THE RELATIONSHIP BETWEEN INFLATION AND FINANCIAL DEVELOPMENT IN SAUDI ARABIA

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ABSTRACT

The improved performance of the financial sector through its process of financial intermediation between savers and investors and between lenders and borrowers as well as the guidance of the funds those are available to the optimal investments lead to achieve the desired stable economic growth. Economists generally believe that high rates of inflation cause problems to some individuals and as well as for the whole economic performance. In general, low inflation rate with financial sector development plays a crucial and essential role in achieving sustained and stable economic growth. Therefore, maintaining inflation rate at low level and improving the financial sector performance are considering themain targets for policy makers to promote sustained and stable economic growth. So, the main purpose of this paper was to investigate empirically the relationship between inflation and financial sector development in Saudi Arabia for the period of 1982-2013.This paper used the autoregressive distributed lag (ARDL) bound testing approach suggested by Perasan et al. (2001) to examine the existence of the long-run relationship between the inflation rate and financial sector development. The advantage of the bounds testing approach is in its applicability irrespective of whether the underlying variables are purely I (0), purely I (1) or mutually co-integrated.All data were tested for stationarity using Augmented Dickey-Fuller (ADF) test and the Phillip-Perron (PP) test to determine the order of integration. The variables included in this study are: The credit to the private sector as percentage of GDP was used as a proxy of financial development and inflation rate measured by the consumer price index. The study also included two more control variables: trade openness and real gross domestic product. The main findings are as follows. First, tests results of the Augmented Dickey-Fuller (ADF) and Phillips – Perron (PP) showed that consumer price index (LCPI), real gross domestic product (LGDP) and trade openness (LOPEN) did not seem to be stationary at their level but they were at first difference. Accordingly, they were integrated of order one I (1). On the other side, both tests results of financial development (LFD) seemed to be stationary at its level. Accordingly, it was integrated of order zero I (0). Second, results showed that there was a statistically significant long-and-short run negative relationship between inflation and financial development. Third, there was statistically significant positive impact of previous financial sector's policies on financial sector development.Forth, results indicated that there was statistically significant positive impact of economic growth on financial development. Fifth, there was a statistically significant negative impact of trade openness on financial development.Accordingly, inflation and trade liberalization policy are the main obstacles facing financial sector performance. Therefore, the policy makers can reduce inflation through the use of appropriate fiscal and monetary policies.

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INTRODUCTION

In general, macroeconomic theory suggests that the combination of low inflation with financial sector development plays a crucial and fundamental role in achieving sustained economic growth. The improved performance of the financial sector through its process of financial intermediation between savers and investors and between lenders and borrowers as well as the guidance of the funds those areavailable to the optimal investments lead to achieve the desired economic growth. Generally, the financial development has a positive effect on economic growth (Jung, 1986; Roubini and Sala, 1992; King and Levine, 1993a, b; Pagano, 1993; Levine and Zervos, 1996, 1998). On the other hand, inflation is one of the main obstacles that affectfinancial sector and economic growth negatively (Huybens and Smith, 1998, 1999; Haslag and Koo, 1999; Rousseau and Wachtel, 2002).

Saudi Arabia has a strong economy, robust and stable markets, where trace Kingdom market mechanisms system which is based on supply and demand and competition, and there are no restrictions on foreign exchange operations, and there is no ban or quantitative restrictions on imports of goods and lower tariffs on some imports. The Saudi economy's considers the biggest economy to the free market in the Middle East and North Africa region, where Saudi Arabia maintains a 25% share of GDP.

