ISSN 2079-7141

UAEU Faculty of Business and Economics

# *UAEU-FBE-Working Paper Series*

# Title: The Race to the Top: Institutional Clusters and World FDI Shares

Authors: Wasseem Mina

Department: Economics and Finance

No. 2017-04

Series Founding and Acting Editor: Prof. Dr. Abdulnasser Hatemi-J

# The Race to the Top: Institutional Clusters and World FDI Shares

Wasseem Mina[1,2]

**Abstract:**

The literature on the institutions-FDI nexus has treated the influence of institutions independently of each other. This implies they are not related to one another both theoretically and empirically, an important shortcoming. To address this shortcoming empirically, we use Principal Component Analysis (PCA). PCA is used to extract correlated institutional "clusters".

The influence of correlated groups of institutions or institutional clusters on FDI flows is examined empirically in this paper. Using ICRG data for a large sample of countries over the period 1987-2014, PCA extracts three institutional clusters: quality of public administration, social cohesion, and stability and property rights protection.

We use an empirical model, which is based on on Dunning's (1981) location advantage hypothesis to examine the influence of those clusters on the competition to attract FDI flows. We adopt a least squares estimation methodology to account for both country and time effects. Empirical evidence shows that the three clusters have a positive influence on the share of world FDI flows. Robustness checks support the positive influence of the first two clusters in the post Asian crisis period. Distinguishing low from high FDI share countries, results show that quality of public administration and social cohesion have a positive influence, while in the high share group all three clusters have a positive influence. The approach and results are particularly novel in the literature.

These results have an important policy implication. In examining the influence of institutions on economic variables countries should adopt a wider perspective that realizes the interrelationships among institutions. This perspective provides policy makers flexibility in the design and implementation of institutional reforms.

Keywords: Institutions, FDI, Institutions, Clusters, Principal component analysis, Panel data models.

*JEL classification:* F21, C23, C26, O12, O17

[1] Department of Economics and Finance, College of Business and Economics, United Arab Emirates University, P.O. Box 15551, Al Ain, and Research Fellow, Economic Research Forum. Tel:+971503383120; Email: wmina@uaeu.ac.ae

[2] This work was sponsored by the Economic Research Forum (ERF) and has benefited from both financial and intellectual support. In this respect, I wish to thank Fadia Hassan and Raed Safadi (Economic Research Forum 23rd Annual Conference, Amman, Jordan) and Jacob Vigdor (Association for Public Policy Analysis and Management conference, Brussels, Belgium) for their valuable comments and suggestions. An earlier version of this work was published as an ERF Working Paper Number 1136.

**The Race to the Top: Institutional Clusters and World FDI Shares**

## 1. Introduction

The political system, comprised of political and legal institutions, serve to facilitate people's collective action regarding the provision of public goods, such as education, health, and infrastructure.[3] Political institutions help facilitate the provision and maintenance of human and physical capital needed for growth and development. Legal institutions on the other hand comprise the set of laws and regulations, which help organize and govern people's transactions in the economy. Dixit (2009) advocates that legal institutions, through property rights protection and contract enforcement, reduce uncertainty of consumer and capital goods exchange, and thus transaction costs including production costs. Therefore the political system with its political and legal institutions influence human and physical capital accumulation and the level of economic activity (North 1991).

The effect of political and legal institutions on capital flows has been examined in the capital flows literature, for example in Daude & Fratzscher ( 2008) , De Santis & Luhrmann (2009), Fratzscher (2102), and Papaioannou (2009). Investigating the effect of global shocks on global portfolio investment flows, Fratzscher (2012) finds that the strength of political institutions and reduced country risk ameliorate the effect of these shocks. Similarly Daude & Fratzscher (2008) and De Santis & Luhrmann (2009) find that the quality of institutions in general matters most for portfolio investment. Examining the role that legal institutions play in attracting capital flows, Papaioannou (2009) finds that weak property rights protection, inefficient legal system and a high risk of investment expropriation deter banking flows.

In the capital flows literature examination of the influence of individual institutions has been common. Empirically because of the way institutions are measured, introducing a number of institutions in empirical models raises an issue of multicollinearity. To avoid this problem, usually institutions are introduced individually while other highly correlated institutions are excluded. This treatment however ignores the interrelationship between institutions and the possibility that one institution may be capturing another institution. In other words, it implies that institutions are conceptually "independent" of each other. A more comprehensive approach than just using individual institutions is needed since the presence of multicollinearity spoils the disentanglement of the effect of different institutions (Jellema and Roland 2011).

A complementary approach has been the use of aggregate (linear) measures of institutions. Bundling institutions into an aggregate measure helps address the multicollinearity problem associated with unbundling institutions. However, this approach suffers two problems.[4] First, it does not help examine

[3] Institutions are mainly the formal rules, which govern human behavior (North 1991).

[4] In addition to these two problems, aggregate measures have often been based on "subjective evaluations, contain significant noise, are suspiciously volatile, and are likely to be biased or contaminated by perceptions of a country's economic performance" (Jellema and Roland 2011, p108).

influence of individual institutions. Second, it also implicitly assumes that institutions are "independent" and linearly related.

In this paper, we address this institutional correlation problem in examining the influence of institutions on FDI flows. Applying Principal Component Analysis (PCA) to a panel of institutions reveals three orthogonal clusters or themes, which are based on correlated institutions. The first can be interpreted as the "quality of public administration", while the second and third clusters can be "social cohesion" and "stability and property rights protection", respectively.

The extent to which these institutional clusters influence FDI flows is then empirically examined. Building on Dunning's (1981) location advantage hypothesis, institutional clusters, as opposed to individual institutions, may influence foreign investors' perceptions about countries *competitiveness* compared to other countries. Thus we explore empirically the extent to which clusters matter for countries' shares of world FDI flows.

We use a sample of 130 countries over the period 1984-2014 and least squares dummy variables (LSDV) approach. LSDV allows us to account for country-specific effects, time-specific effects, or both. Country-specific effects are time-invariant and unique to individual countries. On the other hand, time-specific effects are country-invariant and unique to individual time periods (years). Time-specific effects may arise for example from global business cycles or financial crises.

Empirical evidence shows that of the three extracted clusters, "social cohesion" matters for a country's location advantage. Social cohesion has a positive influence on the share of world FDI flows. This finding is robust to changes in the nature of unobserved effects controlled for, model specification, and sample period. This particular result is novel in the institutions-FDI literature and has important policy implication for institutional reforms.

Section 2 provides a brief literature review of the institutions-capital flows nexus focusing on how institutions are accounted for in empirical modelling. Section 3 specifies the empirical model and the data sources. Section 4 discusses the empirical issues and estimation methodology. Section 5 discusses the empirical results, while section 6 concludes.

## 2. Capital flows and institutions - literature review

Most studies on the institutions-capital flows nexus have assumed no correlation between institutions (Aleksynska and Havrylchyk 2013; Alfaro et al. 2008; Busse et al. 2010; Daude and Fratzscher 2008; Papaioannou 2009; Fratzscher 2012; and Shah et al. 2016). Only the studies by Globerman and Shapiro (2002) and Goswami and Haider (2014) accounted for institutional correlation in examining the influence on FDI inflows of governance infrastructure in the former and political risk in the latter.

In examining the institutions-FDI nexus, Globerman and Shapiro (2002) examine the role of "governance infrastructure" on inward and outward FDI flows for 144 developed and developing countries over the period 1995-1997. They employ governance indices estimated by Kaufmann et al.

(1999a; 1999b), including political instability, rule of law, graft, regulatory burden, voice and political freedom, and government effectiveness. Because of the significant correlation between these indicators and the difficulty of employing them in a single equation, they use a principal component of these indicators, an approach similar to what we adopt in this paper. They found a positive impact of the governance principal component on inward FDI flows but at a diminishing rate suggesting that governance plays more important role in small, as opposed to large, economies.

In contrast to Globerman and Shapiro (2002), most empirical studies assumed no institutional correlation. Alfaro et al. (2008) examine the Lucas paradox, where there is a decline in capital flows from rich to poor countries over the period 1970-2000. They find that low institutional quality explains such decline. They measure institutional quality using the period average of the sum of ICRG indicators, including the risk of investment expropriation, government stability, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability, and quality of bureaucracy. Similarly, addressing the Lucas paradox from bank lending flows, Papaioannou (2009) finds that institutional quality matters for bank flows. He uses ICRG's "political risk" rating to proxy for institutional quality.

Daude and Fratzscher (2008) in examining the pecking order of cross-border investment, comprising FDI, portfolio equity, debt and loans, in a sample of 77 countries find that information frictions and institutional quality in host countries matter for the order of capital flows. They find that the FDI size and share (in total capital stock) are largely insensitive to institutional quality in contrast to portfolio investment sensitivity. They measure institutional quality using transparency, risk of investment expropriation, and corruption.[5] More recently Fratzscher (2012) examines the 2008 global financial crisis and the post crisis recovery. He finds that crisis impact and recovery depends on the quality of domestic institutions. He uses ICRG's financial and political risk indexes to assess institutional quality.

