

# Exchange Rate, Political risk and China's FDI into European Union:

## A Panel Data Analysis

Haiyue Liu, Zixuan Min (Sichuan University, Chengdu City, Sichuan Province, China)

**Abstract:** This paper attempts to find out the features and the effects of exchange rate (ER) and political environment (PE) on China's foreign direct investment (FDI) into European Union's 28 countries for a recent period of 2003-2013 using GMM model. We measure ER level, ER volatility and expectation by the first, second and third moment of the ER changes, and capture the effect of Political Risk using International Country Risk Guide (ICRG). The study indicates an insignificant response of China's FDI to PE and a mixed effect of different ER measures on China's FDI into EU countries.

**Key words:** FDI, exchange rate, political risk, European Union **JEL codes:** F21, F23, F31

## **1. Introduction**

Since 2003, China's FDI has kept a steady rising with a high speed. 2014 United Nations' World Investment Report showed that by 2013, China's foreign direct investment flows had climbed to 1010 billion dollars — the third highest around the globe, ranking merely behind America (338 billion dollars) and Japan (136 billion dollars), the two traditional sources of foreign investment (Figure 1).

Among the areas Chinese MNEs invest into, European Union (EU)<sup>1</sup> is a remarkable region. According to 2008-2011 Statistical Bulletin of China's Outward Foreign Direct Investment indicates, China's FDI into European Union was keeping a stable rise with a fast speed from 2008 to 2011. Especially, the Britain has become one of the most important destinations of China's FDI. The investment from Chinese MNEs into the Britain has been rushing since 2012, and it is predicted that Chinese MNEs investment to the Britain will reach about 150 billion dollars during 2012-2014. According to Financial Report's report in October 27, 2014, the Britain is probable to become the third country that is the most absorbing to China's FDI, only ranking behind the United States and Japan. Figure 2 shows the countries distribution of China's FDI into the Europe.

Haiyue Liu, Professor, Sichuan University (SCU); research areas/interests: foreign investment, world economics. E-mail: seamoon@scu.edu.cn.

Zixuan Min, Ph.D. Candidate, Sichuan University (SCU); research areas/interests: economics, foreign investment, world economics. E-mail: minzixuan1208@foxmail.com.

<sup>&</sup>lt;sup>1</sup> The European Union (EU) is a politico-economic organization of 28 member states that are located primarily in Europe. The EU operates through a system of supranational institutions and intergovernmental-negotiated decisions by the member states. The 28 member states of EU are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom. This paper do not include statistics of 8 (Croatia, Cyprus, Estonia, Latvia, Lithuania, Malta, Slovakia, Slovenia) of them due to data default.



Figure 1 1992-2012 China's FDI Flows (by billion dollars)

Resource: 2001 World Investment Report (UNCTAD), 2012 Statistical Bulletin of China's Outward Foreign Direct Investment





However, recently China's FDI into EU has experienced a large fluctuation. In 2012, China's FDI towards EU appeared the first decline during the recent 10 years, and made up a share of only 7% of the total flows of China's total FDI, which had decreased by 19.1% comparing with 2011. Thus, there is a necessity to reveal the economic roots of this obvious change.

The top five industries that China invested into EU during 2010-2012 are as the following table (Table 1). Among these five industries, finance and mining seemed having risen in 2012 compared with 2010, whereas leasing and business service, manufacturing and wholesale and retailing declined.

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2010			2011		2012	
Industry	Stock (Billions of US dollars)	Share (%)	Stock (Billions of US dollars)	Share (%)	Stock (Billions of US dollars)	Share (%)
Leasing and Business Service	587625	47.0	813635	40.1	966720	30.7
Finance	145128	11.6	208354	10.2	63834	21.0
Manufacturing	307900	24.6	382581	18.9	630236	20.0
Mining	35945	2.9	374807	18.5	379312	12.0
Wholesale and retailing	68231	5.5	80935	4.0	141888	4.5

Table 1 The Top 5 In	dustries of China'	s FDI to EU in	i 2012 (by I	oillion dollars)
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Resource: 2010-2012 Statistical Bulletin of China's Outward Foreign Direct Investment

At the meantime, propelling more enterprises to go out and expanding outward investment have been a significant means for China to develop its economy further. There have been qualities of research indicating that the fluctuation of exchange rate has obvious effect on enterprises' foreign investment. Exactly, on July 21, 2005, the People's Bank of China announced to reform the exchange rate regime by moving into a managed floating exchange rate regime based on market supply and demand with reference to a basket of currencies. The reform of RMB exchange rate means the formation of a more flexible RMB exchange rate regime, and after that, yuan has showed a generally great appreciation tendency. By December 2008, RMB has appreciated for more than 20%. Figure 3 shows that the exchange rate of RMB has been keeping a steady rising trend during 2003-2014.





