

# The impact of institutions' quality and information availability on capital inflows volatility in selected MENA countries

Capital inflows  
volatility in  
MENA  
countries

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## Abstract

**Purpose** – This paper aims to discuss the main characteristics of the Middle East North Africa (MENA) region's capital inflows volatility. It also examines the effect of institutional quality and information availability on capital inflows volatility in selected MENA countries (Bahrain, Egypt, Israel, Jordan, Kuwait, Libya, Morocco, Oman, Saudi Arabia and Tunisia) in the period 1996–2017.

**Design/methodology/approach** – The study's assessments are based on the International Country Risk Guide (ICRG) and globalization indices. It also employs an updated data set of balance of payments indicators released by the International Monetary Fund. Moreover, the study uses econometric panel modeling of random effect model, with Driscoll-Kraay robust standard error, to analyze the relationship between capital inflows volatility, institutional quality and information availability.

**Findings** – The paper finds that both institutional quality and information availability are in an inverse relationship with the total capital inflows volatility in the MENA region. However, the findings vary across the different components of total capital inflows. For example, the volatility of foreign direct investment (FDI) declines, like total capital flows, as the two factors improve. However, the volatility of foreign portfolio investment (FPI) is negatively related to institutional quality but does not have any significant relationship with information availability. While the volatility of foreign other investments (FOI) decreases with the availability of information, but does not have any significant relationship with institutional quality.

**Originality/value** – This paper expands the limited literature regarding the determinants of capital inflows volatility. Furthermore, it is the first study that investigates the effect of institutional quality and information availability on capital inflows volatility in the MENA region.

**Keywords** Capital flows volatility, Capital movements, Panel data models, Institutions, Information, MENA region

**Paper type** Research paper

## 1. Introduction

The drivers of capital flows [1] volatility are commonly researched, however, few researchers have assessed the effect of domestic and global macroeconomic policies on this volatility.

**JEL Classification** — F32, N1, C23, E02, G14, N25

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Yet such policies have numerous economic consequences such as amplifying the fluctuations of the financial markets and exacerbating macroeconomic instability (Mercado Jr and Park, 2011; Forbes and Warnock, 2012; Opperman, 2016). Recent scholars have divided the factors that drive capital flows volatility to developing countries into domestic and global macroeconomic policies, and financial liberalization, while others consider both domestic and global factors' effects simultaneously [2].

Despite the importance of institutional quality and information availability, few researchers have studied their simultaneous relationship to capital flows volatility (Alfaro *et al.*, 2004, 2007, 2008).

The term "institution" commonly refers to a particular entity, such as a university or a non-governmental organization (NGO). Hamilton (1919) and North (1991) defined institutions as the "rules of the game or the humanly devised constraints that structure political, economic and social interaction" [3], and also distinguished between the rules of the game, like constitutions and regulations, and the game players, such as countries entities.

Hashimoto and Wacker (2016) stated that information disclosure is important in investors' decision making. From the demand side, foreign investors use relevant information to make optimal decisions about anticipated investments. Whereas investors, especially foreign direct ones, who do not have the required information cannot make the appropriate financial assets assessments. From the supply side, productive assets in some countries are almost in vain as a result of poor institutional quality and lack of information. Nevertheless, countries with less productive assets "lemons" disguise their information and attract more capital flows.

For example, in 1996 Intel Corporation decided to spend \$300m to construct a new extension in a developing country. At the final stage of the decision process, Mexico and Costa Rica were shortlisted. The two countries had similar GDP per capita (close to \$3,000 at that time) and similar levels of adult literacy rates. However, each country had a key distinguishing feature, Mexico had well-trained engineers and technicians, but Costa Rica had reputable institutional quality. It was assumed that an electronic-based company like Intel would choose the country that had a distinctive human capital advantage, i.e. Mexico, but Costa Rica's institutional quality and lower corruption levels determined the final decision in their favor (Spar, 1998). This illustrates the importance of institutional quality in attracting capital inflows.

The MENA region [4] countries have been affected, both directly and indirectly, by several regional and global economic and financial crises within the last decade. In addition to this, the region has suffered from weak domestic and global macroeconomic indicators, especially after the Arab Spring. Therefore, the current study analyzes the effect of institutional quality and information availability upon the volatility of the various capital inflow components [5] in a sample of the MENA countries in the period 1998–2017. According to the World Bank (WB) classification, the MENA region consists of 21 countries [6]. However, only 10 of them (Bahrain, Egypt, Israel, Jordan, Kuwait, Libya, Morocco, Oman, Saudi Arabia and Tunisia) are included in the scope of this study due to data availability.

The rest of the study is organized as follows. Section 2 presents a review of relevant literature on capital flows volatility determinants. Section 3 describes the volatility of the gross capital inflows, institutional quality and information availability in the selected MENA countries. The methodology, data, and hypotheses of this study are detailed in section 4. This is followed by the empirical results in section 5. Finally, section 6 concludes the study of the empirical results and also offers some policy recommendations.

