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## **Institutional Clusters and FDI Flows to the MENA Region**

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### **Abstract:**

The empirical literature on the institutions-FDI nexus has treated the influence of institutions individually despite the correlation among them. This is a conceptual shortcoming. To overcome this limitation, we cluster institutions using Principal Component Analysis (PCA). We apply PCA to ICRG institutions for 17 Middle East and North Africa countries during the period 1984-2011. Three institutional clusters have been extracted: stability and order, quality of public administration, and presence of democratic systems. Using feasible generalized least squares estimation methodology, estimates show that stability and order and the presence of a democratic system have a positive influence on FDI flows, while the quality of public administration has a surprisingly negative influence.

***JEL Classification:*** F21; C23

***Keywords:*** Institutions, Institutional Clusters, FDI, MENA, Principal Component Analysis.

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<sup>1</sup> This paper has been presented at the 80th International Atlantic Economic Association conference in Boston and the 18<sup>th</sup> EBES conference in Sharjah, UAE. It builds largely on a forthcoming conference proceeding in the “Proceedings of the 18th Eurasia Business and Economics Society Conference” published by Springer.

## **1. Introduction**

The influence of institutions on capital flows has been examined in the extant capital flows literature. Recent studies, such as Daude and Fratzscher (2008), Fratzscher (2012) and Papaioannou (2009), have examined the role of institutions and risk in attracting capital flows. In investigating the effect of global shocks on global portfolio investment flows, Fratzscher (2012) finds that it depends on the recipient country's quality of formal political institutions, country risk, and the strength of macroeconomic fundamentals and policies, a result which Daude and Fratzscher (2008) similarly obtain. They find that the quality of institutions matters most for portfolio investment and least for FDI. Papaioannou (2009) examines the role of institutions in driving capital flows and finds that imperfect legal and judicial institutions deter banking flows.

In the empirical capital flows literature, institutions were treated individually and separately from each other. Such treatment implies that individual institutions are uncorrelated to one another, and ignores their possible clustering around a broader institutional function. This same point is emphasized by Leschke (2000) in the search of components of economic freedom and political liberty that influence prosperity.

In this paper, we use principal component analysis (PCA) to extract institutional components for 17 Middle East and North Africa (MENA) countries using ICRG's political risk indicators for the period 1984-2011. These countries include Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen. We find that institutions can be grouped into 3 clusters or components, which may be interpreted as stability and order, quality of public administration, and the presence of democratic system. We then use these clusters to explain aggregate FDI flows to the region together with other FDI location determinants.

To account for panel heterogeneity and serial correlation, we adopt feasible generalized least squares (FGLS) estimation methodology. FGLS estimation results show that stability and order and the presence of a democratic system have a positive influence on FDI flows, while the quality of public administration has a surprisingly negative influence.

The structure of the paper goes as follows: Section 2 empirically examines correlation among institutions for the sample MENA countries and identifies the main principal components. Section 3 specifies the empirical model, and the data sources. Section 4 discusses the empirical issues and estimation methodology, while section 5 discusses briefly the empirical results. Section 6 concludes.

## **2. Institutional correlation and principal component identification in the MENA region**

We explore the institutional correlation for the MENA region using the International Country Risk Guide (ICRG) political risk indicators for 17 MENA countries over the period 1984-2011. These countries include Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen.

The ICRG indicators include government stability, investment profile, internal and external conflicts, corruption, military and religion in politics, law and order, ethnic tensions, democratic accountability and bureaucracy quality. A higher score for each of these indicators reflects better 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. 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.

Table 1 shows the correlation coefficients matrix for these institutions. Many institutions are strongly correlated to each other.<sup>2</sup> Internal conflict is strongly and moderately correlated to five institutions in total. It is strongly correlated to law and order, ethnic tensions, and external conflicts, and moderately correlated to religion and military in politics. Government stability is moderately correlated to three institutions: internal conflict, investment profile, and ethnic tensions. As the table shows, investment profile, external conflict, law and order, military and religion in politics, and bureaucracy quality are moderately or strongly correlated to two institutions each.

