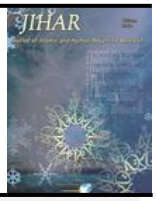

# Examining the Relationship between FDI, Financial Development, Exchange Rate and Inflation in Yemen

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**Abstract**
The aim of this paper is to examine the cointegration among FDI, financial development, exchange rate and inflation in Yemen for the 1990-2014 period. The ARDL bounding the maximum likelihood and also identify the long-run and short-run relationship between the research variables. It is important to highlight these relationships in less developing countries due to low FDI inflows. Overall, the main findings show there is cointegration among FDI and FD, exchange rate, inflation. In the long the results depict there is negative and significant relationship between FDI and FD. The other two independent variables; exchange rate and inflation did not show any meaningful correlation with foreign direct investment as their long run coefficients are not significant. In the short run the results depict there is negative and significant relationship between FDI, FD and EX. The country needs various policies to attract FDI in Yemen. Furthermore, it is also very important to focus on financial development to support FDI inflows in coming years in Yemen.

**Key words**: FDI, financial development, exchange rate and inflation, Yemen.

## 1. Introduction.

Beginning in the mid-1980s, world foreign direct investment (FDI) flows increased rapidly with a growing number of multinational enterprises (MNEs) as the engine of the increased international economic activities. Both industrialised and developing countries are becoming more receptive to FDI flows such that a majority of FDI policy changes in these countries are in the direction of more liberalization of FDI inflows (United Nations, 1992). There are various benefits which FDI economic growth. Various countries have different policies to enhance FDI in order to meet the new economic challenges. In this context, it is important to have affective policies. Many researchers have examined the relationship between FDI and several variables such as brought for economic growth. It is important to design the effective policies in order to achieve high economic growth, trade and energy consumption (Apergis et al., 2006; Tang et al., 2008; Lee, 2013; Omri, 2014; Tang and Tan, 2014; Bhattacharyaa et al., 2016). Foreign Direct Investment (FDI) becomes a central player in the world

economy and this fact has been approved by numerous economists, as there is a very decisive link between foreign direct investment as well as economic development in the level of developed and developing countries. According to the world investment report issued by (UNCTAD) in 2013, global foreign direct investment has reached 1.35 trillion of US dollar in 2012. Also it is estimated that FDI flows may then reach 1.6 trillion of US dollar in 2014 and 1.8 trillion of US dollar in 2015. Foreign direct investment is an important way to enhance economic efficiency and encourage long-run economic growth. Also it could afford several economic benefits such as generating employment opportunities, boosting sales and government tax revenues and inducing the trade by enhancing the competitiveness of local products and increase the export volume. Additionally, allow technology transfer and management techniques to the host country.

Furthermore, the body of empirical evidence on the more general case of developing countries still remains to be inconclusive, as the results of existing studies are obviously country- and methodology-specific. Most of the existing empirical works, on the other hand, are taint with severe estimation biases as they employ earlier econometric techniques which do not take into account cross-sectional dependency and heterogeneity issues. There is therefore a need for further research on causality

In spite of the fact that Yemen is a country still undergoing a low level of FDI inflows, the Yemeni government has shown considerable interest in attracting FDIs over the past years. The Central Bank of Yemen's (CBY, 2008) report described Yemen as one of the poorest nations in the Middle East, with approximately 35% of its population living below the poverty line and with a GDP of 5.6% as at 2005 because of increased production of oil by 4% in 2004. However, such growth rate decreased to 3.2% and remained at 3.3% in 2007 due to decrease in the production of oil. During the following year, the GDP increased to 3.9% and in 2009, the move towards initiating a new liquefied natural gas project was expected to bring about a greater increase in the production of hydrocarbon. By 2010, the real GDP increased to 7.7% (CBY, 2010) but declined rapidly in 2011 to a lowest level of -12.7%. This could be due to the suffocating political crisis experienced by the Middle East countries. However, there was slight improvement in the real GDP in the following year 2012, 2013 as it increased by 2.4% and 6% respectively (UNCTAD, 2013).

With regards to its macroeconomic stability, Yemen is among the several countries that have launched reformation programs which led to the occurrence of many controversies. This includes the plan to manage the exchange rate floating. The Yemeni exchange rate experienced a dynamic fluctuated in the past twenty years.

The Central Bank of Yemen (CBY) established a floating rate system in 1996 but has an evident preference for the stable Yemeni Rial (Schneider et al., 2007). With regards to the rate of inflation, Yemen is one of the nations that reported the highest price increase in the Middle Eastern region in 2008. More specifically, it reported a high and volatile rate of inflation from 2002 to 2007 (Almounsor, 2010). The government of Yemen has made great efforts via legal framework and promotional campaigns to attract foreign investors. It made its first step in attracting FDI inflows by establishing the Yemeni General Investment Authority in 1992 and passed the Foreign Investment Law. In order to further encourage FDI, a new Foreign Investment Law was also issued in 2002. Additionally, it established a specific center to lower the time required to approve and register investments (UNCTAD, 2009). Despite these concessions, Yemen is still suffering from several economic problems,

and the sluggish of foreign direct investment inflows is one of important problem which need urgent solation. There are many problems government must be resolved, like finding a safe environment for investment. The state must take control of all the country and eliminate all terrorist groups which destroy the image of the country and end armed manifestations. The image of the country should be changed to a positive in the international media by proving political stability.