## 2. Literature review

Although the volatility of capital inflows are commonly researched, few studies have examined the determinants of volatility. The leading causes of capital inflows volatility are

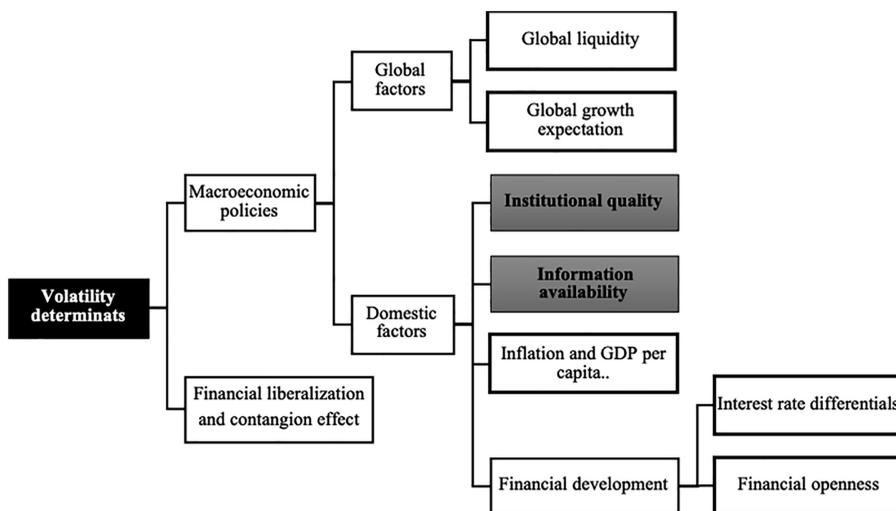
macroeconomic policies and financial globalization dynamics. Figure 1 breaks down both of these determinants into other related factors identified in the existing literature on this subject.

Financial liberalization is considered the leading factor affecting capital inflows volatility in emerging countries [7]. Carp (2014) [8] assumed that financial crises and liberalization had negative externalities on capital inflows volatility because of sharp increases in foreign capital inflows movements. Her study found that after financial globalization and within the disequilibrium environment, the foreign investor always dealt with their funds as deposits and withdrawals from the international market leading to “hot flows”.

Furthermore, the same study developed a different perspective to assess if capital flows volatility was affected by global and regional spillover. Using GMM panel data from 49 emerging and industrial countries, the paper found that both the contagion effect [9] and institutional quality had strong impacts on capital inflows volatility.

Macroeconomic policies can be divided into global and domestic factors. This division has resulted in a great deal of debate among scholars. Some have argued that global factors are the main cause of capital inflows volatility (IMF, 2007, Broto *et al.*, 2011; Wang, 2019). Broto *et al.* (2011) [10] suggested that global drivers had a consistent influence on all levels of capital inflows volatility, but domestic factors were completely “masked” aspects. Also, IMF (2007) found that global factors dampened the volatility of capital inflows by emphasizing the role of global liquidity in emerging countries.

On the contrary, some empirical studies have concluded that domestic aspects lead to more volatility [11]. For instance, Opperman and Adjasi (2017) [12] argued that global factors had an “ambiguous” influence on capital inflows volatility, as global liquidity and private credit had a contradictory signal by increasing the volatility of FDI only. Mercado and Park (2011), also examined the determinants of the level and the vulnerability of capital inflows and their components using the GMM approach. They found, in developing Asian countries, that domestic features had a stronger impact on volatility than global factors. Similarly, Hegerty (2011) and Cerdeiro and Komaromi (2019) found that the more advanced the



Source(s): Researcher using Mercado *et al.* (2011) and Lee *et al.* (2013) division

Figure 1.  
Determinants of capital  
inflows volatility

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countries were, the greater was the effect of financial openness on reducing capital inflows volatility, because of “risk-sharing”.

Furthermore, some researchers have emphasized the simultaneous impact of global and domestic policies (Mohamed, 2017). A few studies have also examined the influence of either institutional quality or information availability. Alfaro *et al.* (2004, 2007, 2008) investigated the main determinants of capital inflows and their volatility using various samples [13] across the last 30 years. The main results of their three studies showed the strong impact of institutional quality and policies, and also provided a partial explanation of the impact of information availability on the magnitude and volatility of capital inflows. While Dreher (2006) and Muhammad *et al.* (2010) examined the effect of the globalization dimensions on economic growth, and found that information flows promoted growth.

The current study contributes to this literature in three different ways; firstly, the study adds to the minimal literature on the analysis of capital inflows volatility, assessing the influence of two crucial variables – institutions and information flows. Secondly, no study in the existing literature to date has focused exclusively on the MENA region when investigating the determinants of capital inflows volatility and their components. Lastly, most previous studies in this field have used the generalized method of moments (GMM), while the current study employs the random effect model using Driscoll and Kraay robust standard error.

