MONEY SUPPLY ROLE IN ECONOMIC AND INDUSTRIAL GROWTH: THE CASE OF JORDAN (1990-2010)

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Abstract:

Economic theorists from David Hume to Keynes and new Monetarists are all emphasize monetary policy measures to induce economic growth and industrial development. This policy is also used to cure sharp inflation and economic crises. The most two popular monetary measures, used by most countries are money supply and the interest rate. Were these measures used effectively in Jordan? Were they used as inducers or did they just grow parallel and coincided with the achieved economic growth and production in Jordan during the first decade of this century, at a time when the world faces economic and financial crises? The core and the essence of this empirical paper will be to answer these questions with the focus on the money supply role in economic growth.

Regression model with lag one year was used in this paper. The purpose of this type of models is to evaluate whether money supply was inducer or grew parallel to economic growth and growth in the industrial sector. For comparisons, two periods were studied. Each period is for a decade. The first period covered the years 1990 to 2000, and the second period covered the years 2001 to 2010.

It is concluded that in both periods money supply in Jordan was not used as an inducer to the growth of the economy neither used as an inducer to the growth in the industrial sector.

Keywords: Money supply, Jordan, economic growth, industrial growth

1. Introduction

Theoretically there are two monetary models used to induce economic growth. These are; growth induced by money supply increment; and, growth derived by the creation of mild inflation. In this paper the following questions will be answered. Was the economic growth in Jordan, in the past two decades, derived through the creation of inflation? Or, was it derived from an increase in money supply?

Therefore, a theoretical approach will be introduced by applying a mathematical model to evaluate the effect of the money supply on the economic growth in Jordan. Then conclusions will be derived.

2. Growth through inflation

David Hume concentrates his arguments on inflation as an inducer to economic growth. He argues that inflation is a continuous increase in prices, and as a consequence real wages will decrease. This means that the large portion of profits will go to the investors in the form of savings and investment which consequently will lead to economic growth.

This dogma adopted by Keynes who said; to achieve higher level of economic growth, inflated profits must be created.

Gross domestic product (GDP) is the total of the private sector's consumption and investment, and the public sector consumption and investment. Any increase in any of these components will increase GDP. In recession period, decreased investment will lead to increase in unemployment and decrease in wages, and consequently private and public sectors expenditures on consumption will decrease, and GDP will decrease as an independent variable. In such a case a mild inflation (around / less than 5%) will lead to increase in wages and increase in demand on consumption goods, and this will induce production and finally an increase in GDP. The inflation here must be mild not hyper. If it was hyper, the sharp increase in prices in an economy with full employment for factors of production, the result will be increase in prices not increase in production (GDP).

3. Economic growth through the increase in money supply.

If we assume that import and exports in a country are zero, then

$GDP = C + I + G$

Where:

C = Private sector consumption

I = Private sector investment

G = Government expenditures on consumption and investment

To increase the left-hand part of the equation, one or two or all the three factors on the right-hand side must be increased.

How to increase any one of these factors? Any increase in money supply will lead to series of effects on these factors. Lower interest rate will lead to increase investors demand on loans. New investment will lead to higher wages and higher level of expenditure on consumption, and consequently higher production (GDP). Two constraints on this argument, these are; the level of (GDP), and the velocity of money (v). The latter is highly depends on the rate of interest rate (r) where the higher the interest rate is the lower for (v) and consequently money supply will depend on (GDP) and (v).

GDP = MV

$$M = \frac{GDP}{V}$$

Moreover, the new monetary theory emphasizes that money supply (M) * velocity of money (v) = price rate (P) and;

MV = PQ where Q is the real national income

From this we can reach to;

$$\frac{M}{P} = \frac{Q}{V}$$

From this last equation, we conclude that any higher level of (M) than the level of (Q) will lead to inflation. Therefore to avoid inflation, money supply (M) must go baralel to the real growth in national income (Q).

4. The case of Jordan

From the previous theoretical approach, two questions worth to highlight and to be answered.

1. Was the economic growth in the last two decades derived from the creation of inflation?
2. Was the money supply an inducer or was it grew in baralel with the achieved economic growth?

Tables (1) and (7) show that the inflation rate in Jordan was 3.7% as an annual average during the period 1990-2000. This annual rate increased to 4.1% during the period 2001-2009. Whereas, the annual real rate of growth in GDP (1994=100%) was 4.2% during the period

1990-2000, and 6.6% during the period 2001-2009. Comparing the rates of growth in GDP with those in the inflation, we conclude that the inflation rate was just a baralel to the growth in the economy and the growth in GDP was not an inflationary one.