This paper examines the possibility of cointegration and causality among FDI, FD, EX and INF in Yemen. The country has various challenges regarding political instability, closed economy and slowed economic growth. It is important to shed light on all these factors to enhance FDI and economic growth in the long run. It also needs important decisions that how to develop bilateral relationship with Yemen to improve economy. The remainder of this study is structured as follows. Section 2 reviews the overview of Yemen. Section 3 provides the literature review. The data sources and model framework are presented in Section 4. Results and discussion are presented in Section 5. The conclusion and policy implications are discussed in Section 7.

## 2. Overview of Yemen Economic

Several countries have experienced a considerable FDI increase owing to its significant impacts on developed and developing nations. Nevertheless, in Yemen, low levels of FDI inflows have been experienced and the country is considered as one of the countries having the least amount of FDI inflows in the Middle East. It has revealed that Yemen still had low levels of FDI inflows and on top of this, its FDI inflows experienced sharp decline and had been negative for some years. The events Yemen experienced in 2011 had serious effects on the performance of the national economy, causing substantial damages in all economic sectors. As a consequence, Gross domestic product at current as well as constant prices shrank last Year as a result of a slump in economic activities. Gross domestic product at constant prices shrank by 15.3% in 2011 after having expanded by 6.8% in 2010. The fall in GDP in 2011 was essentially as a result of a reduction of economic activity in both sectors of manufacturing of commodities and production of services by 14.0% and 16.1% respectively. On the other hand, non-oil GDP at constant prices receded by -14.8% in 2011 after expanding by 7.2% in 2010.

The economic situation in 2012 despite the continuation of political tensions in Yemen which followed the events of 2011 in addition to the process of political transition, the national economy witnessed in 2012 positive growth in most economic sectors, as a result of relative improvement in the political situation and gradual return of stability in the country, as reflected in improvement of some economic indicators. As a consequence GDP data at constant prices showed an increase of 2 %in 2012, compared with a decrease of12.8% in 2011. Likewise the nonoil sectors achieved real growth of 4.4% compared with a contraction of 11.9 % in 2011 In 2012 the Yemeni economy experienced some recovery in its performance achieving a growth rate of 2% in GDP at constant prices and 4.4% in nonoil GDP. Looking the energy consumption UN Yemen there are various challenges to provide enough energy supply in the country. Energy growth remained low due to inefficient supply resources.

FDI inflows in Yemen is depicting negative growth rate, which shows that they are not enhancing the economic performance in this context. Country needs to enhance the FDI inflows to flourish in future. It is very important to make effective decisions that how to attract FDI in Yemen economy. In the context of Yemen, the Inward FDI Potential Index is lower than its Inward FDI Performance Index and according to UNCTAD (2007), (see Figure 1).

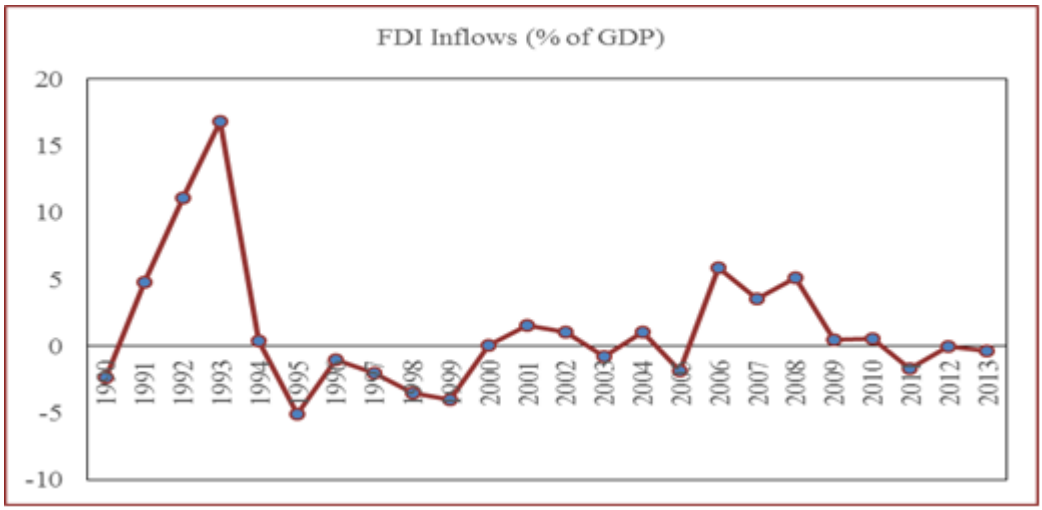


Figure 1.1: Foreign direct investment in Yemen (1990-2014).

Source: World Bank Indicators Yemen (2016).

**Financial sector**

Structural reforms are also key to meeting various goals in Yemen. While being strong, the design of the reform program takes into account by policy makers because it is difficult in unstable social and political conditions through appropriate sequencing and protection of the poor. Measured. Hereby, a problem emerges from the fact that there are mean activities which use up scarce resources and yield satisfaction (and hence income) but for which there is no observable transaction no market exchange. Therefore, in order for employ the restricted definition of income.