Busse et al. (2010) examine the effect of bilateral investment treaties on bilateral FDI flows, accounting for the degree of political institutions development. They find that bilateral investment treaties encourage FDI flows. In accounting for political institutions, they use Henisz's (2000) political constraints on the executive branch as a proxy.

Aleksynska and Havrylchyk (2013) examine the location decisions of FDI flows emanating from the south and find that institutional distance between the south and north matters for FDI with larger distance discouraging FDI flows. This negative effect diminishes with resource abundance in the host countries. To assess institutional distance, they use the six World Bank governance indicators - voice and accountability, political stability and lack of violence, government effectiveness, regulatory quality, rule of law and control for corruption.

[5] They are guided in their choice of institutional variables by the theoretical literature.

Recently, Shah et al. (2016) investigate the bidirectional causality between institutions and sectorial FDI for Pakistan using ARDL. They use ICRG's individual and aggregate measures of institutions. Individual institutions include the risk of investment expropriation (investment profile), law and order, government stability, corruption, democratic accountability, and bureaucracy quality. They find long-term bidirectional causal relationship between institutional quality on the one hand and aggregate FDI, and FDI in services and manufacturing on the other hand. Short-term bidirectional causal relationship is found with manufacturing FDI.

## 3. Empirical model and data

The empirical model of this paper builds on the location advantage hypothesis of Dunning's (1981) ownership-location-internalization (OLI) paradigm. According to the OLI paradigm, a firm produces abroad building on three types of advantages: ownership (O), location (L), and internalization (I).

A firm's ownership advantages arise from its possession of intangible assets, such as technology, patents, and skilled management. The firm itself does not possess location advantages but rather the host economy it invests in. For example, the host economy may enjoy large market size and potential, cheap skilled labor, developed infrastructure, openness to trade and capital flows, developed financial markets, friendly business environment, and quality domestic institutions. The internalization advantage emanates from the firm's own engagement in production abroad rather than relying on the market, in the form of licensing or subcontracting for example, because of the higher transaction costs of the latter.

Since the purpose of this paper is to examine the influence of institutional clusters on foreign investors' perceptions about countries' relative location advantage or the location competitiveness, the dependent variable we consider is the share of world FDI flows. The empirical model we adopt is highly parsimonious and is expressed as:

$$FDI_{i,t} = \beta_0 + \beta_1 RGDP_{i,t} + \beta_2 TRADE_{i,t} + \beta_3 INFRASTRUCTURE_{i,t} + \beta_4 CREDIT_{i,t} + \beta_5 INFLATION_{i,t} + \beta_6 EXCHANGE_{i,t} + \beta_7 CLUSTERS_{i,t} + \varepsilon_{i,t} \quad \textbf{(1)}$$

where *FDI* is the country's share of world FDI inflows (in percentage). *RGDPCAPITA* is real GDP measured in constant 2010 US dollars (log) to account for the host country market size, *TRADE* is the percentage of trade to GDP to account for trade openness, *INFRASTRUCTURE* is measured by the number of registered carrier departures worldwide (log) to account for the degree of infrastructure development. *CREDIT* is private sector domestic credit as a percentage of GDP to account for financial development. *INFLATION* is the GDP deflator-based inflation rate (log), to account for macroeconomic stability. *EXCHANGE* is the devaluation of the exchange rate expressed in terms of the logarithm of the (period) average number of local currency units per US dollar to account for competitiveness. *CLUSTERS* is the institutional clusters extracted using PCA. The subscripts *i* and *t* are country and time indexes.

In our analysis we use panel data on a sample of 127 countries over the period 1987-2014.[6] Data on the dependent variable – the share of world FDI inflows - are obtained from UNCTADSTAT database. Data on *RGDP*, *TRADE*, *INFRASTRUCTURE, CREDIT, INFLATION* and *EXCHANGE* are obtained from the World Bank's World Development Indicators (WDI). Data on institutions from which we extract *CLUSTERS* are obtained from the International Country Risk Guide (ICRG).

ICRG data include 12 political risk components: a) government stability, b) socioeconomic conditions, c) investment profile, d) internal conflict, e) external conflict, f) corruption, g) military in politics, h) religion in politics, i) law and order, j) ethnic tensions, k) democratic accountability, and l) bureaucracy quality. We exclude "socioeconomic conditions" since this variable is correlated to economic performance, which likely affects perceptions about institutions as Jellema and Roland (2011) argue. Higher (lower) scores indicate lower (higher) risk and better (worse) institutional performance.

*Government stability* measures the government power to undertake its announced economic and political programs and remain in office. This power depends on and is measured by government unity, legislative strength and the support of people. The maximum score is 12. *Investment profile* assesses risk factors, which affect investment in the country. Risk factors include the extent of contract expropriation, the degree to which investors repatriate earned profit and delays in government payments back to investors. The maximum score is 12. *Internal conflict* measures political violence and its impact on governance. The maximum score is 12. *External conflict* measures the risks of wars and cross-border conflicts to the incumbent government. The maximum score is 12. *Corruption* assesses the degree of corruption within the political system. The maximum score is 6. *Military in politics* assesses the degree of interference and involvement of the military establishment in politics. The maximum score is 6. *Religion in politics* measures the domination of a single religious group and its intent, attempts and/or success to replace civil laws by religious law and exclude other religions from the social and/or political process. The maximum score is 6. *Law and order* measures the degree of strength, independence, and unbiasedness of the legal system and people's observance of law. The maximum score is 6. *Ethnic tensions* measure the degree of racial, national, and linguistic tensions. The maximum score is 6. *Democratic accountability* measures the responsiveness of government to its people. The maximum score is 6.

[6] These are Albania, Algeria, Angola, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Belarus, Belgium, Bolivia, Botswana, Brazil, Brunei, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Congo, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gabon, Gambia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Malta, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Tanzania, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, UAE, Uganda, Ukraine, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Yemen, and Zambia.

*Bureaucracy quality* assesses the strength to govern without severe changes in policy and/or interruptions in the provision of public services. The maximum score is 4.

## 4. Empirical issues and estimation methodology

We account for three main issues in the empirical methodology. The first issue is the identification of institutional clusters using PCA and the interpretation of their estimated coefficients. The second is the presence of panel unit root processes associated with explanatory variables time series. The third is the presence of potential endogeneity, arising from the presence of unobservable country and/or time effects, simultaneity, and variable omission.

### *A. Identification of institutional clusters*

The first issue is to identify institutional clusters using PCA. Identification of clusters is based on the correlation between institutions. While extracting clusters is a straightforward task theoretically, correlation among institutions might not be strong enough to render such extraction a simple task practically. In addition, interpreting or labeling these clusters is subjective depending on the institutional composition of these clusters.

As Norman and Streiner (2008) explain, the idea of PCA is to explain the variance among a number of variables in terms of orthogonal principal components. In doing so, PCA obtains a series of linear combinations of variables which define each component, with the number of linear combinations or components equal to the number of variables.[7] A principal component $i$ takes the following form:

$$PC_i = w_{i1}x_1 + w_{i2}x_2 + \cdots + w_{ik}x_k \qquad \textbf{(2)}$$

where $x$ is a variable, $w$ is the weight, $i$ is variable indicator with $i = 1, \dots, k$. The weight $w$ has two subscripts, with the first one indicating the principal component, and the second one indicating the variable it relates to. The $w$'s for the principal components are chosen in such a way that sequentially expresses the largest amount of variance in the sample. For example for the first principal component, $w$'s express the largest amount of variance in the sample, while for the second component $w$'s are derived in such a way that the second component is uncorrelated to the first one and expresses the next largest amount of variance.

One criterion for choosing among the derived principal components (clusters) is the Kaiser criterion. According to this criterion, principal components with eignevalues exceeding 1 are selected. In interpreting the principal components, we will adopt the results of orthogonal (Varimax) rotation.

[7] See Norman and Streiner (2008) page 198.

We should point out that the interpretation of the estimated coefficients of principal components (clusters) can be challenging. To simplify such task, we conduct our PCA on the Z-scores of ICRG institutions. This has two advantages. First, it does not alter the results. Second, it makes the interpretation of the coefficients easier. The estimated coefficients are interpreted as the influence of an increase of one standard deviation of the principal component on the share of world FDI flows.

*B. Presence of Unit Root*

The second issue is to detect potential unit root process, which might result in spurious regressions. To detect non-stationarity, we use a battery of panel unit root tests. The first test is Levin, Lin and Chu (LLC) unit root test, which assumes identical first-order autoregressive coefficients across countries. We also use the Im, Pesaran and Shin (IPS) W-stat, and the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) - Fisher Chi-square tests, which allow the first-order autoregressive coefficients to vary across countries.

The LLC unit root test involves fitting a the following regression equation

$$\Delta y_{it} = \alpha_i + \gamma_i y_{it-1} + \sum_{j=1}^{k} \alpha_j \Delta y_{it-j} + \varepsilon_{it} \quad \textbf{(2)}$$

The subscripts $i$ and $t$ are country and time indicators with $i=1,...,N$ and $t=1,...,T$. The null hypothesis $H_0$: $\gamma_i = \gamma = 0, \forall\, i$ against the alternative hypothesis $H_1$: $\gamma_1 = \gamma_2 = \cdots = \gamma_N < 0, \forall i$. The IPS, ADF and PP tests allow the first-order autoregressive coefficients to vary across countries under the alternative hypothesis $H_1$: $\gamma_i < 0, \forall i$. The selection of the number of lags is based on Schwarz Information Criterion (SIC).

