economic variables on these two indexes. Estimation of the empirical models was done based on several econometric tests. The results show the presence of a long-run equilibrium relationship between both core inflation and headline inflation with economic variables. However, the results indicate that core inflation is superior interacting with economic variables. These results suggest policy makers should take movements of core inflation into consideration when considering economic policies.

Keywords: core inflation, headline inflation, monetary policy, Jordan.

Code JEL:E31, E61, E64, P44, P24.

1. Introduction

Price stability is one the most important objectives of monetary policy to achieve sustainable economic growth. Major fluctuations in prices lead to economic distortions, making it harder for economic policy makers to stimulate the economy by making appropriate decisions. Hence, it is crucial to study inflation, its measurement methods, and its impact on the economy.

There are two basic ways to measure inflation, headline inflation and core inflation. An example of a headline inflation measure is the Consumer Price Index (CPI). Core inflation is derived from the CPI. It excludes some of the commodities whose prices are determined administratively and excludes some of the goods that are affected temporarily by supply shocks.

Monetary policy tries to control inflation, whether it was caused by demand or supply shocks. When using core inflation, goods affected by temporary supply shocks will be excluded from the CPI. Some of the components of the CPI could cause sharp fluctuations in the overall inflation rate, but the effect of these fluctuations may fade after a short period of time. For example, goods that may have price changes related to climate, such as vegetables, are excluded. Another example of an often excluded good is energy; its prices may be affected by the supply made available by oil-producing countries. Temporary price changes with either of these goods would be lead monetary policy to be ineffective.

Modern theories have linked monetary policy and core inflation as follows: when headline inflation is greater than core inflation, it does not require an immediate intervention of monetary policy; instead the policy makers should postpone any reaction at this stage (Gregorio, 2012). This is due to the fact that an increase in prices may not be attributed only to increased demand, like an excess of money in the market, but it might be a result of exceptional or external circumstances that may change in the future.

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This illustrates the importance of this study; it is key to know if the monetary authority ought to switch to core inflation rather than headline inflation, or CPI, for setting monetary policy. This study aims to clarify how core inflation can be calculated and connected to macroeconomic variables through monthly data for the period (1994-2014). For this purpose, an econometric model that fits the nature of the Jordanian economy is applied. Through this model, this research will examine the impact of macroeconomic variables on core inflation and will show the extent to which this index can be relied upon as an alternative index for headline inflation. Specifically, this research will study how core and headline inflation rates are related to a number of economic variables. These economic variables include: broad money supply M2 to represent monetary policy, tax to represent fiscal policy, the index of industrial production to represent economic activity level, and oil prices to represent international price levels.

This paper is organized in the following order. Section 2 presents the literature review, and section 3 introduces the theoretical framework and the development in Jordan. Sections 4 and 5 present the methodology and the empirical results, respectively. Finally, section 6 includes the conclusions of the research.

2. Literature Review

Previous studies on the subject of core inflation in the Jordanian economy are limited. It is also hard to find studies that link core inflation with macroeconomic variables in the Jordanian economy. Most of the available studies are at the international level and are focused on the nature of the core inflation rate and its calculation methods. None, to the best of the author's knowledge, attempted to link core inflation to macroeconomic variables.

At the international level, Roger (1998) studied the concept, uses, and measurement of core inflation. The study concluded that monetary policy must focus on the core inflation rate, because headline inflation is strongly affected by supply shocks. Thornton (1998) focused on the idea whether core inflation helps predict headline inflation in Colombia, where he applied Granger method in the causality tests using error correction methodology. The key finding of that research was that core inflation is useful in predicting headline inflation.

Crone et al. (2008) measured core inflation through headline inflation of the United States via monthly data for the period (1987-2006). The study found that decision-makers should be guided by the core inflation, which excludes items that show sharp changes in relative prices that have nothing to do with the trend of inflation. The study also noted that the forecasting of core inflation is better than headline inflation. Le Bihan and Sedillot (2000) studied whether core inflation helps in predicting inflation in France for the period (1975-1998). They measured the ability of four indicators to predict core inflation; food and energy were excluded. The study concluded that core inflation is better at predicting the level of inflation.

