Government consumption expenditure, velocity of money, export, and longrun investment: Implication for Libya

Rasheed Muftah Salem

Department of Economics, Faculty of Economics and Political Science, University of Tripoli

المستخلص

تهدف هذه الدراسة لبناء دالة للاستثمار بطريقة تبين سلوك الاستثمار بالاقتصاد الليبي. يوجد متغيرات يعتقد بأنها مهمة مثل الإنفاق الاستهلاكي الحكومي وسرعة دوران النقود والصادرات تؤثر على الاستثمار وذلك باستخدام نموذج الانحدار الذاتي لكشف دالة الاستثمار طويلة الأجل عبر الفترة الممتدة من 1962 إلى 2010. بينت الدراسة خلال الفترة الطويلة بوجود علاقة طردية بين الإنفاق الاستهلاكي الحكومي والاستثمار وعلاقة طردية بين الصادرات والاستثمار وعلاقة عكسية بين سرعة تداول النقود (كمقياس لسعر الفائدة). وتقترح الدراسة بأن الإيرادات النفطية التي تقود الاستثمار عرضة بشكل كبير للتقلبات مما يساهم ذلك بعدم الاستقرار الاقتصادي.

Abstract

648

The objective of this study is to construct an investment function of the way in which investment behaves in Libya's economy. Variables such as government consumption expenditure, velocity of money, and export are believed to be of

importance affecting investment using the VAR approach to examine government consumption expenditure, velocity of money, export, and long-run investment for the period of 1962-2010. The results revealed that over the long-run, investment positively related to government consumption expenditure and export, and that negatively related to velocity of money (the proxy for interest rate). The results obtained suggest that investment driven by oil revenue availability is extremely prone to fluctuations that contribute to overall economic instability.

1. Introduction

649

Government consumption expenditure and gross investment accounts the share of gross domestic product that is considered for the government sector. Government consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditure on national defense and security, but excludes government military expenditure. Investment classified intoexpenditure by government and private sector for fixed assets that directly benefit the public.

An area which appears to always be of importance to oil exporting countries is investment which creates social benefits. These include education and health.

In Libya, the approach taken towards investment decisions was largely handled and centralized by the government, and investment decisions were more influenced by the maximization of social welfare than by economic considerations, i.e. profit maximization. As in most developing countries, investment is subject to certain constraints. Factors making investment behavior different from those in developed countries are the absence of well-developed financial markets. Therefore, the interest rate is probably not an important factor and has never played a crucial role in simulating investment in Libya (Essa, 1997)

(Essa, H. 1997, p.71). In Libya, as the government exerts a greater role in undertaking investment projects and oil is the main source of foreign earnings, subsequently to investment, it is believed that interest rate, suggested by theories, will not affect the direction of investment.

Due to the fact that Libya has not established stock markets yet, and official interest rates do not reflect the real scarcity of loan-able funds because it is not determined according to market forces, an attempt will be made to formulate investment function by incorporating velocity of money and it is more relevant here to be as a proxy for interest rate. The velocity variable represents tightness of money and is more appropriate than interest rate (Michel, 1970). (Micheal, K. 1970, p.628).

Thus, it will be of both academic interest and practical relevance that an attempt will be made to construct an investment function of the way in which investment behaves in Libya's economy.

2. Review of literature

650

Although most economists agree that investment plays a crucial role determining the pace of economic activity, there is a little agreement on the variables affecting investment. Therefore, investment does not to be a stable function of a few factors. Different theories such as the marginal efficiency of capital, the acceleratory theory and the neoclassical model of investment, assume different explanatory variables. Some of these stresses the role of interest rates and changes in output, others complains the importance of sales and profits in determining investment, and availability of internal and external finance.

Jay (2004) (Jay, D. 2004, P.287).formulated his function of investment in Indonesia using standard ordinary least squares (O.L.S) method and quarterly data over the dataset 1993:1-2002:4. He assumed that investment is a function of export performance, government expenditure, and interest rate. He assumed that higher exports and government expenditure would lead to larger investment, higher interests rates decrease investment. He pointed out deficiencies in the banking and the financial system and corruption are two important factors.

