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# CONTENT

# DRIVERS OF BILATERAL FDI INFLOWS IN NORTH AFRICA REGION: A GRAVITY MODEL APPROACH

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## ABSTRACT

**Purpose-** This paper aims to explore the main determinants of bilateral foreign direct investment (FDI) and investigate the relationship between bilateral trade and FDI inflows in five North African countries with 25 investment partners.

**Methodology-** The study employs a gravity model and pooled time-series-cross-sectional regression method, utilizing a 10-year average over the period 2001-2010, the significance of this research lies in its contribution to the existing literature as the first study to analyze the factors influencing bilateral FDI inflows between North African countries and their primary investing partners.

**Findings-** The results indicate that bilateral trade, economic size, financial development, and common language of host countries are key drivers of bilateral FDI inflows between North African countries and other nations. Furthermore, the presence of a common language between host and home countries has a significant and positive impact on bilateral FDI. However, the distance between host and home countries has a negative effect on FDI.

**Conclusion-** This paper concludes that foreign direct investment (FDI) between North Africa and other nations was influenced positively by the economic sizes of both the home and host countries while being negatively affected by the physical distance between them. Additionally, the results demonstrate that the presence of a common language and bilateral trade play crucial roles, with their effects being highly positive and significant. This suggests that FDI flows tend to be greater between North African countries and those with whom they already have substantial bilateral trade transactions. Furthermore, the study concludes that France, the United Arab Emirates, Spain, and Kuwait are the most significant investing countries in the North African region in terms of FDI, surpassing other nations.

**Keywords:** Bilateral FDI inflows, bilateral trade, gravity model, North Africa, geographical and culture factors.
**JEL Codes:** F14, F21, F40, F30, F15

## 1. INTRODUCTION

The past three decades have witnessed significant changes that have greatly impacted the restructuring of economic infrastructure in various aspects. Among these changes, technological advancements and the liberalization of financial systems have emerged as crucial factors. As a result, these transformations have played an important role in promoting economic development by facilitating the flow of foreign investments between nations.

Consequently, FDI is widely recognized as a key contributor to the inflow of capital, which has significantly contributed to the advancement of development and economic growth in numerous developing countries. where, FDI serves as a vital conduit for financial progress, enhancement of productivity, and the exchange of technology and knowledge across borders. Additionally, it plays a role in generating employment opportunities, fostering trade, and expediting overall growth and development (Asiedu, 2006 and Pradhan et al., 2017).

And, as a result of the spillovers of foreign direct investment (FDI), governments in the most countries were prompted to seek optimal policies regarding FDI and endeavored to adopt more liberalized approaches to attract investor confidence. As a consequence, governments initiated a diverse array of policies aimed at fostering a secure environment for investors, enabling them to conduct their business activities without encountering unnecessary risks (Asiedu, 2004, Dellis et al, 2022).

Thus, governments in North African countries, namely Algeria, Egypt, Libya, Morocco, and Tunisia, initiated comprehensive economic reforms with the objective of restructuring their economies through liberalization and gradually integrating with

the global economy. Statistically, according to UNCTAD data (2022), the amount of FDI flows into North Africa countries have raised from an annual average of US $ 2.2 billion during the 1990s and US$ 12.5 billion during 2000s, and reached its peak in 2007 by the US $ 23.1 billion. However, the level of FDI inflows notably decreased in 2011 by US$7.5 billion, which is a repercussion of political disturbances (Arab Spring) to reach an annual average from 2011 to 2015 by the US $ 11.9 billion as shown in Figure 1.

According to The Arab investment and export credit guarantee corporation (2016), the main investment players in this region are divided into two groups: the first group consists of GCC countries, while the second group comprises countries with a colonial history in this region. In the North Africa region, the GCC countries, namely UAE, Bahrain, Qatar, Kuwait, and Saudi Arabia, emerged as the most significant source of Greenfield investment. The total investments from these countries reached over 133US$ billion between 2003-2015. On the other hand, the colonial countries, including France, Spain, UK, USA, and Italy, ranked as the second-largest source of foreign investment for this region, as depicted in Figure 2.

**Figure 1: Trend of FDI Inward in North Africa (US$ million) (2000-2022)**
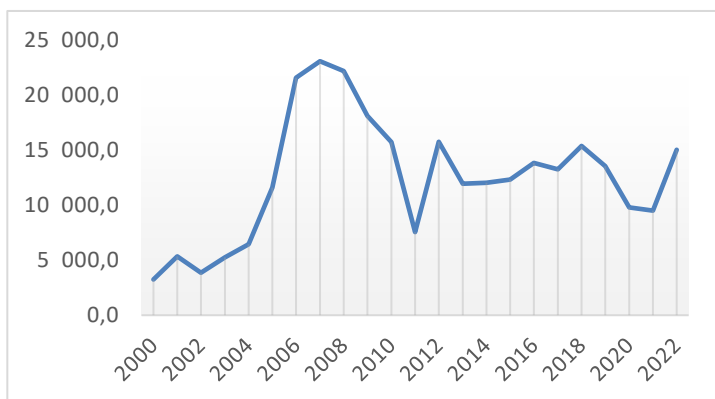


Source: UNCTAD data,2022.

**Figure 2: Main Greenfield FDI Contributors in North Africa by Origin (US$ million) (2003-2015)**
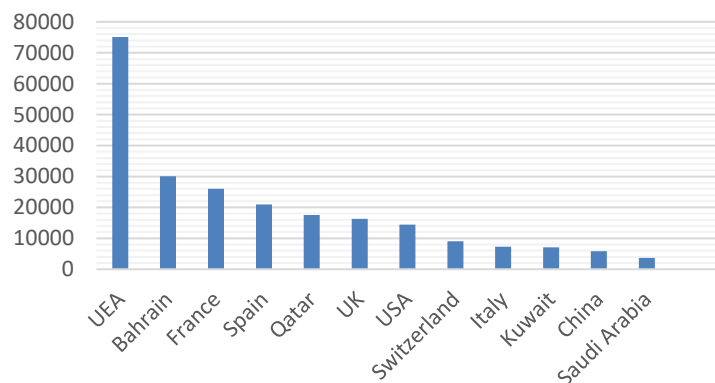


Source: The Arab investment and export credit guarantee corporation, 2016

This paper employs a gravity model to investigate main determinants of bilateral FDI in host countries (North Africa countries), and examining the relationship between bilateral trade and FDI inflows using a pooled time-series -cross-sectional regression method (10-years average over the period 2001-2010) for net FDI inflows in Five North African countries with 25 investment partners countries which are (France, Italy, UK, Germany, Spain, France, Switzerland, Turkey, Holland, Belgium, Canada, China, South Korea, Singapore, USA, Egypt, Emirates, Qatar, Libya, Kuwait, Bahrain, Tunisia, Morocco, Algeria, and Saudi Arabia).

This paper is composed of four sections and organized as follows: section 2 offers a concise literature review on the gravity model, section 3 Data and methodology which includes the explanation main factors influencing bilateral FDI inflows through a gravity approach, and section 4 presents the study's conclusion.

## 2. LITERATURE REVIEW

The gravity model of trade in international economics draws its theoretical foundation from gravity models in social science, specifically Newton's law of gravity. This model has been subsequently adapted and employed in the context of international trade and investment. Its fundamental concept revolves around utilizing the economic size and geographical distance between countries to forecast bilateral trade flows. In the literature, this model has been enhanced and tailored for diverse objectives, incorporating additional variables that encompass shared cultural and historical attributes, such as a common language or borders (Boughanmi, 2008, Osabuohien et al,2019). There are Numerous investigations have been conducted utilizing this framework since the 1960s, encompassing the works of Poyhonen (1963) and Linnemann (1966). These studies have deduced that the geographical separation between nations exerts an adverse impact on the bilateral trade, whereas the Gross Domestic Product (GDP) of the trading nations has a positive influence on exports. As a result, the dynamics of bilateral trade can be elucidated by the subsequent specification

$$Ex_{ij} = \beta 0 (GDP_i) \beta 1 (GDP_j) \beta 2 (D_{ij}) \beta 3 (A_{ij}) \beta 4 u_{ij} \qquad (1)$$

Where, $EX_{ij}$ is the value of trade from country i to country j, GDP i, $GDP_j$ is the value of GDP for countries i and j, $D_{ij}$ is the geographical distance between the economic center of countries i and j, $A_{ij}$ is other factors that aid or resist the trade flow between countries i and j, and $u_{ij}$ is error term. The application of the gravity model offers a theoretical basis for various FDI theories. Specifically, the use of the gravity model can offer explanations for the Dunning eclectic paradigm (Market-seeking FDI), which has been previously studied by examining the relationship between FDI and the size of the market in both the home and host countries. Moreover, the monopolistic competition theory is well-explained by the gravity model, which suggests that countries with similar characteristics trade distinct goods due to varying consumer preferences, as noted by Krugman (1980) and Bergstrand (1985). Consequently, firms engage in foreign activities to cater to the diverse needs of consumers and to strengthen their monopolistic dominance. The gravity model, originally designed to explore the determinants of international trade flow between countries, and it has been utilized to estimate bilateral FDI. This model has been further developed to investigate the determinants of bilateral investments between countries. The significance of using the gravity model in this study lies in its ability to provide a comprehensive understanding of the role of geographical and cultural factors in determining the level of FDI within the region. Additionally, the model enables us to examine whether bilateral trade between home and host countries can increase FDI inflows between them. The gravity model takes into account factors originating in both the home and host countries that affect bilateral trade or foreign investment flows between nations (Duong et al, 2021). Thus, the utilization of the gravity model in forecasting trade integration and spatial distribution among nations has been explored in various studies, including those conducted by Antonucci and Manzocchi (2006), Ravishankar and Ekanayake et al. (2010), Stack (2014), and Osabuohien et al. (2019). These investigations have revealed that bilateral trade is significantly influenced by factors such as GDP and the geographical distance between countries. Meanwhile, Numerous research studies, including Grosse and Trevino (1996), De Mello-Sampayo (2009), Petri (2012), and Paniagua and Sapena (2014), have employed a gravity model to examine the determinants of bilateral foreign direct investment (FDI) patterns between nations. The majority of these studies have found that market size is the primary positive factor that influences FDI flows between countries, while the distance between the home and host nations is the primary negative factor that affects FDI flows between countries. (Duong et al, 2021).

## 3. DATA AND METHODOLOGY

North African countries are widely recognized as one of the most prosperous regions in terms of natural resources and geographical location. Consequently, this study aims to explore the factors driving the expansion of 25 investment partners within this region, with a particular focus on the countries that contribute the most to foreign direct investment (FDI). To achieve this objective, the research utilizes bilateral FDI inflow data between five North African countries, namely Algeria, Egypt, Libya, Morocco, and Tunisia, and their 25 investment partner countries (please refer to the appendix for a comprehensive list of these countries). The analysis employs a pooled time-series cross-sectional regression method, averaging data over a 10-year period from 2001 to 2010. The selection of North African countries, specifically from the Arab region, is based on a variety of factors. Firstly, these countries are geographically close to each other, which allows for easier comparison and analysis. Secondly, they share a common coastline, which has influenced their historical and economic development. Moreover, these countries have all experienced the impacts of colonialism from different directions, shaping their political and social landscapes. However, the time period from 2000 to 2010 was specifically chosen for several reasons. Firstly, there was a scarcity of available data for continuous periods, especially after 2010 and the outbreak of the Arab Spring.

This lack of data posed challenges in analyzing bilateral investment between most North African countries (Egypt, Libya, and Tunisia) and the rest of the world. Additionally, the period between 2000 and 2010 is widely recognized as a highly successful period in terms of attracting foreign direct investments in the region, as evidenced by figure 1. Moreover, within the economic literature focusing on the determinants of bilateral foreign direct investment (FDI), there has been a limited number of studies that have specifically examined the factors influencing bilateral FDI within the Middle East and North Africa (MENA) region. Additionally, most of the previous empirical studies in this area have primarily focused on analyzing FDI inflows into MENA countries as a whole, rather than investigating the determinants of bilateral FDI within the region. Furthermore, none of these studies have utilized the gravity model, particularly in relation to the North Africa region. The scarcity of research on bilateral FDI in the MENA region can be attributed to the lack of available data on this specific type of FDI within the region. However, between the years 2000 and 2010, researchers gained access to data on FDI flows between MENA countries, which became accessible through various sources such as the Arab Investment and Export Credit Guarantee Corporation, the Organization for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD), Bilateral FDI Statistics, and the CEPII research and experts on the world economy.

### 3.1. Data Sources and Variables Selection

The dependent variable used in this study is the logarithm of net FDI inflows bilateral FDI inflows While the argument selection of independent variables summarized in the following section. *Economic Size*: According to the investment theories literature, the volume of foreign direct investment (FDI) between nations is influenced by the economic size of both the host and home countries, as measured by their GDP. This relationship suggests that the GDP of the host country indicates its ability to accommodate new foreign investments, while the GDP of the home country reflects its potential to expand investments and activities overseas (Petri, 2012; Paniagua and Sapena, 2014; Sengupta and Puri, 2020).In this estimation, the study will use the natural logarithm of real GDP for host and home countries as a proxy for economic size. The expected sign of the economic size of both sender and receiver FDI countries is to be positive. *Geographical and Culture Factors:* According to the gravity model, the significance of geographic distance as a determinant of investment choice activities is emphasized. As the physical distance between the home and host country increases, it not only raises transportation costs but also complicates access to information between them. Consequently, the cost of investment activities tends to be higher when there is a greater geographic distance between the partners. To measure this distance, the study utilized the natural logarithm of bilateral physical distance in kilometers between the home and host country, obtained from the CEPII database. It is expected that the effect of bilateral distance between the countries will be negative, as supported by previous research conducted by Aggarwal et al. (2012), Aleksynska and Havrylchyk (2013), Kahouli and Maktouf (2015), and Dorakh (2020). Furthermore, the investigation analyzed the impact of a common borders factor by employing a binary variable set to one for countries that possess a shared border and zero otherwise. The anticipated effect of common borders is positive. In simpler terms, the presence of a shared culture, encompassing language and religion, between the home and host nations can result in a reduction in information costs and facilitate communication. This study utilized the binary variable set to one for both countries that share an official or second language. Consequently, the expected direction of the common language variable is positive (Mishra and Jena,2019). *Bilateral Trade:* According to Carstensen and Toubal (2004) and Aggarwal et al. (2012), Albulescu and Goyeau (2019) there is a positive correlation between bilateral trade relations and bilateral foreign direct investment (FDI) between investment partners. The level of bilateral trade is determined by the total bilateral export between the home and host country, relative to their respective GDPs, as measured by the following equation.

$$BT_{ij} = ((X_i)+(x_j))/(GDP_i+GDP_j) \tag{2}$$

Where the $BT_{ij}$ is the value of bilateral trade from country i to country j ,$GDP_i$, $GDP_j$ is the value of GDP for countries i and j , $X_i$ is the total of export that flow to i country from j country, $X_j$ is the total of export that flow to j country form i country. This study used the CEPII database (which based mainly on IMF data) to measure the bilateral export between countries. The expected sign is to be positive, where the greater bilateral trade should enhance FDI between countries. *Inflation Rate:* Additionally, it has been found in several studies that the inflation rate is significant factor that influence the attraction of foreign direct investment (FDI). When the inflation rate is higher, the host country's currency tends to depreciate against the home currency, making it more affordable for foreign investors to acquire assets in the host country. This, in turn, increases the likelihood of FDI inflows. However, the depreciation of the currency can have a negative impact on foreign investors when they repatriate their profits, as their purchasing power decreases. Moreover, the variance of inflation is considered an indicator of economic stability and reflects how well the government manages fiscal and monetary policies. Several studies, including those by Onyeiwu and Shrestha (2004), Asiedu (2006), Udoh and Egwaikhide (2008), Hailu (2010), and Heshmati (2017), have investigated the relationship between inflation and FDI. The findings consistently show that inflation has a negative effect on FDI, and lower levels of inflation tend to attract more inward FDI in developing countries. In a similar vein, Naude and Krugell (2007) concluded that inflation is a significant factor that impacts investors' decisions to invest in African countries. This study utilizes the annual percentage change in the Consumer Price Index (CPI) as a proxy for measuring the

inflation rate. The anticipated direction of the estimated coefficient of inflation is negative. *Financial System Development*: The development of the financial system in the host country is an additional factor that can significantly impact an investor's decision. A well-established financial system enables a higher capacity to enhance the productivity of foreign capital by effectively allocating financial resources to projects with the highest rate of return. Additionally, it provides a convenient channel for accessing finance. This notion is supported by Kaur et al. (2013). Moreover, a well-developed financial market has the potential to facilitate the flow of information and reduce transaction costs, thereby attracting foreign direct investment (FDI) more easily. This finding is highlighted by Ezeoha and Cattaneo (2012).

