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FINANCIAL ECONOMICS | RESEARCH ARTICLE

The impact of inflation on the financial sector development: Empirical evidence from Jordan

Khaled Batayneh^{1*}, Wasfi Al Salamat² and Mohammad Q.M. Momani²

Abstract: In any economy, the financial sector plays a fundamentally important role in achieving economic growth and thus achieving sustainable economic development. Therefore, interest in this sector and the improvement of its performance is considered a strategic goal for any country. Accordingly, this study aims to analyze the short- and long-run impacts of inflation on the development of this sector on the Jordanian economy for the period from 1993 to 2018. To do so, the study uses an auto-regressive distributed lag bound testing approach, which is considered an advanced analytical model. Empirical findings confirmed that there is a statistically significant long- and short-run negative effect of inflation on financial sector development. On the contrary, there is a statistical significant long- and short-run positive impact of economic growth on financial sector performance. In addition, results confirmed that there is a positive support of the previous financial sector policies on financial sector performance in the current period.

Subjects: Economic Theory & Philosophy; Macroeconomics; Banking

Keywords: Financial Sector Development; Inflation; ARDL Approach; Cointegration; Jordan

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PUBLIC INTEREST STATEMENT

Jordanian economy is small open economy with limited resources and has faced many challenges and risks have been created and produced by political and economic conditions in neighbors. Despite challenges, its financial sector has witnessed stability. It has remained strong and stable because of the government and the Central Bank policies. Banking sector is characterized as a solid and sound sector that is generally able to withstand risks and shocks as a result of its enjoyment of high levels of capital and comfortable levels of liquidity and profitability. This paper aims to investigate the impact of inflation on financial development in Jordan using (ARDL) econometric technique. This subject has been researched in many countries but not in Jordan. This paper confirms that high rates of inflation deteriorates financial sector performance, but on the contrary economic growth and financial sector policies lead to improve the performance of financial sector in Jordan.

1. Introduction

The financial sector is the main source of financing productive economic projects in any economy in the world. It plays a major role in the functioning of the economy through financial intermediation. Simply, the role of financial sector lies between savers and borrowers: it takes money from savers (in the form of deposits) and lends it to those who wish to borrow, such as companies, governments, or individuals. The financial sector promotes economic growth through capital accumulation and technological progress by increasing the saving rate, providing information about investment, and improving capital allocation. Numerous studies indicate that the development of financial sector plays an important role in economic development, such as (Bose & Cothren, 1996, 1997; Saint-Paul, 1992). They have introduced an endogenous growth theoretical model to clarify how the development of financial markets eases informational frictions in financial markets, enhances the economy's efficiency of resource allocations, and thereby fosters economic growth.

The development and improvement of the financial sector also stimulates the growth of small and medium-sized enterprises (SMEs) by giving them access to finance. One of the characteristics of small and medium companies is that they are labor intensive and create more jobs than large companies, which contributes significantly to economic development in emerging economies.

Studies have found that the financial sector development has a positive significant effect on economic growth (Jung, 1986; Roubini & Sala-I-Martin, 1992; King & Levine, 1993a ; King and Levine, 1993b; Pagano, 1993; Levine & Zervos, 1996, 1998). Therefore, the interest in developing the financial sector and improving its performance is a strategic and important goal for any country, especially emerging economies.

So, achieving high economic growth and the consequent achieving sustainable economic development that reflected positively on various aspects of life (economic, social, political, and others) is the most important and main goal of economic and political decision makers in the world. Consequently, achieving this goal comes by providing the necessary financial resources for the process of growth and economic development and by properly employing these resources (investments) in healthy productive projects that ultimately benefit all members of society by providing job opportunities for them and achieving economic well-being. The main source of funds (investments) for these economic projects comes mainly from commercial banks and other related financial institutions (the financial sector). Therefore, it is necessary to improve and develop the performance of these financial institutions so that they can play their role effectively and distinctively.

In addition to some administrative and institutional laws set by the financial institutions and government, which in turn may contribute to the improvement of the performance of financial sector, there are some macroeconomic variables that could have some effect on the performance of the financial sector. One of these major macroeconomic variables is inflation. The economic literature has shown the existence of a negative relationship between inflation and the performance of the financial sector and the reflection of this effect on economic growth. According to Huybens and Smith (1999) an increase in inflation rates have negative impact on financial sector performance which in turn hurt economic growth in the long-run. In addition, Boyed and Champ (2003) confirm that inflation harms economic growth through declining financial sector performance, especially by harming the operation of financial markets. Boyd et al. (2001) highlight the theoretical literature on credit market frictions, finance, and growth delivers empirically testable implications regarding the consequences of higher long-run or permanent rates of inflation as follows: (1) higher rates of inflation are associated with greater inflation and stock return variability. (2) Higher inflation implies less long-run financial activity. In economies with high inflation, intermediaries will lend less and allocate capital less effectively, and equity markets will be smaller and less liquid. (3) Several inflation thresholds may characterize the relationship between inflation and financial sector conditions. Most prominently, once inflation exceeds a critical level, incremental increases in the (long-run) rate of inflation may have no additional impact on financial sector activity. (4) Higher long-run inflation implies lower long-run levels of real activity and/or slower long-run growth rates. Moore (1986), Choi et al. (1996), and Azariadas and Smith (1996) they pointed out

that the rise in inflation to certain levels reduce returns on savings, which in turn leads to a decline in number of savers and savings alike; therefore, credit becomes scarce in such an economy.