In the few recent years, Yemen has adopted a strategy of public finance management (PFM) that includes general budget reform. The main aim is the enhancement of control and financial accountability, reform of the system of bids and procurement and improvement of competence and skills. In order to assist the further improvement it lies with the implementation of this sweeping reform strategy, a multi-donor group has developed a Public Financial Management Reform Action Plan. However, the Yemen government has implemented these reforms slower than expected. Current deficiencies and mechanisms of financial corruption and political patronage: the budget setting process is little more than ad hoc bargaining ministry by ministry; there is only limited parliamentary oversight; the approved budget and the executed budget are only loosely related; the deliberate underestimation of oil revenues leads to the centrality of large discretionary supplemental budgets, which are more prone to attracting corruption; and the military budget is reportedly a single line item in the national budget, thus eliminating oversight or accountability. Recommendations include advocating for PFM reforms in the budgeting process, enhancing

parliamentary oversight, building Parliamentary capacity to undertake effective oversight and building capacity at the local level for budget execution (USAID, 2006).

## Inflation

The history of inflation in Yemen is rather turbulent. This is due to the integration of the two diverge economies in 1990, the planned south and the open economy in the north part; in addition to destructive political conflicts which occurred in the period 1991 to 1994. The dominant regime contributes to the increase rate of inflation. Consumer prices increased to a peak in March 1994 to September 1994 during the time of the civil war.

The inflation had been a major problem for Yemen, which reached 50% in 1994 and 55% in 1995. However, during such short period, the government succeeded in defeating the high inflation in 1997 by reducing the budget deficit and increasing the interest rates to absorb excess liquidity in the market through the market auction of treasury bills and increased deposit interest rates. This in turn, led to stabilizing the YR, which was floated in July 1996.

Moreover, the Central Bank of Yemen (CBY) since 1996 has maintained a target Consumer Price Index (CPI) growth of 10% or less, which in the same year was estimated at around 30% and then to 2.2% in 1997. Nevertheless, the Asian crisis in 1998 affected the progress on its ERSAP as a result of the fall in world oil prices, which caused an increase on the inflation rate to 6%, and 8.7% in 1999, and then dropped to 4.6% in the year 2000.

Inflation for the period (2001-2009) has witnessed a noticeable increase due to the plan by the government to lift gradually the subsidies of some commodities. But at the same time, the increase in world prices for some commodities which influenced the recovery of FDI inflows to many regions of the world (UNCTAD, 2005). Thus, the government must plan and implement some sort of policies that help in reducing the rate of inflation. In other words, according to the results of polynomial analysis shown in Figure 3.3, it can be noticed that a ratio of 52.79% of the variability in inflation for the period 1991-2009 was caused by the increase of the time.

## Exchange Rate

The free exchange rate system has been the regime adopted by Yemen for more than a decade and the Central Bank intervenes to influence the direction of exchange rate only in the case of short term wide fluctuations in the foreign exchange market, which are unwarranted by economic fundamentals. This policy has contributed in enhancing economic stability and bolstering .Investors' confidence in the national economy. As a consequence of monetary policy performance represented in its various instruments with reference to exchange rate in harmony with economic activity rates, the exchange rate of the US dollar vis-àvis the Yemeni rial amounted to YR 214.89 at the end of 2013, which was the same rate registered at the end of the previous year

# 3. Literature Review

## Relationship between FDI and Financial development (FDI and FD)

Mele and Quarto (2015) highlighted the causal relationship between FDI and financial development (FD) using monthly data from China. In particular, we want determine

whether there existed any significant causal nexus was from FDI exchange rate to financial development or the other way round in China utilizing a VAR approach. The results indicated that FDI explain nearby 36% of variation of SSE, and FDI depicts positive relationship with financial development; while Exchange rate variation, although it also showed a positive relationship with Shanghai Stock Exchange Composite Index time series dataset, the magnitude of the effect is rather small.

Otchere, Soumare and Yourougou (2015) investigated on the direct causal relationship between FDI and FD in Africa. Used data from 1996 - 2009 for African countries where such data were available. Granger causality tests and multivariate analyses support the bidirectional positive relationship between FDI and FD. Find that FDI impacts positively and significantly on GDP in Africa when we control for the simultaneous effects of both FDI and FD.

Arcabic et al. (2013) analysed the relationships between FDI and the stock market in Croatia. The main hypothesis is that, in the long run, trends in FDI should determine the movement of the stock market through the channel of economic growth. Using the Engle-Granger and Johansen cointegration methodology. The result showed that in the short run, movement on the Croatian stock market, measured by trading volume, positively affected FDI stock in Croatia. However in the long run, the growth of FDI positively influenced the stock market.

Samadi, Fathi and Tahmasebi (2011) investigated whether (FDI) can stimulate the impact of corruption on FD in developing countries and The role of FDI on this influence, panel date techniques is applied on a sample of 8 developing countries of D- 8, over the period of 1996-2009.The empirical analysis show that corruption affects FD significantly and negatively. Furthermore inflowing the foreign good, capital, and making competition in the countries of sample, reduce the negative impact of corruption on FD. The study Noorbakhsh et al (2001) showed a significant positive correlation between financial development and FDI flows in developing countries. Using a panel of 97 countries over the period of 20 years. Moreover, Dutta and Roy (2008) found a concave relationship between FD and FDI inflows: before the FD reaches a certain threshold, financial development has a positive impact on entries FDI, but when he crosses the threshold, financial development has a negative impact on FDI inflows.