Table 1

Some important economic indicators 1989-2009

	1989	***1991***	***1995***	***1999***	***2000***	***2002***	***2005***	***2007***	***2009***
M2 (JD million)	2971	3717	5160	6747	7435	8419	12364	15607	20013
Real GDP (JD million)	3429	3474	4628	5181	5393	5930	7379	8677	9607
$\frac{M2}{GDP}\%$	86	106	111	130	138	142	167	180	208
Inflation rate %	13	6	2	0.6	0.7	1.9	3.5	4.7	-0.7

JD = 1.4 US$

Source: Derived from Table 7

The second question was to evaluate if the expansionary money supply was behind the achieved growth in the economy. Table (1) also shows that since 1991 M2 growth was accelerating to exceed the rate of growth in GDP and to double the rate of growth in GDP in 2009. This should result in an increase in prices, or higher rate of inflation, but the inflation rate was low during the whole period 1991-2007. The highest was 6% in 1996 and 6.2% in 2006. In 2008 it reached 13.9% to decrease sharply in 2009 to reach (-0.7%), as shown in Table (7). This indicates once again that the achieved growth in the economy could not be attributed to inflation, but the growth in the M2 was to facilitate, or to induce or to go parallel with the level of growth in the economy and not resulted in an inflationary economy.

Money supply could be considered inducer to economic growth, i.e. the rate of growth in GDP was induced by the increase in M2, or M2 could be considered a facilitator to the growth in the economy and not to induce this growth, i.e. the rate of growth in M2 came as a follower or as a result to the growth in GDP. To test these two hypotheses the following models introduced.

The following regression model will test whether the growth in M2 was intended to induce GDP growth or not.

$GDP = B_0 + B_1 M2 (t - 1)$

$GDP = B_0 + B_1 M2 (t + 1)$

GDP = is real GDP

B_0: is constant

B_1: is factor of Ms

M2 = M1 + quasi-money

t – 1: The period under analysis with a previous year to this period in M2

t + 1: We take M2 in a following year to the period under analysis

In this model we took the GDP for two periods; 1990-2000, and 2001-2010. For M2, we took 1989 for the first period, and 2000 for the second period to evaluate the impact of a previous year of M2 on the GDP in a following year. The results of this regression are shown in Table (2).

Also another regression was done to evaluate whether the growth in M2 came to be parallel to the growth in real GDP or not. The results are shown in Table (3).

Moreover, the impact of the industrial output on the GDP and the M2 was evaluated and the results are show in Tables (4) and (5).

From the previous tables we conclude the following:

1. In general, and from Tables (2) and (3), it is obvious that the indicators of the models $GDP = f (M2_{t-1})$ and $GDP = f(M2_{t+1})$, see Table (2), are more significant than the indicators of the model $M2 = f (GDP_{t-1})$ and $M2 = f(GDP_{t+1})$, see Table (3), especially in the period 2001-2010 as R2, F and t-values in (Table 2) are higher than those in Table (3) and those in the period 1989-2000. This means that M2 was playing the role as a facilitator, or follower (t+1), to the growth in GDP in the period 2001 – 2010.

Table (2)

GDP = f (M2) t – 1					
Period	**R2**	**F**	**Sign.**	**t – value for B_0**	**t – value for B_1**
1989-2000	0.986	629.6	0.000	17.23	25.09
1999-2010	0.972	282.20	0.000	10.41	16.79
GDP = f (M2) t + 1					
1990-2000	0.905	86.1	0.000	6.485	9.280
2001-2010	0.995	1765.9	0.000	24.95	42.02

2. Taking the model, in Table (3), M2 = f (GDP $_{t-1}$) where t-1 is the first period 1989-2000, and 1999-2010 is the second period of comparison,

the results of the regression show that R2, F, and t-values are more significant in the second period. This means that M2 was more depending on the growth in GDP. It is obvious also that in the period 1990-2000, the growth in M2 was parallel to the growth in GDP, whereas in the period 1999-2010, the GDP was inducing, (t-1), money supply to increase as shown in Table (3), and this sustains the previous conclusion when we look to the model used in Table (2).

Table 3

M2 = f(Real GDP) t – 1					
Period	**R2**	**F**	**Sign.**	**t – value for B_0**	**t – value for B_1**
1989-2000	0.851	57.15	0.000	-3.09	7.56
1999-2010	0.995	1550.73	0.000	-15.74	39.37
M2 = f(Real GDP) t + 1					
1990-2000	0.971	332.46	0.000	-7.63	18.234
2001-2010	0.962	200.22	0.000	-5.59	14.15

3. In Table (4) we tested the hypothesis that

GDP = f (Industrial output $_{t-1}$)

And

GDP = f (Industrial output $_{t+1}$)

The results of the regression show that the industrial production was highly induces gross domestic product to grew in the period 1999-2010 in comparison with the period 1989-2000, and the results also emphasize that the growth in industrial products, as an inducer to the growth in GDP (t-1), is more significant than its growth as a consequence, (t + 1), to the growth in GDP. See Table (4).