*C. Endogeneity, Causes, and Estimation*

The third issue is to address potential endogeneity, defined as the correlation between the explanatory variables and the error term. Endogeneity may result from the presence of unobservable country or time effects, simultaneity, or variable omission. The presence of endogeneity results in inconsistent ordinary least squares (OLS) estimates.

To account for country and time specific effects, we use least squares dummy variables (LSDV) estimation methodology. In detecting simultaneity between the dependent and explanatory variables, we use Granger-causality tests.

## 5. Empirical results

A. *Descriptive statistics*

Table 1 provides descriptive statistics of the non-logarithmically transformed variables. *FDI* shows a mean value of nearly three quarters of one percent with a minimum value of -3.42 percent. This suggests that at least one country experienced more divestment than investment in a year. Inspecting *FDI* data closely shows that many countries, both developed and developing, have experienced negative FDI

inflows.[8] *RGDP* shows a mean of about US$0.4 trillion with a standard deviation of about US$1.3 trillion. In a similar fashion, we can observe wide variation in *INFRASTRUCTURE* and *EXCHANGE*. Exchange rate shows both depreciation and appreciation. The maximum depreciation and appreciation rates are 10 and 18 percent, respectively. Such variation lends support to taking the log of these variables in order to reduce the standard error and increase estimate efficiency.

**Table 1: Descriptive Statistics**

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| *FDI* (%) | 3675 | 0.72 | 2.30 | -3.42 | 43.53 |
| *RGDP* (US$ billion) | 3569 | 395.39 | 1316.53 | 0.24 | 16177.46 |
| *TRADE* (%) | 3514 | 79.60 | 48.69 | 0.31 | 439.66 |
| *INFRASTRUCTURE* (million) | 3370 | 0.18 | 0.79 | 0.00 | 10.10 |
| *CREDIT* (%) | 3434 | 46.71 | 43.04 | 0.00 | 312.12 |
| *INFLATION* (%) | 3562 | 39.47 | 346.24 | -27.63 | 13611.63 |
| *EXCHANGE* (%) | 3348 | 2.73 | 3.11 | -17.89 | 10.16 |

The share of world FDI flows is concentrated in few countries (Appendix A). The US, UK, China, France, Belgium, Spain and Canada occupy nearly half of the world FDI flows, with the US and UK alone accounting for about 30 percent. A look at the share of world FDI flows by income level shows that high income OECD countries have the highest average shares with the US, UK, France, Belgium, Spain, Netherlands, Canada, Germany, Australia, Mexico, Italy, Sweden, Switzerland and Ireland each having at least one percent of world FDI flows. Among the non-OECD countries, China, Singapore, Brazil, Russia and India each has at least one percent of world FDI flows.

B. *Identification of institutional clusters*

Table 2 presents the correlation coefficients matrix for the different institutions in the full (145) ICRG dataset for the period 1984-2014. Internal conflict, law and order, military in politics (in descending order) have the highest sums of correlation coefficients among the different institutions, while ethnic

[8] These countries include Angola, Argentina, Australia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Belgium, Bolivia, Botswana, Brunei, Cameroon, Canada, Denmark, Egypt, El Salvador, Finland, France, Gabon, Germany, Guyana, Iceland, Indonesia, Iran, Ireland, Italy, Jamaica, Japan, Jordan, North Korea, Kuwait, Liberia, Libya, Luxembourg, Malawi, Malta, Mozambique, Netherlands, New Zealand, Niger, Norway, Panama, Papua New Guinea, Peru, Qatar, Saudi Arabia, Senegal, Sierra Leone, Slovenia, Somalia, South Africa, Sudan, Suriname, Sweden, Switzerland, Tanzania, Togo, UAE, Uganda, United Kingdom, Uruguay, Venezuela, and Yemen. The number of observations with negative values amount to 201 with a mean of -0.2 percent and a standard deviation of 0.44 percent.

tensions, religion in politics, and government stability have the lowest.[9] For example, internal conflict is highly correlated with law and order, external conflict, military in politics, and ethnic tensions. Therefore as one examines the influence any of these institutions on FDI flows, we are very likely capturing the influence of some other institution.

**Table 2: Correlation Coefficients Matrix**

| | GS | IP | IC | EC | C | MP | LO | RP | DA | BQ | ET |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| GS | 1.000 | | | | | | | | | | |
| IP | 0.550 | 1.000 | | | | | | | | | |
| IC | 0.453 | 0.488 | 1.000 | | | | | | | | |
| EC | 0.321 | 0.373 | 0.646 | 1.000 | | | | | | | |
| C | 0.098 | 0.255 | 0.425 | 0.315 | 1.000 | | | | | | |
| MP | 0.227 | 0.531 | 0.617 | 0.464 | 0.564 | 1.000 | | | | | |
| LO | 0.373 | 0.472 | 0.691 | 0.439 | 0.612 | 0.634 | 1.000 | | | | |
| RP | 0.118 | 0.213 | 0.458 | 0.380 | 0.326 | 0.405 | 0.336 | 1.000 | | | |
| DA | 0.113 | 0.463 | 0.441 | 0.411 | 0.519 | 0.602 | 0.447 | 0.324 | 1.000 | | |
| BQ | 0.230 | 0.532 | 0.510 | 0.386 | 0.676 | 0.690 | 0.655 | 0.270 | 0.620 | 1.000 | |
| ET | 0.300 | 0.276 | 0.600 | 0.393 | 0.326 | 0.407 | 0.500 | 0.402 | 0.237 | 0.320 | 1.000 |

Notes: Based on ICRG's 145 countries. BQ: bureaucracy quality. C: Corruption. DA: democratic accountability. ET: ethnic tensions. EC: external conflict. GS: government stability. IC: internal conflict. IP: investment profile. LO: law and order. MP: military in politics. RP: religion in politics. All correlation coefficients are statistically significant at the 5 percent significance level.

This correlation is useful in the extraction of principal components or institutional clusters. Identifying correlation coefficients of 0.3 and above in the correlation matrix is the basic requirement for a successful factor extraction, as Norman and Streiner (2008) point out based on Tabachnick and Fidell (2001).

Assessing sampling adequacy, the Kaiser-Meyer-Olking (KMO) statistic amounts to 0.878 indicating that the different institutions will likely load on components. The Bartlett's test of sphericity shows a *p* value of 0.000, which indicates that the correlation matrix is not an identity matrix.[10]

Table 3 shows the 11 principal components obtained, with three components having eigenvalues exceeding 1 according to the Kaiser criterion. The three components explain nearly 70 percent of the cumulative variance. The first component alone explains nearly half of the variance.

**Table 3: Principal Component Analysis of Institutions**

| Total Variance Explained | | | | Orthogonally Rotated Component Matrix | | | |
|---|---|---|---|---|---|---|---|
| Component | Initial Eigenvalues | | | | Component | | |
| | Total | % of Variance | Cumulative % | Institution | 1 | 2 | 3 |

[9] The order of the sums of correlation coefficients is: internal conflict, law and order, military in politics, bureaucracy quality, democratic accountability, investment profile, external conflict, corruption, ethnic tensions, and religion in politics, and government stability.

[10] The Chi-square value amounts to 23,564.3 and the *p*-value is 0.000.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | **5.4** | **49.0** | **49.0** | BQ | **0.857** | 0.149 | 0.238 |
| 2 | **1.3** | **11.7** | **60.8** | C | **0.792** | 0.266 | -0.072 |
| 3 | **1.1** | **9.7** | **70.5** | DA | **0.783** | 0.155 | 0.108 |
| 4 | 0.7 | 6.8 | 77.2 | MP | **0.737** | 0.361 | 0.227 |
| 5 | 0.6 | 5.4 | 82.6 | LO | **0.606** | 0.441 | 0.34 |
| 6 | 0.5 | 4.4 | 87.0 | ET | 0.131 | **0.767** | 0.2 |
| 7 | 0.4 | 3.6 | 90.6 | RP | 0.217 | **0.752** | -0.116 |
| 8 | 0.3 | 2.9 | 93.5 | IC | 0.372 | **0.691** | 0.425 |
| 9 | 0.3 | 2.5 | 96.0 | EC | 0.273 | **0.604** | 0.314 |
| 10 | 0.2 | 2.1 | 98.1 | GS | -0.021 | 0.203 | **0.881** |
| 11 | 0.2 | 1.9 | 100.0 | IP | 0.443 | 0.079 | **0.748** |

Notes: Based on ICRG's 145 countries. BQ: bureaucracy quality. C: Corruption. DA: democratic accountability. ET: ethnic tensions. EC: external conflict. GS: government stability. IC: internal conflict. IP: investment profile. LO: law and order. MP: military in politics. RP: religion in politics. Varimax method is used for orthogonal rotation. PCA is performed on the Z-scores of the institutions. The numbers in the orthogonally rotated component matrix indicate correlation between the variable (institution Z-score) and the principal component.