Tekatlı (2010) conducted a study on the core inflation index of Turkey for the period (2003-2010). The study included two objectives: proposing a new mechanism to calculate the core inflation index, and evaluating the predictive power of this new index to analyze inflation. The study pointed out that core inflation accurately predicts inflation in the short and medium terms.

Aghajanyan (2005) studied core inflation in Armenia, a country in transition, for the period (1996-2002). The study found that CPI is an inappropriate index for inflation for a number of reasons. According to the study, CPI is highly volatile, and the weights for some items are not normally distributed, leading to a biased CPI. Thus, core inflation measures are suitable alternatives for CPI. Gregorio (2012) studied the relation between goods' prices, monetary policy, and inflation. He pointed out that monetary policy must respond to commodity price shocks to achieve price stability. The study argued that authorities should not ignore commodity price shocks, and they should take into account core inflation instead of headline inflation.

Abdih et al. (2016) studied U.S. inflation, which has evolved differently over time. They found that domestic forces play a larger role relative to foreign factors in influencing core services inflation, while foreign factors predominantly drive core goods price changes. They found support for the stance of monetary policy currently pursued and the need for proceeding cautiously in gradually raising the federal funds rate. Locally, we find studies related directly to headline inflation and its impact on certain economic variables. One of these studies was Khir-Addin (2008). It studied the effect of fluctuations in oil prices on inflation and trade balance in Jordan. The study showed that the inflation rate in Jordan is linked to changes in world oil prices in previous years; thereby, the levels of expected inflation in the coming years can be predicted through oil prices. Other studies were conducted on the subject of the relationship of headline inflation with macroeconomic variables.

For example, Alawin (2013) studied the relation between inflation and unemployment, and Mousa et al. (2012) focused on the relation between inflation and the prices at Amman Stock Exchange.

3. Theoretical Framework

Headline inflation is defined as the continuous rise in the general price level. It is measured by finding the rate of change in the CPI from year to year, or even from month to month. On the other hand, core inflation is a measure widely used for the rate of consumer prices, often used as a complement to headline inflation, and is usually associated with expectations, excluding supply shocks (Aghajanyan, 2005).

The idea of core inflation was launched from a number of studies. Bryan and Cecchette (1993) examined the problems related to the measurement of inflation and the consequence of conducting monetary policy. One of the traditional problems of inflation measurement is that it contains a large number of external items that are highly volatile in their prices and are difficult to control at the same time. Hence, it is difficult to apply the rules of inflation targeting and even conducting monetary policy. Some studies and statistical institutions have suggested methods to remove the disturbances from the inflation data. Therefore, Bryan and Cecchetti used a methodology that utilized CPI, after automatically excluding goods with large price changes from the CPI basket.

3.1 How to Measure Core Inflation

There are many methods used when measuring core inflation, but the most popular method is the elimination method. This method removes the prices of a specific set of the CPI basket's components, which usually consist of food and energy that are usually vulnerable to supply shocks. In our study, we will utilize the elimination method when measuring core inflation. Many reasons support the popularity of this method: it is easy to understand, it is easy to measure, and it is a method that is consistent with international practices.

3.2 Experiences of Some Countries with the Core Inflation

Several statistical institutions publish data about core inflation. The surveillanceof core inflation by central banks has become a common practice, regardless of the regime followed for monetary policy. Institutions are divided between central banks that do not target inflation, like Japan and the USA, and central banks that do target inflation, such as central banks in Canada, the Czech Republic, Finland, Thailand, and South Africa. The second type of countries use core inflation as a target of monetary policy.

As mentioned, most countries use the method of elimination. For example, the United States excludes food and energy, while Canada excludes food, energy, and the effects of indirect taxes. South Korea excludes most fruits, vegetables, and sources of energy. Japan excludes only fresh food, while Indonesia excludes fuel, transportation fees, electricity, tobacco, and seasonal food (Web sites of statistical institutions and central banks of these countries). Most of the items that are excluded are goods related to food and energy. Foods are affected by fluctuations in the weather, and energy price is determined globally.

3.3 Headline and Core Inflation Rates in Jordan

There are two key measures of inflation in Jordan issued by the Department of Statistics: the consumer price index (CPI) and the GDP deflator (Figure 1). The first is the most important one, since it measures changes in the prices of a fixed basket of goods and services consumed by the majority of people. The second measure watches the changes in the prices of all goods and services that make up GDP.