Ghani and Din (2006) Ghani, E. and Din, M. 2006, p. 94). analyzed the impact of public investment on economic growth in the contest of Pakistan's economy using VAR technique for the period 1973 to 2004. They revealed that there evidence of short-run causality from public consumption to public investment.

Badiel and Bina (2002) (Badiel, S. and Bina, C. Oil and the Rentier State: Iran's Capital Formation, 1960-1997'.2002) <u>https://www.core.ac.uk</u>. examined the impact of oil revenue on capital formation using time series data from 1960 to 1979 as well as for the period of 1980-1997 in Iran. The results revealed that, for the first period, oil revenue has a significantly positive impact on capital formulation. However, the second period showed that oil revenue has an insignificantly positive impact on capital formation. They suggest that the insignificant positive impact from oil revenue to capital formation is probably due to neglecting the task of capital formation in favour of consumption expenditure.

3. Data and methodology

651

The study uses the VAR approach to examine government consumption expenditure, velocity of money, export, and long-run investment. The VAR consists of four variables, investment (I), government consumption expenditure (*GEXP*), velocity of money (V), and export (*EX*). Data on these variables are

collected from Economic Research Center of Benghazi and Central Bank of Libya for the period 1962-2010. The previous studies not only allows to construct an investment function, but, in addition to this, sheds light on the investment behavior on the long –run cointegaration relationship. Thus, to, avoid the potential problem of estimating spurious relationships, the time series properties of the variable under investigation are tested for unit roots.

4. Test results for unit roots results

To avoid the potential problem of estimating spurious relationships, it is necessary to test the time series properties of the variable under investigation.

Each time series in our simple of I, GEXP, V and EX are first tested for their order of integration by using AugumentedDicky-Fuller (ADF) test.

We use an AugumentedDicky-Fuller test to help determine whether the process has a unit root. They actually consider three different equations that can be used to test the existence of a unit root.

 $Dy_{t=c_0} + \gamma y_{t-1} + c_2 t + \varepsilon_t$ (1) $Dy_{t=c_0} + \gamma y_{t-1} + \varepsilon_t$ (2) $Dy_{t=\gamma}y_{t-1} + \varepsilon_t$ (3)

652

The difference between the three equations concerns the existence of intercept and time trend. The first includes both intercept and linear time trend. If we inappropriately omit time trend, the power of the test can go to zero.

The following hypothesis were formulated and tested to examine whether the process has a unit root. We use a 5% level significance.



 H_0 : There is a unit root, which means that the series is non stationary.

 H_1 : There is no a unit root, which means that the series is stationary.

lnGDP, lnIP, and lnIG were tested for their orders of integration by using Augumented Dicky-Fuller (ADF) tests (table 1). Refer to equations (1), (2) and (3) for the testing equations. The tests showed that I, GEXP, V and EX are integrated of order one.

Variable	Level	P-value	First difference	P-value
Ι	Trend and	1.0000	Trend and	0.0002*
	intercept		intercept	
	Intercept	1.0000	Intercept	0.0006*
	None	1.0000	None	0.0001*
GEXP	Trend and	0.6768	Trend and	0.0000*
	intercept		intercept	
	Intercept	0.9637	Intercept	0.0000*
	None	0.9734	None	0.0000*
V	Trend and	0.0000*	Trend and	0.0000*
	intercept		intercept	
	Intercept	0.0000*	Intercept	0.0000*
	None	0.0000*	None	0.0000*
EX	Trend and	0.0782	Trend and	0.0000*
	intercept		intercept	
	Intercept	0.1515	Intercept	0.0000*
	None	0.3707	None	0.0000*

Table (1) Augumented Dicky-Fuller (ADF) test results for unit root.

Note:*indicates that variable is integrated of order one because p-value is less than 0.05.

653

In general, the ADF unit root test suggests that the time series of all variables in (1) to (3) are integrated process of order 1. Since each of these variables is integrated in an order \sim (1), we proceed to the next stage , which determines whether these variables are co-integrated.

5. Test results for co-integration

Since the time series of *I*,*GEXP*, *V* and *EX* were found to be integrated of the same order

(i.e., order one), a co-integration test could be conducted to determine whether a long-run relation exists among the variables. A Johansen co-integration test is performed, assuming a co-integrating relationship as specified by equation (4).

$$lnI_t + a_1 lnGEXP_t + b_1 lnV_t + c_1 lnEX_t + A = \varepsilon_{1t}$$
(4)

The Johansen co-integration test can be expressed as follows

 H_0 : There is no co-integrating relation (r =0).