### 3. Descriptive analysis

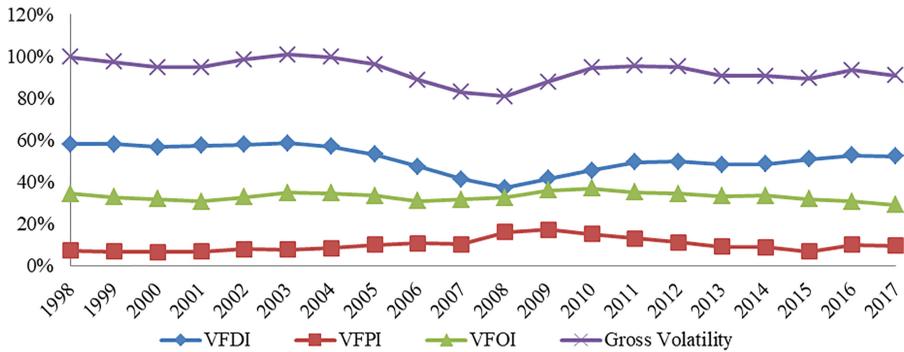
#### 3.1 Capital inflows volatility

Figure 2 shows that the FDI has the highest volatility at 51% on average during the period 1998–2017, followed by other investment inflows at 32.9%, and portfolio investment inflows at 9%. The behavior of the DFI is not consistent with conventional views, which state that FDI as long-term inflows is the least volatile component of foreign capital inflows. Recent empirical studies have not, however, always confirmed these conventional views, especially during periods of unexpected global and regional crises when FDI is considered the most unstable component of capital inflows, especially in developing countries. Similarly, FDI in the selected MENA countries has experienced higher volatility than other components, on account of a series of crises such as the global financial crisis (2007–08) and the Arab Spring that brought a deterioration in governmental stability and internal conflict to most of these countries (Ozan Sula and Willett, 2009; Carril Caccia *et al.*, 2018; Adams-Kane and Lopez, 2019).

#### 3.2 Institutional quality

Institutional quality in the selected MENA countries ranges, on average, between low to moderate-risk rating over the period (1996–2017), according to the International Country Risk Guide (ICRG) (Figure 3). The ICRG provides an overall rating for political, economic and financial risk for a country. Many scholars consider the political risk rating, which assesses political stability [14], as a proxy for institutional quality (Alfaro *et al.*, 2004; Reinhardt *et al.*, 2013; Ahmed and Zlate, 2014). Figure 3 shows that, despite Egypt and Libya having generally had moderate risk ratings during the last two decades, high levels of political risk did occur in both countries in the wake of the 2011 Arab Spring.

The rest of the selected MENA countries range from moderate risk ratings, in Israel, Morocco and Saudi Arabia, to low risk ratings, in Kuwait, Oman, Bahrain, Tunisia, Jordan and Kuwait. This reflects the fact that, during the last decade, the MENA countries have started to recover from the negative consequences of the Arab Spring.



Capital inflows volatility in MENA countries

**Figure 2.** Volatilities of foreign capital inflows in selected MENA countries (1998–2017)

**Note(s):** This paper uses the standard deviation of capital flows, using a 3-year rolling window method, which is why the period starts from 1998 in figure 2

**Source(s):** IFS (2018) online database and researchers' calculations

### 3.3 Information availability

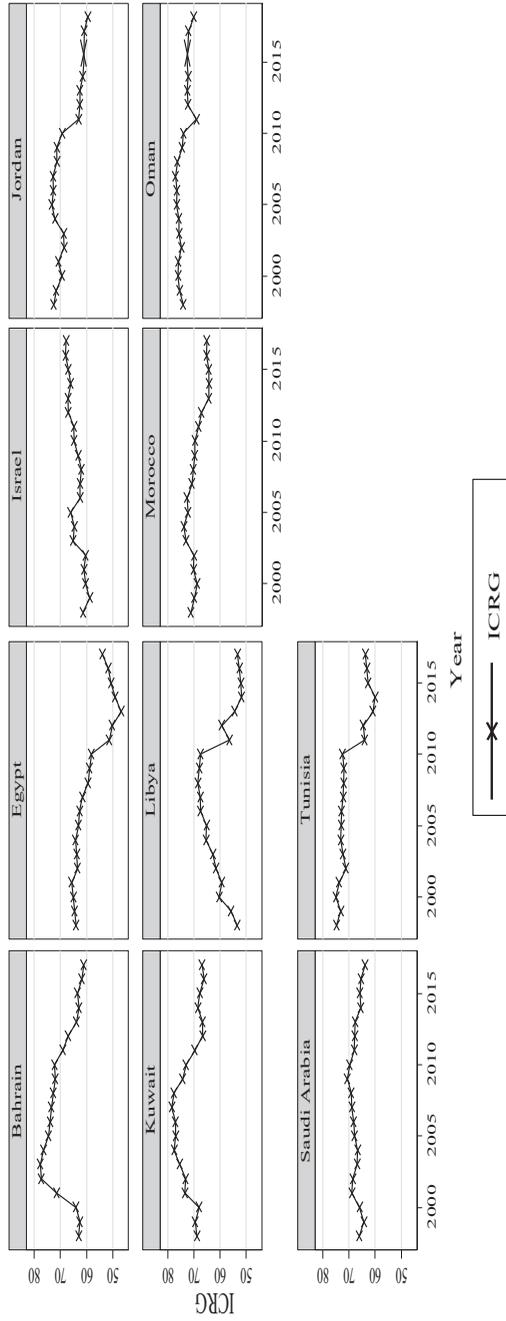
Dreher (2006) has created the KOF [15] Globalization Index, which is composed of three categories: (1) economic globalization; measured by two sub-components, trade and financial globalization, (2) political globalization; including three elements: embassies, UN peace keeping missions and international NGOs and (3) social globalization; measured by three sub-components: interpersonal, informational and cultural globalization. The information element of social globalization is calculated using data on the number of internet users (per 100 persons), the share of television subscriptions, and the sum of newspapers exports and imports (as a percent of GDP) (Pinar and Volkan, 2018). This index ranges between zero and 10; with a higher score implying more information flows. Our paper uses the most updated data set of KOF that was provided by Gygli et al. (2018).

