

## What Drives Foreign Direct Investment Inflows in China? ARDL Bounds Test and ECM Approach

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**Abstract:** This paper examines the variables that drive foreign direct investment in Chinese economy. Recent past studies have shown conflicting results which make further study on this subject matter imperative in the recent times. Data were collected from the United Nations Conference on Trade and Development and World Bank Indicator from 1990–2017 and the study employed the Autoregressive Distributed Lag (ARDL) model and Error Correction Model (ECM) to address its objective. Consequently, the major findings that originated from the work could be submitted as follows. The result of ECM term confirmed that about 19% of the total disequilibrium in the previous year would be corrected in the current year. Meanwhile, the principal drivers of FDI inflows in China are the large market size and impressive growth rate of the economy. However, GDP per capita could not derive FDI inflows in China. Based on the findings that emerged in this work, it is mandatory this paper makes these recommends for both the policy makers and the future researchers in China that whenever sporadic inflows of FDI is the target of the policy makers in this country, the Chinese government should manipulate the market size and growth rate of its economy.

**Keywords:** GDP per Capita; FDI Inflows; Market Size

**JEL Classification:** F21; F23; F36

### 1. Introduction

During the era of mercantilist trade was the driving force behind the integration of the global economy. Meanwhile, the proliferation and advancement of digital technologies in the 21<sup>st</sup> century have facilitated the free movement of capital and knowledge across the world. Consequently, foreign direct investment (FDI) has been

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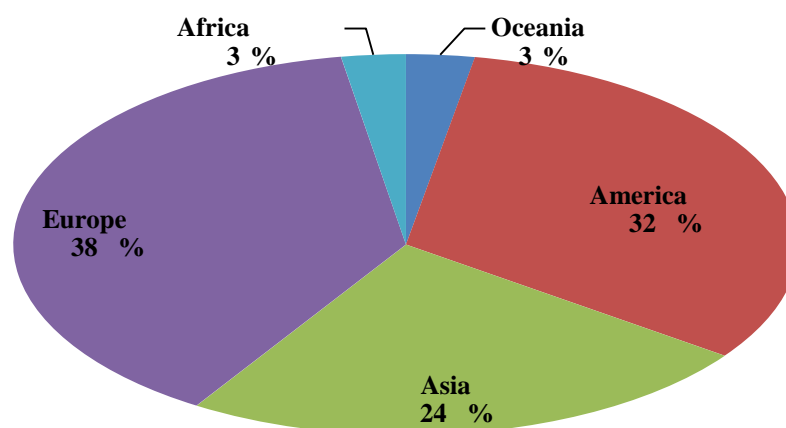
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the most popular variable causing the integration of the global economy through the interdependence of national economies in the last four decades. The most industrialized economies of the world like the US, the UK, and other European countries have always been the popular destinations of FDI inflows in the time past. As a matter of fact, 70% of the global FDI inflows have been received by the America and the European countries between 1980 and 2017 while 24%, 3% and 3% went to Asian, African and Oceanian continents respectively.



**Figure 1. The Geographical Distribution of Global FDI Inflows 1980-2017**

*Source: Author's Computation (2019) from (UNCTAD, 2018)*

In the recent times, there has been a paradigm shift in the inflows of foreign direct investment in the global economy. It is instructive to state that from the year 2010, the focus of foreign investors have been on the newly emerging economies of the world. As a result of this China, Hong Kong, Singapore, Brazil, India, Russia and South Africa came to global limelight regarding FDI destinations. However, the regional distribution of FDI inflows is uneven, in favour of East Asian economies, with the domination of China after 1990. The aftermath effect of the 1979 economic reform in China has brought a colossal success in economic transformation with an average growth rate of 8.8% for the period 2007 to 2017. It is not a gainsaying that the impressive performance of the Chinese economy has been accompanied by the gradual inflows of FDI in the last two decades. It has been observed that FDI inflows expanded sporadically from over US\$72 billion in 2006 to US\$136 billion in 2017. In the same vein, the spillovers of FDI to Chinese economy cannot be overemphasized because in 2006, 28% of the industrial value-added output in China was emanated from foreign invested enterprises (FIEs) and 21% of taxation in China. Similarly, these enterprises accounted for 11% local employment in the country (China Investment Yearbook, 2006).