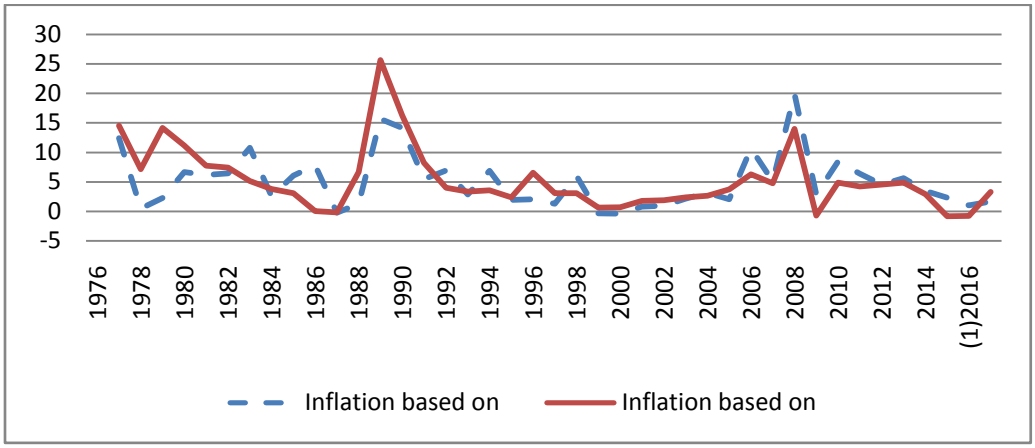

Figure 1: Inflation Rates in Jordan

The Central Bank of Jordan contributed significantly, via its monetary policy, to controlling inflation rates after the economic crisis that struck Jordan in 1989. The central bank has targeted monetary stability, represented by the control of inflation rates and the stability of the exchange rate. This was done in conjunction with the use of indirect monetary policy tools to control liquidity in the money market. The overall process has led to creating jobs, supporting the activities of the real economy, and stabilizing inflation rates.

Jordan suffered during the study period from inflationary pressures arising from external, supply side shocks, mainly because of the increase in the prices of oil. Moreover, Jordan suffered from demand side pressures, like an increase in real estate prices. After the war in Iraq, there was a huge inflow of capital that caused a big boom in the housing industry and the stock market sector. The Syrian crisis also affected the Jordanian economy, because of the displacement of a large number of Syrian refugees inside the Jordanian borders. Finally, Jordan's economy has been affected by the global financial crisis and its effects on the international economy.

Figure 2 illustrates a clear fluctuation in the inflation rate measured by CPI; it reaches its highest level in 2008. However, the inflation rate measured by core inflation reached its highest value in 2007. We also notefrom this figure that the first index shows more sensitivity than the second one. This result is consistent with what is reported in Table 2; that the standard deviation of the CPI is higher than the standard deviation of the core inflation.

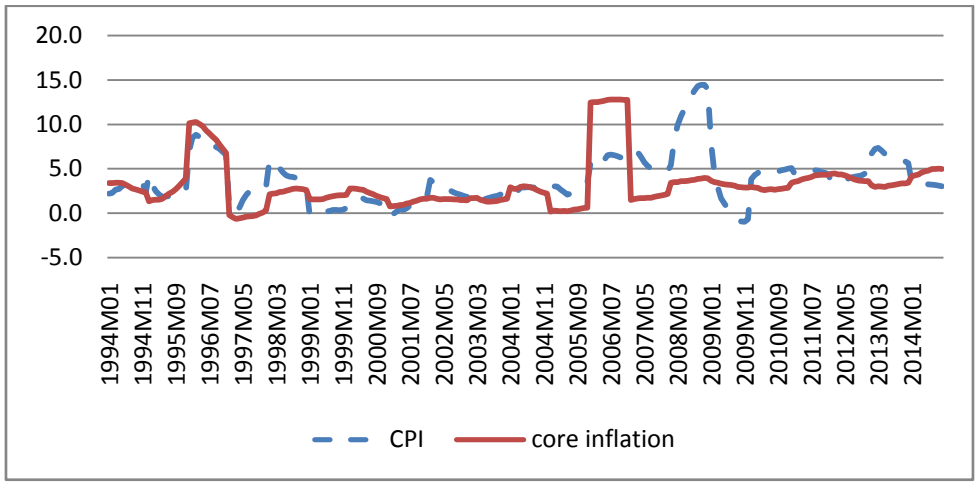

Figure 2: Headline and Core Inflation Rates

Figure (3) demonstrates that both energy and food prices have a significant impact on headline inflation. For example, during 2008, food prices rose dramatically, due to a significant rise in fuel and energy prices in 2007. (The right axis represents the inflation rates for oil prices and transportation. The left axis represents food price inflation.)