There is no doubt that oil is the main pillar of the Saudi economy, which occupies ranked first globally in the oil and its production and export reserves, and 25% of the total global reserves of oil and other natural resources, but it is the efforts of unremitting to diversify its economy to include industry, commerce, and other services. Saudi Arabia has been rated as one of the top 20 economies in the world and occupies the center 9 globally in terms of economic stability, also occupied the 16th place worldwide as the best attractive environment for investment. The government has increased the role of the private sector and encourages investment fields in many sectors such as telecommunications, electricity, airlines, postal services, railways, cities and industrial services, port facilities and water.By the end of 2014, the expansion of the Saudi economy continued for the fifth year in a row, where GDP grew by 3.59% to SAR 2,821 billion (USD 752 billion). The aggregate constituents of GDP grew in varying proportions, and despite the decline in oil prices in the last quarter of year to its lowest level since February 2009, actual revenues amounted to SAR 1,046 billion (USD 279 billion), up 22% versus the estimated budget. The average light Arab oil price reached USD 94.5 for in 2014. Meanwhile, public expenditure amounted to SAR1, 100 billion (USD 293 billion), manifesting a deficit of SAR 54 billion (USD 14.4 billion). The Government's adoption of many development projects and capital spending on infrastructure projects over the last five years contributed to the creation of new business opportunities in the economy which is reflected in the performance of the banking sector in general. Another main driver for the Saudi Arabia economic growth is bank credit to

private sector. With plenty liquidity in the banking system, credit to private sector has maintained strong and stable growth for the third coherent year. For the first six month in year 2014, averaged credit growth to private sector reached about 12 percent, driven by strong corporate credit growth and increasing in consumer lending.This has significant contribution to banks profits, which reach an all-time high of SAR 35.7 billion in year 2013. According to SAMA, bank profits grew by 10.4 percent year-on-year over the first six month of year 2014. Loan to deposit ratio at 81 percent suggests low funding risks; and bank deposits in excess of the statutory requirement at SAMA stood at SAR 54.9 billion at the end of June 2014. Inflation rate in Saudi Arabia economy has been stable so far for year 2014 despite strong domestic demand.

The aim of this study is to investigate the impact of inflation on financial sector development in Saudi Arabia using time series data covering the period from 1982-2013.According to our knowledge, only a few studies have been conductedin the case of Saudi Arabia to discuss the sources of inflation or the determinants of inflation. This study tries to fill the gap in the literature of the impact of inflation on financial sector performance in Saudi Arabia. The rest of the paper is organized as follows. Section 2 summarizes the main findings from the research on the impact of inflation on financial development and review related literature. Section 3 addresses data and the methodology of the study. Section 4 presents the empirical results and section 5 suggest conclusions.

LITERATURE REVIEW

The link between inflation, financial development, and economic growth has received great attention in both theoretical and empirical studies in recent decades. This is motivated by the different empirical findings reported. From an empirical point of view, studies that examined the impact of inflation on financial sector development (based on cross - sectional data, panel data and time series analysis) showed that there was a strong statistically significant negative relationship (correlation) between the variables. In this section a number of empirical works relating to the relationship between inflation, the performance of the financial sector and economic growth will be introduced.

Huybens and Smith (1998, 1999) presented a monetary growth model in which banks and secondary capital markets play a crucial allocative function. Their findings suggest that real activity, the volume of bank lending activity, and the volume of trading in equity markets are strongly correlated. At the same time, inflation and financial market activities are strongly negatively correlated (in the long-run). The same can be said about inflation and the real rate of return on equity. They also found that inflation and real activity are negatively correlated in the long-run, particularly for economies with relatively high rates of inflation.

English (1999) used cross-sectional data to examine the impact of inflation rate on the financial sector's size. He provided empirical evidence that inflation has positive effect on financial sector development. According to English, a higher rate of inflation leads households to substitute purchased transactions services for money balances, thereby boosting the size of the financial services sector. More specifically; the size of a nation's financial sector is strongly affected by its inflation rate.

Boyd et al. (2001) tried to assess empirically the impact of sustained inflation rate on financial sector performance. They found that there was a significant negative