Moreover, since 1994, China started to guide its FDI inflows with a view to meeting its economic developmental targets. This brought about the implementation of the Provisional Guidelines for Foreign Investment Projects in 1995 which summarized the FDI projects into four compartments namely: encouraged, restricted, prohibited and permitted. It is worth of note that the subsets of encouraged projects were those projects domiciled in infrastructure or underdeveloped agriculture; those with advanced technology, or manufacturing new equipment/materials and those which were export-oriented with the capacity to satisfy market demand. The classified restricted projects were as follows: those projects under experiment or monopolized by the nation, with low technologies, and those whose production exceeded domestic demand; and those engaged in the exploration of rare and valuable mineral resources.

Whereas those projects that jeopardized national security or harmed the public interest; those caused damages to the environment, natural resources or human health and those which used sizeable amounts of arable land were classified as the prohibited projects. Meanwhile, the projects did not fall in any of the above groups were tagged as permitted project.

In addition, an attempt to open its economy to the global community, China joined the World Trade Organization (WTO) in 2001. This necessitated the country to revise its regulations in accordance with the requirement of rules of WTO for trade and investment during the transitional period ended in 2005. As a result of this, tariff for imports was sliced from 23% on average basis to 9.4% and Quotas for most import productions were relaxed likewise in 2001 (Long, 2005). The advent of the China in the WTO has orchestrated the attraction of more export-oriented FDI into the country vis-à-vis the advantage of its lower labour cost.

Consequently, China started competing with the US and UK in 2016. As a matter of fact, China received the second highest global FDI inflows after the US in 2017. However, in the first half of 2018, it was recorded that China received the largest quantum of the global FDI inflows with USD 126 billion, in which the United Kingdom came second with USD 66 billion and the United States occupied the third position with USD 57 billion concurrently (OECD, 2018).

Meanwhile, an attempt to empirical verify the critical variables that derive FDI inflows in China has sparked off debate among the scholars and the policy makers in the recent time. In the same vein, literature has indicated divided opinions ranging from the huge domestic market, impressive growth rate, low labour cost, improvement of infrastructure, gross capital formation, governance efficiency and regulatory quality openness to trade, and rule of law as indispensable factors that derive cross border investment in this country. See Jadhav and Katti (2012), Jadhav (2012), Agrawal et al (2011), Vijayakumar et al. (2010), Sahoo (2006). In view of the above conflicting results, re-examination of this subject matter becomes highly imperative in this study. Therefore, this paper examines the critical variables that

propel FDI inflows in China. In addition, the uniqueness of this work also lies in adoption of new methodology in which the majority of past studies have overemphasized.

The arrangement of this work follows this pattern: in section 1, provides the background information for the study. Section 2 gives the theoretical and empirical review of relevant literature relating to the factors that derive FDI inflows in emerging economies in particular and developing countries as a whole. Consequently, section 3 presents data and model specification alongside with empirical results, summary, conclusion and policy recommendation.

## **2. Literature Review**

This section presents recent archive of past studies regarding factors that derived FDI inflows in Asia countries with a view to observing the positions of various scholars regarding this subject matter of this study over time.

Agrawal et al (2011) analyzed the link between FDI and economic growth in both China and India between 1993 and 2009 with the application of modified growth model and Ordinary Least Square model. It was discovered from the study that larger FDI went to China more than India due to the larger market size in the former than in the latter.

Tiwari and Mutasque (2011) employed a panel analysis in examining the linkage between FDI and economic growth in Asian countries between 1986 and 2008. The conclusion of the authors established that economic growth is propelled in those countries by important factors like FDI, Labor, capital and exports. In another perspective, Galina and Long (2007) investigated the spillovers and productivity of FDI in China with the aid of a firm-level data set. The study discovered a mixed result regarding the link between FDI spillovers and productivity of domestic firms in China. It is worth of note that many positive results in the study was largely due to aggregation bias or endogeneity problem of FDI. Meanwhile, after the bias has been adjusted, the evidence of systematic positive effect of FDI disappeared.