To interpret the components we adopt the Varimax method, which rotates the components orthogonally. Orthogonal rotation has two advantages. First, it minimizes the number of variables, which have high loadings on each factor, and thus helps simplify factor interpretation. Second, it assumes that the components or broad institutional themes are uncorrelated to each other. We should be clear though that: 1) the PCA methodology is built on the correlation between institutions, 2) for each component we account for the correlation between individual institutions and the component, and 3) the orthogonal rotation is based on the assumption that the components are uncorrelated with each other.

Orthogonal rotation of the extracted components shows that the first component has the highest correlation, as indicated by the bold fonts in table 3, with bureaucracy quality, corruption, democratic accountability, military in politics, and law and order. The second component has the highest correlation with ethnic tensions, religion in politics, and internal and external conflicts. The third component has the highest correlation with government stability and the risk of investment expropriation (investment profile).

One may interpret the first component as "quality of public administration".[11] The second component may be interpreted as "social cohesion". The third component may be interpreted as "stability and property rights protection".

### *C. Non-stationarity and endogeneity*

We report the panel unit root test results in table 4. The lag length is (automatically) selected up to five periods based on the SIC. Results indicate rejection of the null hypothesis of the presence of unit root process for *FDI*, *TRADE*, INFLATION and *EXCHANGE*. However for *RGDP*, and *INFRASTRUCTURE* , we failed

[11] In public administration, the role of bureaucracy in implementing laws and policies and the behavior of elected officials are considered important.

to reject the null hypothesis and accordingly we took the first difference. First differencing these variables has resulted in the rejection of the null hypothesis. As for *CREDIT*, LLC test result indicates rejection of the null hypothesis of presence of unit root process. However, IPS, ADF, and PPF test results fail to reject the null hypothesis. Thus we first difference *CREDIT*. All test results indicate rejection of the null hypothesis.

**Table 4: Panel Unit Root Tests**

| | LLC | IPS | ADF | PP |
|---|---|---|---|---|
| *FDI* | -8.245a | -11.822a | 705.248a | 771.457a |
| *RGDP* | 26.478 | 32.737 | 79.252 | 71.690 |
| D.*RGDP* | -18.223a | -20.253a | 989.919a | 1079.110a |
| *TRADE* | -4.880a | -2.590a | 361.034a | 361.834a |
| *INFRASTRUCTURE* | 8.009 | 6.775 | 285.479 | 239.787 |
| D.*INFRASTRUCTURE* | -34.188a | -34.989a | 1730.140a | 2028.620a |
| *CREDIT* | -2.353a | 2.250 | 294.193 | 210.408 |
| D.*CREDIT* | -28.084a | -30.474a | 1412.970a | 1604.010a |
| *INFLATION* | -36.920a | -30.197a | 1479.590a | 1256.310a |
| *EXCHANGE* | -2.731a | -4.173a | 598.419a | 411.151a |
| *CLUSTERS* | | | | |
| *CLUSTER1* | -8.609a | -6.69a | 449.243a | 355.581a |
| *CLUSTER2* | -8.073a | -10.29a | 586.298a | 327.51a |
| *CLUSTER3* | -7.21a | -5.627a | 360.024a | 281.288 |

Notes: The lag length is automatically selected based on SIC. a, b, and c indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

For the *CLUSTERS* variable, all test results reject the null hypothesis for *CLUSTER1* and *CLUSTER2*. However, for *CLUSTER3*, LLC, IPS, and ADF test results reject the null hypothesis, while that of PP fail to reject. Based on the three test results, we will proceed without differencing, especially when interpretation of the principal components is not a trivial task.

Examining the presence of simultaneity, we undertook Granger-causality tests on the stationary series. Granger causality test statistics, shown in table 5, indicate that *FDI* does not Granger-cause any of the explanatory variables except *EXCHANGE*. To treat this potential endogeneity issue, we will lag the variable once.

**Table 5: Granger-causality Test Results**

Null Hypothesis: *FDI* does not Granger-cause the explanatory variable

| Variable | Obs. | F-Statistic | Prob. |
|---|---|---|---|
| D.*RGDP* | 3132 | 1.228 | 0.293 |
| *TRADE* | 3185 | 0.370 | 0.691 |
| D.*INFRASTRUCTURE* | 2843 | 1.130 | 0.323 |
| D.*CREDIT* | 2973 | 2.337 | 0.097 |

| | | | |
|---|---|---|---|
| *INFLATION* | 3242 | 0.166 | 0.847 |
| *EXCHANGE* | 3078 | 5.607 | 0.004 |
| *CLUSTERS* | | | |
| *CLUSTER1* | 3407 | 1.403 | 0.246 |
| *CLUSTER2* | 3407 | 0.236 | 0.790 |
| *CLUSTER3* | 3407 | 0.181 | 0.834 |

Notes: Test assumes that the panel data is one stacked dataset and is based on the use of 2 lags. D.*RGDP*: First difference of log real GDP. TRADE: Trade (% GDP). D.*INFRASTRUCTURE*: First difference of log of the number of registered carrier departures worldwide. D.*CREDIT*: First difference of private sector domestic credit (% GDP). *INFLATION*: log of GDP deflator-based inflation rate. *EXCHANGE*: log of the exchange rate expressed in terms the number of local currency units per US dollar. *CLUSTER1*, *CLUSTER2* and *CLUSTER3*: cluster Z-scores.

*D. Estimation results*

Table 6 provides the estimation results using LSDV estimation methodology accounting for both country and time effects. The corresponding *F*-test statistics for the non-robust estimates indicate joint significance of the explanatory variables at the 1 percent level.

Variables are introduced sequentially into the empirical model to allow us to inspect closely the influence of variables on each other. Since the first difference of *RGDP* is taken, results indicate that an improvement in the growth of real GDP by one billion increases world FDI flows share by about 0.6 percentage point, as specification 9 indicates. This result not only emphasizes FDI literature results (Buckley et al. 2007; Chakrabarti 2001; Bevan and Esrtin 2004; Asiedu 2006; Ang 2008; Faria 2016; Dregger et al. 2017) but also highlights the importance of market size to the (relative) competitiveness in attracting FDI at a global scale. For example, Buckley et al. (2007) find that market size matters for China's outward FDI. Chakrabarti (2001) analyses the determinants of FDI motivated by the plethora of empirical studies using extreme bound analysis and finds that market size is one of the robust FDI determinants in cross-country regressions. Bevan and Estrin (2004) find that market size is an important determinant of bilateral FDI flows to Central and Eastern European countries from Western

**Table 6: LSDV Estimation Results**

(Accounting for country and time effects)

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| *D.RGDP* | **0.664a** | **0.785a** | **0.900a** | **1.109a** | **1.042a** | **0.793a** | **0.801a** | **0.755a** | **0.581b** |
| | (0.163) | (0.193) | (0.267) | (0.298) | (0.319) | (0.276) | (0.276) | (0.272) | (0.260) |
| *TRADE* | | 0.001 | 0.002 | 0.002 | 0.002 | -0.000 | -0.000 | 0.000 | 0.000 |
| | | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| *D.INFRASTRUCTURE* | | | **0.054c** | **0.065b** | **0.070b** | 0.037 | 0.038 | 0.041 | 0.035 |
| | | | (0.030) | (0.031) | (0.033) | (0.032) | (0.032) | (0.032) | (0.032) |
| *D.CREDIT* | | | | 0.004 | 0.005 | **0.007c** | **0.007c** | **0.007c** | **0.007c** |
| | | | | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| *INFLATION* | | | | | -0.013 | 0.008 | 0.008 | 0.010 | 0.011 |
| | | | | | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) |
| *L.EXCHANGE* | | | | | | **0.085a** | **0.086a** | **0.085a** | **0.085a** |
| | | | | | | (0.027) | (0.028) | (0.028) | (0.028) |
| *CLUSTER1* | | | | | | | 0.018 | 0.068 | **0.108c** |
| | | | | | | | (0.053) | (0.062) | (0.061) |
| *CLUSTER2* | | | | | | | | **0.136a** | **0.142a** |
| | | | | | | | | (0.051) | (0.051) |
| *CLUSTER3* | | | | | | | | | **0.114b** |
| | | | | | | | | | (0.048) |
| Constant | 0.081 | 0.033 | 0.007 | 0.028 | -0.044 | -0.438b | -0.434b | -0.501b | -0.519b |
| | (0.114) | (0.185) | (0.204) | (0.227) | (0.143) | (0.208) | (0.205) | (0.219) | (0.222) |
| | | | | | | | | | |
| Observations | 3,394 | 3,279 | 2,942 | 2,823 | 2,597 | 2,403 | 2,403 | 2,403 | 2,403 |
| R-squared | 0.796 | 0.803 | 0.802 | 0.812 | 0.813 | 0.843 | 0.843 | 0.844 | 0.844 |
| F-test | **80.52a** | **80.3a** | **71.74a** | **73.16a** | **67.26a** | **76.36a** | **75.85a** | **75.67a** | **75.41a** |

Notes: Robust standard errors in parentheses. The reported F-test statistics are those of the non-robust estimates. a, b, and c indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

countries. Asiedu (2006) find that natural resources and large market sizes attract more FDI to African countries. In the context of Malaysia, Ang (2008) finds that real GDP matters for FDI. Recently Faria (2016) find that market size as well as agglomeration economies, taxes, labor, and location costs impact multinational location choice, while Dregger et al. (2017) find that market size, as well as bilateral trade, drive Chinese outward FDI to the European Union.