relationship between inflation and financial development. Moreover, they found that the empirical relationship between inflation and financial sector activity was highly nonlinear. For example, in low-inflation countries, the data show that more inflation is not matched by greater nominal equity return. In high-inflation countries, nominal stock returns move essentially one-for-one with marginal increases in inflation rates. Rousseau and Wachtel (2002) used a rolling regression technique to examine the interactions between financial development and inflation that affect economic growth for 84 countries. They found that financial depth has a significant positive effect on growth only when inflation falls below a threshold of about (6%) to (8%). The results also showed that inflation had a negative effect on financial depth when the five –year average inflation rate was below about (15%) to (20%). Lee and Wong (2005) applied a threshold regression model to investigate the existence of inflation threshold effects in the relationship between financial development and economic growth for Taiwan and Japan. Their results suggest that financial development may promote economic growth when inflation rate is low and moderate. Khan et al. (2001) used a large cross-country sample to assess the impact of various variables such as GDP per capita, the share of public consumption in GDP, the degree of openness and inflation rate on financial activity. They found support for the existence of threshold level of inflation which lies in the range 3-6% a year depending on the specific measure of financial depth utilized. They also found that an increase in inflation had a weak positive effect when initial rate of inflation is low and a negative effect at initially high inflation rate.

Naceur and Ghazouani (2005) used time series data from 11 MENA region countries and applied GMM methodology to examine the impacts of inflation rate on the financial sector performance. Their results indicated that inflation had a negative and significant impact on the financial sector development; but there was no evidence of thresholds. They showed that a marginal increase of inflation was harmless to stock market performance and banking sector development regardless the rate of inflation. Haslag and Koo (1999) have found that a positive relationship between inflation and financial repression and financial system becomes less developed as inflation rate increases.

Boyd and Champ (2003) used cross-country tests to investigate the relationship between inflation and financial market performance. They provided an empirical result that inflation was negatively associated with banking industry size, real returns on financial assets, and bank profitability. They also indicated that there was positive relationships between assets return volatility and inflation. Finally, they suggested that inflation hurt economic growth through declining financial development.

Kim et al. (2010) applied Pooled Mean Group estimator method developed by Pesaran and Shin (1998) to investigate short-and long-run impact of inflation on financial development for 87 countries covering the period 1965-2005. Their results confirmed that inflation has a positive impact on financial development in short-run but a negative impact on long-run.

Dong-Hyeonkimand Shu-Chin Lin (2010) used Shane and Smith's (1999) ARDL approach to investigate the long-and short-run relationship between inflation and financial development for 87 countries covering the period 1960-2005.The study used three variables of credit to private sector, cash debt, and assets of the bank as a proxy of financial development. Their results indicated that there is a negative long-run

relationship between inflation and financial development but for the short-run the relationship was positive. However, when the data were split to different income or inflation groups, these results can be observed only in low-income or low inflation countries.

Keho (2009) used Bound testing approach developed by Pesaran et al. (2001) and Granger causality test introduced by Toda and Yamamoto (1995) to analyze the long-run and causal relationship between inflation and the financial sector performance in seven countries of the West African Economic and Monetary Union (UEMOA). He found no evidence of long run relationship between inflation and financial development for six countries but in one country. He also found that financial development caused inflation in five countries with the reverse causality detected in only two countries.

In a related single country study which examined inflation and financial development relation, Bittencourt (2011) initially used time series data and then panel time series data to examine the impact of inflation on financial development in Brazil covering the period 1985-2004. The results confirmed that inflation had detrimental effects on financial development. Furthermore, Wahid et al. (2011), Odhiambo (2012) and Ozturk and Karagoz (2012) used the ARDL bounds testing approach and Error Correction Model (ECM) to examine the impact of inflation on financial development. Their results indicated that the relationship between inflation and financial development was negative in the short-and long-run, confirming that inflation reduced the efficiency of financial sector performance. Emmanuel (2012) tried to find out the impact of inflation development in Ghana using quarterly data from 1990 to 2008. The author employed in his study three econometric models: a bivariate ARDL, a bivariate VAR AND a multivariate NLLS. Empirical results provided by author indicated that the following: first, based on cointgration test there was no long-run relationship between inflation and financial development; for the short-run, inflation had a positive relationship with financial development. Second, a unidirectional and negative causality was running from inflation to financial development. Third, threshold persist were observed in the inflation-financial development relation. The threshold was estimated between 11-16% inflation rates.