Furthermore, since the second half of 2008, Europe has fallen into the debt crisis which leading EU into a weak economic growth. By August 2014, Euro exchange rate against the Yuan has dropped to 7.95 and will likely fall further if Euro-zone economy cannot deal with the debt problem effectively and still stays in economy-depressed state. Appreciation of the Yuan against the euro will reduce the cost of Chinese enterprises' FDI into EU, which in fact has increased Chinese investors' relative wealth. To Chinese enterprises, the appreciation of Yuan against the euro is a good time to hold EU assets.

On the other hand, Chinese MNEs still confront some political environment (PE<sup>2</sup>) challenges during the progress of investing to EU. In EU's foreign policies, OECD Multilateral Investment Agreement is taken as a benchmark, but according to the Treaty of the European Community, the policy decision rights on investment are owned by the member states, every of which has regulatory provisions on foreign investment, especially in some vital departments concerned with national security, people's livelihood and public interest, aiming to avoid monopoly and guarantee national economic security. Although most European countries have commonly welcomed Chinese enterprises to invest there, others still regard China as a potential threat and make political interference and obstruction to Chinese MNEs' overseas mergers on the grounds of economic or national security. Chinese enterprises must take political risk into account to avoid risks in investing to EU countries.

The remainder of the paper is organized as follows. Section 2 presents the literature review of FDI and exchange rate as well as political environment relationships. Section 3 describes data and empirical approach. Section 4 and 5 presents the empirical results and robustness checks. Section 6 concludes.

#### 2. Literature Review

There is a mass of literature conducted to identify the determinants of FDI. Nevertheless, consensus that can be regarded as the correct determinants of FDI hasn't been achieved yet (e.g., Moosa, 2002; Blonigen, 1997).

## 2.1 Exchange Rate and FDI

Some researches present a positive relationship between exchange rate and FDI. According to Campa (1993), MNEs' overseas investment decisions depend on the expected future benefit. The stronger a country's currency is, the higher the expected future benefit from this market and FDI inflows absorbed are, whereas the depreciation of a country's currency will lead to an FDI outflows from this country. Klein and Rosengren (1994) examined the relative importance of wealth effect and cost effect in FDI flows using the data of America's FDI inflows from seven major industry countries for the period of 1979-1991, and concluded that exchange rate's influence on FDI is mainly through the wealth effect. Goldberg and Kolstad (1995) extended Campa's (1993) claim that an appreciation of host currency in fact increases FDI flows. Bailey and Tavlas (1991) like Cushman (1985) established that higher exchange rate volatility explains FDI flows from the US to Canada, France, Germany and Japan. Blonien (1997) investigated Japan's FDI and found that the real ER between the Japanese yen and the US dollar had a positive effect on the number of Japanese acquisitions (proxy for FDI) in America, especially in the manufacturing industries with more firm-specific assets.

On the other hand, there are also some studies indicate a negative relationship between exchange rate and FDI. Accam (1997) employed the standard deviation of the exchange rate as a proxy for instability using OLS estimation for 20LDCs and found the relationship between exchange rate uncertainty and FDI for the study period is significantly negative. Baek and Okawa (2001) found that a depreciation of the Asian currencies against the dollar has a significant positive effect in increasing FDI in the export-oriented leading sectors such as chemical and electrical machinery sectors. Froot and Stein (1991) claimed that an appreciation of host currency in fact would not increase FDI flows. Barrell and Pain (1996) affirmed that expected appreciation in the dollar temporarily postponed US outward FDI flows during the study period utilizing a dummy for exchange rate

<sup>&</sup>lt;sup>2</sup> Political Environment (PE) in this paper is measured using a composite index of Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, External Conflict, Corruption, Military in Politics, Religion in Politics, Law and Order, Ethnic Tensions, Democratic Accountability and Bureaucracy Quality.

controls in a profit-maximizing regression model. Farrell et al. (2004) presented a mixed empirical evidence for eight manufacturing industries in 15 countries. They found out that there is a negative but insignificant effect exchange rate has on FDI, despite the result was slightly sensitive to country inclusion. Meanwhile, Vijayakumar et al. (2010) showed that the real exchange rate has a significant negative relationship with FDI through yearly observations for the five BRICS countries during the period of 1975-2007.