In this study, the domestic credit provided by the financial sector (% of GDP) in the host country was utilized as a proxy for financial development, with an anticipated positive effect. *Bilateral Investment Treaties (BITs):* Investment treaties have been identified in several studies as a significant factor in attracting foreign direct investment (FDI). These agreements, such as bilateral investment treaties (BITs), are considered as part of institutional reforms that have facilitated the inflow of FDI. BITs provide investors with higher standards of legal protection and guarantees for their foreign investments compared to what is offered under national laws.

Notably, various studies, including those by Grosse and Trevino (2005), Medvedev (2012), and Buthe and Milner (2014), have found a positive and significant relationship between the number of BITs signed and inward FDI. Similarly, Buss et al. (2010) and Berger et al. (2013) have examined the impact of BITs on FDI attraction. Their findings indicate that signing bilateral investment agreements leads to a reduction in disparities between countries and promotes domestic reforms. Additionally, these agreements help to eliminate trade barriers between states, with the majority of studies confirming their positive effect on foreign investment attractiveness. Consequently, policymakers in developing countries consider increasing FDI through BITs as a strategic goal (Kox and Romagosa, 2020). In this study, a dummy variable is employed, taking a value of one if both countries have a bilateral enforce investment treaty, and zero otherwise. The expected sign of the estimated coefficient for international investment agreements with FDI inflows is positive.

*Human Capital Development*: Human capital is another crucial factor in attracting foreign direct investment (FDI) to the host country. The availability of skilled labor in the host country has a direct impact on the volume of FDI inflows. However, nations with weak human capital and lower wages may struggle to attract FDI, even if the wages of unskilled labor are low. This is because multinational corporations prioritize skilled labor and may avoid investing in countries with insufficient human capital. Feeny et al. (2014) also emphasized the importance of human capital in absorbing foreign knowledge and achieving positive FDI spillovers. Their study used the human development index to measure human capital development in host countries, with a positive expected sign.

### 3.2. Empirical Estimation

A pooled time-series -cross-sectional regression method has been used (10-years average over the period 2001-2010) for net FDI inflows in Five North African countries. The specification of the regression model used in this study can be outlined as follows, data definitions and sources shown in table 1.

$\text{Ln}FDI_{ij} = \alpha + \beta_1 \text{LnGDP}_i + \beta_2 \text{LnGDP}_j + \beta_3 \text{LnDist}_{ij} + \beta_4 \text{bitrade}_{ij} + \beta_5 \text{BIT}_{ij} + \beta_6 \text{comlang}_{ij} + \beta_7 \text{combord}_{ij} + \beta_8 \text{colhist}_{ij} + \beta_9 \text{findev}$

$+ \beta_{10}\text{inflation} + \beta_{11}\text{HDI} + \gamma t$ $\hspace{6cm}$ (3)

**Table 1: Data Definition and Sources**

| Variable | Description | Source |
|---|---|---|
| LnFDIij | The natural logarithm of Net FDI inflows from country(host) i to country (home) j. | -The Arab Investment and Export Credit Guarantee Corporation<br>-UNCTAD<br>-OCED |
| LnGDP*i* | Real gross domestic product for host country in US\$ (Natural Log) | UNCTAD |
| LnGDPj | Real gross domestic product for home country in US\$ (Natural Log) | UNCTAD |
| Lndist*ij* | Natural logarithm of bilateral physical distance in KM between home and host country. | CEPII database |
| Bitrade*ij* | Total of bilateral export between home and host country over the real GDP for both. | CEPII database, IMF<br>UNCTAD |

| BIT$ij$ | A dummy variable equal to one if the home and host country have bilateral investment treaties or zero otherwise. | UNCTAD |
|---|---|---|
| Comlang$ij$ | A dummy variable equal to one if the home and host countries share the same (official or second) language or zero otherwise. | CEPII database |
| Combord$ij$ | A dummy variable equal to one if the home and host countries shar same border or zero otherwise | CEPII database |
| Colohist$ij$ | A dummy variable equal to one if the home and host countries have common colonial history or zero otherwise | CEPII database |
| Findev$i$ | Domestic credit provided by financial sector (% GDP) in host country | World Bank |
| Inflation$i$ | The annual percentage change in consumer price index (CPI) in host country | World Bank, UNCTAD |
| HDI$i$ | Human development index in host country | HDI data |

Table 2 illustrates the descriptive statistics of the variables used in this study. GDP of the home country is the variable with the highest mean and standard deviation among the independent variables. The average value of GDP of the home country is 27.1 percent and its standard deviation is 1.72 percent.

**Table 2: Summary Statistics of the Variables**

| Variables | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| LnFDI$ji$ | 108 | 9.361685 | 1.331969 | 5.800598 | 11.32531 |
| LnGDP$i$ | 108 | 27.05685 | 1.727539 | 23.7495 | 30.29225 |
| LnGDP$j$ | 108 | 25.16153 | 0.569536 | 24.32563 | 25.86253 |
| LnDist$_{ij}$ | 108 | 8.009846 | 0.8150635 | 6.26845 | 9.378292 |
| Bitrade$_{ij}$ | 108 | 0.000788 | 0.0010604 | 0.000136 | 0.0065221 |
| BIT$_{ij}$ | 108 | 0.611111 | 0.4897745 | 0 | 1 |
| Comlang$ij$ | 108 | 0.5092593 | 0.5022449 | 0 | 1 |
| Combord$ij$ | 108 | 0.083333 | 0.2776739 | 0 | 1 |
| Colohist$ij$ | 108 | 0.0740741 | 0.2631225 | 0 | 1 |
| Findev$_j$ | 108 | 38.2 | 20.5623 | 10.7 | 60.8 |
| Inflation$i$ | 108 | 6.627315 | 3.647288 | 2.15 | 13.11 |
| HDI$i$ | 108 | .6653704 | 0.556965 | 0.58 | 0.75 |

Tables 3 present that none of the variables correlates highly to each other, where the mean Variance Inflation Factor (VIF) of 1.83. Furthermore. As can be seen from the table, the correlations between the variables in our sample do not cause any serious multicollinearity problem

**Table 3: Partial Correlation VIF Test**

| Variable | VIF | 1/VIF |
|---|---|---|
| Findev$_j$ | 2.61 | 0.383493 |
| Inflation$i$ | 2.23 | 0.448763 |
| LnGDP$i$ | 2.08 | 0.480127 |
| LnDist$ij$ | 1.93 | 0.518946 |
| Comlang$ij$ | 1.93 | 0.519331 |
| Bitrade$ij$ | 1.84 | 0.542156 |
| Combord$ij$ | 1.64 | 0.610921 |

| HDI$i$ | 1.60 | 0.645622 |
|---|---|---|
| BIT$ij$ | 1.43 | 0.699383 |
| LnGDPj | 1.34 | 0.746253 |
| Colohist$ij$ j | 1.24 | 0.774537 |
| Mean VIF | | 1.83 |

## 4. EMPIRICAL RESULTS

The findings of the main model, as depicted in Table 4, align with the majority of traditional gravity model variables in terms of significance and expected signs. From 2001 to 2010, both the GDP of the host countries in North Africa and their investment partners (home countries) exhibited a positive and significant influence on bilateral FDI. This observation supports the notion that a higher GDP in the host country signifies its ability to attract new foreign investments. This is attributed to the larger current market size and the anticipated growth in market size, which create opportunities for increased profitability and subsequently lead to higher levels of domestic and foreign investment. Consequently, this trend results in an upsurge in capital inflows. Furthermore, this expected outcome concerning the GDP of both host and home countries is consistent with the majority of gravity model studies. In terms of geographical and cultural factors, the analysis revealed that the bilateral distance between host and home countries has a negative impact on FDI. This finding aligns with the location theory, which posits that physical distance between the home and host country tends to increase transportation costs and impede information accessibility between them. Additionally, the presence of a common border between the North African countries was found to have a negative and significant effect on bilateral FDI, primarily due to conflicts along the border.

Conversely, the existence of a common language between the host and home countries was found to have a significant and positive influence on bilateral FDI. These results are consistent with the study conducted by Kahouli and Maktouf (2015). Furthermore, the study's findings demonstrate that an increase in bilateral trade between host and home countries leads to a corresponding increase in bilateral FDI. This correlation suggests a positive relationship between the two nations and reflects a high level of consistency in their transactions.

The results also indicate that bilateral trade has a significant and positive impact on bilateral FDI, which is consistent with the findings of Lien and Selmier (2012). Additionally, the paper found that financial development in the host country has a positive and significant coefficient with bilateral FDI. This is because a developed financial system reduces transaction costs and facilitates information flow, making it more attractive for foreign investors. This result is in line with the research of Ezeoha and Cattaneo (2012). However, the study did not find any significant impact on FDI attraction from investment treaties signed by host countries' governments or the inflation rate between 2001 and 2010.

**Table 4: Cross -Section Estimation Results (10- Years Average)**

| variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| LnGDPj | 0.634** | 0.694*** | 0.732*** | 0.719*** | 0.720*** | 0.737*** | 0.980*** | 0.976*** | 0.941*** | 0.989** |
| | (0.274) | (0.260) | (0.257) | (0.256) | (0.256) | (0.257) | (0.313) | (0.313) | (0.312) | (0.461) |
| LnGDPj | 0.329*** | 0.417*** | 0.571*** | 0.514*** | 0.508*** | 0.519*** | 0.542*** | 0.546*** | 0.538*** | 0.538*** |
| | (0.0932) | (0.0965) | (0.125) | (0.129) | (0.128) | (0.126) | (0.130) | (0.127) | (0.130) | (0.131) |
| Lndistij | | -0.658*** | -0.620*** | -0.813*** | -0.791*** | -0.656*** | -0.637*** | -0.640*** | -0.608*** | -0.606*** |
| | | (0.192) | (0.189) | (0.188) | (0.193) | (0.221) | (0.218) | (0.218) | (0.227) | (0.226) |
| Comlang$ij$ | | | 0.819** | 0.858** | 0.847** | 0.918** | 1.002** | 1.019*** | 1.018*** | 1.019** |
| | | | (0.411) | (0.402) | (0.400) | (0.403) | (0.387) | (0.387) | (0.387) | (0.389) |
| Combord$iji$ | | | | -1.537*** | -1.501** | -1.817*** | -1.799*** | -1.797*** | -1.749*** | -1.746*** |
| | | | | (0.581) | (0.590) | (0.593) | (0.580) | (0.575) | (0.547) | (0.550) |
| Colohist$ij$ | | | | | 0.198 | -0.0466 | -0.0820 | -0.101 | -0.113 | -0.110 |
| | | | | | (0.644) | (0.660) | (0.575) | (0.582) | (0.585) | (0.586) |
| Bitrad$ij$ | | | | | | 257.0* | 307.1** | 304.6** | 308.4** | 308.5** |
| | | | | | | (139.2) | (126.9) | (126.9) | (128.3) | (129.3) |
| Findevj | | | | | | | 0.0171** | 0.0195* | 0.0182* | 0.0189 |
| | | | | | | | (0.00840) | (0.0111) | (0.0108) | (0.0122) |
| Inflation$i$ | | | | | | | | 0.0191 | 0.0173 | 0.00813 |
| | | | | | | | | (0.0620) | (0.0620) | (0.0837) |
| BIT$ij$ | | | | | | | | | 0.131 | 0.126 |
| | | | | | | | | | (0.302) | (0.303) |
| HDI | | | | | | | | | | 0.866 |
| | | | | | | | | | | (5.442) |
| Constant | -7.724 | -6.364 | -12.20 | -8.689 | -8.736 | -10.71 | -18.35* | -18.56* | -17.74* | -19.51 |
| | (7.103) | (6.956) | (7.688) | (7.847) | (7.810) | (7.946) | (9.530) | (9.553) | (9.560) | (15.43) |
| | | | | | | | | | | |
| Obs. | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| R-squared | 0.144 | 0.224 | 0.253 | 0.296 | 0.296 | 0.309 | 0.342 | 0.342 | 0.343 | 0.403 |
| Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 | | | | | | | | | | |

Table 5 displays the fixed effect of home countries in the Middle East countries. The results demonstrate that Emirates, Kuwait, and Qatar exhibit the highest significance in terms of FDI in the North Africa region compared to the other countries in the sample. Additionally, the findings from European partners indicate that most European countries included in the sample display a positive significance compared to other countries, namely France, Italy, Germany, the UK, and Holland. Furthermore, in relation to the regionally fixed effect, the findings suggest that the Gulf region and Europe region countries have the most significant investment effect in the North Africa region compared to other investment partners.

**Table 5: Cross -Section Estimation Results (Fixed Effect of Home Countries)**

| | MENA | | Europ | | Asia | | North America | | All regions |
|---|---|---|---|---|---|---|---|---|---|
| LnGDPj | 0.971*** | LnGDPj | 0.895*** | LnGDPj | 0.810*** | LnGDPj | 0.983*** | LnGDPj | 0.658** |
| | (0.269) | | (0.308) | | (0.289) | | (0.303) | | (0.259) |
| LnGDPj | 0.659*** | LnGDPj | 0.398** | LnGDPj | 0.395*** | LnGDPj | 0.456*** | LnGDPj | 0.490*** |
| | (0.190) | | (0.170) | | (0.148) | | (0.129) | | (0.138) |
| Lndistij | -0.949*** | Lndistij | 0.00885 | Lndistij | 0.135 | Lndistij | -0.612*** | Lndistij | 0.301 |
| | (0.198) | | (0.309) | | (0.323) | | (0.225) | | (0.322) |
| Comlangij | 0.360 | Comlangij | 1.275*** | Comlangij | -0.0687 | Comlangij | 1.099*** | Comlangij | -0.0957 |
| | (0.488) | | (0.480) | | (0.473) | | (0.371) | | (0.416) |
| Combordiji | -0.303 | Combordiji | -1.098** | Combordiji | -1.346** | Combordiji | -1.970*** | Combordiji | 0.761 |
| | (0.796) | | (0.505) | | (0.526) | | (0.520) | | (0.678) |
| Bitradij | 334.7** | Bitradij | 378.8*** | Bitradij | 464.4*** | Bitradij | 336.7*** | Bitradij | 446.7*** |
| | (145.1) | | (132.5) | | (138.0) | | (114.8) | | (118.3) |
| Findevj | 0.0236** | Findevj | 0.0188* | Findevj | 0.0165 | Findevj | 0.0185* | Findevj | 0.0132 |
| | (0.00982) | | (0.0105) | | (0.0101) | | (0.0104) | | (0.00941) |
| inflation | 0.0111 | Inflation | 0.0296 | Inflation | 0.0111 | Inflation | 0.00913 | Inflation | -0.00794 |
| | (0.0521) | | (0.0612) | | (0.0559) | | (0.0572) | | (0.0542) |
| BITij | -0.00219 | BITij | 0.0942 | BITij | 0.0994 | BITij | 0.127 | BITij | 0.551** |
| | (0.327) | | (0.322) | | (0.270) | | (0.282) | | (0.268) |
| Bahrain | 1.141 | Belgium | 0.705 | Turkey | -1.911*** | Canada | -1.350* | Colohistij | 0.413 |
| | (0.998) | | (1.019) | | (0.424) | | (0.767) | | (0.556) |
| Saudi arabia | -0.0894 | France | 1.359* | Singapore | -3.022*** | USA | 2.051*** | Gulf | 2.367*** |
| | (0.603) | | (0.687) | | (0.659) | | (0.615) | | (0.672) |
| Emirates | 3.266*** | Germany | 0.997* | S. Korea | -2.188** | | | Asia | -1.066 |
| | (0.769) | | (0.504) | | (0.896) | | | | (0.735) |
| Algeria | -2.821** | Holland | 1.198*** | Japan | -2.601*** | | | Europ | 1.506*** |
| | (1.080) | | (0.320) | | (0.671) | | | | (0.538) |
| Egypt | 0.277 | Italy | 1.103* | China | -2.014*** | | | N.America | 0.620 |
| | (0.881) | | (0.642) | | (0.616) | | | | |
| Kuwait | 2.131*** | Spain | 1.803*** | | | | | | |
| | (0.696) | | (0.569) | | | | | | |
| libya | -0.480 | Switzerlad | 0.250 | | | | | | |
| | (0.984) | | (0.721) | | | | | | |
| Morocco | -1.977 | UK | 2.415*** | | | | | | |
| | (1.227) | | (0.570) | | | | | | |
| Qatar | 1.738** | | | | | | | | |
| | (0.740) | | | | | | | | |
| Tunisia | -0.847 | | | | | | | | |
| | (1.135) | | | | | | | | |
| Turkey | -1.198** | | | | | | | | |
| | (0.539) | | | | | | | | |
| Constant | -19.11* | Constant | -18.47* | Constant | -15.55 | Constant | -16.60* | Constant | -17.19* |
| | (9.839) | | (9.558) | | (9.681) | | (8.993) | | (8.863) |
| Obs. | 108 | Obs. | 108 | Obs. | 108 | Obs. | 108 | Obs. | 108 |
| R-squared | 0.609 | R-squared | 0.474 | R-squared | 0.412 | R-squared | 0.417 | R-squared | 0.563 |

## 5. CONCLUSION

This paper examined the influence of bilateral trade and FDI inflows between North Africa countries, and a sample of 25. The results from the main gravity model indicate that FDI between North Africa and other countries was positively driven by the economic sizes of both home and host countries and negatively by the physical distance between them. The results also show that the roles played by common language and bilateral trade are particularly relevant and their effects are shown to be highly positive and significant, suggesting that bilateral FDI flows tend to be larger between North Africa countries and other countries that have already a large bilateral trade transaction. the study also concluded that France, Emirates, Spain, and Kuwait are the most significant countries in North Africa region in terms of FDI compared to other investing countries.