Regarding studies on the impact of financial development on economic growth, a study by Nahla et al. (2014) tried to investigate the effect of financial development on economic growth in Saudi Arabia. The authors used annual data covering the period from 1968 to 2010 and employed the autoregressive Distributed lag (ARDL) bounds test econometric technique. Empirical results suggested that financial development has a positive effect on economic growth of the Saudi non-oil sector in the long-run. Moreover, results showed a negative but insignificant effect on the oil sector.

THE EMPIRICAL FRAMEWORK

The Data

This study utilized the annual data on financial development proxied by credit to the private sector as percentage of GDP (FD); inflation rate was measured by consumer price index (CPI). Two control variables were added to the model: Real gross domestic product (GDP) which measure real activity in the economy. Total trade as percentage of GDP

(OPEN) calculated as (total exports + total imports) divided by GDP which measures openness degree of economy. All variables were transformed to logarithms to eliminate the problem of heteroskedasticity. Data included in this study were obtained from Saudi Arabian Monetary Agency (SAMA). The data covers the period 1982-2013. Descriptive Statistics were reported in table (1).

TABLE 1. DESCRIPTIVE STATISTICS

Variables	ΔLFD	ΔLCPI	ΔLGDP	ΔLOPEN
Observations	31	31	31	31
Mean	0.046	0.013	0.031	-0.002
Median	0.081	0.007	0.038	0.019
Maximum	0.303	0.094	0.088	0.156
Minimum	-0.304	-0.032	-0.081	-0.206
Std. Dev.	0.135	0.028	0.044	0.097
Skewness	-0.495	0.751	-0.685	-0.520
Kurtosis	3.305	3.449	2.790	2.408
Jarque-Bera	1.389	3.179	2.486	1.852
Probability	0.499	0.203	0.288	0.396

Methodology

This paper used the autoregressive distributed lag (ARDL) bound testing approach suggested by Perasan et al. (2001) to examine the existence of the long-run relationship between the inflation rate and financial development in Saudi Arabia. The advantage of the bounds testing approach is in its applicability irrespective of whether the underlying variables are purely I (0), purely I (1) or mutually co-integrated. The ARDL bounds model can be written as follows

$$\Delta lnFD_t = \alpha_1 + \alpha_2 lnFD_{t-1} + \alpha_3 lnCPI_{t-1} + \alpha_4 lnGDP_{t-1} + \alpha_5 lnOPEN_{t-1} + \sum_{i=0}^{n} \beta \Delta lnFD_{t-i}$$

$$+ \sum_{i=0}^{n} \gamma \Delta lnCPI_{t-i} + \sum_{i=0}^{n} \delta \Delta lnGDP_{t-i} + \sum_{i=0}^{n} \rho \Delta lnOPEN_{t-i} + \mu_t \qquad (1)$$

Where, Δ is first difference operator, lnFD is natural log of financial development (credit to the private sector as percentage of GDP, lnCPI is natural log of consumer price index, lnGDP is real gross domestic product, lnOPEN is natural log of total volume of trade as percentage of GDP, and μ_t is white noise error term.

The test of no cointegration using ARDL approach involves performing the F-test on the null hypothesis (H0: $\alpha2=\alpha3=\alpha4=\alpha5=0$) against the alternative hypothesis of cointegration (H1: $\alpha2\neq\alpha3\neq\alpha4\neq\alpha5\neq0$). Based on the value of computed F-statistic it can be determined if there is cointegration among the variables. When the computed F-statistic value is more than upper critical bounds value, then hypothesis of cointegration is

accepted. When the computed F-statistic value is less than the lower critical bounds value, then hypotheses of no cointegration cannot be rejected. When the computed F-statistic value comes between lower and upper critical value, then the decision about cointegration becomes inconclusive.

For the short-run relationship between inflation and financial development, we use unrestricted error correction version of ARDL model by estimating the following equation:

$$\Delta lnFD_t = \alpha_1 + \sum_{i=0}^{n} \beta \Delta lnFD_{t-i} + \sum_{i=0}^{n} \gamma \Delta lnCPI_{t-i} + \sum_{i=0}^{n} \delta lnGDP_{t-i} + \sum_{i=0}^{n} \rho lnOPEN_{t-i} + ECM_{t-1} + \mu_t \qquad (2)$$

Where, ECM_{t-1} is the error correction term and measuring the deviation of FD from its long-run value.