Trade openness does not influence *FDI*. In all specifications *TRADE* does not have any economic or statistical significant influence on *FDI*. What this result is indicating is that the degree of trade openness does not influence a country's world share of FDI flows.[12] However, this result is an outcome of including *EXCHANGE* - changes in the exchange rate - in the empirical model, possibly suggesting the importance of exchange rate competitiveness to higher FDI share.

Infrastructure development, measured by the growth rate in the number of registered air carrier departures, has a positive influence on world FDI flow share. An increase of 1 percent in the number of carrier departures increases the share by about 0.01 percentage point. Similar to *TRADE*, the statistical significance of this result disappears once *EXCHANGE* as a possible measure of competitiveness is introduced in the model.

A depreciation of the exchange rate, *EXCHANGE*, in the previous year by one percent increases the share of world FDI flows by nearly one tenth of a percentage point. This result is consistent with the empirical findings of Froot and Stein (1991), Xing (2006), Kimino et al. (2007), Ang (2008), Cuyvers et al. (2011), and recently Mensah et al. (2017), who find that exchange rate depreciation encourages FDI flows. Xing (2006) obtain a similar evidence in the context of Japanese FDI flows to China, Kimino et al. (2007) in the context of inward FDI to Japan, Ang (2008) in the context of FDI in Malaysia, Cuyvers et al. (2011) in the context of FDI flows to Cambodia, Takagi and Shi (2011) in the context of Japanese FDI flows to Asian economies, and Mensah et al. (2017) in the context of FDI flows to Ghana.

The influence of private sector credit exhibits (marginal) statistical significance once exchange rate changes are accounted for in the model. In specifications 6-9, an improvement in the growth of private sector credit by one percentage point increases world FDI share by approximately 0.01 percentage point. Financial development has been found to attract more FDI (Desbordes and Wei 2017; Tang 2017). Examining financial development in source and destination countries, Desbordes and Wei (2017) find that financial development in both types of countries has a large positive influence on greenfield, expansion, and mergers & acquisitions FDI. Financial development is found to increase access to external finance and promote

[12] This result is robust to change in model specification.

manufacturing activity. In examining whether financial development in Central and Eastern European countries helps attract European Union FDI, Tang (2017) finds that bank credit flows and stock market size have a positive influence in 2005-2012 and 1996-2004, respectively. Otchere et al. (2016) examine the relationship between FDI and financial market development in Africa and find bidirectional causality, a positive relationship supported by multivariate regressions. Tang et al. (2014) find financial development is one of the factors that significantly influence inward FDI in the electrical and electronic industry in Malaysia. Other variables include real exchange rate, corporate income tax, macroeconomic uncertainty and social uncertainty. Earlier Alfaro et al. (2004) in explaining the relationship between FDI and growth find that countries with well-developed financial markets gain significantly from FDI, a result Ang (2009) reaches for Malaysia.

The quality of public administration cluster does not have a statistically significant influence the FDI share, as specification 7 shows. The positive influence of this cluster becomes statistically significant, however, when the social cohesion and the stability and property right protection clusters are introduced in the model. Social cohesion in contrast has a positive and statistically significant influence on world FDI shares. An improvement in social cohesion by one standard deviation increases FDI share by more than one tenth of a percentage point, as specifications 8 and 9 shows. Finally, similar to social cohesion, stability and property rights protection has a positive influence on world FDI shares.

The influence of *all* institutional clusters on world FDI shares is clearly positive. Changing the sequence of introducing these clusters into the empirical model does not affect the results.

### *E. Robustness checks*

Our strategy for robustness checks starts by changing the sampling period for the above model. We split the sampling period into two: 1987-1998 and 1999-2014. The main reason for ending the first sample period in 1998 is the 1997-1998 Asian financial crisis.[13] While this crisis was purely financial and is attributable to the accumulation of short term debt to finance long term economic activities, the deterioration of governance, and the spread of crony capitalism in Indonesia in particular, the onset of crises in 1999 onwards may have made foreign investors sensitive to political and possibly social risks. As figure 1 shows, total world FDI flows have been more fluctuating in 1999-2014 compared to 1987-1998.

[13] The Asian financial crisis hit the Southeast Asian countries of Korea, Indonesia, Thailand, the Philippines and Malaysia.

Second, we distinguish between high and low world FDI flow shares by including a dummy variable for the high FDI share countries and interaction terms. The former include the US, UK, China, France, Belgium, Spain and Canada, which account for about 50 percent of world FDI flows. The latter group of countries are the rest. Figure 1 shows the level of FDI flows broken down by income level. It is observed that high income OECD countries, which include the high FDI share countries, obtained more FDI flows than upper middle and lower income countries.

**Figure 1**

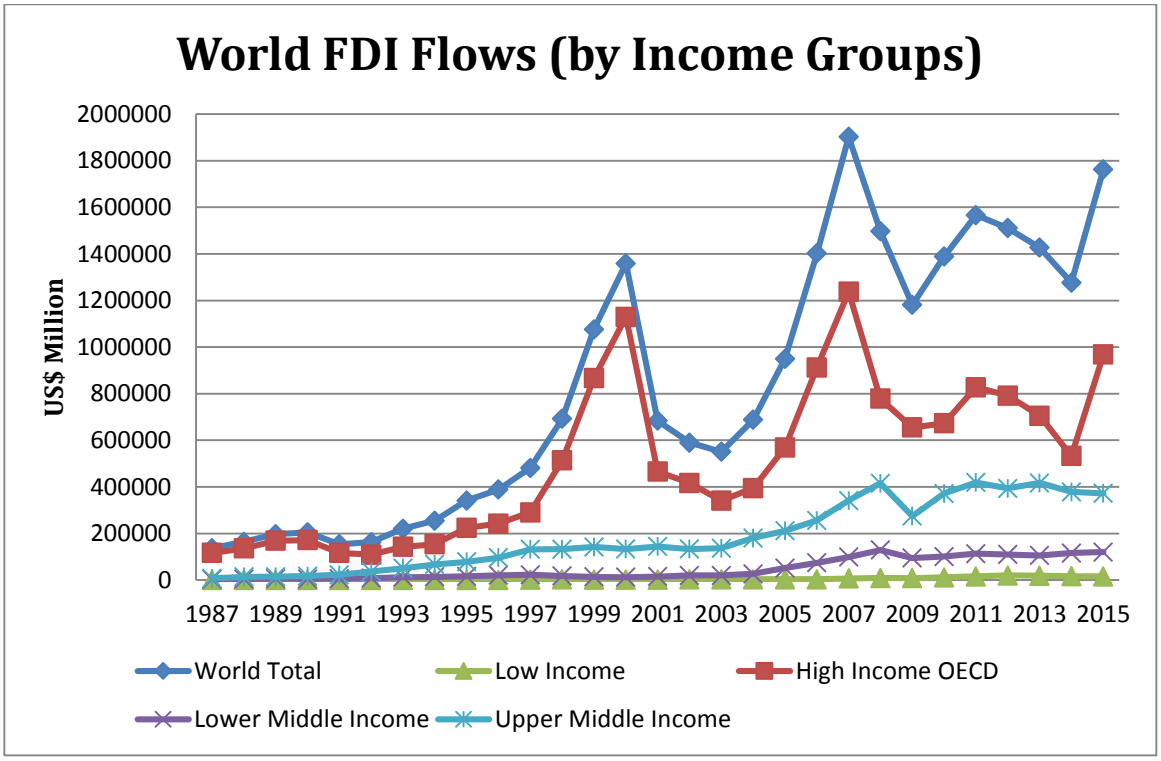


Table 7 presents the robustness checks results. The first two columns present the results for the sample decomposition. In 1987-1988 exchange rate changes have a positive and statistically significant influence on the world FDI share. However, this influence disappears in the 1999-2014 period. The stability and property rights protection cluster has a positive influence in 1987-1998.

In 1999-2014, market size exerts a surprisingly negative influence on FDI shares at the 5 percent level. This significance disappears however when we exclude *EXCHANGE* from the model. The social cohesion cluster continues to exert a positive influence, similar to the results

of table 6. The quality of public administration cluster has a positive influence, while the stability and property rights protection cluster has no influence in contrast.