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# RELATIONSHIP BETWEEN METAVERSE CRYPTOCURRENCIES (META COINS) AND SUSTAINABILITY INDICES

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## ABSTRACT
**Purpose-** The purpose of this study is to determine the relationship between metaverse and sustainability indices. MANA token was used as a metaverse indicator in the study. Dow Jones Sustainability Emerging Markets Index (DJS_EMI), Dow Jones Sustainability World Index (DJS_WI), Dow Jones Sustainability Europe Index (DJS_EI) were used as sustainability indices.
**Methodology-** In this research, the dynamic relationships between Metaverse and 3 sustainable indices used in the study were analyzed with a time-varying parameter vector autoregressive (TVP-VAR) model. This method is based on the fixed parameter sliding window VAR approach, first developed by Antonakakis and Gabauer (2017) and later updated by Diebold and Yılmaz (2009, 2012, 2014).
**Findings-** DSJ_EMI variable carries a volatility spread of 24.85% to "DSJ_WI", 24.81% to "DSJ_EI" and 25.40% to "METAVERSE". "DSJ_WI" has a 59.68% volatility spread to other variables. The variables "DSJ_EMI" 25.04%, "DSJ_EI" 25.10% and "METAVERSE" 24.69% carry out volatility spread. Finally, while 70.79% of the volatility change in the "METAVERSE" variable is due to itself, a total of 29.21% is due to other variables. The variables "DSJ_EMI" 9.74%, "DSJ_WI" 9.74% and "DSJ_EI" 9.73% perform volatility spread.
**Conclusion**- Mana (Decentraland Token) is the cryptocurrency used in the virtual reality platform called Decentraland. Metaverse refers to a digital universe called virtual reality, augmented reality and virtual world. Decentraland is a decentralized virtual reality platform that allows users to create, trade and interact with their own digital content.As a result of the analysis, it was determined that MANA, a Metavarse crypto asset, spreads volatility to sustainability indices. In other words, the MANA token spreads volatility to sustainability indices.

**Keywords:** Metaverse, metaverse cryptocurrincies, meta coins, sustainability ındex, TVP-VAR
**JEL Codes:** C32, C55, C58

## 1. INTRODUCTION

Firstly, Neal Stephenson mentioned the concept of Metaverse in his science fiction novel "Snow Crash". The author, who describes an unreal virtual universe in the novel, explains that people can survive in the virtual universe as well as in the real world. The virtual universe (Metaverse) provides its users with an endless space where they can spend all their time, shop, have fun, have meetings, meet new people, and create their own avatars. In this world, which is a virtual universe, users are free. External factors affecting the individual such as laws, rules, traditions, cultural characteristics, prohibitions, diseases, psychological pressures and family ethics that affect the daily life of individuals in the real world are no longer an obstacle in the virtual universe run by artificial intelligence, thus encouraging users to spend time in the virtual universe. For example, NFT art galleries are one of Metaverse's most popular service offerings. It can be purchased with Ethereum on OpenSea, one of the NFT markets, by clicking on the desired artwork. The currency used to buy and sell digital real estate in Decentraland's Metaverse is "MANA". As the variety of services offered to users in the digital environment increases, the cryptocurrencies used and non-fungible token (NFT) transactions will also increase.

The concept of sustainability has become very popular today. In its most general definition, the concept of sustainability means meeting both economic and social needs while also taking into account the needs of future generations. This means

not consuming existing resources unconsciously while meeting today's needs. The most important issue in this process is the efficient and effective use of environmental factors (Yürek et al., 2021: 1). The increasing importance of sustainability over time has also revealed the need for businesses to act more sensitively and more transparently about the impacts and results of the environmental, social and governance dimensions of their activities, and has made businesses aware of their responsibilities towards a wide segment of society (Wilson, 2003: 2-3). However, it is observed that, as a result of the dramatic degradation of the environment due to overuse of natural resources and high levels of pollution that harm the well-being of future generations, businesses have become more determined to contribute to sustainable development and engage in activities consistent with sustainability. Businesses have also begun to realize the benefits of disseminating their environmental and social activities to their stakeholders (Pereira et al., 2021: 63).

The aim of this research is to determine the relationship between metaverse and sustainability indices. MANA token was used as a metaverse indicator in the study. Dow Jones Sustainability Emerging Markets Index (DJS_EMI), Dow Jones Sustainability World Index (DJS_WI), Dow Jones Sustainability Europe Index (DJS_EI) were used as sustainability indices. Daily frequency data covers the periods 10.11.2020-10.11.2023 for all variables. In the study, time-varying parameter vector autoregressive (TVP-VAR) model was used.

## 2. LITERATURE REVIEW

The prominent studies in the literature on the subject that attract attention are summarized below.

Nadini et al. (2021) analysed a large dataset including 6.1 million trades of 4.7 million NFTs in 160 cryptocurrencies, primarily Ethereum and WAX, and covering the period between June 23, 2017 and April 27, 2021. Finally, they investigated the predictability of NFT sales using simple machine learning algorithms and find that sale history and, secondarily, visual features are good predictors for price.

Aharon and Demir (2021) analyzed the relationship between returns for non-fungible tokens (NFTs) and other financial assets during the period from January 2018 to June 2021. By using the Time-Varying Parameter Vector Autoregressions (TVPVAR) approach, they showed that the relationship between the returns for financial assets increased during the COVID-19 period. As a result of the analysis, they determined that NFTs are independent of shocks from common assets and diversification is beneficial in times of crisis.

Dowling (2021) analysed the pricing of parcels of virtual real estate in Decentraland, showing that the price series of these NFTs are characterised by inefficiency and a rise in value. Dataset is all secondary market trades in Decentraland LAND tokens from the period March 2019 to March 2021.

Ante (2022) investigated the interrelationships between NFT sales, NFT users, and the pricing of Bitcoin (BTC) and Ether (ETH). Dataset are composed of Daily price between January 2018 and April 2021. The results showed that a Bitcoin price shock triggers an increase in NFT sales. Also, Ether price shocks reduce the number of active NFT wallets. Moreover, cryptocurrency markets affect the growth and development of the NFT market, but there is no reverse effect.

Sönmezer and Çelik (2022) investigated the structure of returns on metaverse tokens. The dataset are composed of 394 daily observations of various cryptocurrency returns for the sample period between 27 December 2020 to 27 January 2022. MANA, ENJ, THETA, and AXS are chosen as representatives from the metaverse world and Bitcoin and Ethereum coins are chosen from the crypto world. The results showed that these tokens are positively influenced by their rival tokens' returns as well as their trading volumes. For MANA returns, ENJIN returns have a positive 99% statistical significance but for ENJIN returns, MANA, THETA, AXS, and ETH returns have a positive 99% statistical significant effect.

Yılmaz and Ecemiş (2022) wanted to determine the digital marketing capabilities of the identified Metaverse platforms in relation to the marketing mix components by examining data obtained from the crypto currency exchange "Binance" and the "Intotheblock" website. The sample of the study are the Metaverse platforms with a complete dataset for the criteria determined operating on the "Binance" and "Intotheblock" platforms operating in the crypto currency exchanges, "Aavegotchi (GHST), Axie Infinity (AXS), Decentraland (MANA), Illuvium (ILV), My Neighbor Alice (ALICE), The Sandbox (SAND) and Smooth Love Potion (SLP)". According to the results obtained with the CoCoSo method, the success order of Metaverse platforms is MANA, SAND, GHST, AXS, SLP, ALICE and ILV.

Vidal-Tomás (2022), analysed the performance and dynamics of market price movements of 84 metaverse tokens and 129 play-to-earn tokens over a period between 28 October 2017 and 31 October 2021 and found positive performance though characterized by high volatility. Moreover, the financial performance of metaverse and play-to-earn tokens could not be justified by the real evolution of NFT sales and investor attention.

Sahay et al. (2022) focused on how the Metaverse can affect the business models of companies and the growth of their economies. The authors used econometrics models such as ARIMA and SARIMAX to predict the stock prices of four Metaverse cryptocurrencies like AXS, MANA, SAND and ILV based on their performance during March 2021 to March 2022 and reported an increase in the investment. The results are an indicator for the potential growth of the respective company's cryptocurrency token, which in turn is proportional to the growth of the company in the market.

Akkuş et al. (2022) wanted to investigate the existence of price bubbles in MANA, the meta coin of the Decentraland digital reality platform, which has the largest market value among meta coins. For this purpose they used the newly developed GSADF multiple bubble test. According to the result of the analysis carried out with the GSADF test, the existence of price bubbles in MANA prices in different periods has been determined.

Nakavachara and Saengchote (2022) addressed to the returns to LAND investment using real estate analyses such as hedonic pricing regressions and price indices. By examining repeat sales they can more accurately assess whether purchasing and reselling LAND is a good investment in different denominations.

Pamucar and Biswas (2023) aims to provide a framework to compare the metaverse crypto assets based on their market performance. A novel hybrid framework such as Logarithmic Percentage Change driven Compromise Solution based Appraisal are used in the study. According to the results, the momentum of the closing prices and volatility of the price movements hold the higher importance as derived by calculation of objective weights. The comparison of the results obtained by LOPCCSA with other Multi Criteria Decision Making (MCDM) models show considerable consistency. The sensitivity analysis indicates that LOPCCSA provides a stable solution.

## 3. DATA AND METHODOLOGY

The aim of this study is to determine the relationship between metaverse and sustainability indices. MANA token was used as a metaverse indicator in the study. Dow Jones Sustainability Emerging Markets Index (DJS_EMI), Dow Jones Sustainability World Index (DJS_WI), Dow Jones Sustainability Europe Index (DJS_EI) were used as sustainability indices.

MANA token is the meta coin of the Decentraland digital realty platform. In other words, MANA is the local cryptocurrency of the Decentraland project and allows users to buy and sell digital assets in a virtual realty environment. Since Decentraland is a platform that uses blockchain technology to create and manage a virtual reality world, MANA is a tool used to trade digital assets within this metaverse of Decentraland. The DJS_EMI index is an index created based on the financial performances of companies operating in emerging markets, the DJS_WI index is based on the financial performances of large and sustainability-oriented companies around the world, and the DJS_EI index is based on the financial performances of sustainability-oriented companies in Europe.

The DJS_EMI, DJS_WI and DJS_EI variables used in the study were obtained from the internet addresses "www.spglobal.com" and the MANA variable was obtained from the internet addresses "www.coinmarketcap.com". Closing data sets at daily frequency cover the periods 10.11.2020-10.11.2023 for all variables. Data sets of variables were converted into return series with the formula ln(Pt/Pt-1)*100, and then volatility series were obtained by taking the squares of the return series.

In this research, the dynamic relationships between Metaverse and 3 sustainable indices used in the study were analyzed with a time-varying parameter vector autoregressive (TVP-VAR) model. This method is based on the fixed parameter sliding window VAR approach, first developed by Antonakakis and Gabauer (2017) and later updated by Diebold and Yılmaz (2009, 2012, 2014). The TVP-VAR model is as follows (Antonakakis and Gabauer, 2017; Akkuş and Doğan, 2023; Doğan et al., 2023):

$$Y_t = \beta_t Y_{t-1} + \epsilon_t \qquad\qquad \epsilon_t|F_{t-1} \sim N(0, S_t) \tag{1}$$

$$\beta_t = \beta_{t-1} + v_t \qquad\qquad v_t|F_{t-1} \sim N(0, R_t) \tag{2}$$

The total connectedness index is calculated as follows (Antonakakis and Gabauer, 2017):

$$C_t^g(J) = \frac{\Sigma_{i,j=1,i\neq j}^N \tilde{\phi}_{ij,t}^g(J)}{\sum_{i,j=1}^N \tilde{\phi}_{ij,t}^g(J)} * 100 \tag{3}$$

$$= \frac{\Sigma_{i,j=1,i\neq j}^N \tilde{\phi}_{ij,t}^g(J)}{N} * 100 \tag{4}$$

The situation called "total directional connectivity to others", where variable i transmits its shock to all other variables j, is as follows;

$$C_{i \to j,t}^{g}(J) = \frac{\Sigma_{j=1,i \neq j}^{N} \tilde{\phi}_{ji,t}^{g}(J)}{\sum_{j=1}^{N} \tilde{\phi}_{ji,t}^{g}(J)} * 100 \tag{5}$$

The situation called "total indirect connectivity from others", which variable i contains from other j variables, is as follows;

$$C_{i \leftarrow j,t}^{g}(J) = \frac{\Sigma_{j=1,i \neq j}^{N} \tilde{\phi}_{ij,t}^{g}(J)}{\sum_{i=1}^{N} \tilde{\phi}_{ij,t}^{g}(J)} * 100 \tag{6}$$

"Net total directional connectedness", which can be interpreted as the "strength" of variable i or its effect on the network of all variables, is obtained by subtracting the total directional connectedness from the others as follows::

$$C_{i,t}^{g} = C_{i \to j,t}^{g}(J) - C_{i \leftarrow j,t}^{g}(J) \tag{7}$$

## 4. FINDINGS

In this part of the study, dynamic connectivity relationships between the variables used are investigated with the TVP-VAR model. First of all, the time path graphs of the price series of the variables are shown below in Figure 1.

**Figure 1: Price Series Graphs of Variables**



When the price series graphs of the DJS_EMI, DJS_WI and DJS_EI variables in Figure 1 are examined, it is understood that it peaked in 2021. These variables started to decline at the end of 2022 and started to rise again in 2023.

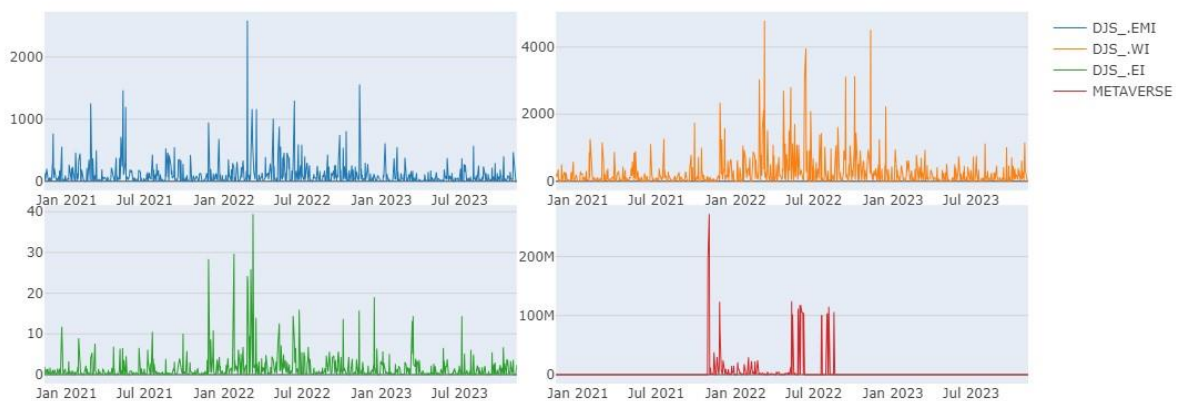**Figure 2: Volatility Series Graphs for Variables**

Figure 2 shows the volatility series graphs of the variables. DJS_EMI, DJS_WI and DJS_EI have the highest volatility in 2022. In addition, volatility is highest in the METAVERSE variable in the January-June period of 2022.

**Table 1: Descriptive Statistics of Volatility Series of Variables**

|                 | DSJ_EMI        | DSJ_WI         | DSJ_EI         | METAVERSE        |
|-----------------|----------------|----------------|----------------|------------------|
| **Mean**        | 108.058        | 264.458        | 1.599          | 3616881.546      |
| **Skewness**    | 5.099***       | 4.552***       | 5.491***       | 7.526***         |
| **Kurtosis**    | 40.281***      | 28.273***      | 41.190***      | 68.065***        |
| **Jarque-Bera** | 55897.504***   | 28562.864***   | 58833.391***   | 157323.750***    |
| ERS             | -10.786***     | -10.337***     | -8.949***      | -8.876***        |
| Q(10)           | 27.410***      | 47.321***      | 62.813***      | 183.051***       |
| Q2(10)          | 7.851          | 13.800**       | 48.241***      | 117.426***       |
| **Observation** | 778            | 778            | 778            | 778              |
| **ADF**         | -15.163***     | -21.266***     | -33.742***     | -41.635***       |

Table 1 shows descriptive statistics of the volatility series for the variables used in the study. Additionally, as a result of the Jargue-Bera test, it was determined that the variables were not normally distributed. According to the ADF unit root test results, it is understood that that the series of first differenced values of variables are stationary.