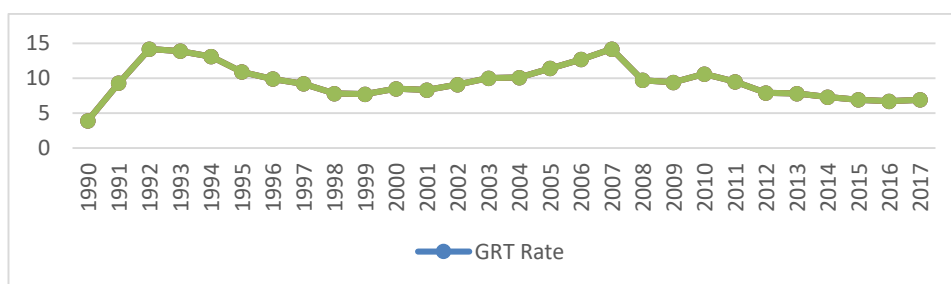
However, Kaliappan et al. (2015) adopted a static linear panel data analysis to empirically verify the determining factors that cause services FDI inflows in ASEAN economies between 2000 and 2010. The authors concluded that availability of improved infrastructure, human capital, trade openness and market size had a significant direct association with services FDI inflows. Whereas the reverse was the case of inflation and services FDI inflows. While examining the variables that derive FDI inflows in China and India, Wei (2005) submitted that cheaper cost of labor, lower country risk, cultural similarity and geographic closeness to OECD countries were principal variables that propelled FDI inflows into India. Also, the study found

out that the reasons why there was a wide gap between FDI inflows in China and India was largely due to the capacity of China to attract much higher FDI from OECD countries in connection with its larger market size and higher external trade relation with OECD countries.

Consequently, Taqadus et al (2014) compared the spillovers of foreign direct investment on the economies of South Asian states with China with the application of OLS and granger causality test. The authors argued that the Chinese economy was much faster growing economy than South Asia sub region.

Finally, the above reviewed literature show that studies on factors that derive FDI inflows in Asian Tigers in general and China in particular are still on going and there is not yet a consensus in the literature. Hence, the relevance of this work

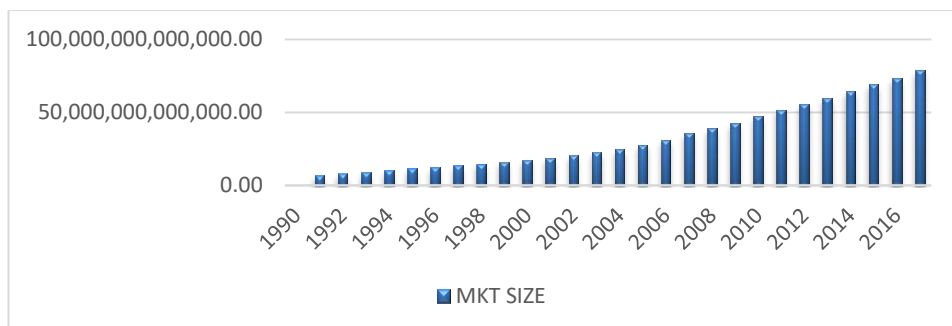
## 2.1. An Overview of Some Selected Indicators that Derive FDI Inflows in China