Economic integration and technology are considered key sources of globalization in the MENA region (Muhammad et al., 2010). Figure 4 below indicates that the level of globalization in the selected MENA countries has an upward trend over time due to a set of communicational infrastructure reforms in these countries. According to Figure 4, Israel, Kuwait, Bahrain and Jordan are ranked as the most globalized countries in the region; while Tunisia, Morocco, Egypt and Oman can be considered to have been moderately globalized in the period 1998 to 2008. On the other hand, Libya is considered the least globalized country across the period under investigation, due to a series of unstable domestic (monetary, fiscal and political) policies. Furthermore, within the last decade, variation has tightened with almost all countries ranked between 70 and 80 points; thus, the selected MENA countries converged in information flows from 2016.

## 4. Methodology, data and hypotheses development

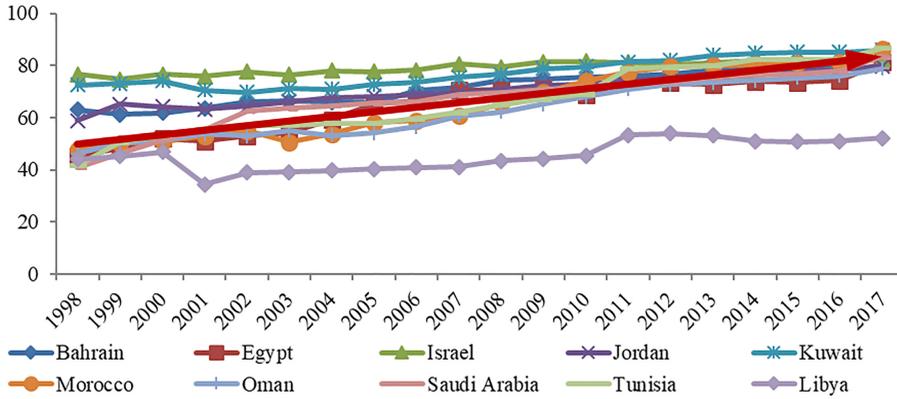
### 4.1 The model

This paper investigates the extent to which institutional quality and information flows relate to capital inflows volatility in 10 selected MENA countries during the period 1996–2017. This relationship was estimated using a random effect panel data model, and the Driscoll-Kraay robust standard error was used to account for autocorrelation, heteroscedasticity and cross-sectional dependence problems. Following Beck (2001), Broner and Rigobon (2004), Alfaro et al. (2007), Mercado and Park (2011), Broto et al. (2011), and Neanidis (2019) these relationships were estimated using the following equation:



**Figure 3.** Institutional quality in the selected MENA countries (1996–2017)

Graphs by Country  
Source(s): Globalization Index (2018), online database and researchers' calculation



Capital inflows volatility in MENA countries

**Figure 4.** Information flows in the selected MENA countries (1998–2017)

Source(s): Globalization Index (2018), online database and researchers’ calculations

$$\ln CFV = \delta + \beta_1 IQ_{it} + \beta_2 \ln IA_{it} + \beta_3 FO_{it} + \beta_4 D.ID_{it} + \beta_5 D.CC_{it} + \beta_6 \ln GL_{it} + \beta_7 R_{it} + \beta_8 \ln I_{it} + \beta_9 \ln GDP_{it} + \beta_{10} DC_{it} + u_{it}$$

Where CFV signified the gross capital inflows volatility, and IQ and IA were institutional quality and information availability respectively. In addition, some relevant controlled variables were used in estimation; namely, capital control (CC), interest rate differentials (IR), financial openness (FO), global liquidity (GL), reserves (R), inflation (I) and GDP per capita (GDP).

The standard deviation of capital inflows has been calculated using only a three years rolling window in order to minimize data loss, which only leads to two missing years in each country studied (Broner and Rigobon, 2004; Alfaro et al., 2007; Neumann et al., 2009; Broto et al., 2011; Mercado, 2019; Forbes and Warnock, 2012; Lee et al., 2013). Thus, the sample’s time frame spans 1998 to 2017.

$$\sigma_{it} = \left( \frac{1}{n} \sum_{k=\tau-(n-1)}^{\tau} (flows_{ik} - \mu)^2 \right)^{\frac{1}{2}}$$

Where,  $\mu = \frac{1}{n} \sum_{k=t-(n-1)}^t flow_{ik}$  and  $flow_{ik}$  denote capital inflows in country i and period k;  $n = 3$ .