The aim of this study is to examine the impact of inflation rate on financial sector development in Jordan. The impact of inflation on the financial sector performance might not have been studied efficiently in Jordan. So, the study tries to examine long- and short-run impact of the inflation on financial sector development by applying the autoregressive distributed lag (ARDL) bound testing approach suggested by Pesaran et al. (2001) using yearly collected data for the duration 1993 to 2018. The rest of the paper is structured as follows: Section 2 A brief overview of inflation rate and the financial sector in Jordan, Section 3 represents the literature review, Section 4 describes data and the econometric methodology, and Section 5 reports the study results. The final section, Section 6, presents the conclusions and policy implications.

2. A brief overview of inflation rate and the financial sector in Jordan

The Jordanian economy is considered as small and open economy; in which it has trade relations with many world countries. Jordan is characterized by limited economic and natural resources; its economy depends mainly on the services sector, tourism, and on some extractive industries such as phosphate and potassium, as well as on some agricultural crops. But it lacks energy sources such as oil and natural gas, which are enter in the process of production in many sectors such as industrial, agricultural, production of electricity and other sectors. Before 2003, Jordan was depending on the flow of oil from Iraq, which it was obtaining it at a very cheap prices compared to the international prices. Therefore, if we look at the inflation rates before 2003, we notice that they were low. The average rate of inflation, based on a GDP deflator measurement was approximately 2% during the period between 1994 and 2003. But for the period between 2003 and 2008, the average inflation rate was approximately 6.7%, where the inflation rate in 2008 reached approximately 18% compared to 2.2% in 2003. This rise in inflation rate was attributed to several factors, including both external and internal. As for the external factors: cessation of Iraqi oil flow after 2003 as a result of the war and the subsequent instability in Iraq, also, the displacement of a large number of Iraqis to Jordan, which led to an increase in demand for goods and services, especially residential buildings which caused an increase in the prices and push inflation rate up, in addition to that the negative impact of the global financial crisis in 2007–2008 on economic growth worldwide and its impact on the crude oil prices and hence increase the prices of other products. As for the internal factors, they included the lifting of subsidies on oil derivatives and the expansionary financial policies undertaken by Jordan government during this period. As for the period between 2009 and 2014, the average inflation rate was approximately 5%. Starting from 2015 until 2018, the inflation rate began to decline gradually until it reached nearly 2% in 2018 (Central Bank of Jordan, Statistical database). It is noted, according to the annual reports of the Central Bank of Jordan for the years 2008 and 2009, that the inflation rates (GDP deflator index) for these years were 18% and 5%, respectively, as they had a role in the decline in growth rates in the volume of credit to private sector. The growth rate in the credit decreased from 13% to 1.4% in 2009. The high inflation rate in 2008 was mostly caused by the rise in the prices of Jordanian imports as a result of the global financial crisis. (Central Bank of Jordan, 2008 and 2009).

On the other side, the financial sector in Jordan consists of banks, insurance companies, money exchange companies, brokerage companies and various financial services, microfinance companies, financial leasing companies, multifinance companies, in addition to small- and medium-sized enterprises financing companies. The financial sector in Jordan is highly dependent on banks because of their effective and key role in financing economic activities and projects in the country. In 2018, the value of its assets amounted to nearly 48 billion Jordanian dinars, which constituted 93.4% of the total assets of the financial sector, in addition to 161.9% of the gross domestic product, compared to 165.5% for the year 2017. With regard to credit facilities, we note that the credit facilities portfolio is still the largest component of banks' assets, as it constituted 51.3% at the end of 2018, compared to 50.6% for the year 2017. The credit facilities amounted to about 25.7 billion dinars at the end of 2018, with a growth rate of 5.3%, compared to a growth rate of 8% in 2017, where credit facilities accounted for 85.6% of GDP in year 2018, compared to 86.1% in year 2017. As for the distribution

of credit facilities, they came as follows: individuals accounted for 38.8% of the total credit facilities, for large companies by 37.7%, the government and the public sector by 9.7%, small- and medium-sized enterprises (SMEs) by 9.2%, and commercial real estate by 4.6%. As for the funds held by banks (liabilities), they came as follows: the first source is deposits, which is the main source. It amounted to 33.8 billion dinars, which counted by 69.7% of the total sources of funds for 2018. The second source is shareholders' equity, amounting to 6.2 billion dinars for the year 2018. The third source is bank deposits, which contributed 8.5% of the total sources of bank funds for the year 2018.

As for the other components of the nonbanking financial sector (non-banking financial institutions), we also review them briefly. The insurance sector, which consists of 24 insurance companies, is considered one of the basic components of the financial sector in Jordan, as its role is to protect individuals and property from risks, in addition to collecting and developing national savings to support economic development. The contribution of this sector's premiums amounted to 2% of the GDP in 2018. The total assets of insurance companies amounted to 960 million dinars at the end of 2018, compared to 948 million dinars in 2017. Nonbank financial institutions that include (microfinance companies, financial leasing companies, multifinance companies, small- and medium-sized enterprises financing companies). Nonbank financial institutions play an important economic role by granting credit to groups that have difficulty accessing banks. The number of these companies is 43. The total assets of these institutions amounted to about 967 million dinars, while the volume of the loan portfolio amounted to about 822 million dinars (Central Bank of Jordan, Financial Stability Report, 2018).