**Figure 1. Economic Growth Rate in China**

*Source: Authors' Computation (2019) from WDI, 2018*

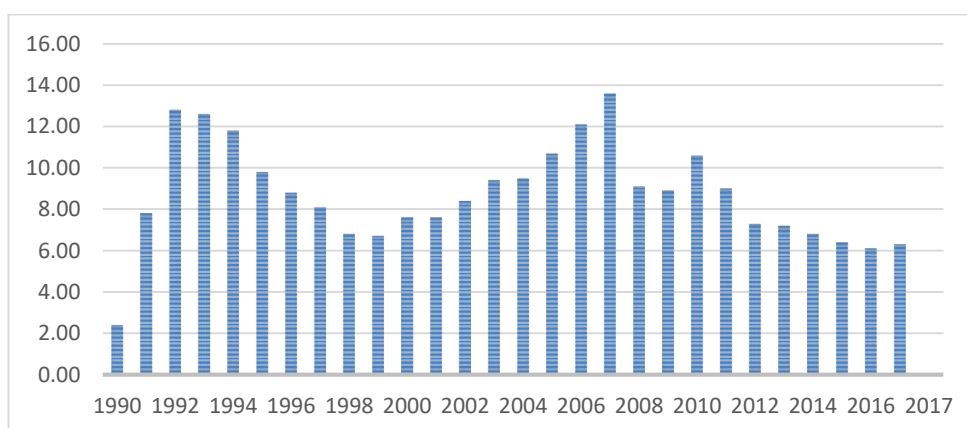
Figure 1 shows the growth rate in China. This measures the economic performance of the country from 1990 to 2017. The figure above shows that the country registered a very sharp growth rate between 1991 and 1992 before it started to decline gradually from 1993 to 1999. However, year 2000 marked a turning point in the country for the recovery of the growth rate, as such the growth rate moved in upward direction until it got to its peak in 2007. There was a sharp decline in 2008 and 2009, this might be the result of spillover effects of global economic recession which began in year 2007. It is worth of note that since 2010 to 2017, the economic growth rate in China has been declining except 2013. This implies that economic performance in China has not fully recovered to its former position before the global economic recession that ravaged the world economy around 2007 and 2008.



**Figure 2. Market Size in China**

*Source: Authors' Computation (2019) from WDI, 2018*

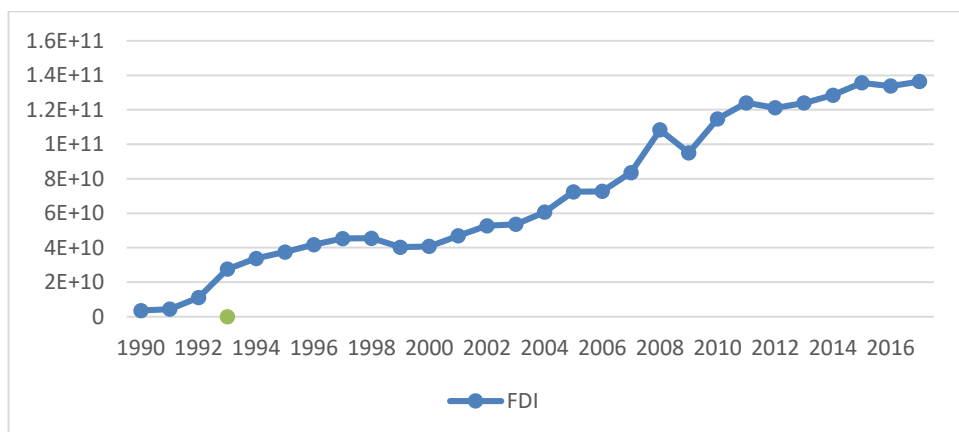
Figure 2 shows the market size of the Chinese economy in the last 27 years. It could be deduced from the above figure that between 1990 and 2017, the market size in this country has expanded significantly. This implies that the size of the economy is expanding with an impressive performance each year from 1991 till 2017.



**Figure 3. GDP Per Capita in China**

*Source: Authors' Computation (2019) from WDI, 2018*

Figure 3 presents the panoramic view of the level of welfare in the country measured by GDP per capita. The Chinese GDP per capita has been fluctuating between 1990 and 2017. It started growing with an impressive performance in 1991 and 1992 and thereafter began to fall from 1993 throughout 1999. However, from 2010 there was an upward movement of the trend which continued until it got to the pinnacle in 2007. Consequently, 2008 marked another downward trend of this variable in the country with slight improvement in 2010 and 2011, apart from those years, this variable continued to fall before it improves a little bit in 2017.