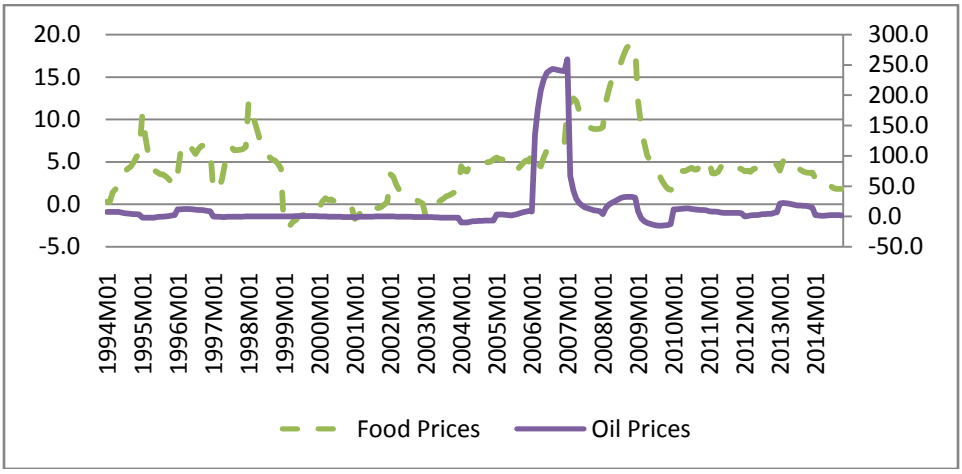

Figure 3: Food and Oil Prices

4. Methodology and Data

This study aims to analyze how core inflation and headline inflation are affected by fundamental macroeconomic variables to determine how these two indexes interact with macroeconomic variables. This study uses a time series analysis with an econometric model that includes core inflation, in addition to some macroeconomic variables that represent monetary policy, fiscal policy, economic activity, and world prices. These results will be compared with the results of the same model that uses headline inflation instead.

This study analyzes monthly data for the period (1994-2014). The main data sources are the Central Bank of Jordan and the Department of Statistics.

The theoretical econometric model for the study was formed using the following equation:

$Y = \beta_0 + \beta_1 M_2 + \beta_2 T + \beta_3 IPQ + \beta_4 OIL + e$ …….… (1)

where Y represents the core inflation or headline inflation rate. β_0 is the intercept, and β_i represents the model parameters where i = 1, 2, 3, and 4. M_2 refers to broad money supply to represent monetary policy, T is tax to represent fiscal policy, IPQ is the industrial production index to measure economic activity, OIL represents world oil prices, and e represents the error term.

In this equation, the dependent variable (Y) is represented as follows:

A. Headline inflation (CPI): The percentage change in the CPI has been used to represent headline inflation. This variable includes most consumption commodities in the market, which are affected by internal and external conditions.
B. Core inflation (COR): This indicator reflects the elimination of goods with high price fluctuations, in addition to goods that are affected by external factors, such as energy prices.

Below is the theoretical analysis of the economic interpretation of the explanatory variables that are embodied in the model.

M_2 represents the monetary policy with the aim of measuring the impact on core inflation and its inflation rate. We expect β_1 to have a positive effect on inflation rate. Increasing money supply means that liquidity will increase in the market, which leads to increased demand and therefore prices.

Taxes (T) represent fiscal policy. The parameter, β_2, is expected to be positive. When taxes are imposed on goods, they lead to increased prices.