**Relationship between FDI and Inflation**

Inflation rate is considered a vital factor in a country's economic development. Rate of inflation is considered as an important element that affects the FDI inflows the rate of inflation brings the overall financial performance of host nations to light.

Shafi, et al. (2015) investigated that FDI, inflation and supply of money have strong relationship with exchange, direct investment for last 20 years for Pakistan. The data was collected from the internet from various websites. These websites include www.sbp.pk (State Bank of Pakistan (SBP), www.fbs.pk (Federal Bureau of Statistics (FBS), and www.kse.pk, www.pide.org. The result also showed that FDI, inflation and supply of money have strong relationship with exchange rate. Therefore, countries like Pakistan faced such kind of problem that FDI has negatively affected. Inflation and money supply are positively affected. Therefore, government should take consideration of fiscal and monetary policies in order to give these matters very important priority.

Rahman (2015) conducted statistical analyzed of the relationships between FDI and its impact on selected macroeconomic indicators such as Gross Domestic Product, Inflation Rate, and Balance of Trade. He examined time series data over a period from 1999 to 2013.the result strong positive correlation between FDI and inflation rate and FDI was linked with increases in the inflation rate and a negative trade balance. As discussed before, higher inflation rate reduces the purchasing power of people and has been blamed for economic stagnation.

Bekhet and Al-Smadi (2015) evaluated the long-run and short-run relationships among FDI inflows and their determinants in Jordan for the (1978–2012) period ARDL was used to analyse the data series among period. Of the Study, results indicated that the relationship between FDI and CPI was negative in the long run which confirmed the efficiency-seeking framework of Dunning (1980). These results mean that an increase of inflation rate represented by CPI would lead to decreasing the FDI inflows in the host country. (2011) explored relation between GDP, FDI, trade and INF in turkey using annual time series data over the period from 1970 - 2008. The results of the Johansen cointegration test showed that INF and FDI are positively related to GDP.

Similarly and Taiwo (2011) examined the long-run co integration relationship between inflation, investment and growth in Nigeria over the period 1980 - 2006. The results from the ordinary least squares indicated that inflation relates negatively and positively with growth. Both studies fail to check for causality between the INF, FDI and growth.

Omankhanlen (2011) explored the effect of exchange rate and INF on FDI and its relationship with GDP in Nigeria using annual time series data over the period 1980 - 2009. Government expenditure and gross fixed capital formation were reviewed. The empirical studies reviewed are classified into four groups: (1) INF, FDI and GDP (2) Inflation and FDI, (3) INF and GDP and (4) FDI and GDP.

Faiza et al. (2012) investigated the impact on FDI, GDP and INF in Pakistan using annual time series data over the period of 1990 - 2011.The result suggested that FDI related positively with inflation and GDP, the conflicting results with other studies are due to the different estimation techniques.

**Relationship between FDI and Real Exchange Rate**

Abri and Baghestani (2015) investigated the impact of greater FDI on real exchange rate volatility in eight emerging Asian economies for the period 1980–2011. They used time-series data to estimate their model with individual-country. The results indicated that greater FDI in the form of FDI was more effective in reducing real exchange rate volatility for China, India, Malaysia, Singapore, and South Korea. In contrast, greater FDI increased real exchange rate volatility for Indonesia, the Philippines, and Thailand.

Azhar, et al. (2015) highlighted effect of exchange rate volatility on FDI in SAARC countries, which includes Pakistan, India and Sri Lanka. Time series data is used in this paper from 1981 to 2013, which is taken from the World Bank website.The result showed that there is a negative relationship between exchange rate volatility and FDI for these countries.

In Yemen, AL-Shebami, et al. (2013) employed secondary data to examine the macroeconomic factors determining inflows of FDI from 1991 to 2008. These factors are categorized into five groups, including market size, cost-related factors, infrastructure, openness of trade, and human capital. Using the autoregressive distributed lag (ARDL) approach, the empirical results suggests that in the long run, the most dominant factor determining FDI in Yemen is the infrastructure. This is followed by exchange rate, while other factors such as real gross domestic product per capita, trade openness, and human capital have less influence on FDI inflow. However, interest rate and the growth of real gross domestic product are found to be insignificant in influencing the FDI inflow in the long-run. On the other hand, their results also indicate that in the short run, real gross domestic product per capita, trade openness, and infrastructure have positive impacts on the FDI while the exchange rate and human capital affect FDI inflow negatively. Also in the short run, the growth of real gross domestic product and interest rate are found to be insignificant in influencing FDI.

Azhar, Ullah and Malik (2015) aimed to evaluate effect of exchange rate volatility on FDI in Pakistan, and Statics Division, Staff Working Paper India and Sri Lanka for the period of 1981 to 2013. The time series data is used and sample covers data over the period of 1972-2013. Result shows that there is a negative relationship between exchange rate volatility and FDI for these countries and the results of all the other variables are according to our expectation and prior studies.

Suliman, et al. (2015) examined the relationship between FDI and the real exchange rate for low-income countries of Sub-Saharan Africa, using a panel data approach and Two-Stage Least Squares (2SLS) method. The results show that while the depreciation of the real exchange rate draws more FDI to Sub-Saharan African countries, the real exchange rate volatility causes greater instability in FDI inflows to these countries.