In general, the Jordanian financial sector is characterized by strong solidity that makes it flexible and capable of facing economic problems and challenges to a large extent. The rational policies of the Central Bank of Jordan helped in protecting the financial sector to stand against economic shocks: "The Central Bank has historically maintained monetary and banking stability by controlling inflation rates, stabilizing foreign exchange rates, and preserving the resilience of the banking system," says CBJ Governor (Fariz, 2018) and adds: "Our view is that the growth and success of the Jordanian banking sector is a key driver for the economic development of the country as a whole."

The Financial Stability report issued by Central Bank of Jordan in 2017 (CBJ) stated that the financial sector represents about 20% of Gross Domestic Product (GDP), with commercial banks representing the biggest participation in the industry. In its report issued in July 2017 on Jordan, the International Monetary Fund (IMF) noted that by the sheer size of their balance sheet, with total assets amounting to 176% of GDP in 2016, commercial banks play the most important role in Jordan's financial sector.

"Jordan 2025 targets raising the percentage of bank loans given to SMEs from 9% in 2014 to 14% by 2025, while the credit bureau is targeted to reach 55% of the adult population by 2025," as Fariz declared. In particular, CBJ has increased loan guarantees for SMEs and entrepreneurs through the restructuring of the Jordan Loan Guarantee Corporation, and increasing funds available to them through the provision of CBJ funding programs in certain industries and the establishment of a fund to support SME start-ups in partnership with the World Bank.

3. Literature review

In view of the great positive role that the financial sector plays in influencing various economic sectors, and its role in the process of economic growth and development, many theoretical and applied studies have appeared to discuss the relationship of economic variables that may be related to or affect the performance of this sector. These studies varied in terms of the selection and nature of variables, and in terms of the methodology of the statistical means used in the analysis. One of these variables that received a lot of attention among researchers and decision makers is the inflation rate. Many researchers and those interested have studied the relationship between inflation and the financial sector, using the time series method, cross-sectional data and panel data. This section presents some of these studies and their results. The higher rate of inflation leads to decrease the real value of long-term returns through imposing cost representing in losses that reducing the real value of cash balances. Furthermore, the real value of bank's individuals' deposits and projects as well as the monetary reserves of the banking

system will be reduced as a result of high inflation and hence reduces financial depth (Khan (2002:13). The higher rate of inflation also contributes in limiting the signing long-term financial contracts as well as reducing the enthusiasm of intermediary financial institutions to provide long-term financing for the formation of physical capital and reducing the desirability of lenders and borrowers to sign long-term contracts which including cash balances. Increasing inflation also increases the cost of maintaining liquid cash balances which leads individuals and projects transferring money into real commodities, which results in a decrease in the ratio of money supply to GDP, which is an important determinant of banking sector performance. On the other hand, higher inflation leads to an increase in information and transaction costs, which impedes the achievement of the economic development process. For example, the instability of inflation rate makes it difficult to predict costs and profits and the high cost of such forecasting, which leads to the inability of individuals and projects to develop future plans. The inability to accurately predict the inflation rate also causes investors to be reluctant to sign future contracts, which limits the establishment of new projects (P. L. Rousseau & Wachtel, 2000:3). The high rate of inflation is accompanied by various methods of financial restraint used by governments in order to impose restrictions on the financial sector, with the aim of protecting certain sectors within the national economy. Examples of these methods include the following: setting maximum limits on interest rates on deposits and loans, setting special standards for regulating credit granted to certain economic activities, and imposing taxes on profits of intermediary financial institutions (P. L. Rousseau and Wachtel (2000:4), Wang (1999:7–6). According to theoretical studies done by Moore (1986), Azariadas and Smith (1996) and Choi et al. (1996), the rise in inflation to a certain high level leads to a decrease in the returns on savings, which contributes to reducing in both the volume of savings and the number of savers. Accordingly, the rise in inflation leads to reduction in the size of credit in an economy.

Lots of empirical studies in recent decades in developed and emerging market economies done to examine the relationship between inflation and financial sector development have been based on time series data, cross-sectional data, and panel data. The results suggest that there is a strong statistically significant negative relationship (correlation) between the two variables. A monetary growth model result presented by Huybens and Smith (1998, 1999) assures that inflation is negatively correlated with the financial market.

On the contrary, using a cross-sectional model, English (1999) investigates the impact of inflation on the financial sector's size. The study's empirical estimations indicate that inflation has positive impact on the 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. Moreover, Boyd et al. (2001) use panel data for 100 different countries including the variables banking sector activity, equity market size, equity market liquidity the rates of return, to assess the predictions about the mechanisms by which predictable increases in the rate of inflation interfere with the ability of the financial sector to effectively allocate resources. The evidence indicates that there is a significant negative relationship between inflation and both banking sector development and equity market activity. Further, the relationship is nonlinear. As inflation rises, the marginal impact of inflation on banking lending activity and stock market development diminishes rapidly. Moreover, they find evidence of thresholds. For economies with inflation rates exceeding 15%, there is a discrete drop in financial sector performance. Finally, while the data indicate that more inflation is not matched by greater nominal equity returns in low-inflation countries, nominal stock returns move essentially one-for-one with marginal increases in inflation in high-inflation economies.