**Figure 4. FDI Inflows in China**

*Source: Authors' Computation (2019) from UNCTAD, 2018*

The trend of FDI inflows shown in Figure 4 indicates that the direct cross border investment in this country has been an impressive one on average basis because it shows an upward trend apart from few years of little fluctuation. In an explicit form, between 1990 and 2008, the trend was relatively stable in an upward manner before there was a sharp drop in 2009. However, in 2010 FDI inflows rose again and continued to increase steadily till 2017.

### 3. Methodology

The data for the empirical analysis in this work are extracted from secondary sources. In another words, FDI data were sourced from UNCTAD investment report published by the World Bank. Meanwhile, data on market size, growth rate of the economy, growth per capita were sourced from World Bank Development Indicator. E-Views software was employed for the running of the data.

#### 3.1 Model Specification

$$FDI = F( MKTZ, GRT, GDP/CA) \text{ -----1}$$

If model 1 is linearized to form model 2

$$LnFDI_t = \alpha_i + \beta_0 LnMKTZ_t + \beta_1 GRT_t + \beta_2 GDP/CA_t + \mu_i \text{ -----2}$$

#### ARDL Model Specification

Various diagnostic tests such as unit root test and Bound Test performed on the variables of interest motivated the choice of ARDL and ECM in this paper. Due to different orders of integration of the variables i.e. I(1) and I(0), the paper utilizes

autoregressive lag model to address its objective (Pesaran, Shin and Smith, 2001, Pesaran and Pesaran, 1997).

In a general form, ARDL model can be specified as follows:

$$ARDL(1, 1) \text{ model: } Y_t = \mu + \alpha_1 Y_{t-1} + \beta_0 X_t + \beta_1 X_{t-1} + U_t \dots \dots \dots (3)$$

Meanwhile,  $Y_t$  and  $X_t$  are stationary variables, and  $U_t$  is a white noise.

Therefore, in an explicit way the model to capture the analysis of this work could be stated thus:

$$\Delta LnFDI_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta Ln LFDI_{t-1} + \sum_{i=0}^p \beta_2 \Delta LnMKTZ_{t-1} + \sum_{i=0}^p \beta_3 \Delta GRT_{t-1} + \sum_{i=0}^p \beta_4 \Delta GDP/CA_{t-1} + ECM_{t-1} + \theta_2 LnFDI_{t-1} + \theta_3 LnMKTZ_{t-1} + \theta_2 GRT_{t-1} + \theta_3 GDP/CA_{t-1} + \mu_i \dots \dots (4)$$

Where

MKTZ is used to represent the market size of the economy and is proxied by real gross domestic product and is measured in US dollars.

FDI means foreign direct investment inflows which is measured in the millions US dollars in constant prices.

GDP/CA denotes gross domestic product per capita and is measured in percentage.

GRT captures the rate at which the economy is growing on annual basis and is measured in percentage.

$\mu_i$  represents stochastic error terms.  $p$  is the lag length and  $t = 1990 \dots \dots 2107$ .

### 3.2 Results and Discussion

**Table 1. Descriptive Statistics of Annual Data Series (1990-2017)**

| Descriptive Statistics | LMKTZ    | LFDI     | GDP/CA   | GRT RATE |
|------------------------|----------|----------|----------|----------|
| Mean                   | 30.57467 | 24.69577 | 8.721429 | 9.532143 |
| Median                 | 30.79321 | 24.76555 | 8.600000 | 9.350000 |
| Maximum                | 31.99533 | 25.63827 | 13.60000 | 14.20000 |
| Minimum                | 22.58216 | 21.97231 | 2.400000 | 3.900000 |
| Std. Deviation         | 1.727149 | 0.953298 | 2.464918 | 2.480898 |
| Skewness               | 3.644663 | 1.484496 | 0.008820 | 0.251021 |
| Kurtosis               | 17.70082 | 4.909357 | 3.209016 | 2.863887 |
| Jargue-Bera            | 314.1232 | 14.53732 | 0.051332 | 0.315667 |
| Probability            | 0.000000 | 0.000697 | 0.974661 | 0.853992 |
| Sum                    | 856.0907 | 691.4814 | 244.2000 | 266.9000 |
| Sum. Sq. Deviation     | 80.54216 | 24.53698 | 164.0471 | 166.1811 |
| Observation            | 28       | 28       | 28       | 28       |