**Figure 3: Dynamic Total Connectivity Relationship of Variables**



Figure 3 shows the dynamic connectedness relationship between variables. According to the results, there is a lot of volatility spread among the variables until the end of 2021. However, after this period, the dynamic interconnectedness between these variables partially decreased and remained stable.
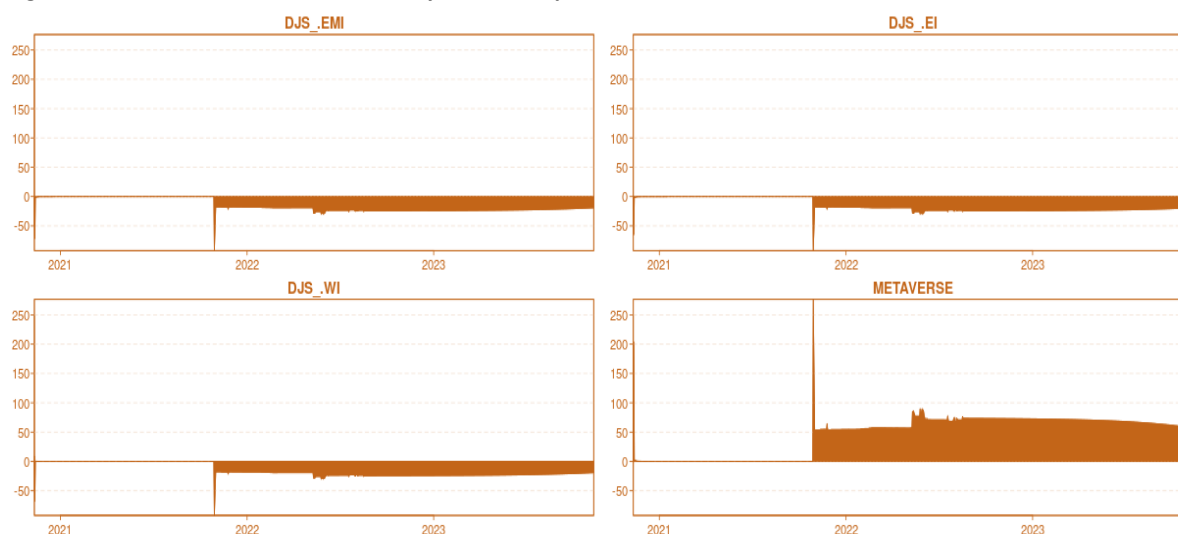
**Figure 4: Net Total Directional Connectivity Relationship of Variables**



Figure 4 shows the net total directional connectivity results with the TVP-VAR model. The shaded areas below the zero point show the volatility pickup in the corresponding date or period, and the shaded areas above the zero point show the volatility spread in the corresponding date or period. According to the results, the variables "DJS_EMI", "DJS_WI" and "DJS_EI" are volatile. However, the "METAVERSE" variable spreads volatility in all periods.

**Table 2: Average Dynamic Connectivity Relationship of Variables**

|  | DSJ_EMI | DSJ_WI | DSJ_EI | METAVERSE | FROM |
|---|---|---|---|---|---|
| **DSJ_EMI** | 24.94 | 24.85 | 24.81 | 25.40 | 75.06 |
| **DSJ_WI** | 25.06 | 25.14 | 25.08 | 24.72 | 74.86 |
| **DSJ_EI** | 25.04 | 25.10 | 25.17 | 24.69 | 74.83 |
| **METAVERSE** | 9.74 | 9.74 | 9.73 | 70.79 | 29.21 |
| **TO** | 59.85 | 59.68 | 59.62 | 74.81 | 253.97 |
| **NET** | -15.21 | -15.18 | -15.21 | 45.60 | 84.66/63.49 |

Table 2 shows the average dynamic connectivity results of the variables during the analysis period. While 24.94% of the volatility change in the "DSJ_EMI" variable is due to itself, a total of 75.06% is due to other variables. DSJ_EMI variable carries a volatility spread of 24.85% to "DSJ_WI", 24.81% to "DSJ_EI" and 25.40% to "METAVERSE". On the other hand, "DSJ_EMI" has a 59.85% volatility spread to other variables. Accordingly, "DSJ_EMI" is a variable with a net volatility of 15.21%.

While 25.14% of the volatility change in the "DSJ_WI" variable is due to itself, a total of 74.86% is due to other variables. The variables "DSJ_WI" 25.06%, "DSJ_EI" 25.08% and "METAVERSE" 24.72% perform volatility spread. On the other hand, "DSJ_WI" has a 59.68% volatility spread to other variables. Accordingly, "DSJ_WI" is a variable with a net volatility of 15.18%.

While 25.17% of the volatility change in the "DSJ_EI" variable is due to itself, a total of 74.83% is due to other variables. The variables "DSJ_EMI" 25.04%, "DSJ_EI" 25.10% and "METAVERSE" 24.69% carry out volatility spread. On the other hand, "DSJ_EI" has a volatility spread of 59.62% to other variables. Accordingly, "DSJ_WI" is the variable with a net volatility of 15.21%.

Finally, while 70.79% of the volatility change in the "METAVERSE" variable is due to itself, a total of 29.21% is due to other variables. The variables "DSJ_EMI" 9.74%, "DSJ_WI" 9.74% and "DSJ_EI" 9.73% perform volatility spread. On the other hand, it has a volatility spread of 74.81% to other variables in the "METAVERSE". Accordingly, the "METAVERSE" variable is the variable that has a net volatility of 45.69%.
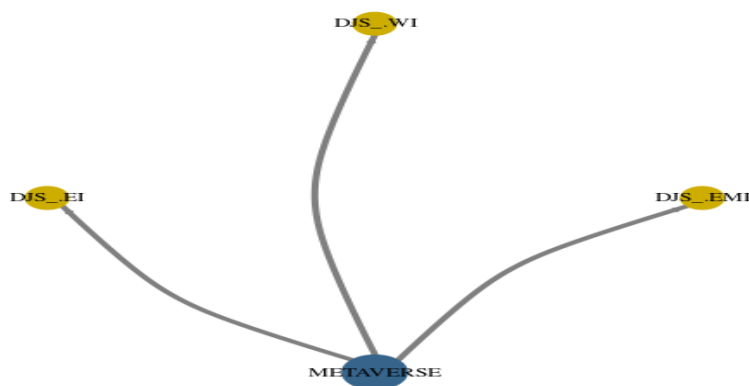
**Figure 5: Network Graph of Volatility Spread of Variables**



Figure 5, presented as a network graph, shows the variables containing volatility spreads between volatility series. Blue circles represent variables that spread volatility, while yellow circles represent variables that spread volatility. In addition, the size of the circles indicates the size of the spillover effect. Accordingly, while "METAVERSE" is the variable that spreads volatility, "DJS_EMI", "DJS_WI" and "DJS_EI" are the variables that spread volatility to itself. In other words, the "METAVERSE" variable spreads volatility to the "DJS_EMI", "DJS_WI" and "DJS_EI" variables. The arrows in the chart show the direction of the volatility spread and the thickness of the lines with the arrows show the strength of the volatility spread. Accordingly, the "METAVERSE" variable spreads volatility equal to other variables.

## 5. CONCLUSION

Mana (Decentraland Token) is the cryptocurrency used in the virtual reality platform called Decentraland. Metaverse refers to a digital universe called virtual reality, augmented reality and virtual world. Decentraland is a decentralized virtual reality platform that allows users to create, trade and interact with their own digital content. Mana tokens are used to buy land on the Decentraland platform, sell virtual properties, buy and sell virtual items, and support activities on the platform. Therefore, Mana is a tool used in the content and economic transactions of the Decentraland platform and is used to facilitate trade and interactions within the Metaverse.

In this study, the relationship between metaverse crypto assets and sustainability indices was determined. MANA token was used as the metaverse indicator. Dow Jones Sustainability Emerging Markets Index, Dow Jones Sustainability World Index, Dow Jones Sustainability Europe Index were used as sustainability indices. Data from the periods 10.11.2020-10.11.2023 were used in the study. TVP-VAR method was used in the study. As a result of the analysis, it was determined that MANA, a Metavarse crypto asset, spreads volatility to sustainability indices. In other words, the MANA token spreads volatility to sustainability indices.

This study which examines the dynamic connectivity relationship between metaverse crypto assets and sustainability indices, has a number of limitations. First of all, the findings are valid for the MANA token and the relevant period. New studies with different crypto assets are needed to better understand the relationship between Metevarse and sustainability. Additionally, in future studies, investigating the relationships between new crypto assets such as NFT and DeFi and sustainability indices and clean energy indices will contribute to the literature.

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# EXPLORING THE ADOPTION OF RISK GOVERNANCE STRUCTURES WITHIN THE TURKISH BANKING FIELD: AN INSTITUTIONAL THEORY LENS, 2006-2019

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## ABSTRACT

**Purpose-** The purpose of this study is to investigate the adoption patterns of transnationally imposed risk governance structures within the Turkish banking field employing an institutional theory perspective. Building on institutional complexity, which stems from the conflict between transnational and national institutional influences, our study examines two different periods where transnational and national institutional arrangements were in relative fit or misfit.

**Methodology-** The methodology of this study includes the analysis of the publicly available panel data of banks. The annual reports of all 15 banks are used to gather the banks' risk governance, risk management and performance indicators. All the reports are reached from Public Disclosure Platform (www.kap.gov.tr) or the corporate web sites of the banks.

**Findings-** A risk governance index is constructed to measure the varying levels of adoption among the banks, covering the period from 2006 to 2019. According to the findings, the risk governance index may include the dimension of risk committee, the dimension of chief risk officer, the risk appetite framework of the institution, and corporate governance. However, the risk performance of the banks may vary on different indicators.

**Conclusion-** It is uncovered that banks displayed a relatively homogenous adoption pattern during the 2006-2012 period when transnational and national institutional arrangements were in harmony. However, the adoption patterns diverged among banks when national institutional arrangements began to differ from transnational standards starting from 2013. It is also found that the adoption of transnational templates about risk governance did not result in significant performance increases in risk or corporate performance metrics, indicating a ritual adoption behavior by the majority of the banks, which fail or intendedly decline to entrench corresponding practices associated with these templates.

**Keywords:** Risk governance, adoption, institutional field, transnational institutions, banking
**JEL Codes:** D21, G21, G32, L20, M10

## 1. INTRODUCTION

This study aims to investigate the structures of risk governance in the Turkish banking field with an institutional theory lens. Institutional theory argues that organizations which operate within an organizational field tend to employ similar practices and become isomorphic over time due to the pressures stemming from regulatory compliance, overarching normative guidelines and mimetic behaviors (DiMaggio and Powell, 1983). Fields in institutional theory are defined broader than industries. They include organizations, related actors, and regulatory agencies that interact based on their 'shared cognitive or normative frameworks or a common regulative system' (Scott 1995, p. 56). In this sense, commercial banking is repeatedly acknowledged as an ideal organizational field both within advanced national settings (Kenis and Knoke, 2002) and in others (Tihanyi and Hegarty, 2007). However, recent arguments point to the fact that organizational fields do not simply develop within nation-states but can be transnationally formulated (Buchholz, 2016). The emergence of transnational networks of influence such as the Basel Committee on Banking Supervision (BCBS) and increasing convergence of markets, payment systems and technological platforms has

prompted the formation and subsequent diffusion of transnational institutional arrangements across different national banking fields (Goldbach, 2015). Thus, banks operating within a national setting are exposed both to the transnational level institutional pressures and national field level pressures simultenously, creating additional layers of complexity for their attempts to become legitimate and compliant (Djelic and Quack, 2003).

Motivated by the presence of concurrent demands for transnational and field level compliance, which may contradict with each other at times, the study initially explores the convergence or divergence patterns of risk governance structures within the Turkish banking field between 2006 and 2019. Turkish context offers a suitable observation opportunity for this investigation. Turkey, situated at the crossroads linking East and West, stands out as a significant country with a large sized market economy amounting to 720 billion $ and housing a significant Muslim population exceeding 83 millions. Turkey also has an established and diversified banking field, composed of public owned and private owned commercial banks as well as participation banks (Islamic rule banks). Moreover, the structural adjustment program applied following the 2001 macroeconomic crisis had significant influence on the Turkish banking field in terms of creating a regulatory harmony between transnational and national level institutional arrangements (Bakir and Onis, 2010). Yet, scholars of political economy repeatedly assert that the majority of these institutional arrangements have been reversed after Gezi events, a social movement against the government that occurred in 2013 (Esen, 2021). The policy reversal resulted in a divergence from transnational norms and increased national level pressure over the field via local bodies controlled by the government (Ciddi, 2021). Thus, this study additionally explores whether the shifts of relative fit or misfit between transnational and national level institutional pressures in two different periods (ie. 2006-2012 and 2013-2019) have had influence over the variation of Turkish banks' risk governance structures.

Moreover, as a supplement of its initial research aim, the paper also investigates whether proper presence of risk governance structures positively affect risk management metrics and/or performance indicators of banks during the same time period. As transnationally defined risk governance practices impose formation of risk management committees and active participation of risk managers in top level decision making of bank organizations, the study also investigates whether structural compliance with transnational norms translate into performance differences among Turkish banks. There are existing studies in this domain which link risk management and bank performance (Aebi et al., 2012; Kafidipe et al., 2021), risk governance and bank performance (Chen et al., 2019; Erin et al., 2020; Karyani et al., 2020; Zhang, 2021; Abid et al., 2021), and performance comparison of commercial and islamic banks (Erol et al., 2014; Kamarudin et al., 2016). The study extends the existing strand of research by exploring the combined effects of risk management, corporate governance and risk governance on risk and performance indicators. In this sense, findings contribute to the literature by uncovering patterns of performance variations among different clusters of the Turkish banking field.

The remainder of this article is prepared as follows. The theoretical background of risk governance, evolution of Turkey's institutional setting and the adoption or risk governance practices is discussed in the literature review part. Subsequently, the research method section covers sample and data information as well as the details about the variables. Findings section includes descriptive information about the data set, risk governance analysis and panel data analysis of the research. The paper concludes by highlighting its findings, contributions to the literature and limitations of the study.

## 2. LITERATURE REVIEW

### 2.1. Risk Governance Practices and Transnational Institutional Arrangements

"Risk governance" concept has emerged to better frame the structural aspects of risk management in financial institutions (FIs). Many scholars underscored that corporate governance practices had failed in FIs (Beltratti and Stulz, 2012; Erkens et al., 2012). Diamond and Rajan (2009) revealed that poor performance of banks during the 2008 crisis was linked with the defects of bank governance mechanisms. Due to the fact that FIs represent unique organizational forms, which intermediate market transactions among both real and legal entities of the entire population, they require more prudent governance mechanisms as well as a reliable risk management function to operate under dynamic and varied pressures stemming from external and internal factors (Sheedy and Griffin, 2017). Therefore, corporate governance mechanisms and risk management practices have mutually evolved especially at the transnational level to frame appropriate practices and standards about the new concept of risk governance.

So what is the risk governance? Financial Stability Board (FSB) (2013) indicates that risk governance refers collectively to the role and responsibilities of the board, the firm-wide Chief Risk Officer (CRO) and risk management function, and the independent assessment of the risk governance framework. Gontarek (2016) defines risk governance as a framework of setting a strategy, defining and monitoring the risk appetite and its limits, as well as measuring and managing the risks. He further identifies four key elements of risk governance as i) the foundation of board-level risk committees, ii) empowerment of CROs, iii) the existence of

risk appetite statements, and iv) establishment of a strong risk culture (Gontarek, 2016). Thus, rather than a conventional risk assessment and mitigation approach, which has been prevalent before the second accord of the BCBS (Chaney et al.,2009), a holistic framework, which encompasses empowered roles in the corporate governance accompanied by solid risk management practices that span enterprise-wide operational and cultural conduct, has been increasingly promulgated across academic circles (Sheedy, 2016) and by transnational actors alike (FSB, 2013; BCBS, 2015).

BCBS was founded in 1974 as a transnational network of central bankers with the aim to improve the supervisory practices in the banking field and its initial accord, known as BASEL I, was published in 1988. Even though critics denounce these efforts as insufficient since the BCBS did not have supervisory authority and could not impose stricter measures because of its diverse make-up (Nicolas and Firzli, 2011), it is fair to conclude that the transnational standards of risk management practices in the banking field have begun to diffuse widely from then on (Goodhart, 2011; Agha, 2013). BCBS continually expanded its first accord's content, which was primarily concerned with capital adequacy of banks and introduced its second accord in 2004 to frame different risks and a holistic framework to assess and mitigate them (Goldbach, 2015). Alongside with BCBS accords, transnational standards began to proliferate after the 1994 Mexico and 1997-1998 international financial turmoils (Helleiner, 2010). In 1999 G7 established Financial Stability Forum and Organization for Economic Cooperation and Development (OECD) introduced corporate governance standards. Taken together with the development of securities regulation in 1998 by the International Organization of Securities Commissions (IOSCO), announcement of insurance supervision in 1997 by the International Association of Insurance Supervisors (IAIS), creation of the agreement of payments systems in 2001 by the Committee on Payment and Settlement Systems (CPSS) and formation of accounting and auditing standards in 2002 by two private institutions, the International Accounting Standards Board (IASB) and the International Federation of Accountants (IFAC), the movement toward transnational norms and standards to frame a transnational field for FIs has become apperant.