However, Tomlin (2000) estimated the average rate of FDI entries per industry from 1982 to 1993 and found that neither the level nor the standard deviation of the exchange rate has any effect on the rate of FDI.

Also, in terms of studies in China's FDI, Liu (2010) assembled data from 18 source countries for the period of 1989-2006 and found a positive relationship between depreciation of real exchange rate and FDI inflows into China.

## 2.2 Political Risk and FDI

There exist amounts of literature on the relationship between political environment and FDI. Most studies show that political instability may affect incoming FDI positively (Busse & Hefeker 2007; Hayakawa, Kimura, & Lee, 2011; Wei, 2000). Busse (2003) found that democracy played a positive role in raising FDI inflows in emerging countries using both cross-section and panel data analysis. Jakobsen and de Soysa's (2006) study also support this finding. Meon and Sekkat (2004) also tested the effect of institutions on FDI focusing on MENA countries, and found that institutional quality enhanced FDI inflows. Jensen's (2006) study presented that democracy in emerging countries reduces expropriation risk for foreign investors. Rios-Morales et al. (2009) assessed that political risk is one of the crucial FDI determinants. In their study, a good government management was taken as a proxy to reckon the political instability. Furthermore, the political instability among countries could be discriminated on the basis of more salient factors such as rule of law, control of corruption among all other factors. They showed that political instability has apparent effect on FDI. Harms and Ursprung (2002) asserted that inward FDIs tend to gravitate towards nations that respect civil and political liberties.

A few opposite evidence studies suggest that the influence of political environment on FDI should be negative. Li and Resnick (2003) presented that when the level of property right protection is controlled, democracy decreases FDI to developing countries. Oneal (1994) alluded to the possibility that a cooperation between autocratic governments and MNEs could be mutually beneficial, but found no statistically significant relationship between US OFDI flows and the political regimes of the recipient countries.

Interestingly, Kim (2006) investigated the relationship between FDI and political risk in Asian countries for the period of 1984-2002 and indicated that bilateral investment treaties (BITs) is an important way to attract FDI in Asian countries but the expropriation risk balances the benefits of BITs could bring for Asian countries. Therefore, the conclusion was that political risk cannot be neglected for FDI attractiveness.

In conclusion, there are abundant arguments about the relationship that FDI has with the exchange rate and political environment. But evidence about China's FDI, especially the investment into European Union — the specified economic group, is relatively absent. And that's which motivates this research.

## 3. Empirical Analysis

This paper mainly investigates the effects of exchange rate and political risk on China's FDI into EU from 2003 to 2013 adopting unbalanced panel data collected from the Statistical Bulletin of China's OFDI, the World Bank, the International Monetary Fund and other databases. There are 540 observations from 20 of EU countries

that China invests into. Our measurements proceeded as follows.

## 3.1 The Variables

## 3.1.1 Political Environment

We adopted International Country Risk Guide (ICRG) index to capture the effect of Political Risk. Political environment, as one of the most researchable issues in international economics, has been emphasized recently, so we make  $PE_{it}$  represent political environment for "country I" at "time t", which includes not only political risk, but also government and institutional assessment as the qualitative expert views. ICRG rating is a composite index comprising three subcategories of risk: political, financial and economic. And among them, political risk comprises 13 variables containing government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability and bureaucracy quality. The rating score of ICRG composite index is from 0 to 100 which are divided into categories from Very Low Risk to Very High Risk (Table 2). Considering that the higher the index number is, lower the risk is, we expect a negative sign of the PE since a higher country risk reduces an incentive for outward FDI.