Source: Authors` Computation (2019)



An attempt to verify the normal distribution of the dataset for the econometric analysis, the study subjected the data to the computation of various descriptive statistic such as mean, median, minimum and maximum values, the skewness, kurtosis and Jaque-Bera statistics. Consequently, from the above table it could be pinpointed that the values of mean and mode of the data series are identical. Karmel and Polasek (1980) argued that when a distribution is perfectly symmetrical, the mean, mode and median must converge. But in a case of near symmetry, the three measures are necessarily very close. The values of mode and mean fulfilled the above condition, therefore one could conclude that the distribution of the dataset is near a perfect symmetry. In addition, the values of Kurtosis for 3 of the variables are not too far from 3. This is also justified the normal distribution of the data set. Hence, the data could be used for further econometrics analysis.

**Table 2. Unit Root Test**

| Variables  | ADF Test    |                       |         | PP Test     |                       |         |
|------------|-------------|-----------------------|---------|-------------|-----------------------|---------|
|            | Level       | 1 <sup>st</sup> Diff. | Remarks | Level       | 1 <sup>st</sup> Diff. | Remarks |
| LMK<br>TZ  | -2.981038** | -2.981038**           | I (1)   | -2.976263** |                       | I(0)    |
| LFDI       | -2.976263** |                       | I(0)    | -2.976263** |                       | I(0)    |
| GDP/<br>CA | -2.976263** |                       | I(0)    | -2.976263** |                       | I(0)    |
| GRT        | -2.976263** | -2.981038**           | I(1)    | -2.976263** |                       | I(0)    |

*Source: Authors` Computation (2019) \*\*\* %5 level*

The test for stationarity or unit root becomes imperative when it comes to time series analysis because of the danger of spurious results that could emanate from such analysis if the data possess a unit root. In view of the above, the augmented dickey fuller (ADF) and Phillips-Perron (PP) tests were employed to verify whether there is a presence of unit root in dataset. As reported in the estimated results in table 2, shows that the variables of interest are a mixture of (1) and (0). This implies that some are stationary after first differencing. Whereas others are stationary at a level.

**Table 4. ARDL Bounds Test**

Sample: 1991 2017

Included observations: 27

Null Hypothesis: No long-run relationships exist

| Test Statistic | Value    | k |
|----------------|----------|---|
| F-statistic    | 60.13107 | 3 |

Critical Value Bounds

| Significance | I0 Bound | I1 Bound |
|--------------|----------|----------|
| 10%          | 2.72     | 3.77     |
| 5%           | 3.23     | 4.35     |
| 2.5%         | 3.69     | 4.89     |
| 1%           | 4.29     | 5.61     |

*Source: Authors` Computation (2019)*

Due to the combination of stationarity and non-stationarity data set, it is expedient to examine the existence or otherwise of the long run equilibrium relationships among these variables with aid of Bound Test. (Pesaran and Pesaran, 1997, Pesaran, Shin and Smith, 2001). Based on the estimated result presented in the above table the Null hypothesis of no long run relationships could not be accepted because the upper and lower Critical Value Bounds at all level of significance is less than the value of F-Statistic. Therefore, the variables of interest have a long run relationship in the model. This outcome necessitates the estimation of both short run relationship and long run relationship among these variables.