How different is the influence of clusters in high FDI share countries as opposed to other countries? The third column shows the influence in both country groups for the period 1999-2014, which experienced FDI flows volatility . In the "low" FDI share countries, the influence of these clusters is given by the coefficients of the variables *CLUSTER1*, *CLUSTER2*, and *CLUSTER3*. The influence in the high FDI share countries is provided by the addition of the coefficients of these variables to the coefficients of the corresponding interaction terms. To ensure robustness of results, we add only those statistically significant coefficients at least at the 5 percent level. Since the coefficients of the interaction terms are positive, the influence of clusters in high FDI share countries exceeds that for the low FDI share countries. The influence of the three clusters is 14.6, 4.8, and 3,6, respectively. The coefficient of

**Table 7: Robustness Checks**
(Accounting for country and time effects)

| | 1987-1998 | 1999-2014 | High FDI Share 1999-2014 |
|---|---|---|---|
| *D.RGDP* | 0.606 | **0.531c** | 0.332 |
| | (0.413) | (0.290) | (0.230) |
| *TRADE* | 0.000 | **-0.003b** | **-0.004a** |
| | (0.001) | (0.001) | (0.001) |
| *D.INFRASTRUCTURE* | 0.039 | 0.037 | 0.031 |
| | (0.043) | (0.041) | (0.043) |
| *D.CREDIT* | 0.004 | 0.004 | 0.001 |
| | (0.005) | (0.005) | (0.004) |
| *INFLATION* | **0.000c** | -0.000 | -0.000 |
| | (0.000) | (0.001) | (0.001) |
| *L.EXCHANGE* | **0.091a** | -0.094 | **-0.111c** |
| | (0.032) | (0.079) | (0.061) |
| *CLUSTER1* | -0.041 | **0.334a** | **0.173a** |
| | (0.078) | (0.087) | (0.051) |
| *CLUSTER2* | 0.061 | **0.207b** | **0.105b** |
| | (0.043) | (0.081) | (0.042) |
| *CLUSTER3* | **0.191a** | 0.019 | 0.005 |
| | (0.064) | (0.070) | (0.047) |
| *HIGHFDISHARE* | | | **-27.548b** |
| | | | (10.881) |
| *CLUSTER1*HIGHFDISHARE* | | | **14.444a** |
| | | | (5.142) |
| *CLUSTER2*HIGHFDISHARE* | | | **4.718a** |

| | 1987-1998 | 1999-2014 | High FDI Share 1999-2014 |
|---|---|---|---|
| | | | (1.801) |
| *CLUSTER3*HIGHFDISHARE* | | | **3.609b** |
| | | | (1.602) |
| *HOECD* | | | |
| | | | |
| *CLUSTER1*HOECD* | | | |
| | | | |
| *CLUSTER2*HOECD* | | | |
| | | | |
| *CLUSTER3*HOECD* | | | |
| | | | |
| Constant | -0.600a | 0.725 | 0.870a |
| | (0.208) | (0.452) | (0.330) |
| | | | |
| Observations | 1,110 | 1,481 | 1,481 |
| R-squared | 0.872 | 0.852 | 0.871 |
| *F*-test | **47.74a** | **56.61a** | 64.74a |

the first cluster suggests that an improvement in the quality of public administration by one standard deviation increases world FDI shares by about more than 14.6 percentage points.

## 6. Conclusion and policy implication

The extant literature on capital flows-institutions nexus has focused empirically on examining the relationship between individual institutions and capital flows. The correlation between the different institutions was largely ignored and thus the unraveling of the influence of individual institutions has been spoiled. In this paper we have dealt with the problem of multicollinearity by using PCA to obtain non-orthogonal components or institutional clusters. Three clusters were extracted: quality of public administration, social cohesion, and stability and property rights protection. Whether these clusters impact the competitiveness of countries to attract FDI flows relative to the world total is empirically examined in this paper. Empirical evidence has shown that in the post 1998 Asian crisis period an improvement in the quality of public administration and social cohesion have a positive and robust impact on world FDI shares. This result is novel to the best of our knowledge.

Clustering institutions allows us to have a wider perspective and understanding of their functionality. For example, improving the quality of public administration requires the

understanding of its two dimensions: public administration (bureaucracy quality, corruption and law and order) and political institutions (democratic accountability and military in politics). While policy makers may strongly believe and advocate the reform of the public administration dimension, leaving out the reform of political institutions may reduce the chances of success. Understanding the importance of representing and serving citizens, which is at the core of democracy, is key to improving the quality of public administration. The understanding of the interrelationships among institutions is very useful and perhaps key to the design, implementation, and evaluation of institutional reform programs.

**References:**


Aleksynska, M., Havrylchyk, O. (2013). FDI from the south: The role of institutional distance and natural resources. *European Journal of Political Economy*, 29, 38-53.

Alfaro, L., Kalemli-Ozcan, S., & Volosovych, V. (2008). Why doesn't capital flow from rich to poor countries? An empirical investigation. *Review of Economics and Statistics*, 90 (2), 347-368.

Ang, J. B. (2008). Determinants of foreign direct investment in Malaysia. *Journal of Policy Modeling*, 30(1), 185-189.

Ang, J. B. (2009). Financial development and the FDI-growth nexus: The Malaysian experience. *Applied Economics*, 41(13), 1595-1601.

Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions and political instability. *World Economy*, 29(1), 63-77.

Bevan, A. A., & Estrin, S. (2004). The determinants of foreign direct investment into European transition economies. *Journal of Comparative Economics*, 32(4), 775-787.

Buckley, P. J., Clegg, L. J., Cross, A. R., Liu, X., Voss, H., & Zheng, P. (2007). The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38(4), 499-518.

Busse, M., Königer, J., Nunnenkamp, P. (2010). FDI promotion through bilateral investment treaties: More than a bit? *Review of World Economics*, 146 (1), 147-177.

Calderón, C., & Fuentes, J.R. (2012). Removing the constraints for growth: Some guidelines. *Journal of Policy Modeling*, 34 (6), 948-970.

Chakrabarti, A. (2001). The determinants of foreign direct investment: Sensitivity analyses of cross-country regressions. *Kyklos*, 54(1), 89-113.

Cuyvers, L., Soeng, R., Plasmans, J., & Van Den Bulcke, D. (2011). Determinants of foreign direct investment in Cambodia. *Journal of Asian Economics*, 22(3), 222-234.

Daude, C., & Fratzscher, M. (2008). The pecking order of cross-border investment. *Journal of International Economics*, 74 (1), 94-119.

De Santis, R.A., & Lührmann, M. (2009). On the determinants of net international portfolio flows: A global perspective. *Journal of International Money and Finance*, 28, 880-901.

Desbordes, R., Wei, S.-J. (2017). The effects of financial development on foreign direct investment. *Journal of Development Economics*, 127, 153-168.

Dixit, A. (2009). Governance institutions and economic activity. *American Economic Review*, 99 (1), 5-24.

Dreger, C., Schüler-Zhou, Y., & Schüller, M. (2017). Determinants of Chinese direct investments in the European Union. *Applied Economics*, 1-10. doi:10.1080/00036846.2017.1279269

Dunning, J. (1981). *International Production and the Multinational Enterprise*. (London: Allen & Unwin).

Faria, J.R. (2016). Location Clusters, FDI and Local Entrepreneurs: Consistent Public Policy. *Journal of the Knowledge Economy*, 7(4), 858-868.

Fratzscher, M. (2012). Capital flows, push versus pull factors and the global financial crisis. *Journal of International Economics*, 88 (2), 341-356.

Froot, K. A., & Stein, J. C. (1991). Exchange rates and foreign direct investment: An imperfect capital markets approach. *The Quarterly Journal of Economics*, 106(4), 1191-1217.

Globerman, S. & Shapiro, D. (2002). Global foreign direct investment flows: The role of governance infrastructure. *World Development*, 30 (11), 1899-1919.

Henisz, W. (2000). The institutional environment for multinational investment. *Journal of Law, Economics and Organization*, 16(2), 334–364.

Jellema, J., & Roland, G. (2011). Institutional clusters and economic performance. *Journal of Economic Behavior and Organization*, 79, 108–132.

Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999a). Aggregating governance indicators. World Bank Working Paper #2195.

Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999b). Governance matters. World Bank Working Paper #2196.

Kimino, S., Saal, D. S., & Driffield, N. (2007). Macro determinants of FDI inflows to Japan: An analysis of source country characteristics. *World Economy*, 30(3), 446-469.

Leschke, M. (2000). Constitutional choice and prosperity: A factor analysis. *Constitutional Political Economy*, 11, 265–279.

Mensah, L., Bokpin, G. A., & Fosu-Hene, E. D. (2017). Foreign exchange rate moments and FDI in Ghana. *Journal of Economics and Finance*, 41(1), 136-152.

Norman, G. R., & Streiner, D. L. (2008). *Biostatistics: The Bare Essentials*. (Shelton: PAMPH).

North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5 (1), 97-112.

Otchere, I., Soumaré, I., & Yourougou, P. (2016). FDI and financial market development in africa. *The World Economy*, 39(5), 651-678.

Papaioannou, E. (2009). What drives international financial flows? Politics, institutions and other determinants. *Journal of Development Economics*, 88 (2), pp. 269-281.

Shah, S.H. , Ahmad, M.H. & Ahmed, Q.M. (2016). The nexus between sectoral FDI and institutional quality: Empirical evidence from Pakistan. *Applied Economics*, 48 (17), 1591-1601.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Analysis*. (Boston: Allyn and Bacon).