P. Rousseau and Wachtel (2002) manipulate rolling regression technique for 84 countries to examine the interactions between inflation and financial development that affect economic growth. Empirical results indicate that financial depth has a significant positive effect on growth only when inflation falls below a threshold of about (6%)–(8%). The results also indicate that inflation has a negative effect on financial depth when the five-year average inflation rate was below about (15%)–(20%).

Lee and Wong (2005) apply a regression model to examine the relationship between inflation threshold, financial development and economic growth for Taiwan and Japan. Their empirical results suggest that financial development promotes economic growth when the inflation rate is low and moderate. Khan et al. (2001) includes various variables for large cross-countries sample such as the inflation rate, the share of public consumption to GDP, the degree of openness and the GDP per capita to examine their impact on financial activity. Results indicate that low inflation rate has a weak positive effect on financial activity, but high rate of inflation has a negative effect.

Naceur and Ghazouani (2005) use GMM methodology to examine the influence of inflation on the financial sector development for 11 MENA region countries. The findings indicate a significant negative impact of inflation on financial performance regardless of the rate of inflation. Results also show inflation is harmless to stock market and banking sector performance. Boyed and Champ (2003) examine the relationship between inflation and financial market performance by using cross-country data. Their empirical results indicate that inflation rate has negative effect on bank profitability, banking industry and real return on financial assets. Their suggestion indicates that inflation leads to a decline in financial sector performance, which in turn harms economic growth.

Kim et al. (2010) analyze the short- and long-run impact of inflation on financial development for 87 countries by using Pooled Mean Group estimator method. The results show positive impact of inflation on financial development in the short-run but negative long-run impact. Dong-Hyeon and Shu-Chin (2010) apply ARDL econometrics technique for 87 countries to investigate the short- and long-run relationship between inflation and financial sector development. The study includes variables such as: cash debt, credit to private sector and banks assets as proxy of financial sector. Empirical results confirm that the relationship is positive in the short-run but negative in the long run.

Keho (2009) tries 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). The study analysis is based on bound testing approach developed by Pesaran et al. (2001) and Granger causality test. The results indicate that no long-run relationship exists in six countries, but it exists in one country. The study also detects that financial development caused inflation in five counties and inflation rate causes financial development in two countries.

Bittencourt (2011) uses time series data and panel time series data to investigate the impact of inflation on financial development in Brazil. Detrimental effect of inflation on financial sector development is found. Emmanuel (2012) uses three different types of econometric techniques such as: a bivariate ARDL, a bivariate VAR and a multivariate NLLS to analyze the impact of inflation on financial development in Ghana. Study results indicate the following: first, a positive relationship between inflation and financial development in the short run. Second, no long-run relation between the two variables. Third, negative a unidirectional causality running from inflation to financial development. Forth, threshold persist is observed in the inflation financial development relationship. The threshold estimation is between 11 and 16% inflation rates.

Wahid et al. (2011), Odhiambo (2012), and Ozturk and Karagoz (2012) apply bounds testing approach (ARDL) and Error Correction Model (ECM) to test the effects of inflation on financial sector development. Their findings confirm that there is a negative short- and long-run effect of inflation on financial sector development, suggesting that inflation reduces the efficiency of the performance of the financial sector.

Alimi (2014) applies ARDL Bounds Testing Approach to examine the long run and short run relationships between inflation and the financial sector development in Nigeria over the period between 1970 and 2012. Results indicate that inflation presents deleterious effects on financial development.

Almalki and Batayneh (2015) apply autoregressive distributed lag (ARDL) bound testing approach suggested by Pesaran et al. (2001) to examine the long-run relationship between the inflation rate and financial sector development. Results confirm that there is a statistically significant long-and-short run negative relationship between inflation and financial development. Also, the result confirms that there is a statistically significant positive impact of previous period financial sector’s policies on financial sector development in the current period.

Recently, Zermeño et al. (2018) have applied panel quantile regressions to examine the effects of inflation on financial sector performance for 84 countries for the period from 1980 to 2010. The results indicate a consistently negative and nonlinear effect of price increases on financial variables; in particular, it is statistically significant in the full sample of countries, significant in developing countries, and insignificant in developed countries. Abu Asab and Al-Tarawneh (2018) applied threshold model to examine the impact of inflation on investment in Jordan. Their result confirmed that investment is shrunk by inflation when inflation rate reaches a threshold of 10%, and so to improve investment the inflation rate should remain below 10%.

This paper highlights the nonlinear relationship between inflation and investment in Jordan. Applying a threshold model over the period 1980–2016, the results reveal that investment is retracted by inflation when inflation rate reaches a threshold of 10%. This suggests that inflation rates should remain below 10% to sustain and improve investment levels.