**Table 1: Institutions Correlation Coefficients Matrix**

	GS	IP	IC	EC	C	MP	RP	LO	ET	DA	BQ
GS	1										
IP	0.573	1									
IC	0.575	0.443	1								
EC	0.523	0.501	0.699	1							
C	-0.063	-0.06	0.159	0.16	1						
MP	0.295	0.42	0.543	0.4	0.286	1					
RP	0.409	0.286	0.582	0.445	0.06	0.25	1				
LO	0.499	0.527	0.767	0.587	0.146	0.592	0.471	1			
ET	0.513	0.478	0.748	0.602	0.143	0.438	0.389	0.684	1		
DA	-0.097	0.051	-0.013	0.11	0.051	0.03	-0.167	-0.086	0.111	1	
BQ	0.179	0.328	0.413	0.413	0.302	0.568	0.003	0.486	0.367	0.178	1

**Notes:** IP: investment profile. IC: internal conflict. EC: external conflict. C: corruption. MP: military in politics. RP: religion in politics. LO: law and order. ET: ethnic tensions. DA: democratic accountability. BQ: bureaucracy quality. For each variable, missing values are replaced with the variable mean.

<sup>2</sup> Correlation is strong if the correlation coefficient is 0.7 and above, and moderate if it is 0.5 and less than 0.7.

Instead of examining the influence of individual institutions on FDI flows, an approach which disregards correlation between the different institutions, we use principal component analysis (PCA) to reduce the number of dimensions into a smaller number of principal components.

Table 2 presents the (rotated) principal components or institutional clusters. Analysis reports the clustering of internal conflict, government stability, ethnic tensions, law and order, external conflicts, investment profile and religion in politics into one component.<sup>3</sup> They have the highest correlation coefficients (0.6 and above) with the first component. Corruption, bureaucracy quality, and military in politics have the highest correlation coefficients with the second component. Democratic accountability has the highest correlation coefficient with the third component.

**Table 2: Principal Component Analysis**

Comp.	1	2	3
IC	<b>0.827</b>	0.321	-0.152
GS	<b>0.794</b>	-0.141	-0.107
ET	<b>0.777</b>	0.245	0.056
LO	<b>0.777</b>	0.372	-0.126
EC	<b>0.766</b>	0.232	0.063
IP	<b>0.756</b>	-0.047	0.198
RP	<b>0.590</b>	0.035	-0.521
C	-0.111	<b>0.827</b>	-0.108
BQ	0.356	<b>0.654</b>	0.37
MP	0.492	<b>0.614</b>	0.06
DA	0.036	0.039	<b>0.844</b>

**Notes:** IP: investment profile. IC: internal conflict. EC: external conflict. C: corruption. MP: military in politics. RP: religion in politics. LO: law and order. ET: ethnic tensions. DA: democratic accountability. BQ: bureaucracy quality.

One may interpret the first component as stability and order. The second component may be interpreted as the quality of public administration. The third component may be interpreted as the presence of a democratic system. Guided by these results, we will introduce these three principal components into the empirical model.

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<sup>3</sup> The numbers in the table report the correlation coefficients with the extracted components.

### 3. Empirical model and data

The conceptual framework underlying the empirical model is Dunning's (1981) location advantage hypothesis. To engage in foreign investment abroad, the firm is attracted to the host country by the available location advantages. For example, the host economy may enjoy large domestic or regional market size and potential, developed infrastructure, openness to trade and capital flows, developed financial markets, friendly business environment, and quality domestic institutions. Accordingly, we express the empirical model as:

$$FDI_{i,t} = \beta_0 + \beta_1 CLUSTER_{i,t} + \beta_2 TRADE_{i,t} + \beta_3 INFRA_{i,t} + \beta_4 FINANCE_{i,t} + \epsilon_{i,t} \quad (1)$$

where *FDI* is FDI inflows as a percentage of GDP, *CLUSTER* is institutional clusters extracted using PCA, *TRADE* is trade openness as measured by the sum of imports and exports as a percentage of GDP, *INFRA* is the degree of infrastructure development as measured by the number of mobile cellular subscriptions per 100 people (in log form), *FINANCE* is the degree of financial system depth as measured by percentage of private sector credit to GDP.

Data on FDI are obtained from the UNCTADSTAT database. Data on *TRADE*, *INFRA*, and *FINANCE* are obtained from the World Development Indicators. Data on *CLUSTER* are obtained from ICRG.

### 4. Empirical issues and estimation methodology

In constructing the empirical model, we consider two main empirical issues. These are heterogeneity and serial correlation. MENA countries are diverse with respect to FDI inflows, trade openness, degree of economic development, and financial system depth. This is likely to generate heteroskedasticity in the error term. In presence of heteroskedasticity, coefficient estimates are consistent but inefficient. Standard errors of coefficients are biased and result in inference problems in presence of heteroskedasticity. To detect heteroskedasticity, we conduct a Wald test for panel heterogeneity.

Serial correlation is likely to arise in a long series of data. In this paper, we examine a period of 28 years (1984-2011). In presence of serial correlation, coefficient estimates are consistent though inefficient. The associated standard errors are also not unbiased. To detect the presence of autocorrelation, we conduct a test for autocorrelation as demonstrated by Wooldridge (2002).