Table 2 ICRG Risk Category

Risk category	Very High Risk	High Risk	Moderate	Low Risk	Very Low Risk
Composite index scope	0-49.5	50-59.5	60-69.5	70-84.5	85-100

## 3.1.2 Exchange Rate variables

We introduced three variables to examine the effect of ER on direct investment, based on Ivan's (2005) study. According to Ivan, *Mean<sub>it</sub>* (ER level) is the average of monthly real exchange-rates around year t (that includes monthly observations for year t and t-1) for "country I". It represents the relative price difference between the host countries' and Chinese aggregated goods. Real Exchange Rate (RER) index is calculated so that a rise (positive sign) is associated with Yuan appreciation. We expect a positive sign of the Mean since Yuan appreciation may support Chinese outward FDI.

*Volatility*<sub>*it*</sub> (ER risk) is the standard deviation of real monthly exchange rates around year t for country i. Standard deviation is calculated utilizing 24 monthly observations for year t and t-1. The higher value is associated with higher ER volatility. Based on Ivan's (2015) theoretical model and previous literature results, the expected sign is ambiguous to the host country's level of economic development and industry's specifics.

*Skewness*<sub>it</sub> is the ER expectation around year t for country i, which is calculated adopting 24 monthly observations for year t and t-1. We expect that a positive sign is associated with a large number of Yuan appreciation shocks which in turn may lead to the expectation of Yuan depreciation and thus a rise in the future value of repatriated profits. Therefore, FDI is expected to be associated positively with Skewness.

3.1.3 Other Control Variables

Some consolidation seems necessary with so many variables.

First, *GDP<sub>it</sub>* represents the market size for country i at time t that has been considered as one of the first principal determinant of FDI. A positive sign of GDP in FDI is expected.

Second, we utilize  $Openness_{it}$  to measure the trade between China and host countries. It is proxied by the ratio of the sum of imports and exports to GDP. We expect a positive sign of the openness for FDI for a large openness indicates lower trade barriers. Table 3 displays the information regarding the descriptive statistics for the variables.

Variables	Descriptions	Unit	Expected signs	Sources
FDI	China's OFDI in EU countries	Current price(US\$ millions)	n/a	Department of commerce of China
СРІ	Consumer Price Index	Index, 2010 = 100	n/a	IMF IFS statistics
Political Environment (PE)	Political risk, using ICRG index	International Country Risks Index	-	The International Country Risk Guide
Mean	Yearly REER divided by CPI average	First moment of host country currency, host country CPI (by RMB)/China CPI, year t-1 and t	+	IMF IFS statistics
Volatility	Yearly REER divided by CPI standard deviation	Second moment of host country currency, host country CPI (by RMB)/China CPI, year t-1 and t	+/-	IMF IFS statistics
Skewness	Yearly REER divided by CPI skewness	Third moment of host country currency, host country CPI (by RMB)/China CPI, year t-1 and t	+	IMF IFS statistics
GDP	Gross Domestic Product	constant 2005 US\$	+	WB WDI
Openness	Openness in constant prices, ratio of the sum of imports and exports to GDP	Constant prices, Ratio of the sum of imports and exports to GDP	+	WB WDI

Table 3 An Overview of Factors Determining China's OFDI

### 3.2 Empirical Model and Results

To test a possible institutional quality and financial risk's effect on direct investment, we utilize GMM estimator. The basic model for GMM is as follows:

$$Y_{it} = \gamma Y_{it-1} + \beta X'_{it} + \delta_{it}$$

Where  $Y_{it}$  is the logarithm of China's OFDI to an EU "country I" at "time t" and  $Y_{it-1}$  is a lagged dependent variable, which is the logarithm of Outward FDI from China to an EU "country I" at "time t-1".  $\gamma$  is a scalar.  $X'_{it}$  means exogenous variables which vary in the cross-section and tested time dimension.  $\delta_{it}$  is a random error term, which is assumed to be uncorrelated over all *i* and *t*. According to the above discussion, we construct the following model:

$$(Log\_FDI)_{it} = \alpha_1(Log\_FDI)_{it-1} + \alpha_2(Log\_RGDPCPI)_{it} + \alpha_3Log\_PE_{it} + \alpha_4Log\_Open_{it} + \alpha_5Log\_Mean_{it} + \alpha_6Var$$