IPQ represents the level of economic activity. The estimated parameter may have either a positive or a negative effect. A positive impact occurs if the output was higher than its potential value, leading to higher prices. A negative impact happens if the output was less than its potential value, leading to lower prices. When world oil prices (OIL) rise, prices in the domestic market will also rise due to the direct impact on production costs. This will cause business owners to re-price their basic goods, e.g. transportation, clothing, and rents, etc. This means that the estimated value of the parameter, β_4, will be negative.

4.1 Descriptive Analysis of the Data

The correlation matrix shown in Table (1) shows the existence of a high correlation for each variable used in the study with both core inflation and headline inflation.

Table 1: Correlations among Variables

	CPI	COR	IPQ	M_2	OIL	T
CPI	1	0.9933	0.8451	0.9849	0.9078	0.9042
COR		1	0.8647	0.9885	0.9144	0.9084
IPQ			1	0.8998	0.8907	0.82724
M_2				1	0.9409	0.9108
OIL					1	0.8615
T						1

Table (2) shows the basic statistical indicators. The standard deviation of COR is five degrees less than CPI. This provides evidence that overall inflation has higher volatility than core inflation, suggesting that core inflation is better for monetary policy makers, due to the homogeneity it creates with the domestic demand.

Table 2: Statistical Descriptions for Data

	COR	CPI	IPQ	M_2	OIL	T
Mean	95.091	100.974	128.136	13070.59	51.552	167.315
Median	88.132	91.000	134.000	9828.050	39.685	135.812
Maximum	134.973	149.017	170.400	29240.40	133.880	524.700
Minimum	69.388	69.300	79.700	4484.700	11.350	63.463
Std. Dev.	18.242	23.671	26.481	7762.528	32.294	94.681
Skewness	0.512	0.632	-0.185	0.653	0.500	1.4126
Kurtosis	2.013	2.035	1.535	2.012	1.875	5.096
Jarque-Bera	21.221	26.580	23.986	28.165	23.775	129.929
Probability	0.000	0.000	0.000	0.000	0.000	0.000
Sum	23962.96	25445.5	32290.14	3293789	12991.06	42163.42
Sum Sq. Dev.	83527	140644	176017	1.51E+10	261764	2250087
Observations	252	252	252	252	252	252

* Note: the natural logarithm was taken to all variables when performing the econometric tests.

4.2 The Unit Root Test

The stationarity of any variable is important in time-series analysis. If the variables are not stationary, the regression results obtained for the time-series variables become spurious through a high value of R^2. Non-stationarity in the time-series usually appears due to the existence of a trend in the data, which reflects certain conditions that influence other variables in the model. One of the most used tests for stationarity is the Augmented Dickey Fuller test (ADF).

4.3 Cointegration Tests

If the results of the unit root test show the variable is non-stationary at the level but stationary at the first difference, then it is convenient to implement the cointegration test. Engle and Granger (1987) have explained that there is a possibility for a stationary linear combination, I(0), that can be formed out of non-stationary time series. In this case, it is possible to use the variables at their levels in the regression, and the equilibrium can be described as a long-term relation.

The Johansen-Juselius Cointegration Test is one of the most commonly used tests to prove the existence of a long-term relationship between economic variables. This test fits small samples and three or more variables. In order to determine the number of cointegration vectors, this application includes two statistical tests. The first one is the Trace Test (λ_{trace}), where the null hypothesis proposes that the number of cointegration vectors is less than or equal to a specific number (q).

The alternative hypothesis suggests that the number of cointegration vectors exactly equals the number (q). The second test is the Maximal Eigenvalue test, where the null hypothesis suggests that there are (r) cointegration vectors versus the alternative hypothesis that suggests (r+1) cointegration vectors (Abdali, 2007). Selection of Lag-Length will be tested, using either Akaike Information Criterion (AIC) method or Schwartz's Criterion (SBC) method. The nature of the relation between the variables in the model will be determined through the following tests.

A. Vector Error Correction Model (VECM)

If it was concluded that the time series variables used in the study are non-stationary at the level and stationary at the first difference, and that the time series variables are cointegrated and have a long-term relation between them, then we apply an error correction model to estimate the relation between the variables in the short and long term model. The error correction model will be estimated using the Two-Step Engel-Granger Method. The first step is estimating the equilibrium relationship model in the long-term, the cointegration regression. The second step is to estimate the error correction model, which reflects the relationship in the short-term or the short-term fluctuation around the trend of the long run relationship. Thereby, this short-term model will be estimated by including the estimated residuals of the long-term regression as an independent variable but with a one period lag (Abdali, 2007).