## 5. Empirical results

Panel heterogeneity test indicates rejection of the null hypothesis of homoskedasticity at the 1 percent level. Serial correlation test indicates rejection of the null hypothesis of no serial correlation at the 1 percent level. These results lend support to the use of FGLS estimation methodology.

Table 3 shows the estimation results. The stability and order cluster (*CLUSTER1*) exerts a statistically significant, positive influence on FDI flows at the 1 percent level. In other words, an improvement in the institutions forming this cluster, as a group, results in an increase in FDI flows to the MENA region. As mentioned in section 2 above, these institutions comprise internal conflict, government stability, ethnic tensions, law and order, external conflicts, investment profile and religion in politics.

**Table 3: Influence of Institutional Clusters on FDI Flows**  
Dependent variable: FDI inflows (% GDP)

VARIABLES	Estimates	Robust SE
<i>CLUSTER1</i>	0.464a	-0.132
<i>CLUSTER 2</i>	-0.367a	-0.1
<i>CLUSTER3</i>	0.216b	-0.091
<i>TRADE</i>	0.014a	-0.005
<i>INFRASTRUCTURE</i>	0.014a	-0.003
<i>FINANCE</i>	0.022a	-0.005
Constant	-0.374	-0.333
Obs.	382	
Wald test	236.26a	
Countries	17	

**Notes:** Robust standard errors in parentheses. a, b, and c indicates significance at the 1%, 5%, and 10% levels, respectively. *CLUSTER1* refers to stability and order. *CLUSTER2* refers to quality of public administration. *CLUSTER3* refers to the presence of democratic systems.

Similarly the democratic system cluster (*CLUSTER3*) exerts a statistically significant, positive influence at the 5 percent level. In other words, an improvement in democratic accountability is associated with an increase in FDI flows. This result is consistent with Jensen (2003) for a panel of more than 100 countries and with Asiedu and Lien (2011) for countries whose share of natural resources in total exports is below a critical value. For the MENA region, this result is consistent with Zouhaier and Karim (2012) who found a positive association between democracy and investment.

In contrast to the influence of these two clusters, the quality of public administration (*CLUSTER2*) exerts a statistically significant, negative influence on FDI flows at the 1 percent level. Thus, an improvement in corruption, bureaucracy quality, and military in politics, as a group, reduces FDI flows to the MENA region. Although this negative result seems surprising, Helmy (2013) obtained a similar finding on the relation between corruption and FDI in the MENA region. This negative relationship sheds light on the perception about the association between the greasing/greased hand and FDI flows.

The signs of the coefficients of the other explanatory variables are as positive as expected and are statistically significant at the 1 percent level. Trade openness, the degree of infrastructure development, and the depth of the financial system all have positive influence on FDI flows to the MENA region. An increase in each of these variables attracts more FDI flows to region. An increase in the sum of exports and imports (relative to GDP) and in the number of mobile cellular subscriptions per 100 people by one percentage point increases FDI flows by 0.01 percentage point of GDP, while an increase in the extended private sector credit (relative to GDP) by one percentage point increases FDI flows by 0.02 percentage point of GDP.

## **6. Concluding remarks**

In this paper, we have examined the influence of institutional clusters on FDI flows to a sample of 17 MENA region countries. Institutions have been clustered using PCA to account for the correlation between the different institutions, which have been largely overlooked in the institutions-FDI nexus literature. The included MENA countries are

Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen.

Results show that the groups of correlated institutions which serve the stability and order function and constitute the presence of a democratic system encourage FDI inflows to the region. We should note at this point that a democratic system can be more generally viewed as a government, which is responsive to people's needs and wants or their collective choice.

Results also show that the group of correlated institutions which relate to the quality of public administration, including corruption, surprisingly reduces FDI inflows. While these results suggest that fighting corruption and enhancing the quality of the bureaucracy reduce FDI flows, controlling corruption may pay off in terms of promoting trade, which attracts FDI.<sup>4</sup>

The positive relation between responsive or democratic governments and regional FDI flows constitutes an invitation to policy makers in the MENA region to take a deeper look at how can governments be more responsive to their own people without instigating much instability as the Arab Spring did. The mechanisms through which democracy encourages FDI flows to the MENA region need to be explored.

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<sup>4</sup> On the effect of corruption on the economy, see for example d'Agostino et al. (2016a, 2016b), Jain (2001), Mauro (1995), Meon and Sekkat (2005), Mo (2001), and Tanzi (1998).

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