**Table 5. Parsimonious Short Run and Long Run Regression Estimates****Dependent Variable: LFDI**

| Variables     | Coefficient | t-statistics | P-value | Variable   | Coefficient | t-statistics | P-value |
|---------------|-------------|--------------|---------|------------|-------------|--------------|---------|
| LFDI(-1)      | 0.335*      | 5.7          | 0.0000  | LFDI(-1)   | 0.363**     | 3.2          | 0.0047  |
| D(LMKT Z(-1)) | 0.100*      | 6.3          | 0.0000  | LMKTZ(-1)  | 3.52E       | 0.2          | 0.8456  |
| D(GRT(-1))    | 0.056*      | 4.8          | 0.0001  | GRT(-1)    | 0.174       | 1.0          | 0.3178  |
| D(GDP/CA)     | 0.128***    | 1.3          | 0.1837  | GDP/CA(-1) | 0.107       | 0.6          | 0.5397  |
| C             | 1.561       | 1.1          | 0.2837  | ECM        | -0.187**    | 2.6          | 0.0223  |

*Source: Authors` Computation (2019) \*\*\*Significant at 10%, \*\*Significant at 5%, \*Significant at 1%,*

Table 5 presents the ARDL results of the short run and long run relationship between the FDI and other macroeconomic variables that derive it the studied economy. From the estimated results it could be deduced that when FDI is the dependent variable,  $D(\text{FDI}(-1))$  is positive and significant. This implies that FDI inflow in the previous year increases the level of FDI inflows in the current year. Similarly, FDI inflows and market have a positive relationship in the both short run and long run, but the relationship is only significant in the short run. This finding is supported by the findings of Aderemi et al (2018:1) Kaliappan et al (2015), Agrawal et al (2011), Azam (2010) and Wei (2005) in similar studies in China, Indonesia, India and Pakistan and ASEAN countries respectively in spite of adoption of different methodologies. This implies that market size is a principal variable that derives FDI inflows in China. In another words, FDI inflow in china is more of market seeking. In the same vein, the relationship between FDI and growth rate of economy is positive and significant in the short run and not significant in the long run. This shows that FDI inflows in China is propelled significantly by the rate at which its economy is growing. In another words, foreign investors are attracted to this country because of the rate at which it has been growing its economy in the past few decades. However, there is negative relationship between FDI and GDP per capita but not significant in both short run and long run. GDP per capita is not a motivating factor behind FDI inflows in China.

Moreover, the error correction model (ECM) which shows the speed of adjustments back to equilibrium in the estimated model is negative and significant. The speed of adjustment for correcting disequilibrium from the previous year to equilibrium in current year is 18% as reflected by the coefficient of ECM. In another words, this implies that an approximately 18% of disequilibria from the previous year's shock converge to the long-run equilibrium in the current year.

### 3.4. Diagnostic and Stability Tests

**Table 6. Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:

|  |          |                     |        |
|--|----------|---------------------|--------|
| F-statistic                                    | 1.088771 | Prob. F(1,19)       | 0.3098 |
| Obs*R-squared                                  | 1.463345 | Prob. Chi-Square(1) | 0.2264 |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey |          |                     |        |
| F-statistic                                    | 2.042632 | Prob. F(6,20)       | 0.1070 |
| Obs*R-squared                                  | 10.25882 | Prob. Chi-Square(6) | 0.1142 |
| Scaled explained SS                            | 5.115784 | Prob. Chi-Square(6) | 0.5291 |