Takagi, S., & Shi, Z. (2011). Exchange rate movements and foreign direct investment (FDI): Japanese investment in Asia, 1987–2008. *Japan and the World Economy*, 23(4), 265-272.

Tang, C. F., Yip, C. Y., & Ozturk, I. (2014). The determinants of foreign direct investment in malaysia: A case for electrical and electronic industry. *Economic Modelling*, 43, 287-292.

Tang, D. (2017). The determinants of European Union (EU) foreign direct investments in the EU countries from Central and Eastern Europe during 1994–2012. *Comparative Economic Research*, 20(1), 75-99.

Xing, Y. (2006). Why is China so attractive for FDI? The role of exchange rates. *China Economic Review*, 17(2), 198-209.

## Appendix A

| Country | FDI | RGDP | Trade | INFRASTRUCTURE | CREDIT | INFLATION | EXCHANGE |
|---|---|---|---|---|---|---|---|
| | (%) | Billion | (%) | | (%) | (%) | (LCU/US$) |
| Albania | 0.028 | 7.9 | 60.2 | 4,319.34 | 19.24 | 17.71 | 113.61 |
| Algeria | 0.083 | 119.1 | 56.7 | 42,460.61 | 30.31 | 12.55 | 63.03 |
| Angola | 0.081 | 46.7 | 112.7 | 8,727.68 | 11.20 | 439.73 | 52,840.75 |
| Argentina | 0.939 | 305.5 | 25.0 | 104,413.00 | 17.64 | 237.11 | 3.21 |
| Armenia | 0.023 | 6.6 | 77.6 | 4,361.35 | 18.65 | 267.04 | 409.87 |
| Australia | 2.626 | 835.0 | 37.8 | 341,464.60 | 60.04 | 3.65 | 1.35 |
| Austria | 0.545 | 320.4 | 82.1 | 84,374.55 | 72.08 | 2.05 | 11.53 |
| Azerbaijan | 0.120 | 27.6 | 88.9 | 13,837.26 | 12.17 | 166.37 | 0.81 |
| Bahamas | 0.053 | 6.9 | 100.2 | 23,965.03 | 59.57 | 3.34 | 1.00 |
| Bahrain | 0.109 | 16.1 | 151.8 | 20,299.78 | 47.95 | 2.84 | 0.38 |
| Bangladesh | 0.045 | 72.8 | 29.3 | 15,708.31 | 20.40 | 6.62 | 58.09 |
| Belarus | 0.066 | 37.0 | 125.3 | 13,786.17 | 3.31 | 249.41 | 3,977.19 |
| Belgium | 3.619 | 396.2 | 132.8 | 103,849.20 | 39.04 | 2.27 | 33.81 |
| Bolivia | 0.057 | 13.9 | 57.6 | 20,867.34 | 27.53 | 459.96 | 6.23 |
| Botswana | 0.030 | 8.5 | 98.3 | 5,599.86 | 16.83 | 9.88 | 5.45 |
| Brazil | 2.338 | 1601.9 | 21.4 | 469,246.50 | 44.46 | 364.19 | 1.74 |
| Brunei | 0.063 | 11.8 | 106.2 | 9,623.10 | 41.55 | 2.56 | 1.55 |
| Bulgaria | 0.162 | 39.5 | 96.6 | 19,649.11 | 46.64 | 53.87 | 1.24 |
| Burkina Faso | 0.005 | 5.5 | 39.8 | 2,340.27 | 11.71 | 2.55 | 511.45 |
| Cameroon | 0.035 | 18.5 | 42.9 | 6,262.17 | 16.02 | 3.80 | 511.45 |
| Canada | 3.353 | 1289.3 | 63.9 | 594,691.80 | 78.27 | 2.47 | 1.26 |
| Chile | 0.794 | 146.1 | 62.6 | 61,292.70 | 50.87 | 10.13 | 509.62 |
| China | 6.666 | 2914.0 | 39.7 | 851,147.00 | 94.24 | 5.79 | 7.23 |
| Colombia | 0.616 | 205.8 | 34.5 | 160,935.60 | 30.70 | 15.58 | 1,780.90 |
| Congo | 0.064 | 8.5 | 119.1 | 6,127.01 | 10.34 | 5.77 | 504.99 |
| Costa Rica | 0.105 | 24.9 | 80.6 | 22,960.08 | 27.38 | 12.73 | 366.63 |
| Cote d'Ivoire | 0.041 | 21.3 | 76.8 | 5,111.50 | 24.90 | 4.36 | 511.48 |
| Croatia | 0.151 | 53.7 | 79.0 | 18,708.16 | 50.78 | 3.56 | 5.85 |
| Cyprus | 0.101 | 17.8 | 113.4 | 9,526.44 | 131.16 | 3.73 | 0.49 |
| Czech Republic | 0.531 | 169.0 | 105.5 | 40,911.30 | 46.83 | 6.23 | 25.91 |
| Denmark | 0.560 | 279.1 | 80.2 | 80,501.32 | 78.69 | 2.47 | 6.27 |
| Dominican Republic | 0.111 | 33.7 | 70.1 | 4,670.95 | 22.45 | 16.90 | 26.28 |
| Egypt | 0.475 | 139.1 | 50.1 | 48,057.18 | 36.93 | 10.70 | 4.63 |
| El Salvador | 0.027 | 16.7 | 60.9 | 16,769.98 | 32.84 | 3.77 | 8.63 |
| Estonia | 0.092 | 17.7 | 142.4 | 10,017.56 | 57.45 | 6.28 | 13.13 |
| Ethiopia | 0.025 | 17.0 | 44.0 | 28,561.66 | 15.02 | 8.89 | 10.01 |
| Finland | 0.436 | 199.2 | 65.9 | 92,862.12 | 59.76 | 2.72 | 4.93 |
| France | 4.098 | 2234.8 | 49.1 | 486,634.80 | 64.89 | 2.06 | 5.52 |
| Gabon | 0.017 | 12.6 | 89.5 | 9,333.53 | 14.10 | 5.02 | 511.45 |

| Country | FDI | RGDP | Trade | INFRASTRUCTURE | CREDIT | INFLATION | EXCHANGE |
|---|---|---|---|---|---|---|---|
| | (%) | Billion | (%) | | (%) | (%) | (LCU/US$) |
| Gambia | 0.004 | 0.7 | 72.9 | 755.20 | 10.99 | 12.28 | 19.69 |
| Germany | 3.018 | 2970.4 | 59.4 | 536,219.30 | 85.12 | 1.67 | 1.64 |
| Ghana | 0.063 | 20.6 | 69.4 | 7,456.27 | 8.42 | 26.17 | 1.04 |
| Greece | 0.314 | 244.0 | 47.6 | 86,800.17 | 43.17 | 7.96 | 266.74 |
| Guatemala | 0.061 | 29.6 | 50.9 | 4,437.03 | 18.21 | 10.20 | 7.03 |
| Guinea | 0.013 | 3.7 | 60.9 | 1,786.67 | 5.75 | 13.08 | (3,811.57) |
| Guinea-Bissau | 0.000 | 0.7 | 50.8 | 1,200.00 | 8.96 | 31.17 | 458.29 |
| Guyana | 0.012 | 1.7 | 171.8 | 4,344.76 | 29.67 | 23.19 | 173.86 |
| Haiti | 0.004 | 6.7 | 52.7 | 1,213.64 | 14.53 | 10.86 | 29.51 |
| Honduras | 0.043 | 11.1 | 98.1 | 16,402.09 | 31.76 | 11.04 | 15.17 |
| Hungary | 0.459 | 114.9 | 120.9 | 34,409.06 | 38.99 | 9.85 | 192.69 |
| Iceland | 0.054 | 10.4 | 76.0 | 16,642.25 | 71.70 | 8.76 | 86.91 |
| India | 0.919 | 928.3 | 29.7 | 253,225.60 | 25.08 | 7.09 | 43.38 |
| Indonesia | 0.616 | 498.8 | 54.2 | 236,306.40 | 31.86 | 11.84 | 7,608.02 |
| Iran | 0.113 | 305.6 | 39.4 | 89,427.60 | 31.44 | 21.36 | 6,633.63 |
| Iraq | 0.059 | 87.4 | 69.2 | 7,076.08 | 7.55 | 46.60 | 675.12 |
| Ireland | 0.941 | 149.9 | 145.1 | 184,595.10 | 60.88 | 2.86 | 0.66 |
| Israel | 0.379 | 159.0 | 75.3 | 33,562.04 | 54.59 | 28.99 | 3.66 |
| Italy | 1.719 | 1929.8 | 45.6 | 262,263.00 | 64.37 | 3.90 | 1,587.92 |
| Jamaica | 0.052 | 12.0 | 97.1 | 17,940.67 | 24.25 | 19.61 | 59.62 |
| Japan | 0.545 | 5106.8 | 23.1 | 541,640.40 | 150.99 | -0.13 | 110.68 |
| Jordan | 0.076 | 16.3 | 121.5 | 18,134.50 | 54.81 | 4.65 | 0.70 |
| Kazakhstan | 0.500 | 103.5 | 86.1 | 24,279.67 | 28.79 | 199.60 | 131.59 |
| Kenya | 0.015 | 28.3 | 56.2 | 25,086.68 | 21.00 | 10.63 | 69.44 |
| Kuwait | 0.029 | 94.3 | 94.6 | 16,525.90 | 45.47 | 4.04 | 0.29 |
| Latvia | 0.060 | 21.5 | 96.6 | 22,013.67 | 46.40 | 5.46 | 0.57 |
| Lebanon | 0.150 | 25.0 | 85.5 | 15,370.65 | 74.50 | 14.38 | 1,487.34 |
| Liberia | 0.035 | 1.2 | 154.4 | 3,173.68 | 5.23 | 4.70 | 57.50 |
| Libya | 0.047 | 56.9 | 79.4 | 13,232.71 | 19.39 | 10.51 | 0.89 |
| Lithuania | 0.062 | 32.3 | 113.8 | 9,406.23 | 32.45 | 3.82 | 3.25 |
| Luxembourg | 0.568 | 36.9 | 251.4 | 21,867.48 | 85.82 | 2.65 | 33.81 |
| Madagascar | 0.028 | 6.8 | 56.3 | 16,861.57 | 13.68 | 13.20 | 1,502.58 |
| Malawi | 0.006 | 4.5 | 67.1 | 4,011.01 | 10.43 | 22.26 | 140.11 |
| Malaysia | 0.958 | 162.0 | 167.1 | 159,756.20 | 75.87 | 3.25 | 3.31 |
| Mali | 0.013 | 6.8 | 53.3 | 2,334.79 | 15.59 | 4.50 | 511.45 |
| Malta | 0.120 | 6.4 | 164.7 | 9,191.09 | 74.02 | 2.57 | 0.36 |
| Mexico | 2.405 | 829.0 | 47.3 | 232,579.50 | 22.15 | 24.79 | 9.74 |
| Moldova | 0.017 | 4.9 | 117.1 | 4,425.87 | 24.77 | 100.92 | 11.28 |
| Morocco | 0.155 | 62.9 | 62.8 | 34,200.36 | 30.39 | 2.73 | 9.05 |
| Mozambique | 0.067 | 5.5 | 60.7 | 7,547.42 | 15.86 | 26.74 | 20.60 |
| Myanmar | 0.075 | 23.5 | 4.5 | 21,688.55 | 6.08 | 20.75 | 187.59 |