EMPIRICAL RESULTS

Stationarity Test

The augmented Dickey-Fuller (ADF; see Dickey and Fuller (1970)) and Phillips-Perron (PP; see Philips and Perron (1988)) unit roots tests for stationarity were conducted and reported in tables (2 & 3). Based on the results of both tests it was found that natural logarithm of consumer price index (LCPI), natural logarithm of real gross domestic product (LGDP) and natural logarithm of trade openness (LOPEN) did not seem to be stationary at their level but they were at first difference. Accordingly, they were integrated of order one I (1). On the other side, both tests results of natural logarithm financial development (LFD) seemed to be stationary at its level. Accordingly, it was integrated of order zero I (0).

TABLE 2. AUGMENTED DICKEY – FULLUR UNIT ROOT TEST

	Null Hypothesis: Variable is not- Stationary ADF				
Variables	Level with constant (C)	Level With C and trend (T)	First differences (C)	First differences (C &T)	Variable type
LFD	-2.69***	-4.27**	-5.42*	-5.53*	I(0)
LCPI	0.29	-1.79	-2.70***	-3.43***	I(1)
LGDP	2.42	-2.66	-4.51*	-5.13*	I(1)
LOPEN	-1.84	-2.73	-4.73*	-4.26**	I(1)
	Critical Values				
Significance level 1%	-3.66	-4.37	-3.72	-4.37	
5%	-2.96	-3.60	-2.98	-3.60	
10%	-2.62	-3.23	-2.63	-3.23	

*Note: *, **, and *** represent significance at the 1%, 5% and 10% levels, respectively.*

TABLE 3. PHILLIPS – PERRON (PP) UNIT ROOT TEST

Null Hypothesis: Variable is not-stationary

Variables	PP Test				
	Level (C)	Level (C&T)	First differences (C)	First differences (C &T)	Variable type
LFD	-2.77***	-7.52*	-8.36*	-10.32*	I(0)
LCPI	1.62	-0.66	-2.82***	-3.36***	I(1)
LGDP	2.25	-2.59	-4.51*	-5.13*	I(1)
LOPEN	-2.03	-2.61	-4.83*	-4.76*	I(1)

		Critical Values			
Significance level	1%	-3.66	-4.28	-3.67	-4.29
	5%	-2.96	-3.56	-2.96	-3.56
	10%	-2.62	-3.21	-2.62	-3.21

*Note: *, **, and *** represent significance at the 1%, 5% and 10% levels, respectively.*

Cointegration Test

The next procedure to find out whether there is a long – run relationship between inflation and financial development or not. Since all variables in this study are not integrated of the same order, they are I (1) and I(0), we cannot apply the traditional cointegration approaches that were provided by Engle and Granger (1987), Johansen and Juselius (1990) and Johansen (1992), since they should be integrated of the same order I(1). Therefore in this situation the best approach to apply for cointegration test is autoregressive distributive lag model (ARDL) which was developed by Pesaran et al. (2001). The ARDL bound testing approach is considered more suitable and it provides better results for small sample size (Haug, 2002).

In order to proceed with the ARDL bounds testing approach, optimal lag length needs to be determined.

TABLE 4. LAGLENGTH SELECTION CRITERIA

lag	LR	FPE	AIC	SC
0	NA	2.01e-08	-6.37	-6.18
1	184.10*	2.86e-11*	-12.94*	-11.99*
2	15.63	4.24e-11	-12.61	-10.92
3	13.76	6.53e-11	-12.37	-9.92

Table (4) implies that the optimal lag order is 1. The results of the ARDL bounds testing approach are presented in table (5) indicating that the computed F-statistic (5.66) exceeds upper critical bound (5.61) at 1% level of significance. This finding supports that

contegrating relationship exists and confirms the stable long-run relationship between the variables. Examining the marginal impacts of inflation, economic growth and trade openness on financial development comes next. Therefore, the long-and short-run relations were estimated based on Schwarz Bayesian Criterion (SBC) and thus the ARDL (1, 0, 0, 1) model has been adopted.