Above mentioned standarts and norms do not represent ad hoc developments but rather the results of a concerted effort among transnational actors (including World Bank and International Monetary Fund) to formulate the norms of a transnational organizational field for banking and finance, which is to a large degree autonomous from the national field level supervisory actors (Goldbach, 2015). The relative autonomy of transnational institutional arrangements from national field level arrangements has become a significant topic in the management and organization theory (Djelic and Quack, 2013). Whereas scholars almost uniformly agree that greater degrees of fit between transnational and national field level norms are more likely to bring about holistic and replicative adoption of such norms within an organizational field (Kostova, 1999; Kostova and Roth, 2002), there is less consensus about what happens when transnational and field level institutional arrangements contradict (Djelic and Quack, 2003; Buchholz, 2016). Some scholars argue that in case of a misfit between transnational and national field level arrangements, actors in a given field may be more likely to edit or adapt transnationally imposed templates about organizational roles or practices to increase chances of local acceptance (Ansari et al., 2010), others contend that actors may go for 'mock' adoption (Walter, 2008), or intentional decoupling (Gondo and Amis, 2013) to seemingly accommodate a demand from either of these fields while complying with the other one. Being rare, there is also the chance that actors may reject a transnational institutional arrangement or a template in case of its significant deviation from the immediate national field level requirements (Rovik, 2016). Given the theoretical dissensus about how misfit between transnational and national field level institutional arrangements condition organizational level responses to adopt, adapt or reject a structural template, the next section introduces the context of Turkish banking field and formulates relevant hypotheses for testing.

## 2.2. The Adoption of Risk Governance Practices in the Turkish Banking Field Following 2001 Macroeconomic Turmoil, 2006-2019

Following the devastating Marmara earthquake in 1999, already weakened Turkish macroeconomic indicators deteriorated even more until a political stand-off between the president and prime minister stimulated one of the severest politico-economic crisis of the Turkish history in February 2001 (Esen, 2021). A macroeconomical program titled "transition to the strong economy" was formulated by Kemal Dervis, who was a former World Bank officer, and it was backed by the IMF and WB with more than 20 billion $ funding for the bail-out of bankrupt FIs or losses of public banks. The program contained significant structural adjustment packages, many of which were related to the supervision and governance of FIs (Onis, 2009). Among many headings, the program introduced central bank autonomy, endorsement of capital adequacy measures in accordance with BCBS guidelines and stricter bank ownership standards, which are geared to cut off dense ownership linkages of banks with Turkish family holdings in order to prohibit imprudent credit allocation of the former for the affiliates of the latter (Marois and Güngen, 2019).

Although the implementation of the program had to be carried out under the Justice and Development adoption of a more nationalist and unorthodox economic policy, the main tenets of which were based on the promotion of large-scale infrastructural

projects via public private partnerships, pressing for lower interest rates to boost credits and increased adoption of Islamic rule finance, which do not offer interests but participation shares. Many political economists argue that the reversal of initial neo-liberal policy followed by JDP and its related institutional arrangements have become visible after the Gezi events in 2013, marked by massive protests against Erdogan and JDP (Esen, 2021). Turkish political governance moved rapidly into an ultracentralized presidency rule after the failed coup attempt of 2016 and already weakened fit between transnational and national institutional arrangements began to deteriorate. The autonomy of central bank was both discursively and actively undermined, the board membership positions of the supposedly autonomous regulatory body, namely Banking Regulation and Supervision Agency, have begun to be populated by pro-government members and a significant discursive campaign was launched to undermine the conduct of transnational bodies such as IMF, WB and even bodies of European Commission (Ciddi, 2021).

Busch (2009) and Goldbach (2015) assert that national level institutional arrangements in the banking and finance field are still more influential than transnationally imposed institutional arrangements. Building on these arguments, it is articulated that actors of the Turkish banking field will be more likely to comply with both transnational and national level institutional arrangements, when they are in harmony, but will prefer to comply with national arrangements, once there is disagreement between them. Furthermore, it is plausible to offer that relative harmony between transnational and national level institutional arrangements will lead to faster and holistic adoption of templates in the Turkish banking field as actors in the field will perceive benefits about being legitimate. Similar adoption decisions will bring about structural homogeneity among members of the banking field. However, misfit between these arrangements will create complexities for at least some of the banking actors, (i.e. banks with foreign ownership) especially who need to answer to the divergent demands of their stakeholders. This time members of the banking field may develop more heterogenous structures. Therefore we develop the following hypotheses:

Party (JDP) rule, which won the majority of votes in the 2002 elections, many commentators agree that JDP sticked to the program and worked hard to comply with its requirements in its initial government period (2002-2007) to merge this neo-liberal transformation program with the European Union accession policy (Onis, 2009). JDP's wholehearted commitment to the program continued until 2008/2009 financial crisis, the effects of which in Turkey was a significant undervaluation in local currency and worsened macroeconomic indicators. From then on, JDP gradually began to move away from transnational institutional arrangements and embarked on

**H1:** *From 2006 to 2012 when transnational and national institutional arrangements about banking and finance are in relative harmony, the implementation of transnational standards of risk governance structure among Turkish banks will be more homogenous.*

**H2:** *From 2013 to 2019 when transnational and national institutional arrangements about banking and finance are in relative conflict, the implementation of transnational standards of risk governance structure among Turkish banks will be more heterogenous.*

As actors in the banking field begin to adopt and implement the trans/nationally imposed roles and practices associated with risk governance, it is expected that these changes will influence their corporate and risk management performance. Aebi et al. (2012) reveal that banks, where Chief Risk Officer (CRO) directly reports to the board and not to the CEO, tend to have higher Return on Equity (ROE) and stock returns. On the other hand, they also indicate that corporate governance indicators such as board size and board independence have insignificant or have even negative impact on banks' performance. Chen et al. (2019) have shown that banks with a low risk governance score, which is measured by the presence, size, composition and activity of the risk committee, have lower stock performance in stock exchange during the 2008 crisis.

There are also some conflicting findings. For instance, Erin et al. (2020) have reported that several risk governance variables such as presence of a CRO and risk committee independence have statistically positive influence on Return on Assets (ROA), whereas risk committee size has a negative effect. Karyani et al. (2020), who investigated Southeast Asian nations, revealed that the overall risk governance, board-level risk governance structures and risk management practices had no significant effect on banks' ROA. They found that only management-level risk governance roles had a negative impact on ROA. Moreover, Abid et al. (2021) investigated Asian commercial banks and seperately analyzed publicly owned and privately owned banks. In their analyses, they found that risk governance mechanisms had positive impact on performance of private owned banks, whereas there was no significant impact observed in publicly owned banks.

Based on the previous findings in the literature, it can be argued that the banks which have adopted risk governance templates imposed by transnational or national actors will likely to experience better risk management performance. Although, the findings indicate mixed results, we also expect better overall corporate performance from banks with higher risk governance scores. Therefore, we formulate the following hypotheses.

**H3:** Banks with higher risk governance scores will have higher risk management performance.

**H4:** Banks with higher risk governance scores will have better corporate performance.

## 3. DATA AND METHODOLOGY

### 3.1. Sample Selection

The study investigates the differential adoption of risk governance practices in Turkish banking field in order to investigate whether these adoption patterns are related with the fit or misfit between transnational and national institutional arrangements in the banking and finance. To this aim, a sample composed of 12 commercial banks are selected from a total number of 47 banks, representing more than 90% of the Turkish banking industry in terms of asset size and number of employees. Additionally, three more Islamic rule banks, which were the only Islamic corporations that are operating in Turkey during the selected time frame, are added to the data. The time period for our research covers annual data of 15 banks over 14 years (from 2006 to 2019). The research data begins with 2006 because there is significant lack of data before this year for the majority of the banks representing the population. As BCBS disclosed BASEL II standards in 2004 and some of the structural arrangements amended by BASEL and the transition to the strong economy program came into effect by the 2005 banking law, 2006 represents an appropriate beginning point for our investigation. Mainly, the annual reports of all 15 banks are used to gather the banks' risk governance, risk management and performance indicators. The annual reports are reached from Public Disclosure Platform (www.kap.gov.tr) or the corporate web sites of the banks.

### 3.2. Variables

#### 3.2.1. Risk Governance

To build a measure about the risk governance practices of banks, a risk governance index is constructed based on the existing literature, which includes 15 variables that are classified under four dimensions. Risk committee is the first dimension of the risk governance index, which includes five major queries (Brancato et al., 2006; Sabato, 2010; Aebi et al., 2012; Ellul and Yerramilli, 2013; Raouf and Ahmed, 2022; Nguyen, 2022). These are the existence of a board level risk committee, the number of members in the risk committee, the average number of risk related committee meetings per year, the number of directors in the risk committee and the percentage of independent directors in the risk committee. The existence of a board level risk committee is a dummy variable, while the remaining four variables are numeric, specified by absolute values or percentages.

Chief Risk Officer (CRO) role is the second dimension of the risk governance index, which includes five variables (Ellul and Yerramilli, 2013; Zhang et al. 2021; Dupire and Slagmulder, 2019). These are the existence of a CRO, the presence of a head of risk on the bank's executive board, the presence of a head of risk on the bank's top management, the presence of a head of risk on the bank's executive committee (EXCO) or asset liability committee (ALCO) and whether the CRO reports directly to the board of directors or CEO. These five variables are all dummy variables. Upon our first check with the descriptive statistics of the data, the last variable (whether the CRO reports directly to the board of directors or CEO) is dropped from the inventory, as it did not vary for all banks and all time periods.

Risk Appetite is the third dimension of the risk governance index (Zhang et al., 2021, Sheedy and Griffin, 2017) and it is measured by the existence of a formal risk appetite framework, which is a dummy variable.

Consequently, bank corporate governance is the final dimension of risk governance index (Aebi et al., 2012; Minton et al., 2014; Zhang et al., 2021; Alshirah et al., 2020). It includes the board size, board independence, whether the CEO is also the chairman of the board of directors, and the existence of a corporate governance committee. Board size and board independence are numeric variables, whereas others are dummy variables. Once again, we eliminated the third variable, as we noticed that the CEO has never assumed the duty of chairman of the board in all Turkish Banks.

#### 3.2.2. Risk Management Indicators

Two different risk management practices are incorporated as dependent variables of the study. First, capital adequacy ratio (CAR) is used to understand the banks' level of risk taking. CAR is listed as one of the principal regulatory indicators used both transnationally and nationally alike, which ensures a bank's financial stability and demonstrates banking sector's proper progress. The indicator is taken directly from the annual reports of the banks, and it is calculated as the capital (Tier 1 and Tier 2 capital) divided by risk weighted assets.

Second, non-performing loan (NPL) ratio, which is a major asset quality metric for the banks is also employed as a risk management indicator in the study. NPL is also gathered from the annual reports of the banks. The formula of the ratio is calculated as non-performing loans divided by total loans.

### 3.2.2. Performance Indicator

As it has also been employed by other studies in the banking field, we used Return on Assets (ROA) as a corporate performance measure. It is calculated as the banks' cumulative net income over a year, divided by total assets as of that year.

### 4. FINDINGS

### 4.1. Empirical Analysis

### 4.1.1. Descriptive Analysis

Table 1 reports descriptive statistics of risk governance variables, risk management practices and the corporate performance indicator.

**Table 1: Description Values of Risk Governance Index and Risk Management and Performance Indicators**

| Variable | N | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|
| Existence of RC | 210 | 0.3381 | 0.4742 | 0 | 1 |
| Number of Members in RC | 210 | 1.0667 | 1.3325 | 0 | 7 |
| Number of RC Meetings | 210 | 2.9667 | 4.7577 | 0 | 14 |
| Number of Directors in RC | 210 | 1.3190 | 2.0067 | 0 | 8 |
| Percentage of Independent Directors in RC | 210 | 0.0320 | 0.0967 | 0 | 0.6 |
| Existence of CRO | 210 | 0.2381 | 0.4269 | 0 | 1 |
| CRO in BoD | 210 | 0.3143 | 0.4653 | 0 | 1 |
| CRO in Top Management | 210 | 0.5238 | 0.5006 | 0 | 1 |
| CRO in EXCO/ALCO | 210 | 0.4524 | 0.4989 | 0 | 1 |
| Existence of RAF | 210 | 0.5048 | 0.5012 | 0 | 1 |
| Board Size | 210 | 2.2299 | 0.2141 | 1.6094 | 2.6391 |
| Board Independence | 210 | 0.1193 | 0.1557 | 0 | 0.5 |
| Existence of CGC | 210 | 0.7333 | 0.4433 | 0 | 1 |
| CAR | 210 | 0.1934 | 0.1719 | 0.1230 | 1.4280 |
| NPL | 210 | 0.0347 | 0.0176 | 0.0026 | 0.0853 |
| ROA | 210 | 0.0168 | 0.0106 | 0.0012 | 0.0929 |

Note: N: number of observations, Std. Dev: Standard Deviation

Table 1 illustrates 210 observations, which include the annual data of 15 Turkish banks over 14 years. There are 13 risk governance variables, seven of which are dummy variables. Independent directors in the risk committee and board independence variables are measured as percentage values. Independent directors in the risk committee, which is calculated as the number of independent directors divided by all directors in the risk committee, had a maximum level of 60% in our observations. On the other hand, board independence, which is calculated as the number of independent board members divided by total board members, reached a maximum level of 50%.

There are two risk management indicators. CAR values decrease after the global crisis in 2008 for almost all banks in the sample and then bounce back in the final years of the analysis period. Therefore, in general, almost all banks designate a similar pattern regarding the CAR values. On the other hand, two different groups can be discerned when NPL ratio is analyzed. The first group of banks have better NPL ratios at the beginning of the period, however their non-performing loans, and therefore, NPL ratios deteriorated due to the global crisis and worsening domestic economic conditions. On the other hand, the second group of banks have had their worst NPL ratios between 2011 and 2015 period, and improved them afterwards.

Finally, all banks included in the analysis have shown a similar pattern in terms of their ROA, which is our sole corporate performance indicator in the study. ROA of the banks are better during the 2006 -2010 period, and then, decline sharply.

### 4.1.2. Risk Governance Analysis

The study firstly investigates the convergence or divergence patterns of the risk governance structures in the Turkish banking field. To understand the risk governance structures and the pattern of (non)adoption of these structures by Turkish banks, a risk governance score is calculated, composed of thirteen variables. First, all of the variables are normalized with min-max normalization shown in the following formula.

$$x_{scaled} = \frac{x - \min(x)}{\max(x) - \min(x)}$$

Following the normalization, bank vectors are constructed using a summated scale method, which represents each banks' risk governance score for each year (from 2006 to 2019), resulting in 210 scores ranging from 0 to 13. 0 pertains to the lowest risk governance score, representing nonadoption of any structural role or practice about risk governance, whereas 13 denotes complete adoption of each structural role or practice.