#### 4.2 Data sources

Indicators were collected from different sources; data on capital inflows and their components (FDI, FPI and FOI) were extracted from the IMF’s international financial statistics (IFS). Institutional quality and information availability data were extracted from the ICRG data base [16] and KOF Globalization Index, respectively.

#### 4.3 Specification

This section explains the tests that were used to address the usual problems encountered in panel data in order to obtain unbiased, consistent and efficient parameters. As a result of economic heterogeneity among the MENA countries, outliers are expected and tested

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mathematically and graphically. Two variables observed suffered from outliers; namely, total capital inflows volatility and interest rate differentials in three countries Bahrain, Kuwait and Libya. After logarithm transformation, outliers have been resolved for the defective variables and their components. Moreover, given the nature of panel data with 20 years, unit root test was conducted with the Levin–Lin–Chu test using an Akaike information criterion (AIC) lag selection, implying that all variables are stationary at level, except capital control.

In addition, the Hausman specification test was performed to determine whether the fixed effect (FE) or the random effect (RE) estimation model should be used (Baltagi, 2008; Cameron and Trivedi, 2009). As proposed by Schaffer and Stillman (2006), the robust Hausman test with robust standard error gives more accurate decisions than the output of the standard Hausman test [17], then the robust Hausman test recommended using the RE model at the 5% significant level ( $p$ -value = 0.94). Additionally, the Breusch-Pagan Lagrange multiplier (LM) test was run to choose between the RE model and Pooled OLS, this showed that the RE model still yielded consistent estimators (Torres-Reyna, 2007).

Furthermore, cross-sectional dependence problems were examined using the Pesaran CD test which detected that the data suffered from cross-sectional dependence (De Hoyos and Sarafidis, 2006). Furthermore, using the modified Wooldridge test, serial correlation was detected at the 5% significant level (Drukker, 2003). Finally, the likelihood-ratio test IR statistic and the Wald test statistic suggested that the data suffered from a heteroskedasticity problem. After turning all variables stationary, Driscoll and Kraay (1998) standard error with RE was used to account for autocorrelation, heteroscedasticity and cross-sectional dependence problems.

The Driscoll and Kraay (1998) method provided an extension of common non-parametric covariance matrix estimation techniques that produced robust standard error to account for cross-sectional dependence especially for long panel data analysis. Although most studies used the GMM to correct for potential endogeneity problem, it had a weakness in working with a large time series and a comparatively small cross-section of countries as it might lead to a high time series bias (Cameron and Trivedi, 2010; Brafu-Insaidoo and Biekpe, 2011).

#### *4.4 Main hypotheses*

Based on the literature and the variables description, the following hypotheses were formulated about the impact of institutional quality and information availability on the volatility of capital inflows and on its components. Table 1 shows the expected inverse relationship of institutional quality with capital inflows volatility as a total and for each component separately. These hypotheses are compatible with the results of previous studies such as: Beck (2001), Alfaro *et al.* (2007), Broto *et al.* (2011), Mercado and Park (2011) and Neanidis (2019). The same effect was expected for information availability based on the mainstream literature, such as (Tille and van Wincoop, 2014; Kingsley and Graham, 2017).

## **5. Empirical results**

### *5.1 Descriptive analysis*

Some descriptive and statistical reviews about the level of data centralization and deviation, and its distribution are shown in Table 2. The figures in the skewness column are mostly zeros, implying that the study variables have a tendency to follow normal distribution.

### *5.2 Discussion of results*

Table 3 below shows that institutional quality is significantly and negatively related to capital inflows volatility, foreign direct investment (FDI), and foreign portfolio investment

No.	Hypothesis	Observed literature
H <sub>1</sub>	Ceteris paribus, <i>Institutional quality</i> [18] shows a negative relationship to capital inflows volatility <ul style="list-style-type: none"> <li>•H<sub>1.1</sub>: Ceteris paribus, <i>Institutional quality</i> is negatively related to FDI inflows volatility</li> <li>•H<sub>1.2</sub>: Ceteris paribus, <i>Institutional quality</i> is negatively related to FPI inflows volatility</li> <li>•H<sub>1.3</sub>: Ceteris paribus, <i>Institutional quality</i> is negatively related to FOI inflows volatility</li> </ul>	Alfaro <i>et al.</i> (2007), Beck (2001), Broner and Rigobon (2004), Broto <i>et al.</i> (2011), Mercado Jr and Park (2011), Neanidis (2019) [19]
H <sub>2</sub>	Ceteris paribus, <i>Information availability</i> [20] shows a negative relationship to capital inflows volatility <ul style="list-style-type: none"> <li>•H<sub>2.1</sub>: Ceteris paribus, <i>Information availability</i> is negatively related to FDI inflows volatility</li> <li>•H<sub>2.2</sub>: Ceteris paribus, <i>Information availability</i> is negatively related to FPI inflows volatility</li> <li>•H<sub>2.3</sub>: Ceteris paribus, <i>Information availability</i> is negatively related to FOI inflows volatility</li> </ul>	Kingsley and Graham (2017), Tille and van Wincoop (2014)