Mele and Quarto (2015) investigated the causal relationship between FDI, exchange rate Used monthly data from China. In particular, the results while Exchange rate variation (RMB), although it also showed a positive relationship with Shanghai Stock Exchange Composite Index time series dataset.

Bilawal et al. (2014) investigated the role Impact of Exchange Rate on FDI in Pakistan. Based on secondary data from time series. For this, purpose 32 years old data of Exchange rate and FDI for period of 1982 - 2013. Results showed that there is positive significant relationship between exchange rate and FDI.

Abbott, Cushman and Vita (2012) examined empirically the effect of exchange rate regimes on FDI inflows to developing countries. Using system-generalized methods of moment's estimation on a panel of 70 developing countries for the period 1985–2004, the results concluded that developing countries adopting de facto fixed or intermediate regimes significantly outperform those opting for a flexible exchange rate system in attracting FDI inflows.

Others highlighted exchange rate movements on FDI. By using the panel data of Japanese FDI inflows to nine dynamic Asian economies during 1987–2008, the paper finds that (I) FDI declined with a depreciation of the yen against host country currencies; (ii) it increased with exchange rate volatility; and (iii) it was little affected by the Asian financial crisis, especially when disguised financial flows were removed

from the data. A novel result concerns the negative response of FDI to the third moment of monthly exchange rate changes: the volume of FDI was smaller when the distribution was positively skewed (i.e., when the yen was biased towards relatively large depreciation shocks). If skewers proxies for expected mean-reverting changes (Takagi and Shi 2011).

The previous studies have highlighted role of FDI in various countries but the current study is filling the gap by using FDI determinants in Yemen economy. The result can brought various effective policy implications for Yemen economy.

## 4. Data Source and Methodology

Annual time series data for the (1990-2014) period has used FDI (Foreign Direct Investment), financial development (FD), Exchange rate (EX) and Inflation (INF) in Yemen are employed. The data were obtained from a single source, the World Bank's development databases (2016) available online at (http://data.worldbank.org/). Micro-fit version 4.1 and E-views version 8.2 statistical packages are utilized. Thus, following Shahbaz et al. (2014), Shahbaz and Lean (2012), Esteve and Tamarit (2012) highlighted that the relationship can be formulated as in equation1

$$FDI_t = f\ (FD_t + EX_t + INF_t)$$

(1)

All the variables in equation (1) are transformed into natural logarithms (L).This transformation is useful to provide more appropriate and efficient results compared to the simple linear model. This reduces the hetrosecdasticity problem and obtains the growth rate of the variable (Bekhet and AL-Smadi.2015; Hamdi et al., 2014; Khan et al., 2014). The, equation (1) is remember as in Equation (2).

$$LFDI_t = \mu + \beta_1 LFD_t + \beta_2 LEX_t + \beta_3 LINF_t + \varepsilon_t$$

(2)

In order to determine the level of stationarity [I (0), I (1) and I (d)] augmented Dicky-Fuller [ADF] (1979, 19810), Phillips-Perron [P-P] (1989) and Kwiatkowaki, Phillips, Schmidt and Shin [KPSS] (1999) statistical tests are used. To examine the co-integration relationship among the variables above, ARDL bounds testing model which was developed by Pesaran and Pesaran 1997; Pesaran and Smith, 1998; Pesaran and Shin, 1999; and Pesaran et al., 2001) is employed. This is because it can be used with small sample sizes, estimates long-run and short-run relationship simultaneously and allows testing for the existence of relationship among variables for stationary data at level I (1) or and I(1) or both. (Hamdi et al., 2014; Chandran, 2009; Pesaran and Shin, 1999; Pesaran and Pesaran, 1997). Equation (3) is being constructed to examine the long-run short-run relationships among the variables. However, the maximum Eigen value test aims determine the minimum number of co-integration (Brook, 2008).

$$\begin{bmatrix} \Delta LFDI \\ \Delta LFD \\ \Delta LEX \\ \Delta LINF \end{bmatrix} = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} + \begin{bmatrix} \phi_{11}\ \phi_{12}\ \phi_{13}\ \phi_{14} \\ \phi_{21}\ \phi_{22}\ \phi_{23}\ \phi_{24} \\ \phi_{31}\ \phi_{32}\ \phi_{33}\ \phi_{34} \\ \phi_{41}\ \phi_{42}\ \phi_{43}\ \phi_{44} \end{bmatrix} \begin{bmatrix} LFDI \\ LFD \\ LEX \\ LINF \end{bmatrix} + \sum_{s=1}^{k} \begin{bmatrix} \alpha_{11}\ \alpha_{12}\ \alpha_{13}\ \alpha_{14} \\ \alpha_{21}\ \alpha_{22}\ \alpha_{23}\ \alpha_{24} \\ \alpha_{31}\ \alpha_{32}\ \alpha_{33}\ \alpha_{34} \\ \alpha_{41}\ \alpha_{42}\ \alpha_{43}\ \alpha_{44} \end{bmatrix} \begin{bmatrix} \Delta LFDI \\ \Delta LFD \\ \Delta LEX \\ \Delta LINF \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{bmatrix} \quad (3)$$

Where $\Delta$is the first difference operator, $\phi_{ij}s$ denote the long run coefficients of the variables. $\alpha_{ij}s$ The short run coefficients, $\varepsilon_{ij}s$ denote the error terms which are normally distributed, K represents the optimal lag length, s is the lag order and I, j=1,….., 4.