4. The empirical framework

4.1. Data

This study employs annual data obtained from the Central Bank of Jordan covering the period from 1993 to 2018. This period was chosen based on the data availability, especially the lack of time series data for the financial sector (credit to private sector) before 1993. The economic variables used in this paper are: inflation rate (DEF) proxied by GDP deflator; real gross domestic product (RGDP), which measures economic growth in the economy. Financial sector development (CTPS) proxied by credit to private sector, and real total trade (OPN), calculated as (real total exports and real total imports) measured as percentage of GDP. Total trade measures the degree of the openness of the Jordanian economy with the rest of the world economy. To avoid the problem of heteroscedasticity, all data set included in this paper were transformed to natural logarithms. So, we can specify our long-linear model as follows:

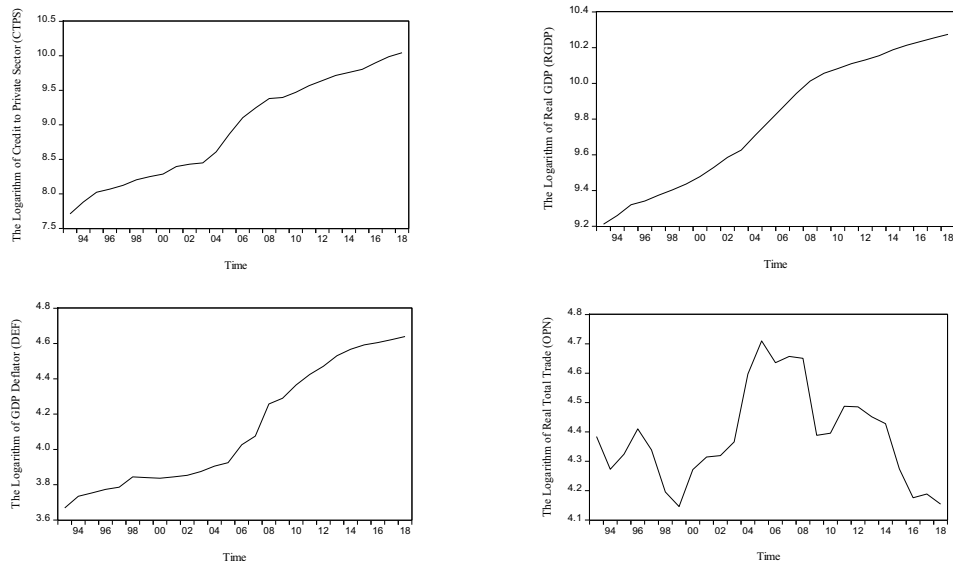
$$\text{LnCTPS}_t = a_1 + a_2 \text{LnCTPS}_{t-1} + a_3 \text{LnDEF}_t + a_4 \text{LnRGDP}_t + a_5 \text{LnOPN}_t + \mu_t \tag{1}$$

Where, μ_t is white noise error term.

The basic descriptive statistics for the four variables are presented in (Table 1), and are depicted in (Figure 1).

Table 1. Basic Descriptive Statistics of the Sample Data Used in the ARDL Model, 1993–2018				
Variables	Mean	Min.	Max	St.Dev
LnCTPS	8.935	7.710	10.043	0.753
LnRGDP	9.791	9.211	10.274	0.363
LnDEF	4.119	3.668	4.639	0.342
LnOPN	4.385	4.145	4.710	0.163

Figure 1. Plot of the Sample Data Used in the ARDL Model, 1993-2018



4.2. Methodology

To check whether there is a long-run relationship between all variables included in this study or not, the researchers applied a more advanced econometric technique instead of using traditional ones such as Engle and Granger (1987), Johansen and Juselius (1990) and Johansen (1992) techniques. These above econometric techniques require that all variables should be integrated at the same order I(0) or I(1). Accordingly, this paper uses autoregressive distributed lag (ARDL) bound testing technique which was suggested by Pesaran et al. (2001). This technique is more appropriate than the other traditional ones for several reasons. First, the approach is used irrespective of whether the time series data are integrated of I(0), I(1) or mix of I(0) and I(1). Second, unrestricted error correction model (UECM) can be derived from the ARDL bounds testing through a simple linear transformation. This model has both short and long run dynamics. Thirdly, ARDL approach is superior and provides compatible results for small sample size (Haug, 2002).

The ARDL bounds model can be written as follows:

$$\Delta \ln CTPS_t = \alpha_1 + \alpha_2 \ln CTPS_{t-1} + \alpha_3 \ln DEF_{t-1} + \alpha_4 \ln RGDP_{t-1} + \alpha_5 \ln OPN_{t-1} + \sum_{i=1}^n \beta \Delta \ln CTPS_{t-i} + \sum_{i=0}^n \gamma \Delta \ln DEF_{t-i} + \sum_{i=0}^n \delta \Delta \ln RGDP_{t-i} + \sum_{i=0}^n \rho \Delta \ln OPN_{t-i} + \mu_t \quad (2)$$

Where, Δ is first difference operator, $\ln CTPS$ is natural long of financial sector proxied by credit to private sector, $\ln DEF$ is natural long of GDP deflator index, $\ln RGDP$ is real gross domestic product, $\ln OPN$ is natural long degree of trade openness proxied by real total trade (exports + imports) as a percentage of GDP, and μ_t is white noise error term. The test is of no cointegration in the long-run using ARDL model involves performing the F test on the null hypothesis: $H_0: \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ against the alternative hypothesis of $(H_1: \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq 0)$.