| Country | FDI | RGDP | Trade | INFRASTRUCTURE | CREDIT | INFLATION | EXCHANGE |
|---|---|---|---|---|---|---|---|
| | (%) | Billion | (%) | | (%) | (%) | (LCU/US$) |
| Namibia | 0.032 | 7.7 | 96.8 | 7,246.40 | 42.43 | 9.90 | 6.92 |
| Netherlands | 3.266 | 674.5 | 118.8 | 174,135.00 | 69.30 | 1.76 | 1.85 |
| New Zealand | 0.344 | 115.2 | 58.2 | 152,754.70 | 57.15 | 3.84 | 1.61 |
| Nicaragua | 0.027 | 6.8 | 68.9 | 3,721.03 | 24.03 | 942.84 | 15.46 |
| Niger | 0.015 | 4.1 | 47.0 | 1,809.74 | 9.57 | 3.09 | 511.45 |
| Nigeria | 0.465 | 209.7 | 53.4 | 24,083.45 | 12.04 | 24.05 | 102.71 |
| Norway | 0.577 | 346.1 | 70.3 | 209,478.80 | 62.46 | 3.91 | 6.84 |
| Oman | 0.081 | 40.9 | 88.7 | 18,776.34 | 28.15 | 4.47 | 0.39 |
| Pakistan | 0.145 | 121.7 | 34.1 | 53,116.25 | 23.28 | 9.87 | 60.57 |
| Panama | 0.088 | 18.5 | 152.2 | 28,361.71 | 54.81 | 2.60 | 1.00 |
| Papua New Guinea | 0.041 | 7.1 | 102.9 | 33,517.04 | 20.42 | 5.81 | 2.32 |
| Paraguay | 0.022 | 14.7 | 98.9 | 6,715.89 | 22.07 | 14.40 | 3,869.32 |
| Peru | 0.328 | 97.4 | 35.9 | 44,114.10 | 18.75 | 337.41 | 2.72 |
| Philippines | 0.263 | 135.5 | 76.5 | 84,794.24 | 27.61 | 8.66 | 40.84 |
| Poland | 0.683 | 356.6 | 64.8 | 48,240.14 | 30.72 | 11.72 | 3.01 |
| Portugal | 0.511 | 197.8 | 64.4 | 78,918.77 | 79.89 | 6.38 | 164.95 |
| Qatar | 0.096 | 89.0 | 91.1 | 36,339.10 | 32.05 | 7.97 | 3.64 |
| Romania | 0.234 | 135.8 | 67.0 | 26,095.69 | 22.96 | 42.84 | 2.11 |
| Russia | 1.812 | 1239.8 | 55.3 | 488,484.80 | 26.77 | 133.91 | 21.78 |
| Saudi Arabia | 0.832 | 358.7 | 73.8 | 106,448.10 | 20.89 | 3.00 | 3.75 |
| Senegal | 0.013 | 9.0 | 64.5 | 4,240.53 | 22.33 | 3.34 | 511.45 |
| Sierra Leone | 0.001 | 2.0 | 44.5 | 1,105.22 | 4.81 | 36.20 | 2,370.78 |
| Singapore | 2.563 | 137.3 | 353.4 | 61,354.46 | 78.97 | 1.39 | 1.54 |
| Slovakia | 0.267 | 68.0 | 133.5 | 7,610.59 | 43.11 | 4.63 | 31.10 |
| Slovenia | 0.055 | 41.9 | 116.4 | 15,054.27 | 50.02 | 4.34 | 172.59 |
| South Africa | 0.239 | 282.7 | 52.2 | 100,010.80 | 98.22 | 10.11 | 6.92 |
| South Korea | 0.793 | 693.3 | 70.3 | 197,169.90 | 86.46 | 4.00 | 1,030.86 |
| Spain | 3.422 | 1106.6 | 48.6 | 338,174.00 | 85.45 | 4.14 | 134.97 |
| Sri Lanka | 0.042 | 36.0 | 70.8 | 11,168.10 | 20.76 | 9.62 | 89.39 |
| Sudan | 0.068 | 37.8 | 25.3 | 8,674.46 | 8.69 | 39.06 | 2.37 |
| Suriname | -0.023 | 3.2 | 65.6 | 3,155.86 | 24.21 | 47.51 | 1.97 |
| Sweden | 1.616 | 389.4 | 73.7 | 160,038.50 | 58.96 | 3.10 | 7.49 |
| Switzerland | 1.265 | 480.5 | 95.2 | 160,723.80 | 134.62 | 1.49 | 1.26 |
| Tanzania | 0.048 | 20.9 | 47.4 | 11,318.03 | 9.35 | 15.79 | 1,027.94 |
| Thailand | 0.016 | 227.4 | 101.1 | 95,714.76 | 71.84 | 3.40 | 33.45 |
| Togo | 0.007 | 2.5 | 88.9 | 2,686.46 | 19.46 | 4.08 | 511.45 |
| Trinidad & Tobago | 0.108 | 13.9 | 87.8 | 22,655.10 | 41.45 | 5.43 | 5.89 |
| Tunisia | 0.125 | 29.1 | 89.5 | 18,085.27 | 55.59 | 4.75 | 1.30 |
| Turkey | 0.504 | 512.5 | 44.1 | 132,755.50 | 23.65 | 43.83 | 1.08 |
| UAE | 0.331 | 198.0 | 137.4 | 88,389.93 | 40.78 | 3.83 | 3.67 |
| Uganda | 0.029 | 11.3 | 36.6 | 2,482.22 | 7.67 | 34.65 | 1,751.52 |

| Country | FDI | RGDP | Trade | INFRASTRUCTURE | CREDIT | INFLATION | EXCHANGE |
|---|---|---|---|---|---|---|---|
| | (%) | Billion | (%) | | (%) | (%) | (LCU/US$) |
| Ukraine | 0.277 | 136.9 | 91.2 | 41,405.21 | 35.86 | 256.54 | 6.37 |
| United Kingdom | 7.859 | 2009.1 | 53.2 | 707,840.10 | 80.60 | 3.32 | 0.62 |
| United States | 21.510 | 11918.4 | 23.1 | 7,112,798.00 | 125.64 | 2.30 | 1.00 |
| Uruguay | 0.069 | 29.3 | 46.2 | 8,524.65 | 31.16 | 32.60 | 16.30 |
| Venezuela | 0.265 | 305.4 | 50.3 | 109,685.70 | 24.36 | 32.94 | 1.78 |
| Vietnam | 0.318 | 66.5 | 104.2 | 41,836.70 | 59.18 | 55.66 | 15,369.05 |
| Yemen | 0.032 | 21.6 | 65.1 | 13,792.46 | 5.63 | 15.22 | 139.63 |
| Zambia | 0.060 | 12.3 | 67.9 | 6,771.25 | 11.77 | 40.07 | 3.56 |