**Table 2: Risk Governance Scores/Vectors of Turkish Banks**

| Bank Vectors | Akbank | Albaraka | Denizbank | Eximbank | Garanti BBVA | Halkbank | ING | İşbank | Kuveyt Türk | QNB Finansbank | TEB | Türkiye Finans | Vakıfbank | YapıKredi | Ziraat Bank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 6.63 | 6.68 | 6.72 | 2.33 | 10.47 | 4.38 | 5.32 | 6.43 | 5.57 | 9.20 | 6.24 | 3.61 | 4.24 | 7.57 | 2.57 |
| 2018 | 6.63 | 6.68 | 5.95 | 2.33 | 10.29 | 3.38 | 5.32 | 6.52 | 5.57 | 8.77 | 6.41 | 3.61 | 4.18 | 7.43 | 2.57 |
| 2017 | 6.63 | 6.54 | 5.95 | 2.33 | 10.85 | 3.38 | 5.14 | 6.52 | 5.57 | 8.78 | 6.53 | 3.61 | 4.21 | 7.43 | 2.57 |
| 2016 | 6.62 | 6.70 | 5.83 | 2.33 | 10.67 | 3.35 | 5.32 | 6.34 | 5.57 | 7.98 | 7.53 | 7.12 | 4.21 | 7.43 | 2.57 |
| 2015 | 6.62 | 4.54 | 5.69 | 1.33 | 9.29 | 3.38 | 5.14 | 6.48 | 5.57 | 8.28 | 5.95 | 2.33 | 4.21 | 7.68 | 2.57 |
| 2014 | 6.62 | 3.52 | 4.71 | 1.33 | 5.84 | 3.38 | 5.47 | 6.34 | 4.57 | 7.99 | 6.95 | 2.33 | 4.24 | 7.68 | 1.57 |
| 2013 | 6.66 | 3.52 | 3.71 | 1.33 | 5.84 | 5.38 | 5.47 | 6.34 | 4.57 | 8.99 | 5.95 | 3.33 | 4.21 | 7.68 | 1.57 |
| 2012 | 5.42 | 3.31 | 3.43 | 1.33 | 3.14 | 3.71 | 4.47 | 4.39 | 4.57 | 8.49 | 5.33 | 2.33 | 3.24 | 5.67 | 2.46 |
| 2011 | 4.60 | 2.77 | 3.16 | 1.33 | 3.14 | 3.71 | 3.47 | 4.39 | 5.71 | 8.49 | 2.96 | 2.33 | 3.24 | 5.67 | 1.46 |
| 2010 | 4.50 | 2.77 | 3.27 | 1.33 | 3.14 | 3.71 | 3.32 | 4.39 | 5.71 | 8.49 | 1.57 | 1.33 | 3.24 | 5.67 | 1.57 |
| 2009 | 4.60 | 2.77 | 3.27 | 1.33 | 3.14 | 3.71 | 2.46 | 4.39 | 5.77 | 8.28 | 1.57 | 1.33 | 3.24 | 4.67 | 1.46 |
| 2008 | 3.74 | 2.91 | 3.27 | 1.33 | 3.03 | 3.71 | 3.26 | 4.39 | 5.70 | 7.19 | 1.57 | 0.33 | 3.24 | 4.67 | 1.46 |
| 2007 | 3.60 | 1.46 | 2.95 | 3.01 | 3.14 | 3.47 | 2.26 | 4.39 | 5.64 | 7.19 | 1.57 | 0.57 | 5.24 | 4.67 | 1.57 |
| 2006 | 2.69 | 0.47 | 3.90 | 3.08 | 2.14 | 5.86 | 3.62 | 4.16 | 4.37 | 4.97 | 1.57 | 0.57 | 3.24 | 6.83 | 3.86 |
| Average | 5.40 | 3.90 | 4.41 | 1.86 | 6.01 | 3.90 | 4.29 | 5.39 | 5.32 | 8.08 | 4.41 | 2.48 | 3.87 | 6.48 | 2.13 |

Table 2 illustrates the risk governance scores (RGS) for each bank and each year in our sample. The table is colored so that the shades of green represent higher scores for each year, whereas the shades of red denote lower values, yellow and orange ones signifying average scores. Overall, Qnb Finansbank sits at the top of the RGS with an average score of 8.08 over 13, whereas Eximbank is ranked at the bottom of the list with an average RGS of only 1.86.

Following the RGS calculation, the euclidean distance between each vector and average score of each year has been calculated and illustrated in the Table 3. The results clearly reveal that RGS of six banks are positive and they tend to diverge from nine banks, which have negative RGS.

**Table 3: Risk Governance Scores/Vectors of Turkish Banks**

| Euclidean Distance (Vector-Average) | Akbank | Albaraka | Denizbank | Eximbank | Garanti BBVA | Halkbank | ING | İşbank | Kuveyt Türk | QNB Finansbank | TEB | Türkiye Finans | Vakıfbank | YapıKredi | Ziraat Bank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 0.77 | 0.82 | 0.85 | -3.54 | 4.61 | -1.48 | -0.54 | 0.56 | -0.29 | 3.34 | 0.38 | -2.25 | -1.63 | 1.71 | -3.29 |
| 2018 | 0.92 | 0.97 | 0.24 | -3.38 | 4.58 | -2.33 | -0.39 | 0.81 | -0.14 | 3.06 | 0.70 | -2.10 | -1.53 | 1.72 | -3.14 |
| 2017 | 0.90 | 0.81 | 0.21 | -3.41 | 5.11 | -2.36 | -0.59 | 0.78 | -0.16 | 3.04 | 0.80 | -2.12 | -1.53 | 1.69 | -3.16 |
| 2016 | 0.65 | 0.73 | -0.14 | -3.64 | 4.70 | -2.62 | -0.65 | 0.37 | -0.40 | 2.01 | 1.56 | 1.15 | -1.76 | 1.46 | -3.40 |
| 2015 | 1.35 | -0.73 | 0.42 | -3.94 | 4.02 | -1.89 | -0.13 | 1.21 | 0.30 | 3.01 | 0.68 | -2.94 | -1.06 | 2.41 | -2.70 |
| 2014 | 1.78 | -1.32 | -0.12 | -3.51 | 1.01 | -1.46 | 0.63 | 1.50 | -0.27 | 3.16 | 2.11 | -2.51 | -0.60 | 2.85 | -3.27 |
| 2013 | 1.69 | -1.45 | -1.26 | -3.64 | 0.87 | 0.41 | 0.50 | 1.37 | -0.40 | 4.02 | 0.98 | -1.64 | -0.76 | 2.71 | -3.40 |
| 2012 | 1.33 | -0.78 | -0.66 | -2.76 | -0.94 | -0.37 | 0.38 | 0.30 | 0.48 | 4.41 | 1.25 | -1.76 | -0.85 | 1.59 | -1.63 |
| 2011 | 0.84 | -1.00 | -0.60 | -2.44 | -0.62 | -0.05 | -0.29 | 0.63 | 1.95 | 4.73 | -0.80 | -1.44 | -0.52 | 1.91 | -2.31 |
| 2010 | 0.90 | -0.84 | -0.33 | -2.27 | -0.46 | 0.11 | -0.28 | 0.79 | 2.11 | 4.89 | -2.03 | -2.27 | -0.36 | 2.07 | -2.03 |
| 2009 | 1.14 | -0.70 | -0.19 | -2.14 | -0.32 | 0.25 | -1.00 | 0.92 | 2.30 | 4.82 | -1.90 | -2.14 | -0.23 | 1.21 | -2.01 |
| 2008 | 0.42 | -0.41 | -0.05 | -1.99 | -0.29 | 0.39 | -0.06 | 1.07 | 2.38 | 3.87 | -1.75 | -2.99 | -0.08 | 1.35 | -1.86 |
| 2007 | 0.22 | -1.93 | -0.43 | -0.38 | -0.24 | 0.09 | -1.12 | 1.01 | 2.26 | 3.81 | -1.81 | -2.81 | 1.86 | 1.29 | -1.81 |
| 2006 | -0.73 | -2.95 | 0.48 | -0.35 | -1.28 | 2.44 | 0.20 | 0.74 | 0.95 | 1.55 | -1.85 | -2.85 | -0.19 | 3.41 | 0.44 |
| **Average** | **0.87** | **-0.63** | **-0.11** | **-2.67** | **1.48** | **-0.63** | **-0.24** | **0.86** | **0.79** | **3.55** | **-0.12** | **-2.05** | **-0.66** | **1.96** | **-2.40** |

The table also reveal detailed findings. As it has been mentioned at the introduction part, Turkish banking system includes both publicly and privately owned banks. Eximbank, Halkbank, Vakıfbank and Ziraatbank are publicly owned banks and all of these four public banks have negative euclidean distance RGS. Moreover, three of them, except Vakıfbank, have the worst scores in terms of the average RGS. On the other hand, the RGS of public banks decline over years. For instance, Eximbank, which is positioned as the lowest ranking bank in terms of its RGS, begins its journey with a 3.08 bank vector and -0.35 euclidean distance value in 2006 and concludes it with a 2.33 bank vector and -3.54 euclidean distance value in 2019. Other three public banks display a similar pattern. Therefore, it can be observed that publicly owned banks deteriorate consistently in terms of both pure vector values and their relative positions in the field. Besides, private banks diverge from each other in terms of their (non)adoption patterns of risk governance structures, but especially some of them have always higher RGS values than others. These are QNB Finansbank, Yapi Kredi Bank, Akbank and Turkiye İs Bankasi. Moreover, Garanti Bank begins with a negative euclidean distance value in 2006 but its risk governance index surges to the best level in 2019, especially due to its acquisition by BBVA group.

Turkish banking field also incorporates participation banks, which operate according to the Islamic rules. These banks are Albaraka Turk, Kuveyt Turk and Turkiye Finans. While Albaraka Turk and Turkiye Finans have negative euclidean distance values in terms of RGS, Kuveyt Turk differentiates itself from the others by its positive values. Finally, a variance analysis has been performed according to the RGS of the entire field in order to uncover the convergence or divergence patterns of Turkish banks over time. Initially, the average values of each years' RGS have been calculated, and then, the variance is computed as the average of the squared differences from the mean which are shown in figure 1.

**Figure 1: Variance of Risk Governance Index in Turkish Banking Sector**
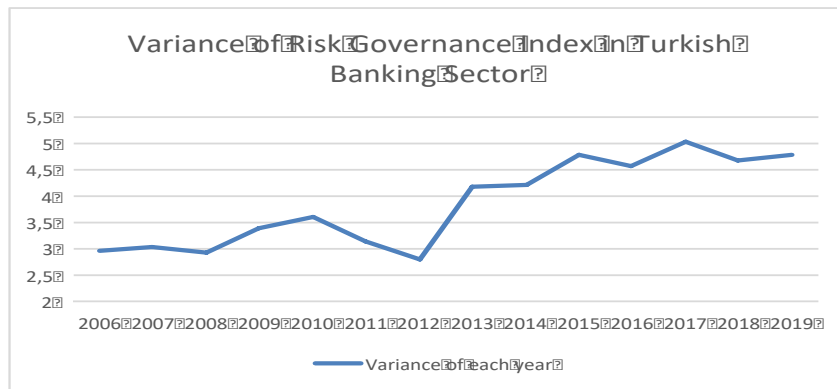
It is obvious that the variance values of whole banking field are relatively stable between 2.79 and 3.59 from 2006 to 2012, but then, the divergence accelerates sharply above 4 and oscillate between 4.5 and 5 after 2015. As our risk governance index includes four major dimensions, which contains measures for risk committee, role of chief risk officer (CRO), risk appetite framework (RAF) and corporate governance, it is further understood that especially the measures of risk committee and the role of the CRO have contributed to the surge of variance over time.

In line with our first and second hypotheses, we employed dependent samples t-test (paired t-test) on the variances of bank risk governance index scores to statistically validate whether the adoption patterns of risk governance structures in Turkish banks converge in the period from 2006 to 2012 and diverge from 2013 to 2019. The STATA interface has been used to calculate the t values and paired t test found that the null hypothesis has been rejected when we consider all banks in our sample. Variance of the risk governance index during the period from 2013 to 2019 (M = 4.59, SE = 0.12) was significantly higher than the variance observed in the same index during the 2006-2012 period (M = 3.12, SE = 0.11), $t(6)=-11.68$, $p<0.01$. Therefore, Turkish banks began to diverge from each other in terms of adopting transnationally developed risk governance structures after 2013, when Turkish economic policy began to move away from transnationally endorsed financial norms and standards. When interpreted with the Table 2, it is possible to argue that privately owned banks significantly diverged from public and Islamic rule banks in the second period regarding their adoption of risk governance structures. Table 4 displays the t-test results.

**Table 4: Paired t-test Results**

| Bank Group | Group of Years | Mean | SE |
|---|---|---|---|
| All Banks | 2006-2012 | 3.12* | 0.11 |
| | 2013-2019 | 4.59* | 0.12 |

*$p<0.01$

### 4.1.3. Panel Data Analysis

In addition to the analysis about the adoption patterns of risk governance structures, the study also investigates if adopted risk governance structures of Turkish banks have had any effect on their risk management indicators or corporate performance. In order to test our third and fourth hypotheses, a panel data analytic model is constructed, where four major dimensions of risk governance index are employed as independent variables to predict capital adequacy ratio (CAR), non-performing loans ratio (NPL) and return on assets (ROA) individually. The effects of risk committee dimension (RC), chief risk officier dimension (CRO), risk appetite framework dimension (RAF) and corporate governance dimension (CG) have been analyzed separately from 2006 to 2019 for all banks in our sample. We used one year lagged measures of our dependent variables to better observe if structural changes resulted in performance gains. STATA interface is used to analyze the panel data.

Firstly, Hausman test is used to decide if a fixed effects or random effects model would be more appropriate for the panel data analysis (Cameron and Trivedi, 2010). As the existence of random effects in both ROA and CAR could not be rejected, the differences between coefficients may not be systematic. Therefore, random effects regression analysis has been preferred to predict CAR and ROA as dependent variables. On the other hand, the existence of random effects is rejected for NPL dependent variable, thus a fixed effects model has been implemented to explain the relationship between RG dimensions and the NPL ratio. The Hausman test results and panel data results with robust option are shown in Table 5.

**Table 5: Results of Panel Data Regression Analyses for Risk Governance Index [a]**

| Independent variables | Return on assets | Capital adequacy ratio | Non-performing loan |
|---|---|---|---|
| Risk Committee | 0.00 | 0.51 | 0.00** |
| Chief Risk Officer | 0.00 | -0.09 | 0.00* |
| Risk Appetite Framework | -0.01* | 0.80 | 0.01* |
| Corporate Governance | 0.00* | -0.50 | 0.00 |
| $R^2$ | 0.24 | 0.00 | 0.19 |
| F for Chi$^{2}$[b] | 76.40* | 0.28 | 5.23* |
| Hausman Test (Prob > Chi$^2$) | 0.93 | 0.01 | 0.02* |

[a] All standardized regression coefficients were taken from the last step in the analyses. n = 210.
[b] Chi2 value when regression analysis is reported in Random-effects method, otherwise F value is reported.
* $p < 0.05$.
** $p < 0.10$.

Following the decision process of using a fixed or random effects model, the panel data analysis has been carried out with the robustness tests. The tests have been done three times for each dependent variables, namely, ROA, CAR and NPL.

The results suggest that the RAF and corporate governance dimensions have statistically significant negative effects on ROA of Turkish banks. Risk Committee and CRO dimensions of risk governance has no statistically significant effect in the analysis. Second, when CAR is taken into account as a dependent variable, there are not any statistically significant effect in the research. Third, when NPL is considered as the dependent variable, CRO and RAF dimensions of risk governance have been found to have significant positive impact. On top of it, risk committee dimension have also significantly positive effect on NPL when p value considered as 0.10.

In conclusion, it can be argued that both of our third and fourth hypotheses are rejected. Contrary to our expectations, the presence and effectiveness of the CRO as well as the presence of a risk appetite framework seems to have a negative effect on Turkish banks' risk management performance, measured by NPL. CAR, on the other hand, is not affected by the adoption of risk governance structures. Moreover, corporate performance of Turkish banks seem to be negatively affected by the adoption of corporate governance practices and presence of a risk appetite framework. We further discuss these findings in the following section.

## 5. CONCLUSION AND IMPLICATIONS

The study aims to explore whether transnational institutional arrangements in the global banking field, which endorse implementation of full-fledged risk governance structures and practices, have been adopted by Turkish banks. Introducing an institutional theory lens, it is argued that relative fit between national and transnational arrangements will positively influence Turkish banks' decision to incorporate structures about risk governance such as the appointment of a CRO role, introduction of a risk appetite framework and solidifying corporate governance structure and practices. Our analyses about the (non)adoption of risk governance structures inform us about the relative strength of national field level pressures. Turkish banking field have followed a similar pattern and reacted more homogeneously to the pressures stemming from both transnational and national level bodies, as these were relatively in harmony during the 2006-2012 period. However, when Turkish economic policies began to depart from transnationally imposed templates during 2013-2019 period, Turkish banks' reaction to the discord brought about divergence in the adoption of risk governance structures. Especially salient about this finding is that the divergence stemmed from the behavior of publicly owned banks, which tended to drift away from transnationally imposed templates about better risk governance. A similar tendency has been noticed in two out of three participation banks, which operate based on Islamic rules. Although, variance also exists among privately owned banks in terms of their adoption of risk governance structures, it is fair to conclude that privately owned banks tended to retain or improve their risk governance structures following the Gezi events in 2013. Thus, we assert that political polarization in Turkey after Gezi events not only caused a relative drift away from transnationally imposed templates in the banking and finance field by national authorities, but this drift seems to cause a polarization within the field in terms of adopting risk governance structures, especially for those that have relatively stronger ties with the government either in the form of ownership (publicly owned banks) or political inclination (Islamic rule banks). In this way, we contribute to the recently burgeoning literature about the transnational institutional fields (Goldbach, 2015; Buchholz, 2016) by accentuating the impact of national political choices, and the mechanisms by which homogeneity pressures can be countered by the government via introducing divergent national regulatory frameworks and transforming national field level bodies (i.e. Banking Regulation and Supervision Agency or The Banks Association of Turkey) by using ownership ties in the field.