The existence of long-run relationship (cointegration) among variables is based on the result of F-Bound test. If the computed F-statistic value is greater than upper critical bounds value, then hypothesis of the long-run relationship (cointegration) existing among variables is accepted. If the computed F-statistic value is less than the lower critical bounds value, then hypothesis of no long-run relationship (no cointegration) cannot be rejected. If the computed F statistic value comes between lower and upper critical value, then the decision about cointegration becomes inconclusive.

On the other side, for the short-run analysis, the study uses the unrestricted error correction version of ARDL model by estimating the following equation:

$$\Delta \text{LnCTPS}_t = \alpha_1 + \sum_{i=1}^n \beta \Delta \text{LnCTPS}_{t-i} + \sum_{i=0}^n \gamma \Delta \text{LnDEF}_{t-i} + \sum_{i=0}^n \delta \Delta \text{LnRGDP}_{t-i} + \sum_{i=0}^n \rho \Delta \text{LnOPN}_{t-i} + \lambda \text{ECM}_{t-1} + \mu_t \tag{3}$$

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

5. Empirical results and analysis

5.1. Unit root test

To proceed further, we need to check the stationarity for each variable included in this study. Therefore, unit root test needs to be applied to check for stationarity. The augmented Dickey-Fuller (AD-F) and Phillips-Perron unit root tests were applied; the results are presented in (Table 2). Results show that all variables are non-stationary in their level but they are stationary in first difference, which means all variables are integrated of order one, or I (1). Since, the results show that all variables are not integrated of order greater than one, and since our sample size is small, therefore we should adopt ARDL approach to test for long run relationship between the variables by applying ARDL cointegration test.

5.2. Cointegration test

Autoregressive Distributed Lags (ARDL) bounds testing approach is applied to test for long-run relationship (cointegration). The selection of the lags order in ARDL model was based in the minimum value of SBC. The estimated results were based on ARDL (2020). (Table 3) reports the long-run relationship between study variables. Results confirm the existence of long-run relationship among variables. Since, the computed value of F-statistic is greater than upper bound. The value of F-statistic is 7.437 and the value of upper bound is 7.063. The result is significant at 1 percent level. Since, the estimations of the unrestricted error correction version of ARDL model is based on the first differences of variables, we will include a plots and descriptive statistics for the four variables in their first difference. (Table 4) provides a descriptive statistic for the variables in their first differences, and the first differences variables are depicted in (Figure 2).

Table 2. Unit Root Tests Results

Variables	ADF		PP		Level of Integration
	Level				
	Intercept	With Trend	Intercept	With Trend	
LnCTPS	-0.780	-2.737	-0743	-1.721	I(1)
LnRGDP	-1.157	-1.642	-1.141	-0.845	I(1)
LnDEF	-0.250	-2.425	0.021	-1.604	I(1)
LnOPN	-1.247	-0.799	-1.483	-1.357	I(1)
	First Difference				
ΔLnCTPS	-3.158**	-3.315***	-3.181**	-3.433**	-
ΔLnRGDP	-2.885***	-3.454***	-3.146**	-3.415**	-
ΔLnDEF	-4.532*	-4.416*	-4.182*	-4.210**	-
ΔLONPN	-3.869*	-5.013*	-3.794*	-4.153**	-

Notes: *, **, and *** indicate significance 1%, 5%, and 10% respectively.

Table 3. ARDL Bounds Test for the Existence of Cointegration

F- Bounds Test	1% Critical value		5% Critical Value		10% Critical value	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F- Statistic = 7.437	5.333	7.063	3.71	5.018	3.008	4.15

Note: Computed F-statistic (Wald test) = 7.437. The critical values are obtained from Pesaran et al. (2001), Table CI (III), p. 300, case III: unrestricted intercept and no trend with n = 50.

Table 4. Basic Descriptive Statistics of the Sample Data Used in the Unrestricted Error Correction Version of ARDL,(first difference), 1994–2018

Variables	Mean	Min.	Max	St.Dev
$\Delta \ln \text{CTPS}$	0.093	0.014	0.258	0.063
$\Delta \ln \text{RGDP}$	0.042	0.019	0.082	0.021
$\Delta \ln \text{DEF}$	0.038	-0.004	0.181	0.039
$\Delta \ln \text{OPN}$	-0.009	-0.262	0.231	0.102

Note: Δ denote to the first differences of the variables.

5.3. Long- run analyses

Next step is to analyze the long-run impact of inflation, economic growth and trade openness on financial sector development. Table 5 reports these impacts. Results confirm that economic growth and inflation rate have a significant impact on financial sector development. The impact of the long-run economic growth on the performance of financial sector is positive and significant at 1 percent level in which an increase by 1% in economic growths leads to improvement in financial sector performance by 1.5%.