B. Causality Test

A causality test is used when dealing with two variables, like X and Y, to see if the variable X causes variable Y, and particularly if the lag of the variable X has predictive power on variable Y. A Granger Causality test will be utilized to determine the causal direction.

C. Variance Decomposition Analysis

Variance decomposition of each variable is typically performed to identify the variation in the prediction of each variable. Prediction error can be attributed to and is composed of two parts. The first part is attributed to the behavior of the variable itself, and the second part is attributed to the prediction error in other explanatory variables. The importance of analyzing variance components arises from the fact that it provides the relative importance of the impact of any shock to each variable on the other variables.

D. Impulse Response Function

This function is used to keep track of the timeline for the various shocks experienced by different variables included in VECM. The function shows the response of each variable to any shock to any variable in the model (Gujarati and Porter, 2010).

5. The Empirical Results

5.1 Unit Root Test Results

The stationarity of time-series variablesare tested using the Augmented Dickey–Fuller test (ADF). Table (3) shows the t-statistics and the probability values of rejecting the null hypothesis for the variables used in the model, at the level and at the first difference.

Table 3: Results of Augmented Dickey-Fuller Test

Variables	Level			First Difference		
	t-statistic	Probability	Results	t-statistic	Probability	Results
LCOR	0.728	0.993	Non-stationary	-15.58	0.00	Stationary
LCPI	0.213	0.973	Non-stationary	-12.58	0.00	Stationary
LIPQ	1.261-	0.648	Non-stationary	-6.04	0.00	Stationary
LM2	0.878	0.995	Non-stationary	-15.73	0.00	Stationary
LOIL	1.689-	0.436	Non-stationary	-11.82	0.00	Stationary
LT	0.901	0.995	Non-stationary	-13.45	0.00	Stationary

Table (3) shows that all variables are non-stationary at their levels, but become stationary when the first difference is taken. This finding proves that variables are integrated of the same degree, signaling a need for the cointegration test. If the variables were found to be non-stationary, the immediate use of the OLS method might lead to superior results.

5.2 Cointegration Results

This test is used to detect the presence of a long run relationship among economic variables. Tables 4 and 5 show the Johansen test results for the headline inflation and core inflation equations, respectively. According to these results, there are at least two vectors for the long-term relation between the variables, which confirms the existence of the cointegration relationship. Accordingly, we can use the vector error correction for both equations, which helps in comparing the strength of the cointegration relations in both equations.

Table 4. The Results of the Cointegration Test for Headline Inflation

Johansen Maximum Likehood Cointegration Tests			
Trace Test			
H_0	H_1	Trace statistic	5% tabulated value
$r = 0$	$r \geq 1$	98.983*	69.819
$r \leq 1$	$r \geq 2$	57.392*	47.856
$r \leq 2$	$r \geq 3$	27.746	29.797
$r \leq 3$	$r \geq 4$	9.073	15.495
$r \leq 4$	$r \geq 5$	0.449	3.841
Eigenvalue Test			
H_0	H_1	Max. Eigenvalue statistic	5% tabulated value
$r = 0$	$r = 1$	41.591*	33.877
$r \leq 1$	$r = 2$	29.646*	27.584
$r \leq 2$	$r = 3$	18.673	21.132
$r \leq 3$	$r = 4$	8.624	14.265
$r \leq 4$	$r = 5$	0.449	3.8415

* means significant at 5% level.

Table 5. The Results of the Cointegration Test for Core Inflation

Johansen Maximum Likehood Cointegration Tests			
Trace Test			
H_0	H_1	Trace statistic	5% tabulated value
$r = 0$	$r \geq 1$	86.349*	69.819
$r \leq 1$	$r \geq 2$	41.044	47.856
$r \leq 2$	$r \geq 3$	20.678	29.797
$r \leq 3$	$r \geq 4$	8.066	15.495
$r \leq 4$	$r \geq 5$	0.512	3.841
Eigenvalue Test			
H_0	H_1	Max. Eigenvalue statistic	5% tabulated value
$r = 0$	$r = 1$	45.304*	33.877
$r \leq 1$	$r = 2$	20.367	27.584
$r \leq 2$	$r = 3$	12.612	21.132
$r \leq 3$	$r = 4$	7.554	14.265
$r \leq 4$	$r = 5$	0.512	3.841

* means significant at 5% level.