Nere is sometimes misaims to link with Equation (4)

$$\begin{bmatrix}\Delta LFDI\\ \Delta LFD\\ \Delta LEX\\ \Delta LINF\end{bmatrix}=\begin{bmatrix}\delta_1\\ \delta_2\\ \delta_3\\ \delta_4\end{bmatrix}+\sum_{s=1}^{k}\Delta\begin{bmatrix}\beta_{11}\ \beta_{12}\ \beta_{13}\ \beta_{14}\\ \beta_{21}\ \beta_{22}\ \beta_{23}\ \beta_{24}\\ \beta_{31}\ \beta_{32}\ \beta_{33}\ \beta_{34}\\ \beta_{41}\ \beta_{42}\ \beta_{43}\ \beta_{44}\end{bmatrix}\begin{bmatrix}LFDI\\ LFD\\ LEX\\ LINF\end{bmatrix}+\begin{bmatrix}\gamma_1\\ \gamma_2\\ \gamma_3\\ \gamma_4\end{bmatrix}\begin{bmatrix}ecM_1\\ ecM_2\\ ecM_3\\ ecM_4\end{bmatrix}+\begin{bmatrix}\varepsilon_1\\ \varepsilon_2\\ \varepsilon_3\\ \varepsilon_4\end{bmatrix} \quad (4)$$

Where $\delta_i s$ denote the intercepts, $\beta_{ij}s$ presents the short-run coefficients and $\gamma_i s$ represents the coefficients of $ecM_{t-1}$ and I, j=1,….., 4. However, $ecM_{t-1}$ is the lagged value of the residuals derived from the F-bounds test among the variable .This is used to detect long-run causality among the variables while, the joint $\chi^2$ statistic for the first difference dlagged independent variables is used to test the direction of short-run causality between the variables (Bekhet and Al-Smadi, 2015; Hamdi et al., 2014; Boutabba, 2014). For example, ΔLEC does not Granger cause $\Delta LCO_{2t}$ if $\beta_{12}$=…..= $\beta_{12,i}=0.$ in final step, cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) is used to check the stability of the long-run parameters movement for ΔLFDI model.

## 5. Empirical Results

**Table 4.1 Unit Root Test Results**

| Variables | Constant | Constant with Trend | Constant | Constant with Trend |
|---|---|---|---|---|
| **First Difference** | | **ADF** | | **PP** |
| **LEX** | -9.7048*** | - | -7.4972*** | -7.7420*** 6.3707*** |
| **LFD** | -6.7843*** | -6.7102*** | -6.8645*** | - 6.7761*** |
| LFDI | -4.9543*** | -5.6386*** | -6.7954*** | -6.7230*** |
| LINF | -1.7146 | -2.2777 | -9.8618*** | 11.3181*** |

Note: *** indicate significant level at 1%.

The first test conducted was the unit root test. The unit root test is done to ensure all the variables are not spurious. It is required to be performed in order to ascertain the stationarity of the data either at the level {I(0)} or at the first difference {I(1)}. The result of the unit root test showed that not all the variables are stationarity at level, this rendered the use of Johansen Jussellius and Engle-Granger based cointegration test

not feasible. However, the results revealed that all the variables are stationarity at first difference and at one present significant level. This rendered the use of Autoregressive Distributed Lag (ARDL) model developed by Pesaran, et al. (2001) feasible. Based on this we employed the ARDL approach in estimating the cointegration relationship among our variables of interest; and establish the globe relationship between the dependent variables and the independent variables.

**Table 4.2 ARDL – Bound Test of the Cointegration**

| **F-Statistics value** | **1%Critical value** | | **5% Critical value** | | **10% Critical** |
|---|---|---|---|---|---|
| | **Lower** | **Upper** | **Lower** | **Upper** | **Lower** |
| **Upper** | | | | | |
| **I(0)** | **I(1)** | I(0) | I(1) | I(0) | I(1) |
| **9.0353*** 5.331** | **3.656** | 2.726 | 4.057 | 2.309 | 3.507 |

**K = 6 , N = 50**

**Critical value Based on Narayan, (2005) table- The Unrestricted Intercept with no Trend**

The table above contains the cointegration bound test. The cointegration bound test is done to ensure the existence of long run relationship among the variables of interest. The results revealed that the variables are cointegrated at 1% significance level which means that long run relationship exists between the dependent variable and the independent variables. This relationship can be explained to the fact that the F-statistics (9.0353) being greater than the values of both the lower I (0) and the upper I (1) bounds of the Narayan (2005) table at 1% critical values; these values are 3.656 and 5.331 respectively. Since the variables are cointegrated it means that global relationship has been established between Foreign Direct Investment (dependent variables) and the independent variables (financial development, exchange rate and inflation). Therefore the estimate of their long run coefficient can be obtained.

Azlina & Sazlin (2014) have found that cointegration exists foreign direct investment and financial development. The causality tests employed by the study firstly found that there is a unidirectional causal relationship between foreign direct investment and domestic credit to private sector. Secondly, there exists a unidirectional causal relationship between market capitalization value and foreign direct investment, but a bidirectional causal relationship between foreign direct investment and stock value traded.