**Source(s):** Constructed by the researchers

**Table 1.**  
Research hypotheses

Variables	Mean	SD	Skewness
Gross capital inflows	2.03	0.10	-0.00
Institutional quality	1.72	0.10	-0.00
Information availability	4.18	0.20	-0.00
Inflation	0.98	0.94	-0.40
Global liquidity	4.26	0.40	0.02
Reserves	1.90	0.84	-0.04
Interest rate differentials	-0.33	8.07	-0.03
Capital control	0.00	0.04	0.00
GDP	71	52.73	0.00
Domestic credit	62.40	41.51	0.23
Financial openness	0.84	1.50	-0.33

**Source(s):** Researchers' calculations

**Table 2.**  
Descriptive statistics of  
the main variables

(FPI) at the 5% significance level, while it has no significant relationship to the foreign other investments (FOI). This signifies that improving institutional quality in the selected sample of countries in the MENA region would reduce the volatility of gross capital flows, FDI and FPI, on average. These findings are in line with those of Beck (2001), Alfaro *et al.* (2007), Lee *et al.* (2013) and Neanidis (2019) [21], who also concluded that institutional quality provides a contract effectiveness enforced by property rights and protects agents from the risk of expropriation, which reduces the volatility of capital inflows. In addition, the private other investors [22] mainly depend on global variables, such as global liquidity and sovereign credit ratings (S&P index [23]) which is the same factor that accelerated the volatility of FOI to the euro area after several episodes of sovereign debt crisis (Broto *et al.*, 2011; Lee *et al.*, 2013; Pagliari and Hannan, 2017).

The results also showed a negative relationship between information availability and capital inflows volatility, FDI and FOI, at 5% level of significance. However, information availability had no relationship to FPI. This indicates that dissemination and transparency of local information in the selected MENA countries would decrease the volatility of the gross

## REPS

Dep. Variable	Total capital flows volatility	FDI	Capital flows volatility	Other investments
	(1)	(2)	Portfolio investment (3)	(4)
Constant	6.04 (0.000)	6.74 (0.000)	1.42 (0.509)	2.32 (0.051)
IQ	-0.27*** (0.003)	-0.93*** (0.003)	-1.23*** (0.001)	0.047 (0.887)
IA	-0.26*** (0.000)	-0.83*** (0.001)	0.22 (0.645)	-0.45*** (0.009)
<i>Control variables</i>				
FO	0.03 *** (0.000)	-0.07*** (0.002)	0.12 *** (0.002)	-0.00 (0.944)
CC	0.06 (0.165)	0.41 (0.368)	0.78 (0.259)	-0.0 (0.891)
ID	-1.22 (0.998)	-0.00 (0.242)	-0.00 (0.329)	-0.00 (0.087)
I	-0.02 *** (0.001)	-0.04* (0.089)	-0.00 (0.575)	-0.04 (0.121)
GL	0.05 *** (0.000)	-0.04 (0.494)	-0.07 (0.637)	0.05 (0.487)
LR	0.04 *** (0.001)	-0.03 (0.433)	-0.15* (0.095)	0.13*** (0.000)
GDP	1.94 *** (0.000)	7.08*** (0.000)	-2.02 (0.526)	3.44** (0.045)
DC	0.00* (0.054)	0.00 (0.110)	-0.00 (0.721)	0.00*** (0.005)
R <sup>2</sup>	0.5143	0.3436	0.1924	0.2468
F-statistic	0.0000*	0.0000*	0.0000*	0.0000*

**Table 3.** Determinants of volatility of capital inflows to the selected MENA countries

**Note(s):** *p*-value of each variable is shown between brackets, \*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.10

capital inflows, FDI and FOI. As foreign direct and other investors are sensitive to information dispersion, and are flexible enough to quickly retreat if a country's information void gets wider. Additionally, foreign portfolio investors are not affected by information availability as they care about possession, flexibility and ease of exit once adverse changes in the investment climate are detected (Tille and van Wincoop, 2014; Kingsley and Graham, 2017).

In the context of control variables, financial openness had a significant positive relationship to the volatility of total capital inflows and FPI, while it had a significant negative relationship to FDI and an insignificant relationship to FOI. This means that increasing financial openness in the selected MENA countries may increase the exposure of these countries to sudden surges, stops, or reversals of capital inflows, especially the "hot money" which is very sensitive to interest rate differentials. These findings are in line with the results of Hegerty (2011) and Mercado and Park (2011).

Moreover, empirical results have shown that both capital control and interest rate differentials are insignificantly related to the volatility of total capital inflows, FDI, FPI and FOI. Hence, there is no evidence that reduced integration with global financial markets is associated with a diminished vulnerability of capital inflows. This is similar to the conclusions of Alfaro *et al.* (2007) and Forbes and Warnock (2012). Moreover, there is no evidence that increasing the differentials of the interest rate will induce fluctuations of capital inflows. Besides, IMF (2007) found a significant positive relationship, suggesting that interest rate differentials enhance the hot money process which boosts the volatility of capital inflows.