The long-run impact of inflation on financial sector development is significantly negative at 1 percent level in which an increase in inflation rate by 1% worsens the financial sector performance by 0.56%. The negative impact of inflation on financial sector worsens the performance of the sector in terms of lowering the amount of loans to private sector and therefore decreases the amount of investment in an economy which in turn slows the economic growth. As overall prices

Figure 2. Plot of the First Difference in the Sample Data, 1994-2018

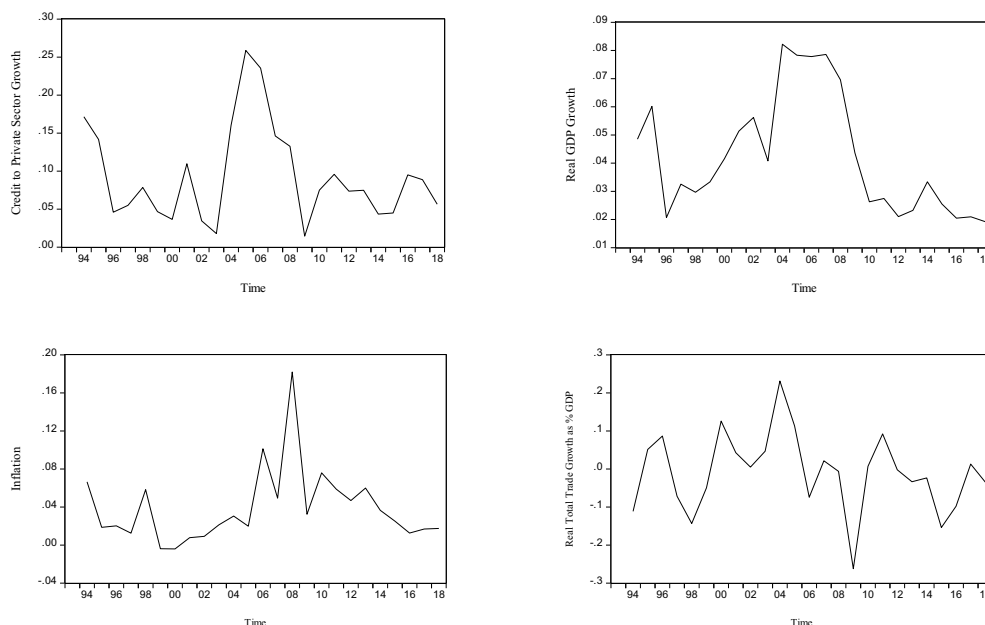


Table 5. Estimates of the Long-Run Coefficients Based on ARDL Model by SBC (2,0,2,0). Dependent variable is NLCTPS

Variable	Coefficients	t-ratio	P-value
LnRGDP	1.562	9.617*	0.000
LnDEF	-0.566	-3.93*	0.004
LnOPN	-0.276	-0.225	0.825
INTERCEPT	-8.601	-10.218*	0.000

Note * Significant at 1%.

increase, people’s purchasing power declines, which forces them to save less money (which in turn decreases the amount of savings in banks). This reduces the amount of money stocks at banks and reduces loans given to the private sector and individuals, which reduces investment. This finding is consistent with Abu Asab & Al-Tarawneh, (2018). As result of all stated factors, the financial sector’s performance will deteriorate.

Finally, there was not any significant relationship between trade openness and financial sector development.

5.4. Short-run analysis

Short-run effect of inflation, economic growth and trade openness on the financial sector development is reported in Table 6. Results show that inflation has a negative effect on the financial sector, and it is significant at 5% level in which an increase in inflation rate by 1% worsens the performance of the financial sector by 0.51%. This positive effect consistent with theoretical studies done by (Azariadas & Smith, 1996; Choi et al., 1996; Moore, 1986). Also, it is consistent with empirical work done by (Alimi, 2014; Almalki & Batayneh, 2015; Boyd et al., 2001; Boyed & Champ, 2003; Naceur & Ghazouani, 2005; Odhiambo, 2012; Ozturk & Karagoz, 2012; P. Rousseau & Wachtel, 2002; Wahid et al., 2011; Zermeño et al., 2018).

Table 6. Error Correction Representation for the Selected ARDL Model—Selected Based on SBC (2, 0, 2, 0). Dependent Variable is DN LCTPS

Variable	Coefficients	t-ratio	P-value
DLnCTPS (-1)	0.696	4.376*	0.000
DLnRGDP	1.144	3.857*	0.001
DLnDEF	0.419	1.491	0.154
DLnDEF (-1)	-0.511	-2.544**	0.021
DLnOPN	-0.020	-0.218	0.830
ECM (-1)	-0.732	-3.803*	0.001

Cointegrating equation

$$LCTPS_t = -8.6014 + 1.5624 LRGDP_t - 0.5664 LDEF_t - 0.2765 LOPN_t + \epsilon_t$$

T-Ratio[Prob] -10.21*[.000] 9.61*[.000]-3.39*[.004] -0.22[.825]

R-square	0.798		
Adjusted R-square	0.7105		
DW	1.782		

Residual Diagnostic tests for the estimated model

Serial Correlation of Residuals-LM	0.80027 p-value [.469]		
Normality J-B Value	2.6462 p-value [.266]		
Heteroscedasticity Test of Residuals	1.412 p-value [0.267]		

Notes: * and ** indicate significance 1%, 5%, respectively.