5.3 VECM Results

Convenient tests were used to select the optimal lag periods. Since available data are based on monthly observations, the results of the optimal lag periods showed that a 14-month period and a 13-month period are the optimal lag periods in the cases of core inflation and general inflation, respectively. The results of the VECM model showed that the parameter for speed of adjustment of the core inflation equation was significant at 1% and carried the expected negative sign. This confirms the long-term equilibrium relation between core inflation and other variables in the model.

The value of this parameter indicates that the speed of adjustment for the state of disequilibrium is 8.6% during the coming periods. The long-term relationship among the variables used in the model with the rate of core inflation and headline inflation appear in equations (3) and (4), respectively. The estimation of the VECM using the core inflation rate has led to a cointegration relationship. Therefore, the use of core inflation in interpreting price level changes has a better reflection for economic relations, especially the variables that represent monetary and fiscal policies. The most prominent conclusion that can be drawn from the results of the error correction vector in the core inflation equation compared to the headline inflation equation is that the speed of adjustment parameter was significant in the case of core inflation and insignificant in the case of headline inflation. This result suggests that core inflation is a better indicator than headline inflation when it comes to understanding the interaction with local and foreign economic variables.

The results of the ECM model appear in the following equations, where the t-statistics are shown in parentheses, and "***" and "**" indicate significance at 1% and 5%, respectively.

$$\Delta \ln Y_t = \beta_0 + \beta_1 \Delta \ln M_{2t} + \beta_2 \Delta \ln T_t + \beta_3 \Delta \ln IPQ_t + \beta_4 \Delta \ln OIL_t + \pi\, ECT_{t-1} + e_t \ldots\ldots\ldots (2)$$

$$\Delta \ln COR = -3.276 - 0.221 \Delta \ln M_2 - 0.300\, \beta_2 \Delta \ln T + 0.465 \Delta \ln IPQ + 0.010 \Delta \ln OIL - 0.086\, ECT_{t-1} \ldots (3)$$

[-1.446] [-3.747]*** [-4.021]*** [5.406]*** [0.329] [-3.532]***

$$\Delta \ln CPI = -3.049 - 0.349 \Delta \ln M_2 - 0.327 \beta_2 \Delta \ln T + 0.660 \Delta \ln IPQ + 0.037 \Delta \ln OIL - 0.032\, ECT_{t-1} \ldots (4)$$

[-1.317] [-5.040]*** [-4.141]** [7.354]*** [1.088] [-1.152]

5.4 Causality Test Results

The results of the causality analysis, as shown in Table 6, have demonstrated that there is bidirectional causality between headline inflation and IPQ and money supply. However, the analysis showed a unidirectional causality with oil prices and taxes. Core inflation also showed a bidirectional causality relationship with both IPQ and money supply. However, it showed a unidirectional causality with oil prices, which shows that global oil prices do not affect core inflation. These results provide evidence that core inflation is influenced only by domestic variables that can be controlled by the central bank.

Table 6: Causality Tests Results

Headline Inflation						Core Inflation					
Direction of causality			F-statistic	Prob.	Result	Direction of causality			F-statistic	Prob.	Result
IPQ	→	CPI	3.053	0.049	Yes	IPQ	→	COR	2.715	0.068	Yes
CPI		IPQ	3.375	0.036	Yes	COR		IPQ	4.272	0.015	Yes
M_2		CPI	6.745	0.001	Yes	M_2		COR	5.006	0.007	Yes
CPI		M2	2.448	0.089	Yes	COR		M2	6.656	0.002	Yes
OIL		CPI	11.373	0	Yes	OIL		COR	1.76	0.174	No
CPI		OIL	1.458	0.235	No	COR		OIL	2.848	0.06	Yes
T		CPI	0.245	0.783	No	T		COR	0.266	0.767	No
CPI		T	79.953	0	Yes	COR		T	81.082	0	Yes

5.5 Variance Decomposition Results

Table (7) refers to the results of variance decomposition for the headline inflation index. The results indicate that changes in the general level of prices are best explained by world oil prices. In this study, this variable explains an increasing amount of the error in predicting the rate of inflation in the following periods. This ratio amounts to 3.9% in the later periods. This shows that the impact of changes in crude oil prices on inflation using CPI comes with lag periods.