Ranga, and Wijesinghe (2015) examine the long-run and short run effects on Sri Lanka's FDI inflows from changes in Exchange Rate. Simple Granger causality test was used to identify the causality between exchange rate and foreign direct investment inflows. Findings indicate that, there is long run relationship between exchange rate and foreign direct investment. This study can simply draw an inference that global relationship between foreign direct investment (dependent variable) and

financial development, exchange rate, and inflation (independent variables) exist in Yemen. Having established the global relationship (cointegration among variables of interest), we further estimated the long run coefficients of the variables to see the exact effect of each of the independent variables on the dependent variable.

The results of the long run coefficient is shown in Table 4.3 below.

**Table 4.3 ARDL- Results of the Long run model with FDI as the dependent variable**

| Variable | Coefficient | Standard Error | T – Ratio [prob.] |
|---|---|---|---|
| LEX | -.19764 | .22285 | -0.8868 [0.381] |
| LFD | -2.2230** | .91982 | -2.4168 [0.021] |
| LINF | -.67173 | .46190 | -1.4543 [0.155] |
| INPT | -40.7602 | 13.4878 | -3.0220 [0.005] |

**Note: LFDI = Dependent variable**

Table 4.3 above shows the values of the estimated long run coefficients with foreign direct investment as the dependent variable this findings conforms to the findings by They also found evidence that the development of the domestic financial system is an important prerequisite for FDI to have a positive effect on economic growth. The policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to maximize the benefits of the presence of FDI.

Iamsiraroj and Ulubaşoğlu (2015) convincingly assert that FDI positively affects economic growth and the relationship holds globally as strongly as in the developing world. They put further the variation was more of regional than within-country variation, and contemporaneous FDI rather than past FDI, which matters for growth. Finally, appropriate absorptive capacity indicators for positive growth are identified to be trade openness and financial development rather than schooling.

Esfandyari (2015) results showed that positive relationship between FDI and growth depends on absorptive capacities. The financial development is one of the most important among the capacities. Empirical analysis, using cross country data between 2004 and 2013 shows that FDI could not have an independent effect on the growth of D8 countries. Independent effect of FDI on growth could be obtained when FDI is interacted with a threshold level of financial development equal to 3.39. Therefore, focus on the internal changes in the financial markets is necessary in the countries studied before the process of attracting foreign direct investment. More importantly, based on the findings domestic investment can play an ambiguous role in contributing to economic growth.

The result of the long run effect of financial development on foreign direct investment in Yemen revealed a negative and significant one, with a coefficient value of -2.223 which means that an increase in financial system or development in Yemen

discourages the inflows of foreign direct investment in to the country by 2.23 percent and is significant at 5 percent level. This finding, although, contrary to A-priori expectation of this study that hypothesized financial development to induce foreign direct investment. However, a study by Desbordes and Wei (2014) uncovered that a country's financial development induces foreign direct investment only when its rate of financial development growth and that of the source countries are related, otherwise a negative effect occur. This means that the destination country will have to attain certain threshold and sustained financial system in order to attract foreign direct investment inflows. In the case of Yemen as a least developed country and having its level of financial development quite low will need to improve in order to attract foreign direct investment inflows.

A study by Fauzel (2016) showed that FDI can be an important ingredient for developing the financial market in small island economies. The study found a bi-causal relationship between FDI and FD. Also, economic growth has been identified to play a crucial role in boosting financial development in this study. Imen and Zouheir (2013) found evidence that development of the domestic financial system is an important prerequisite for FDI to have a positive effect on economic growth. The policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to maximize the benefits of the presence of FDI.

The other three independent variables; exchange rate and inflation did not show any meaningful correlation with foreign direct investment as their long run coefficients are not significant. Although.

**Table 4.4 Short run & ECM Estimation Results with**

| Variable | Coefficient | Standard Error | T - Ratio [prob.] |
|---|---|---|---|
| DLEX | -1.276 | 0.3801 | -3.3580 [0.002] |
| DLFD | -1.607 | 0.6052 | -2.6559 [0.011] |
| DLINF | -0.486 | 0.3132 | -1.5506 [0.129] |
| DINPT | -29.474 | 9.8023 | -3.0068 [0.005] |
| ECM(-1) | -0.7231 | 0.1167 | -6.1947 [0.000] |

**Note: DLFDI = Dependent variable**

The short run and the error correction estimation results showed that in the short run, Exchange rate and financial development have impacts on foreign direct investment in Yemen.

On the side of the exchange rate, the relationship is also negative and significant at 1 percent level. It showed that exchange rate reduces foreign direct investment by 1.3 percent in the short run. Lee (2015) found that exchange rate negatively affect foreign direct investment inflows in Korea. Lily, et al (2014) found that exchange rate has no meaningful relationship with FDI in Malaysia, Philippines and Thailand. Therefor stabilizing the exchange rate will contribute toward attracting the foreign direct investment in Yemen this is became increase in exchange rate makes difficult which will lead to an unfavorable balance of trade. As it happens in Korea. The government

should, by all means boosts by making less than and diversifies the economy to generate more income internally.

The effect of financial development on foreign direct investment inflows in Yemen in the short run showed a negative impact; that is to say financial development in Yemen discoveries the inflows of foreign direct investment in to the country .To be exist, financial system in Yemen reduces the inflows of FDI be 1.607% in to Yemen. This negative relationship between FD and FDI may be due to the current financial distress Yemen is facing, having no single stock exchange market. Stoddard and Noy (2015) also found that financial crises have a strong negative effect on foreign direct investment inflows. Financial system is an important determinant of foreign direct investment inflows. There is a need for the government of Yemen to improve the financial system of the country one of the ways of doing this is by forming or creating a stock exchange market, also known as BORSA.