To complement our primary research objective, we also investigate whether these adopted structures and practices about risk governance have translated into risk management or overall performance of Turkish banks. As it has been adressed previously in the literature review, several scholars have clearly shown that adoption of practices by firms may be ritually performed under compliance pressures and thereby, do not result in solid outputs or action (Özen and Önder, 2021; Rovik, 2016). Besides, previous studies which try to link risk management and/or corporate governance practices with performance outcomes have reported mixed results (Erin et al., 2020; Karyani et al., 2021). Our analyses indicate that the adoption of risk governance structures do not have significant and positive effect on better risk management performace regarding the Turkish banking field. The results of the panel data analyses reveal that the risk governance structures do not have a significant effect on CAR and they have a negative effect on NPL of Turkish banks. The adoption of risk governance structures did not result in higher performance of banks measured in terms of ROA. Whereas these findings indicate that structural adoption of risk governance practices may not translate into expected increases in risk management performance, these results may also suggest that weak structures of risk governance increase the risk of classifying non-performing loans as otherwise, such that publicly owned banks with relatively low risk governance structures do not end up in worse NPL scores. Although, it is not possible to validate the latter argument with concrete evidence, it is fair to conclude that the majority of Turkish banks have either ritually adopted these structures to become legitimate

and did not implant corresponding practices, or they intended to adopt these structures sincerely but failed to incorporate corresponding practices. In this manner, the study corroborates theoretical arguments about the translation thesis in the adoption of managerial practices, which argue that adoption is not a binary decision (adoption versus rejection) but a process where adopted practices significantly diverge in terms of their implemented components (Ercek, 2014; Rovik, 2016).

The study has relied on annual filings for public disclosure platform and reports of Turkish banks, therefore more granular data about risk management practices such as the number of meetings completed by committes and the minutes of these meetings could not be gathered. Although the analyses presented in the paper tried to employ the most robust procedures the gap between formal implementation of a risk governance template and risk management performance cannot be directly observed. Further studies should focus on this gap and test whether an intentional or unintentional decoupling between templates and practices occurred.

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# DOES THE EXTENT OF OWNERSHIP BY DIFFERENT SHAREHOLDERS ENHANCE FIRM FINANCIAL PERFORMANCE? EMPIRICAL EVIDENCE FROM AN EMERGING ECONOMY

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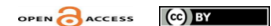[3]United International University, Dhaka, Bangladesh.
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## ABSTRACT

**Purpose-** The aim of this paper is to examine the role of institutional, foreign, and government shareholding in enhancing financial performance of listed companies in the Dhaka Stock Exchange (DSE) of Bangladesh.
**Methodology-** The study is based on 110 manufacturing companies listed on Dhaka Stock Exchange (DSE) during the period of 2013-2017 which produces 512 firm-year observations. The study investigates the impact of the extent of ownership of different shareholders (namely institutions, foreigners, the government) on financial performance (as measured by return on assets, earnings per share and return on sales) of firms by conducting multivariate analysis using Pooled Ordinary Least Square regression along with year dummy, lag model and serial correlation.
**Findings-** The results of multiple regression analysis reveal that institutional and foreign ownership are significantly and positively associated with three proxies of firm performance. This study also finds that government ownership doesn't have any significant impact on firm performance in Bangladesh.
**Conclusion-** The study considers earnings per share as one of the corporate performance indicators which is widely used by fund providers in financial markets but seldom analyzed in the literature. The study will provide valuable insights to investors, regulators, and managers who want to understand how the extent of ownership by different shareholders drive different firm performance measures. The study analyzes only non-financial companies and does not incorporate market performance in the analysis of the hypothesized relationship among the variables.

**Keywords:** Corporate governance, shareholding patterns, ownership structure, firm performance, agency theory
**JEL Codes**: G30, G32, M21

## 1. INTRODUCTION

Previous literature on corporate governance recognizes large external/outsider ownership as an influential governance mechanism. Large share ownerships help to implement good corporate governance in a firm (Shleifer & Vishny, 1997; Cyert et. al., 1998). Extant studies argue that how shares are apportioned to outsiders and insiders is an important corporate control mechanism and it affects firm performance (Jensen & Meckling, 1976). For example, institutional owners are more likely to deliberately vote on anti-takeover decisions (Brickley et. al., 1988). Boone et. al. (2011) found that firms whose ownership contains block shareholdings are likely to perform better. Due to enhanced oversight, a large external ownership has a beneficial impact on the value of the company (Holderness & Sheehan, 1988). Better company performance is made possible by management making more optimal decisions and fewer suboptimal ones thanks to this enhanced and effective level of monitoring. Numerous

research studies have examined the effects of high levels of external ownership on the performance of firms in industrialized nations (Navissi & Naiker, 2006; Shin-Ping & Tsung-Hsien, 2009).

Rahman and Khatun (2017) claim that corporate governance standards are inadequate in emerging nations. Bangladesh is a developing country in South-east Asia that is still having difficulty establishing a corporate governance framework and an accountability culture within its enterprises, despite the publication of guidelines on corporate governance in 2006 and their revision in 2012 and 2018. In the absence of strong regulatory environment and more effective formal corporate governance mechanisms, an important characteristic of ownership that promotes good corporate governance is large external ownership (Rashid, 2020).

In the context of Bangladesh, a few studies have been done to investigate the relationship between ownership patterns and firm performance. However, the extant studies suffer from weaknesses due to limited timeframes (Das et. al., 2023) and limited number of proxies of firm performance and ownership patterns (Rashid, 2020; Das et. al., 2023; Rahman 2023). Moreover, prior studies in the context of Bangladesh provides mixed evidence regarding the connection between firm ownership structure and firm value. Rahman (2023) found insignificant and even negative impact of different categories of owners in the banking industry while others presented largely positive contribution of extent of ownership by different types of shareholders in nonfinancial firm samples (Rashid, 2020; Das et. Al., 2023).

The study makes several contributions to the body of knowledge already available on corporate governance. In the context of Bangladesh, it first examines how government ownership might improve corporate financial performance. The effect of government ownership on company performance was not examined in earlier research. Second, the study presents return on sales and earnings per share, two proxies of company performance that were rarely taken into account in earlier research but are highly pertinent and frequently utilised by investors in business valuation (Rahman et al., 2019). Third, although a number of researchers have questioned the validity of agency theory in emerging economies (e.g. Rahman, 2023), consistent with Rashid (2016) and Meah and Chaudhory (2019), this study provides some support for agency theory in a unique agency setting, Bangladesh. Fourth, we have also addressed the potential endogeneity concerns in the relationship between shareholding pattern and firm performance through appropriate regression models and using a large panel dataset from 512 firm year cases the study provides more robust results on the issue.

The impetus of this study is to investigate a sample of 110 Bangladeshi manufacturing firms during the period from 2013-2017 (resulting in 512 firm-year observations). These firms generally have insider and outsider ownerships. We have looked into how concentrated external ownership—government, institutional, and foreign—affects the ROA, EPS, and ROS measurements of a firm's performance. According to our empirical findings, foreign and institutional ownership significantly improves a firm's performance. Previous studies on the subject conducted in many nations (Tsai & Gu, 2007; Boone et al., 2011; Sunday et al., 2017; Rashid, 2020; Das et al., 2023) are in line with this. In contrast to Rahman (2023), our analysis supports agency theoretical arguments and presents a different picture of the role of institutional owners in Bangladesh. Hence, investors, especially small shareholders and lenders should invest in these types of firm where concentrated ownerships i.e., large institutional and foreign ownerships exist. On the other hand, our investigation found that government ownership doesn't play any monitoring role on firms as government does not hold any significant shares in firms. And therefore, the ownership of the government can be increased in different manufacturing firms if firms are expected to get various benefits of government ownership.

The paper's remaining sections are arranged as follows. In Section 2, we outline our hypothesis and provide a review of the literature. Section 3 covered methodological topics such as variables, econometric models, sample distribution, and data collection procedures. Section 4 presents the empirical data analysis, including summary statistics and our primary findings. Section 5 includes outputs of some further analyses to evaluate the results' robustness. In section 6, a conclusion, limitations, and recommendations are given.

## 2. LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Mixed evidence has been found in the prior literatures of corporate governance concerning the issue whether large external ownerships help to boost firm performance. Some researchers found that large external ownerships reduce the agency problem through curtailed distance between the shareholders and managers. The curtailed distance between the shareholders and managers can be achieved by active monitoring by the large shareholders. Dispersed share ownership creates many problems. For example, it is time consuming for the shareholders to make collective decisions. Dodd and Warner (1983) stated that problems associated with dispersed share ownership can be reduced by the presence of large shareholders. Another study by Shleifer and Vishny (1986) found that the possibilities of making take over decisions are being reduced when large external ownerships exist

and that motivate the managers to earn a high return on shareholdings. However, some studies found the opposite. Kaplan and Minton (1994), say, found that the possibilities of the replacement of managers and overall restructuring of firms increase when large ownership exists, and this leads to a decline of firm performance.

***Institutional ownership-*** In many countries, institutional ownership is major source of equity for companies. This helps to comply with applicable corporate governance guidelines and establish a strong monitoring opportunity of the owners reducing agency problems which leads to more efficient firm performance. Study of Brickley et al. (1988) found that firm performance is positively influenced by institutional ownership. They affirmed that anti-takeover decisions are supported more actively by institutional shareholders than by others.  Their finding is in line with those of Thomsen and Pedersen (2000), & Woidtke (2002). Also, Barclay and Holderness (1991) found that firms perform comparatively better after the acquisition of large portion of shares by corporate investors. According to Sunday et al. (2017), the property rights theory suggests that institutional investors prioritize profit because of their comparatively greater investment sizes. As a result, they continuously exert pressure on management to increase returns and the value of their investments. In line with this, Sarkar and Sarkar (2000) found that when institutions own more than 25% of a company's shares, it has a favorable impact on the company. Based on the arguments above, our hypothesis is-

H1: Institutional ownership is significantly associated with firm performance.

***Foreign ownership -*** The majority of earlier studies offer evidence that foreign ownership improves a company's performance. According to Khanna and Palepu (2000), foreign owners typically have more leverage to take advantage of the gaps in the labor, capital, and technology markets, which benefits those companies. Abor and Biekpe (2007) provided that using modern technique in management and having more international exposure, foreign owners can lower agency costs and improve firm performance. Moreover, Chibber and Majumder (1999) suggested that firms with foreign ownership possess superiority in the field of technological, financial and organizational resources. This finding is also supported by Uwuigbe and Olunsanmi (2012) and Abdelgouad et al. (2015). Also, firms with large foreign ownership have better link with international communities and overseas investors. This causes these firms to have a better performance (Dhar, 1988). Similar evidence has been found in the study of Claessens and Djankov (1999) and Sarkar and Sarkar (2000). Meah (2019) found that foreign ownership helps firms take on less financial leverage and become less risky which implies the positive monitoring role of foreign ownership on firm and firm performance. Based on above discussion, our hypothesis is as follows.

H2: Foreign ownership is significantly associated with firm performance.

***Government ownership -*** In closed economies such as China, the government owns a large share of businesses. Government ownership of businesses is low in free market nations like the United States and the United Kingdom. In developing and mixed economies like Bangladesh, governments own a small percentage of shares in listed firms. Study by DeWenter and Malatesta (2001) found a negative association of firm performance with government ownership. He identified non-profit orientation as a hindrance. Some other research said that appointments of less efficient politically affiliated people in the management are responsible for the negative association (Megginson et al., 1994; Boycko et al., 1996). Thus, Zeitun and Tian (2007) suggested a reduction in government ownership to increase firm performance. These findings are in line with some other studies including Mykhayliv and Zauner (2013) and Ting and Lean (2015).

However, prior research also found positive association of firm performance with government ownership (Martin and Parker, 1995; Kole and Mulherin, 1997). Yu (2013) found the same relationship in Chinese context. On the other hand, Uddin et al. (2014) stated that firms with government ownership earn high return for shareholders along with poor market performance which are due to lack of public trust. These findings are in line with the research of Ang and Ding (2006). Based on the above discussion, our hypothesis is as follows.

H3: Government ownership is significantly associated with firm performance.

## 3. METHODOLOGY

### 3.1. Sampling and Data Collection

Sample of this study consists of 110 manufacturing firms listed on Dhaka Stock Exchange (DSE). The data for the period from 2013 to 2017 (inclusive) have been collected for these 110 manufacturing firms. 512 firm-year observations were picked. Other firm-year observations have been dropped as some information was missing for various reasons. One of the reasons was that only audited financial statements rather than complete annual reports were available in the sources for some of the firm-year observations. But information related to our variables is only available in annual reports. New incorporation of some public limited company is another reason. And thus, the financial statements of all five years were not available for all companies.  And thus,

after comprehensive consideration, we have ended up with 512 firm-year observations in the sample set. This quantitative study collected annual reports from firms` websites and Lanka Bangla Financial Portal, a popular source of financial statements in Bangladesh. Information for large external ownership such as institutional ownership, foreign ownership and government ownership has been gathered from different parts of annual reports and the information for performance proxies (ROA, EPS and ROS) was extracted from the financial statements section of annual reports. Table 2 provides a comprehensive break down of industry-wise sample.

**Table 1: Sample Distribution**

| Industry Breakdown | No. of Sample Firms | Total Firms | Percentage (%) |
|---|---|---|---|
| *Cement* | 6 | 7 | 85.71 |
| *Ceramics* | 4 | 5 | 80 |
| *Food and Allied* | 12 | 17 | 70.59 |
| *Jute* | 3 | 3 | 100 |
| *Tannery* | 3 | 6 | 50 |
| *Power and Fuel* | 12 | 19 | 63.16 |
| *Pharmaceuticals* | 22 | 30 | 73.33 |
| *Textiles* | 28 | 52 | 53.85 |
| *Engineering* | 19 | 36 | 52.78 |
| *Paper and Printing* | 1 | 3 | 33.33 |
| *Total (5 years duration)* | 110 | 178 | 61.8 |

**Variables measurement -** In this study, to test the effect of large external ownership on firm performance, dependent variable (firm performance measures), independent variables (different large external ownership categories) and control variables (firm characteristics) have been used.

**Dependent variables -** Three accounting based firm performance measures—ROA, EPS and ROS have been used as firm performance proxies in this study. A lot of firm performance proxies (ROA, EPS, ROS, Profit Margin, Tobin's Q and so on are used by scholars. Ouyang (2013), Rahman (2016), Rahman and Saima (2018), Rahman et al. (2019), Rahman (2023), and Zeitun and Tian (2007) have used ROA as the proxy of firm performance measure. On the other hand, Goll and Rasheed (2004) has used ROS as firm performance proxy. And finally, EPS has been used as firm performance proxy in the study of Zraiq and Fadzil (2018) and Rahman et al. (2019).

**Independent variables -** In our study, institutional, foreign, and government ownership are used as independent variables. Institutional ownership, as a type of external ownership, has been used in the studies of Shin-Ping and Tsung-Hsien (2009), Navissi and Naiker (2006), Shleifer and Vishny (1986), Barclay and Holderness (1991). Foreign ownership has been used as a type of external ownership in the studies of Abor and Biekpe (2007), Uwuigbe and Olunsanmi (2012), Choi et al. (2012). Zeitun and Tian (2007), Boone et al. (2011), Cheng and Ng (2018), Ting and Lean (2015) have used government ownership as a major factor that impacts firm performance.

**Control variables -** Some other variables may have impact on firm performance, which are needed to be monitored. Firm age, size and sales growth are three control variables of this investigation. Firm size and firm age have been used as control variables to investigate the effect of large external ownership on firm performance by Navissi and Naiker (2006), Cheng and Ng (2018).

### 3.2. Model Specification

Consistent with Zeitun and Tian (2007) along with some modifications considering the context of Bangladesh, following models have been developed to test the hypotheses of this study:

Model 1,       $ROA_{it} = \beta_0 + \beta_1 INSOWN_{it} + \beta_2 FRNOWN_{it} + \beta_3 GVTOWN_{it} + \beta_4 AGE_{it} + \beta_5 SIZE_{it} + \beta_6 GROWTH_{it} + \varepsilon_{it}$

Model 2,       $EPS_{it} = \beta_0 + \beta_1 INSOWN_{it} + \beta_2 FRNOWN_{it} + \beta_3 GVTOWN_{it} + \beta_4 AGE_{it} + \beta_5 SIZE_{it} + \beta_6 GROWTH_{it} + \varepsilon_{it}$

Model 3,       $ROS_{it} = \beta_0 + \beta_1 INSOWN_{it} + \beta_2 FRNOWN_{it} + \beta_3 GVTOWN_{it} + \beta_4 AGE_{it} + \beta_5 SIZE_{it} + \beta_6 GROWTH_{it} + \varepsilon_{it}$

**Table 2: Description and Measurement of the Variables**

| Classification | Abbreviated name | Full name | Measurement |
|---|---|---|---|
| Dependent Variables - Firm Performance | ROA | Return on assets | Net income after taxes / Total assets |
| | EPS | Earnings per share | Net income after taxes / Number of shares outstanding |
| | ROS | Return on sales | Net income after taxes / Total sales |
| Independent Variables – Ownership Structure | INSOWN | Institutional ownership | Percentage of shares held by institutions |
| | FRNOWN | Foreign ownership | Percentage of shares held by foreign entities |
| | GVTOWN | Government ownership | Percentage of shares held by government representatives |
| Control Variables – Firm Characteristics | AGE | Firm age | Natural logarithm of firm age measured as current year minus incorporation year |
| | SIZE | Firm size | Natural logarithm of total sales |
| | GROWTH | Sales growth | Current year sales minus previous year sales and divided by previous year sales |

## 4. EMPIRICAL RESULTS AND DISCUSSIONS

### 4.1. Descriptive Statistics

The descriptive statistics for the study's independent and dependent variables are shown in Table 4. The variables' mean, standard deviation, minimum and maximum values are among the data that are displayed. Return on Sales (ROS), Return on Assets (ROA), institutional ownership (INSOWN), foreign ownership (FRNOWN), and government ownership (GVTOWN), sales growth (GROWTH) are in percentage form. Earnings per share (EPS) and firm age (AGE) are in actual values while firm size (SIZE) is in million BDT (Bangladeshi Taka).