The results of the variance decomposition analysis indicate that the results using core inflation are different. The results clearly indicate that the monetary policy and fiscal policy coefficients are significant in their interpretation and impact on core inflation. Table (8) shows that the core inflation rate is affected by fiscal policy, represented by taxes, during the second time period and beyond. In the last period, changes in the fiscal policy explain 13.6% of the error prediction in the core inflation rate. The variable representing monetary policy explains about 7.3%, during the same period. Comparing the results of these two variables for the same periods with what was obtained in the estimation of variance decomposition of the headline inflation rate, it is evident that estimations using core inflation were more effective and accurately reflected changes in fiscal and monetary policies.

Table 7. Variance Decomposition Analysis for Headline Inflation

Period	S.E.	LCPI	LIPQ	LM2	LOIL	LT
1	0.007	100.00	0.00	0.000	0.000	0.000
2	0.0140	99.38	0.094	0.033	0.413	0.085
3	0.018	98.75	0.264	0.037	0.836	0.115
4	0.021	97.94	0.287	0.076	1.227	0.471
5	0.023	97.49	0.268	0.182	1.465	0.599
6	0.026	96.14	0.272	0.340	2.689	0.556
7	0.028	95.28	0.235	0.584	3.386	0.518
8	0.030	94.67	0.249	0.583	3.580	0.916
9	0.032	93.65	0.308	0.763	3.784	1.498
10	0.033	93.03	0.391	0.781	**3.945**	1.857

Table 8. Variance Decomposition Analysis for Core Inflation

Period	S.E.	LCOR	LIPQ	LM2	LOIL	LT
1	0.008	100.00	0.000	0.000	0.000	0.000
2	0.011	99.64	0.015	0.253	0.085	0.011
3	0.013	98.73	0.941	0.178	0.075	0.076
4	0.015	97.91	1.042	0.316	0.055	0.676
5	0.017	97.03	0.883	0.519	0.045	1.528
6	0.018	94.76	0.758	1.013	0.225	3.249
7	0.020	91.39	0.710	2.703	0.212	4.985
8	0.021	86.51	0.612491	4.772	0.378	7.729
9	0.023	81.80	0.538356	6.561	0.347	10.758
10	0.024	78.28	0.477195	**7.329**	0.309	**13.608**

5.6 Impulse Response Function Results

The Impulse Response Function (IRF) resultsshow that the response of headline inflation to a random shock in the independent variables is weak. This shows that the possibility of controlling headline inflation is limited, which limits the efficiency of fiscal and monetary policies in controlling inflation. However, IRF results indicated that the core inflation response to a random shock in the independent variables was stronger than the response of the headline inflation. This result supports what has been concluded when applying the variance decomposition technique. Core inflation is more responsive to economic variables than headline inflation (note: the results of this test are available upon request).

6. Conclusion

The objective of this study was to compare the performance of core inflation and headline inflation in Jordan for the period (1994-2014). This comparison was done by studying the effect of some macroeconomic variables on these indexes. Although there was a strong correlation for all variables used in the study with both indexes, the study concluded that monetary and fiscal policies would be more effective in controlling core inflation if the central bank targets core inflation. Estimation of VECM shows that the coefficient of the speed of adjustment was significant in the case of core inflation and insignificant in the case of headline inflation. Causality results showed that core inflation is affected by local variables only, answering the basic inquiry of this research. The results of variance decomposition and IRF supported that the core inflation index can be controlled by the authority of the monetary policy.

The results clearly indicate the significance of monetary policy and fiscal policy variables in their impact on the behavior of core inflation. This result shows that controlling headline inflation is limited compared to core inflation, restricting the ability of fiscal and monetary policies to control inflation. In conclusion, this research recommends that monetary and fiscal policies focus on core inflation as an operational target in light of the results. The authors also recommend the adoption of using the core inflation index in the process of wage adjustment, as it reflects domestic demand and supply conditions. This requires statistical agencies to calculate and publish core inflation periodically to make it available for future studies.

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