 $+\alpha_7 Skew_{it} + \beta_{it}$ 

The choice of time period 2003-2013 is useful and justified for analysis. Firstly, "Statistical Bulletin of China's Outward Foreign Direct Investment" is mutually issued by National Bureau of Statistics, Ministry of Commerce and the Administration of Foreign Exchange of People's Republic of China since 2003. Secondly, since 2003, China's OFDI has been rapidly increasing and such trend continues till the year 2013. Thus the analysis of China's OFDI is meaningful for these years. We change a static model to a dynamic model by introducing lagged FDI flows. Thus our panel data set consists of a cross-section dimension (20 countries: i = 1, ..., N), and a time dimension (10 periods: 2003-2012: t = 1, ..., T). In economic data sets, there are generally problems of inherent autocorrelation, endogeneity and heteroscedasticity. In order to deal with these issues, a commonly used method for dynamic panels is the GMM estimator. It eliminates the fixed effects using first differences as the esitimator is set up, and an instrumental variable estimation of the differenced equation is performed. Table 4 shows the results when equation above is estimated using GMM method.

3.2.1 How Does the Level of Exchange Rate Influence China's FDI?

Log\_Mean is significant. However, contradicting the prior hypothesis, the sign of mean is negative and significant implying that Yuan appreciation discouraged FDI for EU. We would like to offer the following explanation. It is plausible that Chinese MNEs have invested as horizontal FDI for local manufacture industries.

Therefore, the sunk cost of initial investment rose up because of Yuan appreciation, and Chinese MNCs could not tolerate it anymore, since the future internalization advantage will not be so large as expected. Thus, they cut their FDI.

Table 4     Results for GMM Estimation					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
LFDI(-1)	0.013385	0.117424	0.113987	0.9095	
LRGDPCPI	0.519963	0.928200	0.560185	0.5767	
LPE	6.912152	8.216782	0.841224	0.4024	
LOPEN	0.399304	0.128746	3.101495	0.0026	
LMEANR	-8.687304	1.811573	-4.795448	0.0000	
SKEWR	-1.020331	0.175211	-5.823441	0.0000	
VARR	0.153604	0.555499	0.276514	0.7828	
		Effects Specificat	ion		
Cross-section fixed (fir	st differences)				
Mean dependent var	0.287373	S.D. dependent va	r	1.150253	
S.E. of regression	1.628579	Sum squared resid		244.0087	
J-statistic	5.595999	Instrument rank		17	

3.2.2 How Does the Expectation of Exchange Rate Influence China's FDI Behavior?

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Log\_Skew is negative significant, which is contradicted to our prior prediction, too. It suggests that the higher the exchange rate expectation is, the less FDI China's MNEs invest to EU. This result is consistent with Campa's (1993) study. We would like to give the following explanation. Actually, most of China's OFDI into EU countries is long-term investment which is exactly market-oriented. Besides, MNEs' FDI behaviors generally depend on the future profit expectation. As a consequence, the appreciation of a host country's currency would increase China's MNEs' expectation of the future benefit and thus lead to more FDI flowing to EU countries. We would also like to give another explanation of this result, which is that some Chinese companies aim to benefit from repatriate profit measured by the host country's currency. The depreciation of RMB means a rising profit in the future. Therefore, China's OFDI into EU countries will get stimulated.

3.2.3 How Does the Trade Openness Influence China's FDI?

We can also find that trade openness are as expected correctly signed and positively associated with FDI, which shows that trade openness is extremely important determinant of Chinese FDI flow to EU. The more open a country is to international investment, the more attractive it is likely to be as a destination for FDI. Apart from that, trade policy in EU countries has been more liberalized, so they attract FDI in the region. It is clear that policies on international capital transfers are likely to attract more FDI.

3.2.4 The Signs of Political Environment and Volatility of Exchange Rate for China's MNEs' FDI

Different with our prior expectation, the coefficient  $\alpha_3$  for PE is positive but insignificant. Thus, we hypothesized Chinese MNEs exhibit a non-linear response to the changes in PE of EU countries. We infer that as follows: Since the composite index PE is constructed with three separate dimensions (political risk, financial risk and economical risk), they may have different effects on MNEs investing behavior. If MNEs are more concerned with political environment, there might be a case that a decrease in ICRG is associated with an increase in FDI negatively. But there is not such one in our research. We hypothesize that Chinese MNEs do not attach so much importance to political environment in EU, with economic factors being considered more. The volatility also presents an insignificant effect on China's MNEs' FDI behavior, indicating that Chinese MNEs are not sensitive to

the flexibility risk of exchange rate.