Table 4

GDP = f (Industrial output) t – 1					
Period	**R2**	**F**	**Sign.**	**t – value for B_0**	**t – value for B_1**
1989-2000	0.915	96.470	0.000	9.424	9.822
1999-2010	0.988	676.53	0.0075	2.048	26.010
GDP = f (Industrial output) t + 1					
1990-2000	0.938	135.318	0.000	7.752	11.633
2001-2010	0.943	132.324	0.700	-0.400	11.503

4. We also turn to the industrial output and its fluctuations and its relationship with M2.

It is known that investment in the industrial sector depends highly on the interest rates on loans, and the interest rate is affected by the level of M2. To test this, the following models introduced;

M2 = f (Ind. output) t - 1

M2 = f (Ind. output) t + 1

And

Industrial output = f (M2) t – 1

Ind. output = f (M2) t + 1

The analyses show that M2, in Table (5), as inducer to the growth in the industrial sector was lower than the industrial sector role (Table 6) as inducer to the growth in M2. This means that M2 role was a facilitator, or follower, to the growth in the industrial sector.

Table 5

M2 = f (Industrial output) t – 1					
Period	**R2**	**F**	**Sign.**	**t – value for B_0**	**t – value for B_1**
1989-2009	0.962	477.221	0.000	-4.721	21.845
M2 = f (Industrial output) t + 1					
1990-2009	0.929	249.642	0.000	-4.069	15.800

Table 6

Industrial output = f (M2) t – 1					
Period	**R2**	**F**	**Sign.**	**t – value for B_0**	**t – value for B_1**
1989-2009	0.952	374.252	0.000	6.316	19.346
Industrial output = f (M2) t + 1					
1990-2009	0.966	532.838	0.000	8.120	23.083

5. Finally, if the two periods are taken to evaluate the growth in real GDP and the growth in M2, we find that real GDP grew by (2.9%) per annum during the period 1989-1999, and by (6.4%) per annum during the period 2000-2010, (Table 7).

M2 grew by (8.9%) annually during the period 1989-1999, and by (10.8%) annually during the period 2000-2010. (Table 7).

This indicates that the growth in M2 was much higher than that in the GDP especially in the second period (2000-2010). This growth in M2 came in a period when the economy suffered a short in the demand and investment. This has reflected in a low inflation rate, with the exception to that in 2008, which decreased from 6.2% in 2006 to 4.7% in 2007 and to -0.7% in 2009 (Table 7).

5. Conclusion

Discussions in this paper conclude the following;

1- The economic growth in Jordan during the last two decades was not inflationary growth.

2- The role of M2 in the economic growth was just to facilitate more than to induce the growth in the economy.

3- The role of M2 in the industrial sector growth was also to serve as a facilitator to this growth rather than to induce.

Table 7

Main Economic Indicators in Jordan 1988-2010

	GDP at current market price JD million	Real GDP at market price JD million	Real Annual growth GDP at market price	Industrial production current price JD million	M2 JD million	Inflation rate %	M2 % annual growth
1988	2349.5	3840.8		393.1	2647		
1989	2425.4	3428.7	-10.8	468.7	2971	13.0	12.2
1990	2760.9	3419.3	-0.3	555.9	3122	10.3	5.1
1991	2958.0	3474.3	1.6	535.2	3717	6.1	19.0
1992	3610.5	3972.7	14.3	642.4	4193	3.2	12.8
1993	3884.3	4151.0	4.5	629.6	4482	2.7	6.9
1994	4358.3	4358.3	5.0	773.6	4841	3.1	8.0
1995	4714.7	4627.7	6.1	862.4	5160	2.0	6.6
1996	4912.2	4723.5	2.1	828.1	5175	6.0	0.3
1997	5137.5	4880.5	3.3	909.3	5577	2.9	7.8
1998	5609.8	5027.6	3.0	1033.6	6026	3.1	8.0
1999	5767.3	5181.4	3.0	1043.4	6747	0.6	12.0
2000	5989.1	5393.7	4.1	1103.8	7435	0.7	10.1
2001	6339.0	5658.1	4.9	1153.9	7866	1.9	5.8
2002	6698.8	5930.6	4.8	1267.6	8419	1.9	7.0
2003	7056.2	6123.5	3.2	1341.7	9466	2.5	12.4
2004	8299.0	6595.1	7.7	1475.1	10571	3.4	11.7
2005	9164.0	7379.6	11.7	1569.3	12364	3.5	17.0
2006	11414.0	7973.8	8.1	1723.2	14110	6.2	14.2
2007	13080.0	8676.9	8.8	1880.2	15607	4.7	10.6
2008	16601.0	9349.8	7.8	2022.6	18304	13.9	17.3
2009	18249.0	9607.3	2.8	2010.7	20013	-0.7	9.3
2010	20100.1*	10003.3*			20793		3.9

Sources: * estimated

For the data 1988-2003, Central Bank of Jordan, Yearly Statistical Series (1964-2003), October, 2004, pp. 52, 53 and 68, 1994 = 100%.

For the data 2004-2010, Central Bank of Jordan, Monthly Statistical Bulletin, June 2010, pp. 84, 86 and 100,1994=100%.

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