As for global liquidity, results have shown its significant positive relationship to the volatility of total capital inflows as IMF (2007) has proposed. This implies that when more liquidity is available in the global economy, volatility of capital inflows will be directed to the markets within the sample MENA countries. This result had been confirmed by Broto *et al.* (2011) and IMF (2007). Furthermore, global liquidity is insignificantly related to FDI, FPI and FOI, which is consistent with the findings of Broto *et al.* (2011) and Mercado and Park (2011).

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Besides foregoing considerations, the empirical results showed a significant positive relationship between total reserves [24] and the volatility of total capital inflows and FOI. The work of Lee *et al.* (2013) justifies these findings as larger foreign reserves may reflect countries' needs to self-insure and therefore result in higher volatility. Also, the study found that higher total reserves may significantly reduce the volatility of FPI in the selected MENA countries. This is similar to Broto *et al.* (2011) and Lee *et al.* (2013) who mentioned that low stock of foreign exchange reserves may lead to liquidity crises and, therefore, higher volatility. Finally, total reserves are not related to FDI, which contradicts the conventional literature as a result of sample characteristics.

Regarding macroeconomic indicators, the empirical results showed, as expected, a significant negative relation between inflation rate and volatility of total capital inflows and FDI (Broto *et al.*, 2011; Lee *et al.*, 2013). This is confirmed by the fact that the higher the inflation rate, the less stability and more uncertainty in the economy, which result in foreign investment outflows. On the other hand, both FPI and FOI were not related to the inflation rate in our sample (Mercado and Park, 2011). These unusual results may be a consequence of the heterogeneous data of the selected MENA region countries.

The results were different regarding the GDP per capita, as it was shown to have a significant positive effect on the volatility of total capital inflows, FDI and FOI. This means that accumulating the GDP per capita in the sample countries will result in higher volatility of total capital inflows, FDI and FOI. Many previous studies; such as Lee *et al.* (2013), Opperman and Adjasi (2017) and Broto *et al.* (2011) reached the same conclusion, lower income countries may have lower levels of volatility as such countries usually depend on financial development aids which reduce the volatility of capital inflows. Unexpectedly, it was found that GDP per capita had no significant relationship to the volatility of FPI in the selected MENA countries.

Finally, domestic credit was found to have a significant positive effect on the volatility of total capital inflows and FOI. This means that increasing the local credit in the selected MENA countries induces the volatility of the gross capital inflows and FOI without any effect on FDI and FPI (Broto *et al.*, 2011; Broner and Rigobon, 2004). This odd positive relationship could be explained by interest rate fluctuations in developing countries that may indirectly have a positive effect on capital inflows. Domestic credit had no significant effect on FDI and FPI. This result reflects the low level of development of domestic banking sectors and thus the ability to achieve more stable foreign direct and portfolio flows in the selected MENA region (Mercado and Park, 2011).

## 6. Conclusion and policy recommendations

This study aimed at examining the relationship of capital inflows volatility and its components to institutional quality and information availability in 10 MENA countries over the period 1996–2017. The study estimated a random effect panel regression with Driscoll–Kraay robust standard error that accounted for autocorrelation, heteroscedasticity and cross-sectional dependence problems. Results revealed that institutional quality and information availability have significant negative relationships to the volatility of total capital inflows and FDI at the 5% significance level. This signifies the importance of institutional quality and information dissemination in attracting more capital inflows and foreign investors to the selected MENA countries.

However, the significant negative relationship between information availability and FPI shows that portfolio investors do not depend on published information in the developing countries and they are able to respond quickly once the changes become public knowledge [25].

The results regarding control variable hypotheses showed either rejection or insignificance, except for financial openness which was consistent with the researchers'

expectations of its positive effect on volatility of total capital inflows, FDI and FPI. These results highlight the fact that the behavior of volatility of total capital inflows and its components in the selected MENA region countries does not follow the norms described in the general literature on this subject. Such conclusions indicate that ensuring financial stability in the sample countries, by minimizing the fluctuations in capital inflows, requires more awareness of these results.