## 4. Robustness Check

We test those data again through Least Squares estimation to check the robustness of our results. The results are as follows. We have done the Augmented Dickey-Fuller Test, and Appendix Table 3 shows the results that the variables are stationary at level, so we can run the Least Squares estimation.

Table 5 Decults for Loget Squares Estimation

	1400	5 Results for Least Square	SESTIMATION		
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
LFDI(-1)	0.013242	0.118176	0.112055	0.9110	
LRGDPCPI	0.511819	0.956452	0.535122	0.5939	
LOPEN	0.398326	0.132427	3.007891	0.0034	
LPE	0.092407	0.113812	0.811930	0.4189	
LMEANR	-8.676550	1.861897	-4.660059	0.0000	
VARR	0.141692	0.563390	0.251499	0.8020	
SKEWR	-1.017644	0.171289	-5.941094	0.0000	
R-squared	0.741022	Mean dependent var	8.461029		
Adjusted R-squared	0.726766	S.D. dependent var	2.636055		
S.E. of regression	1.377912	Akaike info criterion	3.537464		
Sum squared resid	206.9521	Schwarz criterion	3.703629		
Log likelihood	-198.1729	Hannan-Quinn criter	3.604917		
Durbin-Watson stat	2.440967				

Log\_Mean and Log\_Skewr are both significant and negatively associated with FDI, implying that Yuan appreciation and expectation discouraged FDI for EU. Log\_Open is significant and positive, showing that trade openness is extremely important determinant of Chinese FDI flow to EU. The check is consistent with our results, which proves the robustness our test.

## 5. Concluding Remarks

This study explores the effect of exchange rate and political environment on China's FDI into EU. First, we presented an introduction of Chinese MNEs' investment to EU countries. Then, we used a panel data of a total of 20 EU countries for the period 2003-2012 to examine the Chinese OFDI behaviors.

Based on our model setting, several determinants, including GDP, Openness, Political Environment (measured by ICRG index) and exchange rate (measured by three dimensions of mean, volatility and skewness), are complemented for Chinese FDI. Yuan appreciation proved to have a negative effect on Chinese OFDI which contradicts with the prior prediction. The expectation of Yuan also presented a significantly negative effect on Chinese FDI. Openness presented a significant and positive sign to Chinese FDI behaviors. Contradicting our prediction, political environment (PE) and the volatility of exchange rate showed an insignificant sign to Chinese FDI into EU countries. A more detailed study is needed to identify the economic roots for such a behavior of Chinese MNEs.

We come to the conclusion that Chinese FDI can be partly explained by the proposed independent variables reasonably. We successfully found that the level of exchange rate and openness are significantly concerned with Chinese FDI flows. These findings will have important suggestions for future policy consideration by host countries and academic research on multinational companies' behavior.

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#### Appendix

## Table 1 The List of Countries and Areas Used in the Paper

The used EU countries(20 countries and areas) Austria (AUT), Belgium (BEL), Bulgaria (BGR), Czech Republic (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Finland (FIN), France (FRA), United Kingdom (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Italy (ITA), Luxembourg (LUX), Netherland (NLD), Poland (POL), Portugal (PRT), Romania (ROU), Sweden (SWE)

Table 2   Summary Statistics						
	Mean	Median	Maximum	Minimum	Std.Dev.	Observations
LFDI	8.001465	7.931285	15.44942	1.386294	2.776352	141
LRGDPCPI	17.31977	17.21537	19.75575	13.63952	1.36701	141
LPE	4.380924	4.373658	4.5486	4.17182	0.085907	141
LOPEN	-1.968093	-2.82965	3.565703	-2.82965	1.261261	141
LMEANR	-0.766385	-1.83895	4.362425	-2.57456	2.018514	141
VARR	0.691162	0.011052	41.7752	0.002423	3.635398	141
SKEWR	0.207571	0.215502	1.86679	-1.7899	0.464736	141

## Table 3 The Result of Group Augmented Dickey-Fuller Test

Method	Statistic	Prob.**
ADF - Choi Z-stat	-4.19122	0.0000