TABLE 5. ARDL BOUNDS TEST FOR THE EXISTENCE OF COINTEGRATION

F- Statistic	1% Critical value		5% Critical value		10% Critical value	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F (LFD| LCPI, LGDP, LOPEN) = 5.66	3.81	5.12	2.85	4.05	2.42	3.57

Notes: Computed F-statistic (Wald test) = 5.66. The critical values are obtained from Pesaran et al. (2001), Table CI (III), p. 300.

Long-and short-run analyses

As mentioned above, the long-and short-run relations were estimated based on Schwarz Bayesian Criterion (SBC). Table (6) shows the results of long-run relationship between financial development (LFD) and its explanatory variables. Results show that there was a statistically significant long-run negative relationship at 1% level between inflation and financial development in Saudi Arabia. The results also indicated that economic growth has statistical significant positive impact on the financial sector development at 1% level. Finally, there was a statistically significant negative impact of trade openness on financial sector development.

TABLE 6. ESTIMATES OF THE LONG-RUN COEFFICIENTS BASED ON ARDL MODEL BY SBC-FINANCIAL DEVELOPMENT EQUATION

Variables	Coefficients	t-ratio	P- value
LCPI	-2.65	-4.04*	[.000]
LGDP	2.16	7.26*	[.000]
LOPEN	-.769	-2.51**	[.019]
Constant	-10.90	-8.18*	[.000]

*Note: Dependent variable is LFD. * Significant at 1%, ** significant at 5%. *** Significant at 10%.*

Table (7) shows the short-run results. Including the lag of financial development ((DLF (-1)) which measures the impact of previous financial sector's policies on financial development. As seen in table (7) there is statistically significant positive impact at 1% level of previous financial sector's policies on financial development. This confirms that improved financial sector policies in previous period will help to develop financial sector in current period in Saudi Arabia. There was a statistically significant negative short-run impact of inflation on financial development at 1% level. There was also statistically

TABLE 7. ERROR CORRECTION REPRESENTATION FOR THE SELECTED ARDL MODEL – SELECTED BASED ON SBC (1, 0, 0, 1)

Variable	Coefficients	t-ratio	P- value
Constant	-5.82	-3.53*	[.002]
DLFI(-1)	0.46	3.46*	[.002]
DLCPI	-1.41	-3.55*	[.001]
DLGDP	1.15	3.77*	[.001]
DLOPEN	-0.98	-4.30*	[.000]
DLOPEN(-1)	0.57	2.77**	[.010]
ECM(-1)	-0.53	-3.96*	[.001]
R-square	0.94		
DW	1.88		
Serial Correlation	0.166		[.683]
Functional Form	0.056		[.812]
Normality	1.57		[.455]
Heteroscedasticity	1.53		[.216]

*Note: * Significant at 1%, ** significant at 5%. *** Significant at 10%.*

significant positive impact of economic growth on financial development at 1% level. The effect of trade openness on financial development was statistically significant negative at 1% level. Finally, the error correction (ECM (-1)) coefficient estimated at (-.53375) is highly significant at 1% level and has the correct sign indicating a high speed of convergence to equilibrium. The results show that any change in the short-run towards long-run is corrected by 53% per year in the development of financial sector. Finally, Diagnostic tests for this model are provided in table (7).

CONCLUSIONS

This paper has examined the relationship between inflation and financial sector performance in Saudi Arabia in the short-and long-run for the period of 1982-2013. Since all variables in this study were not integrated of the same order I (1) or I (0), the traditional cointegration approaches cannot be applied. Therefore, the best approach to apply for cointegration test was autoregressive distributive lag model (ARDL) which was developed by Pesaran et al. (2001). Long- and short-run results show that inflation has significant negative effect on the financial sector development in Saudi Arabia. In other word, high inflation rate reduces the efficiency of financial sector performance. Therefore, economic decision-makersmust take an appropriate action in relation to fiscal and monetary policies to curb rising inflation. On the other side, previous financial sector's policies and economic growth have played major roles in improving the performance of financial sector development.

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