These results also give some insights to enable policymakers and practitioners to construct more flexible and diversified strategies. The selected MENA countries have experienced a wave of protests, uprisings and demonstrations collectively referred to as the “Arab Spring”. Most of the selected countries suffer greatly from corruption and low bureaucracy quality. Accordingly, they need to control corruption by supporting the rule of law and ensuring transparent legislation and the implementation of severe limitations on political clientelism. Moreover, investment legislation must protect and guarantee investments in the region and should be consistent with global standards. In this context, Bahrain allows for 100% ownership by foreign entities and individuals. In addition, other countries in the region like the UAE, Oman and Saudi Arabia have been reported to be considering similar moves to promote certainty for foreign investors. Although Israel is considered one of the top institutional performers, it suffers from religious tension and external conflicts, represented by the recent civil strife in Gaza, the Iranian nuclear challenge and the Syrian Israeli war. Consequently, a dark shadow on the quality of institutions has shown up. Furthermore, Libya is considered a poor institutional performer, characterized by ethnic tension, internal conflict, tribalism and high levels of violence which have also weakened state institutions. So, reconstruction requires preserving the rule of law, which in turn needs a strong and independent judiciary system that guards the court judges against being vulnerable to political pressures that deviate them away from practicing justice objectively. Furthermore, transparent information about public decisions and economic status must be spread through adopting an effective governance system in order to create a better and more efficient investment environment. In addition, regional economic and policy coordination, accompanied by more effective financial, supervisory and regulatory mechanisms are also significant elements in designing a framework to diminish the cost of financial contagion and crises associated with financial integration. This, also, may help in understanding how foreign investors behave and what attracts them to invest their money abroad (Karam and Zaki, 2017; Aziz, 2018; IMF, 2019).

Further studies are recommended to elaborate on the effect of regional factors on capital inflows volatility. We also employed panel data using only 10 out of 21 MENA countries (according to the WB classification) due to limited data availability thus, including these missing observations, may provide more accurate results about the main relationship under study. Furthermore, institutional quality can be broken down into 12 components in order to check the impact of each component on capital volatility; thus, enabling policymakers to emphasize the most significant factors for eliminating volatility.

## Notes

1. Capital flows are the summation of three main components that are the net incurrence of liabilities of FDI, FPI, and other investments
2. See (Bacchetta and Van Wincoop, 1998; Beck, 2001; Neumann *et al.*, 2009; Forbes and Warnock, 2012; Lee *et al.*, 2013; Carp, 2014; Neanidis, 2019.)
3. Grønning (2008) also considered institutions as “social technology.”
4. Policy instability, weak institutional quality, and corruption constitute more than 70% of the obstacles facing foreign direct investment (FDI) in the MENA region countries (Batra *et al.*, 2003).

5. This current study depends on the gross capital inflow definition of the IMF (2010) and Broto *et al.* (2011) that calculates this variable as the summation of three main components: net incurrence of liabilities of FDI, FPI and other investments. Other investment is a residual category that includes all financial transactions neither considered as direct nor portfolio investment. According to the IMF, other investments consist of loans, currency and deposits, insurance, special drawing rights, and trade credits and advances?
6. MENA region countries according to WB classification: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, West Bank and Gaza, Yemen.
7. See (Bacchetta and Van Wincoop, 1998; Beck, 2001, Neumann *et al.*, 2009; Forbes and Warnock, 2012; Lee *et al.*, 2013; Carp, 2014; Neanidis, 2019)
8. Applied on a selected country from Central and Eastern Europe (CEECs)
9. Contagion effect is defined as “the transmission of an extreme negative shock in one country to another country” (Lee *et al.*, 2013).
10. Perform GMM method using panel data of 48 emerging and less developed economies through 1980–2016
11. See (Broner and Rigobon, 2004; Mercado Jr and Park, 2011; Bruno and Shin, 2015; Opperman and Adjasi, 2017)
12. Perform GMM on sub-Saharan African countries using a panel framework with data from 1990 to 2011
13. Alfaro *et al.* (2004) investigated the role of the institutional quality on the gross capital flows using OLS regression on 61 countries for the period 1971–1998, Alfaro *et al.* (2007) also investigated the effect of institutional quality on the GCFs and its volatility using OLS with White’s correction heteroscedasticity regression for the period 1970–2000 and Alfaro *et al.* (2008) investigated the same relationship within the same period using IV regression. They also introduced information asymmetry as a main factor in international capital market imperfections.
14. Political stability is calculated as the sum of all rating components (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). If the points recorded are less than 50% of the total, a very high risk will be evaluated and vice versa (Howell, 2011).
15. KOF: an abbreviation of a German phrase which means “Economic cycle research institute”
16. Political Risk Services (PRS) constructed a composite indicator, namely the International Country Risk Guide (ICRG) “political risk” rating whose components are like those of the World Bank.  
The ICRG indices are always available for a relatively large sample of countries and have an added advantage that they are available for several years. Moreover, according to the literature review, ICRG is the most common proxy utilized for measuring the institutional quality.
17. As the standard Hausman test is considered not usually enough to decide which model is strongly appropriate FE or RE model as it assumes homoscedastic panel.
18. Using various indices like ICRG and WDI
19. Since the volatility of the capital flows is a new-fashioned terminology, there is no available economic theory to be cited.
20. Using various indices like ICRG and WDI
21. Lee *et al.* (2013) has analyzed capital flow components using net and total capital flow. Other investment is significant in the case of total capital flow volatility. Neanidis (2019) reached the same results using the GMM method which differ from the results of OLS estimation.
22. Other investment flows are divided into public and private flows which is experienced from the main source of the other investment flows volatility (Pagliari and Hannan, 2017).

23. S&P index refers to the Standard and Poor Index.
24. In terms of number of months of imports.
25. See (Kingsley and Graham, 2017)

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