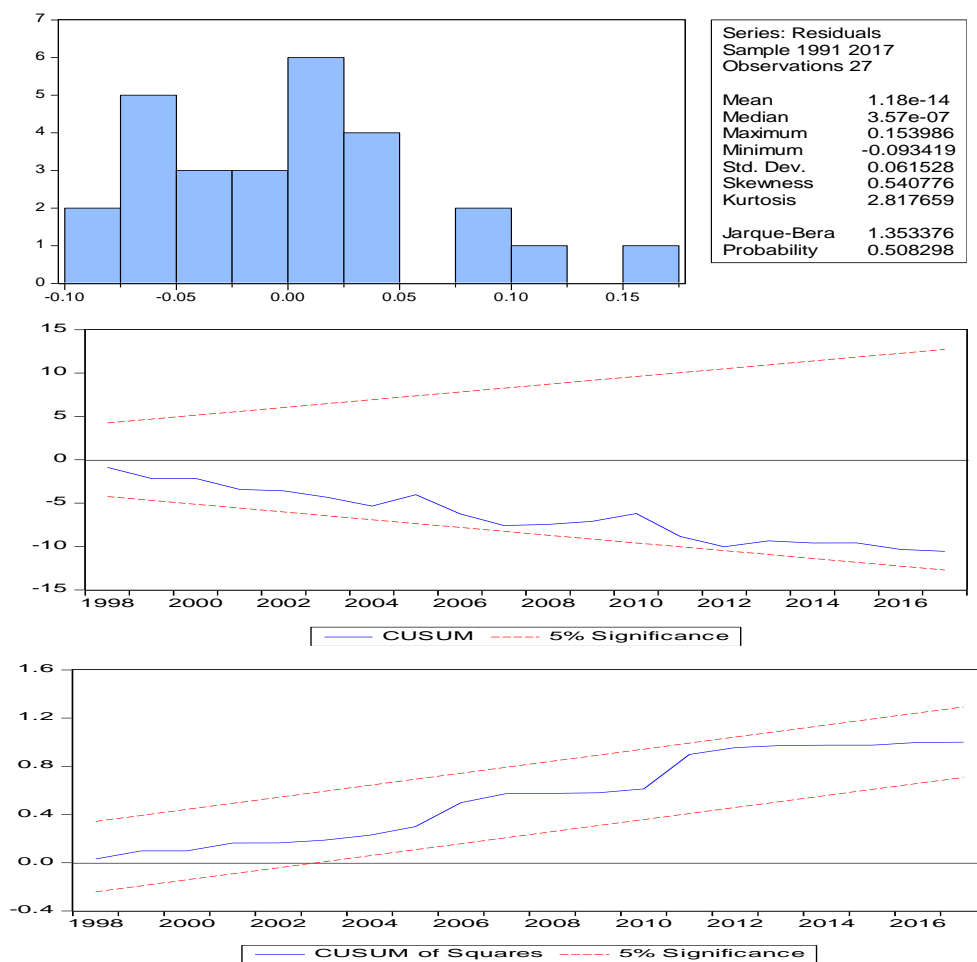


Figure 1. Stability Tests CUSUM Stability Test

In order to establish the appropriateness of the short run (parsimonious) model, in this study further attempt was made to carry out diagnostic test (the Serial Correlation LM test) and stability tests (Cumulative Sum (CUSUM)) on the residual of the short run model. From the results of the table 4.6, the probability value of the observed R-squared Chi-square in the Serial Correlation LM test of the model was insignificant, this confirmed the absence of serial correlation in the residuals of the ECM regression estimate. Similarly, the results of the CUSUM and CUSUMQ stability tests in the above graph showed that the residuals of the error-correction model is within the critical bounds of five percent significant level. This connotes that the estimated parameters are stable over the period 1990-2017. Therefore, the

model is considered to be reasonably specified as a result of the tests carried out above.

### 3.5. Conclusion and Recommendations

This study examined what derives FDI inflows in both short run and long run in Chinese economy over the period of 1990 to 2017. The major findings that originated from the work could be submitted as follows. The result of error correction term confirmed that about 19% of the total disequilibrium in the previous year would be corrected in the current year. Therefore, it will take about five (5) years for the system to adjust back to its long run equilibrium path.

The principal drivers of FDI inflows in China are the large market size and impressive growth rate of the economy. However, GDP per capita could not drive FDI inflows in China.

Consequently, based on the findings that emerged in this work, it is mandatory this paper makes these recommends for both the policy makers and the future researchers in China that whenever sporadic inflows of FDI is the target of the policy makers in this country, the Chinese government should manipulate the market size and growth rate of its economy. In another words, the government should embark on policy measure that will expand the market size and growth rate of its economy exponentially.

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