Regarding the short-run effect of economic growth on financial sector development, results show that the effect of economic growth on financial sector performance is positive, and it is significant at 1% level in which an increase in economic growth by 1% leads to an improvement in financial sector performance by 1.1%. This finding is consistent with Almalki and Batayneh, 2015; and Wahid et al., 2011).

For the short-run effect of trade openness on the financial sector, results show a negative effect, but it is not a significant one. Including the lags of dependent variable (which represents financial sector) gives us indications about the previous financial sector policies and their role in improving or worsening the financial sector performance. Results from Table 5 show that 1 lag of dependent variable (financial sector) has a significant positive effect on financial sector performance in current year. This means that the effect of last year policies will improve the performance of financial sector in a current year. The effect is significant at 1% level.

Also, Table 6 reports the estimated lagged of error correction (ECM (-1)). The ECM (-1) measures the speed at which a dependent variable returns to long-run equilibrium after a change in other variables. The coefficient of ECM (-1) is -0.732, and it is statistically significant at 1 percent level. The results show that any change in the short-run towards long-run is corrected by 73.2% per year in the performance of the financial sector. This suggests that it needs 1.4 year to move from short-run to long-run relationship. Finally, Table 6 also shows the cointegrating equation which represents the long-run relationship between independent variables and dependent ones.

The Residual Diagnostic tests for the estimated model such as: Serial Correlation of Residuals-LM, Normality J-B test and Heteroscedasticity test are reported at the bottom of Table 6. The stability tests of ARDL model which are applied to test the goodness of fit for ARDL model such as cumulative sum of recursive residual (CUSUM) and cumulative sum squares of recursive residuals (CUSUMSQ) are shown in Figures 3 and Figures 4. Results confirmed that they performed very well, and the model is stable.

Figure 3. Plot of Cumulative Sum of Recursive Residuals.

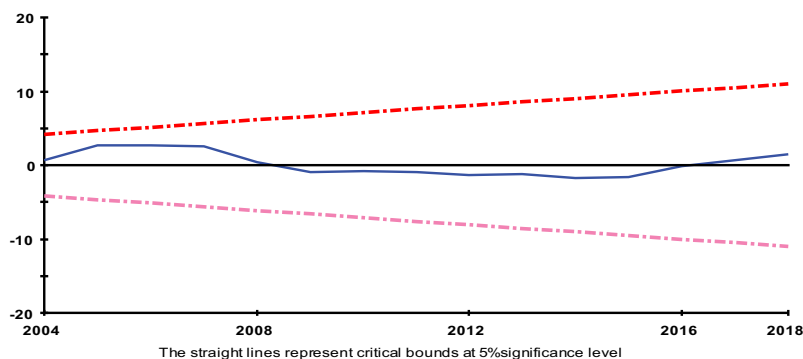
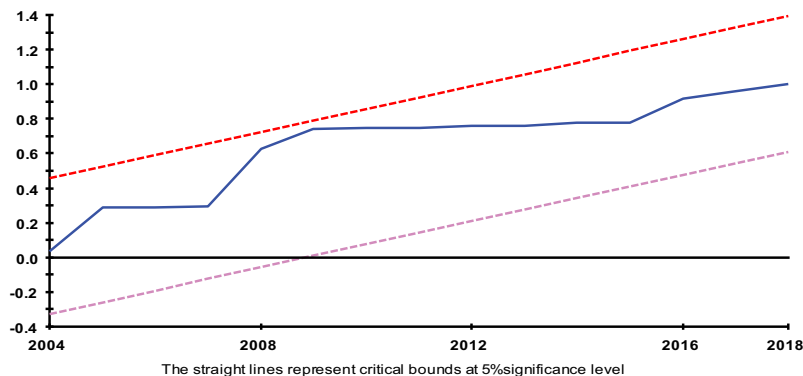


Figure 4. Plot of Cumulative Sum of Squares of Recursive Residuals.



6. Conclusions and policy implications

Many previous theoretical and applied studies dealt with the role of the financial sector and its impact on economic growth, whether in developed or developing countries. Some studies also dealt with the study of the impact of inflation on the performance of the financial sector and its role in the process of economic growth and its reflection on economic development. Some studies have found that the impact of inflation on the performance of the financial sector is negative when inflation rates reach certain levels. This study mainly focused on evaluating the impact of inflation on the performance of the financial sector, using a new applied technique.

The results of this study that were based on ARDL analysis model, confirmed that inflation had negative impact on the performance of the financial sector in both the short and long run. These results were in agreement with the theoretical and empirical economic literature, which confirmed the existence of a negative relationship between inflation and the performance of the financial sector. This might be attributed to the shortage of the volume of savings and the increase in consumers' spending on goods and services as a result of high inflation, which reduces the amount of investments needed for production expansion and limits economic growth. On the contrary, the results showed that the economic growth played a positive role in improving the performance of the financial sector in the Jordanian economy on the short- and long-term levels. Therefore, economic policies that keep inflation rates down and achieve economic growth need to be encouraged by policy makers in order to get better performance of the financial sector in Jordan. In addition, and based on the recommendation of a new study submitted by Abu Asab and Cuestas (2021), Jordan should move to arranging more flexible exchange rates in order to maintain price stability. Future empirical studies may focus on the role of financial sector in achieving economic growth and unemployment rates reduction.

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