The table shows that mean ROA is 5.42% with a standard deviation of 6.52%. The lowest ROA in our dataset is -25.16% and the highest one is 40.32%. Another firm performance measure EPS is BDT 6.5816 on average and the range is minimum BDT -48.14 to maximum BDT 130.5. On average ROS is 8.19% with a standard deviation of 37.89%. Minimum ROS is -650% and highest ROS is 224.66%. Institutional shareholders` ownership percentage is 15.07% on average and it ranges from 0 to 78.89%. It can be said that mean institutional ownership percentage is high enough in Bangladesh to make us expect that this concentrated shareholding has a significant impact on firm profitability. Average foreign ownership is 6.83% and it ranges from 0% to as high as 90%. Although smaller than that of INSOWN, foreign portfolio and direct investment is widespread across listed firms in stock exchanges in Bangladesh. Mean government ownership is 3.23% ranging from 0 to 100%. This indicates that government ownership in Bangladesh on average is very small and mostly limited to state owned companies (SOEs). The sample firms' ages range from minimum 1 to maximum 41 years, with an average age of 16. In 2013, several of the firms had only been in operation for a year, having been incorporated in 2012. BDT 8817 million is the average firm size. The size of the company varies between 72 million to 145931 million BDT. The lowest and largest sales growth rates for Bangladeshi manufacturing companies are -100% and 414.55%, respectively, while the average annual growth rate is 8.5%.

**Table 3: Descriptive Statistics**

| Variable | N | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| ROA (%) | 512 | 5.42 | 6.52 | -25.16 | 40.32 |
| EPS (BDT) | 512 | 6.5816 | 15.7198 | -48.14 | 130.5 |
| ROS (%) | 512 | 8.19 | 37.89 | -650 | 224.66 |
| INSOWN (%) | 512 | 15.07 | 14.12 | 0 | 78.89 |
| FRNOWN (%) | 512 | 6.83 | 19.83 | 0 | 90 |
| GVTOWN (%) | 512 | 3.23 | 14.67 | 0 | 100 |
| AGE | 512 | 16 | 12 | 1 | 41 |
| SIZE (BDT millions) | 512 | 8817 | 16831 | 72 | 145931 |
| GROWTH (%) | 512 | 8.50 | 40.25 | -100 | 414.55 |

### 4.2. Correlation Matrix

Table 5 displays the correlation matrix of the dependent and independent variables in our models. The table shows that institutional shareholding (INSOWN) 0.0797 and government ownership (GVTOWN) (0.1143) are significantly and positively correlated with return on sales (ROS).  FRNOWN has significant positive correlation with return on assets (ROA) and earnings per share (EPS) respectively.

**Table 5: Pearson Correlation Matrix**

| Variable | ROA | EPS | ROS | INSOWN | FRNOWN | GVTOWN |
|---|---|---|---|---|---|---|
| ROA | 1 | | | | | |
| EPS | 0.5288*** | 1 | | | | |
| ROS | 0.2578*** | 0.1045** | 1 | | | |
| INSOWN | -0.0216 | 0.0345 | 0.0797* | 1 | | |
| FRNOWN | 0.5390*** | 0.5977*** | 0.0411 | -0.1236*** | 1 | |
| GVTOWN | -0.0279 | 0.0635 | 0.1143*** | 0.1110*** | -0.0712 | 1 |

(***Significance at 1% level, **significance at 5% level, *significance at 10% level)

**Table 6: Multicollinearity Test**

| Variables | VIF | 1/VIF |
|---|---|---|
| SIZE | 1.53 | 0.652795 |
| GVTOWN | 1.25 | 0.797271 |
| FRNOWN | 1.24 | 0.808347 |
| AGE | 1.22 | 0.822874 |
| INSOWN | 1.10 | 0.907951 |
| GRWOTH | 1.01 | 0.990877 |
| Mean VIF | 1.22 | |

The VIF test of the independent and control variables is shown in Table 6 in order to identify any multicollinearity issues that may exist. Given that the mean VIF value is 1.22 (less than 10) and the range of values for each of these variables is 1.01 to 1.53, the result indicates that there is no multicollinearity issue in this case (Gujarati, 2003).

### 4.3. Regressions Results

The findings of the pooled OLS regression model, which was used to determine how ownership structure affected the manufacturing companies in Bangladesh that were listed on the stock exchange, are shown in Table 7. Table 7 lists the names of the relevant independent and control variables in the first column. The coefficients of ownership structure variables and firm characteristics on ROA, EPS, and ROS, respectively, are shown in the second, third, and fourth columns (asterisked to indicate significance level), along with the number of observations, R squared and F statistics, and standard errors (within parenthesis).

The results indicate that the predictor variable INSOWN is positively related to all firm performance proxies ROA, EPS and ROS and the relationship is significant at 5%, 10% and 1% level respectively. This signifies that the institutional shareholders significantly help improve accounting based firm performance as measured by ROA, EPS and ROS. This result is in line with prior studies Rashid (2020), Sunday et al (2017), and Tsai & Gu (2007). This result is in support of agency theory which says that institutional owners are with greater position due to their concentrated shareholding to monitor managers` performance to increase value of / return on their investment (Agrawal & Knoeber, 1996). The result is also consistent with the property rights theory which views that institutional investors prioritize more on profits because of their relatively larger size of investment and therefore can put pressure on the managers to generate profits and increase the value of their investment (Sunday et al, 2017). However, this result deviates from that of Rahman (2023) who found that institutional ownership has a negative impact on bank performance. Potential explanation may reside in the fact that banking industry is more politically connected industry in Bangladesh which deters external owners especially non-political ones from performing their value enhancing roles (Siddiqui, 2010).

The results presented in Table 7 also show that higher foreign ownership (FRNOWN) is associated with higher firm performance measured by ROA, EPS and ROS at 1% significance level. This implies that foreign ownership plays very important role as a corporate governance mechanism by positively influencing firm performance. This result is consistent with Aydin et al. (2007) and Rashid (2020) who found that foreign ownership has a positive impact on accounting based firm performance along with market based firm value indicators. Foreign owners can help increase firm performance for many reasons. They have generally more resources and motivation to monitor and give incentives to make managers lead the organization more efficiently and avoid initiatives that reduce corporate value (Aydin et al., 2007; Abor and Biekpe, 2007). Perhaps the transfer of innovative new technologies developed by foreign firms may be another explanation for the phenomenon (Chibber and Majumder, 1999).

Table 7 also indicates that firm performance variables ROA, EPS and ROS have no significant relationship with the extent of government ownership (GVTOWN) in the firms. Although insignificant, the coefficients herein are however positive. This result contrasts with prior research which argued that state ownership has positive/negative/U-shaped/inverted U-shaped impact on firm value and performance as measured by different proxies (Yu, 2013). As shown in the table 4, mean government ownership (GVTOWN) is very small compared to INSOWN and FRNOWN. The low government ownership is consistent with Farooque et al. (2007) who found mean government ownership percentage to be even lower (2.8%). Moreover, government ownership in Bangladesh is characterized by large shareholding in State Owned Enterprises (SOEs) which are scarcely listed in the stock exchanges. This insignificant amount of ownership could not explain variation in the financial performance of our sample firms.

Our result also shows that the additional benefits associated with government ownership (for example: benefits from government support and political connections) are perhaps offset by the costs of inefficiencies e.g., lack of entrepreneurial drive (Najid & Rahman, 2011), pursuit of political and welfare objectives rather than commercial objectives (Vickers & Yarrow, 1991), easier access to financing leading to government`s safeguard from financial distress etc. associated with it.

**Table 7: Regression Results of the Explanatory Variables**

| Independent variables | ROA | EPS | ROS |
|---|---|---|---|
| | Coefficients | Coefficients | Coefficients |
| INSOWN | 0.0004** | 0.0566* | 0.0022*** |
| | (0.0002) | (0.0324) | (0.0009) |
| FRNOWN | 0.002*** | 0.4281*** | 0.0012*** |
| | (0.0002) | (0.0614) | (0.0003) |
| GVTOWN | 0.0001 | 0.0370 | 0.0023 |
| | (0.0001) | (0.0286) | (0.0016) |
| AGE | -0.0149*** | 2.7249*** | -0.0422*** |
| | (0.0027) | (0.6073) | (0.0083) |
| SIZE | -0.0007 | 1.6828*** | 0.0136 |
| | (0.0028) | (0.4767) | (0.0093) |
| GROWTH | 0.0347*** | 1.8184*** | 0.1067 |
| | (0.0077) | (0.6526) | (0.0711) |
| CONSTANT | 0.0735*** | -17.5051*** | 0.0148 |
| | (0.0210) | (4.6615) | (0.0767) |
| $R^2$ | 0.3932 | 0.4121 | 0.0545 |
| F | 23.29*** | 17.90*** | 12.40*** |
| N | 512 | 512 | 512 |

(***Significance at 1% level, **significance at 5% level, *significance at 10% level, two tailed. The numbers in parentheses represent standard errors obtained from regressions considering robust standard error)

Table 7 also provides insights about the relationship between firm financial performance different firm characteristics considered as control variables in our analysis. Firm age is negatively related to ROA and ROS but positively related to EPS. Firm size has a significant positive impact on only EPS. The relationship between firm performance proxies and sales growth is positive.

## 5. ROBUSTNESS CHECK

With a view to check the robustness of our study, regression considering year dummy, lag model and serial correlation were run as well. Regression results considering year dummy, lag model and serial correlation have been presented in table 8, 9 and 10

respectively. The regression results pertaining to the relationship between ownership structure and firm performance after considering year dummy is the same as above results (in table 7). It indicates that the results are not affected by previous year and signifies the consistency of the results to be free from bias.

**Table 8: Regression Results Considering Year Dummy**

| Variables | ROA | EPS | ROS |
|---|---|---|---|
| | Coefficients | Coefficients | Coefficients |
| INSOWN | 0.0004** | 0.0574* | 0.0022*** |
| FRNOWN | 0.0020*** | 0.4273*** | 0.0012*** |
| GVTOWN | 0.0001 | 0.0353 | 0.0022 |
| AGE | -0.0149*** | 2.7530*** | -0.0388*** |
| SIZE | -0.0007 | 1.7059*** | 0.0161 |
| GROWTH | 0.0355*** | 1.9046*** | 0.0995 |
| CONSTANT | 0.0697*** | -18.0529*** | 0.0084 |
| $R^2$ | 0.3958 | 0.4132 | 0.0597 |
| F | 14.62*** | 10.94*** | 6.77*** |
| N | 512 | 512 | 512 |
| Year Dummy | YES | YES | YES |

(***Significance at 1% level, **significance at 5% level, *significance at 10% level, two tailed)

Regression results considering lag model is also same as well. It indicates that there is no endogeneity problem between the independent variables and dependent variables as the result is similar to the result of table 7. The results may get biased and erroneous if there is an existence of endogeneity problem between and/or among variables and the results of this study can be claimed to be free from this bias as well due to the consistent results using lag model reported in table 9 compared to main regression results reported in table 7.

**Table 9: Regression Results Considering Lag Model**

| Variables | ROA | EPS | ROS |
|---|---|---|---|
| | Coefficients | Coefficients | Coefficients |
| INSOWN | 0.0003* | 0.0583* | 0.0022** |
| FRNOWN | 0.0019*** | 0.4076*** | 0.0010*** |
| GVTOWN | 0.0001 | 0.0357 | 0.0015 |
| AGE | -0.0134*** | 2.5506*** | -0.0399*** |
| SIZE | 0.0009 | 1.7449*** | 0.0225** |
| GROWTH | 0.0369*** | 2.0761*** | 0.1263 |
| CONSTANT | 0.0598*** | -17.3062*** | -0.0615 |
| $R^2$ | 0.3892 | 0.4052 | 0.0537 |
| F | 18.74*** | 14.26*** | 9.18*** |
| N | 402 | 402 | 402 |

(***Significance at 1% level, **significance at 5% level, *significance at 10% level, two tailed)

Regression results using serial correlation has deviated from previous results in case of INSOWN and its effect on ROA and EPS otherwise the result is same as the result documented in table 7.

**Table 10: Regression Results Considering Serial Correlation**

| Variables | ROA | EPS | ROS |
|---|---|---|---|
| | Coefficients | Coefficients | Coefficients |
| INSOWN | 0.0004 | 0.0566 | 0.0022** |
| FRNOWN | 0.0020*** | 0.4281*** | 0.0012*** |
| GVTOWN | 0.0001 | 0.0370 | 0.0023 |

| | | | |
|---|---|---|---|
| AGE | -0.0149*** | 2.7249** | -0.0422*** |
| SIZE | -0.0007 | 1.6828** | 0.0136 |
| GROWTH | 0.0347*** | 1.8184*** | 0.1067* |
| CONSTANT | 0.0735** | -17.5051** | 0.0148 |
| $R^2$ | 0.3932 | 0.4121 | 0.0545 |
| F | 8.18*** | 5.26*** | 6.88*** |
| N | 512 | 512 | 512 |

(***Significance at 1% level, **significance at 5% level, *significance at 10% level, two tailed)

## 6. CONCLUSION

The aim of this study is to examine the relationship between ownership structure and firm performance. In this paper, three proxies of ownership structure namely institutional ownership, foreign ownership and government ownership are used. Firm performance is expressed through return on assets (ROA), earnings per share (EPS) and return on sales (ROS). 110 listed manufacturing firms of Dhaka Stock Exchange (DSE) of Bangladesh are considered for the sample purpose which produces 512 firm-years during the period of 2013-2017. Multivariate analysis is performed by considering Pooled OLS method along with year dummy, serial correlation, and lag model to find out the impact of external stakeholders on profitability.

We have found that institutional and foreign owners play a very significant role as an external corporate governance mechanism in improving firm performance. Our results are consistent with agency theory that says that concentrated ownership plays a vital role in mitigating agency problems between managers and shareholders and thus improving financial performance of firms (Shleifer & Vishny, 1997; Rashid, 2020; Meah and Hossain, 2023). This is in sharp contrast with Rahman (2023), a recent study based on the listed banking companies in Bangladesh, which questioned the validity of agency-based arguments in favor of institutional ownership in Bangladesh. Moreover, our result is also consistent with property rights theory which postulates that such rights in the private sector are more clearly defined than in the public sector. So, the incentive for seeking profits by private owners leads to more effective monitoring of management performance. As a result, we can say that institutional and foreign owners have both resources and incentives to monitor the work of management (Yu, 2013).

However, we did not find any significant relationship between state ownership and firm performance. Government ownership in Bangladesh is characterized by large investment in State Owned Enterprises (SOEs) and the number of stock-exchange listed SOEs is very small in number. This phenomenon is reflected in small mean government ownership percentage in our sample. This may have led to such insignificant relationship. Existing literature confirmed that government ownership may act as both a "helping hand" and a "grabbing hand" in terms of its role as a corporate governance mechanism (Yu, 2013). The same phenomenon has perhaps led to an insignificant net effect of state ownership on firm performance.

## 7. IMPLICATIONS

Our research has many implications for regulatory authorities concerned with protection of shareholders` rights and investors in stock market securities. The policy makers should provide support to private investors especially foreign and institutional owners as a way of improving profitability of firms and protecting minority shareholders. The investors should invest in securities of firms with large investments by foreign and institutional owners to get higher returns.

Government ownership in stock exchange listed firms is very small in Bangladesh. Government ownership in listed firms can be increased to an optimum level as suggested by prior research (e.g. Yu, 2013) and more and more SOEs can be listed in stock exchanges can strengthen the government's role in corporate governance and help us better understand the impact of government ownership on firm performance.

We suggest future research in this area with a view to further our understanding about the role of different classes of owners in monitoring managers and improving firm performance. Further studies should differentiate among different types of foreign investors, use data from financial sectors not used in this study, use more appropriate research methods to identify net effect of state ownership on firm performance. Moreover, studies should be conducted to identify the underlying industry characteristics that make corporate governance mechanisms in the non-financial sector more effective than in the financial sector.

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