 H_1 : There is co-integrating relation (r ≥ 1).

Where (r) denotes the number of co-integrating vectors.

Table (2) reports the results of the Johansen test. The test outcome indicates that the maximum Eigenvalues and Trace statistics strongly reject the null hypothesis of no cointegration in favour at least two co-integrating relationship, and that linear deterministic trend assumption (intercept no trend) is selected.

6. Estimates of the long-run co-integrating equation

654

A Johansen co-integrating test was performed assuming a co-integrating relationship as specified by equation (4):

 $lnI_t + a_1 lnGEXP_t + b_1 lnV_t + c_1 lnEX_t + A = \varepsilon_{1t}$ (5)

We thus proceed to estimate equation (5). The results of long-run co-integrating equation are presented in table (3):

Cointegration relationship is found in table (3). In the model there exists a significant long-run relationship in equation (5). However, while government consumption expenditure (*GEXP*) and export (*EX*) exert a positive long-run impact on investment (I), velocity of money V has a negative long-run impact on investment (I). The positive sign of government consumption expenditure coefficient indicates a reinforcing influence on investment whereas the negative sign of velocity of money coefficient indicates an offsetting influence on investment.

The results obtained indicate that investment experience fluctuations which are positively related

to export. The results also revealed that government consumption expenditure has helped in insulating investment from the impact of export. In contrast, velocity of money has not helped in insulating investment from the impact of export.

Table (2) Determination the number of co-integrating relations by model

I,GEXP, V and EX.

Sample (adjusted): 1968 2010 Included observations: 43 after adjustments Trend assumption: Linear deterministic trend Series: I GEXP V EX Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)							
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**			
None * At most 1 * At most 2 At most 3	0.662203 0.579884 0.148608 0.034215	92.37391 45.70562 8.414959 1.496988	47.85613 29.79707 15.49471 3.841466	0.0000 0.0004 0.4221 0.2211			

Trace test indicates 2 cointegratingeqn(s) at the 0.05 level

655



* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table (3) The results of long-run co-integrating equation

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	Sample (adjusted): 1968 2010 Included observations: 43 after adjustments Standard errors in () & t-statistics in []	
CointegratingEq:	CointEq1	
I(-1)	1.000000	
GEXP(-1)	-0.643930 (0.08668) [-7.42885]	
V(-1)	0.100843 (0.01480) [6.81387]	
EX(-1)	-0.176841 (0.04109) [-4.30407]	
С	-764.4164	

Note:

1. The cointegation coefficients are normalized on *I*.

2. T-statistics are in parentheses.

3. The length of the lag is (5) choosing according to VEC lag exclusion Wald test.

7. Conclusion

656

This study assesses empirically government consumption expenditure, velocity of

money, export, and long-run investment

The main conclusions of this study can be summarized as follow:

1. An attempt is made to construct an investment function of the way in which investment behaves in Libya's economy.

2. An attempt also is made to incorporate velocity of money and is more relevant here to be as a proxy for interest rate.

3. In addition, the study has incorporated government consumption expenditure and export in the investment function.

4. The ADF unit root test suggests each variable is integrated of order one.

5. There is evidence of long-run relationship among investment, government consumption expenditure, velocity of money, and export.

6. Over the long-run, investment positively related to government consumption expenditure.

7. This is to say to government consumption expenditure has helped investment from the impact of export fluctuations.

8. Over the long-run, investment negatively related to velocity of money.

9. This may give an indicator that velocity of money has not helped in insulating investment from the impact of export.

10. Over the long-run, investment positively related to export.

11. This may give an indicator that investment driven by oil revenue availability is extremely prone to fluctuations that contributes to overall economic instability.

12. The results obtained suggest that government consumption expenditure appear to have helped in insulating investment from the impact of export fluctuation.

13. However, it seems that the economy will continue to depend on fluctuating and declining export that may have complicated development planning and reduced the path of growth below what could be achieved under conditions of stability.

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657

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658