The error correction model (ECM) coefficient showed a negative value of -0.7231 with a significant level of 1%. This means that the speed of adjustment from the long run to the equilibrium point is 72% annually, Shin, et al. (2001). This means that the validity of the ECM coefficient is to have a negative value, less than unity (one) and to be significant.

**Table 4.5 Diagnostic Test Results**

| Test Statistics | LM Version | F Version |
|---|---|---|
| Serial correlation | CHSQ(2) = 9.0043[0.011] | F(2, 34) = 3.9254[0.029] |
| Functional form | CHSQ(1) = 2.1294[0.144] | F(1, 35) = 1.6247[0.211] |
| Normality | CHSQ(2) = 1.5698[0.456] | Not applicable |
| Heteroskedasticity | CHSQ(1) = 0.1178[0.731] | F(1, 46) = 0.1132[0.738] |

| | |
|---|---|
| **R-squared** | **0.7817** |
| **Durbin Watson Statistics** | **1.5000** |

The diagnostic test results above revealed that the variables under strong one fore from functional form misspecification and heteroskedasticity in the error term. The Durbin Watson statistics is 1.5; this indicates there is slightly serial correlation among the variables. It data do not have functional form misspecification which means that they have accounted for some important non linearity. There is also non assistance of heteroskedasticity which variables the statistical test of significant. The existence of heteroskedasticity invariables statistical significance.

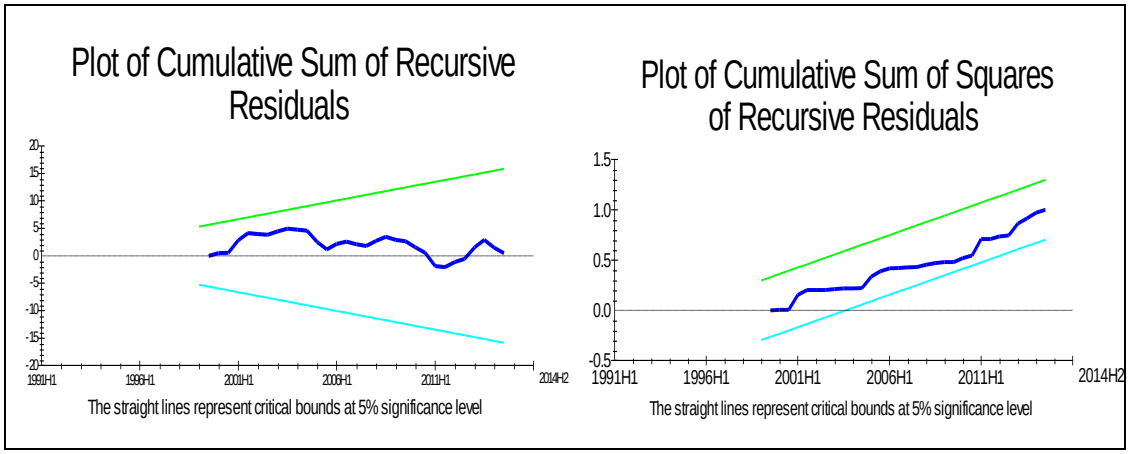


Figure 2: CUSUM and CUSUM square tests for the (1990-2014) period.

## 6. Conclusion and Policy Implications

This paper examine the cointegration among FDI and various determinants such as financial development, exchange and inflation in Yemen for the 1990-2014 period. We have used the ARDL bounding the test approach and also identify the long-run and short-run relationship between the research variables. Overall, the main findings show there is cointegration among FDI, financial development, exchange and inflation.

Our current findings brought various policies the policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to maximize the benefits of the presence of FDI. The policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to maximize the benefits of the presence of FDI .Financial system is an important determinant of foreign direct investment inflows. There is a need for the government of Yemen to improve the financial system of the country one of the ways of doing this is by forming or creating a stock exchange market, also known as BORSA .that is to say financial development in Yemen discoveries the inflows of foreign direct investment in to the country

Furthermore, the FDI inflows generate the possible spillovers of technology and knowledge (that determine by the level of absorptive capacity) through the interaction of technology knowledge and local human capital to upgrade their skills and firms to transfer the technology to the economy. This spillover effects might be able to improve the Yemen firms and human capital development to contribute significantly to Yemen's economic growth. As expected the production supported by advance technology will educate the skilled labor and eventually improved the productivity and enhance the economic growth to be productivity driven growth that must show technical progress through TFP contribution.

Kolhoff (2013) explained that there is ongoing efforts for EIA legislation which can be influenced to a great extent by the power and capacity of, on the one hand, the environmental authorities supporting EIA and, on the other hand, the sector authorities hindering the development of EIA in Yemen. The political system is the most important context factor influencing the rules of policy-making and the power of

the different actors involved. The importance of context factors on the development of ambitions is dependent on the phase of EIA system development. Moreover, some ambitions seem to be influenced by particular factors; for instance the ambitions for the object of study seem to be influenced by the level of environmental awareness of the sector ministries and parliament.

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