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THE IMPACT OF DOMESTIC INVESTMENT, INNOVATION AND R&D ON ECONOMIC GROWTH IN MENA COUNTRIES

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Abstract: *The aim of this paper is to investigate the impact of domestic investment, innovation and R&D on economic growth in the case of MENA Countries over the period 2002 – 2021. By using gravity model statistic, found that domestic investment has a positive impact on economic growth. However, innovation and R&D have not any impact on economic growth. It is true that our results indicate that domestic investments are a source of economic growth, but the lack of R&D investments, the lack of collaboration between universities and businesses, the low quality of education and regulatory obstacles are the causes that make innovation and investment in R&D have an adverse impact on economic growth. MENA countries need to invest more in R&D, promote cooperation, improve the quality of education and ease regulatory barriers.*

Keywords : Domestic Investment, Innovation, R&D, Economic Growth, MENA Countries

JEL Classification : D92, E22, G31, H54, O16, O31, O32, O40, O47, P45.

1. Introduction

Domestic investment is a major contributor to economic growth as it creates jobs, increases production, stimulates innovation and boosts the economic development of a region or country. These investments are made by local or foreign companies and can take the form of equity, debt, fixed assets, R&D, marketing, etc. investments. Domestic investment creates employment by increasing demand for goods and services and requiring labor. Increased production then helps boost economic growth by generating income for workers and increasing state taxes. Domestic investment can also stimulate innovation by funding research and development projects. These projects can lead to technological advances and new and improved products or services, which in turn can boost economic growth. Finally, domestic investment drives the economic development of a region or country by improving infrastructure, increasing productivity and attracting more investment. This helps to reduce economic inequality and promote long-term sustainable growth. In conclusion, domestic investment is critical to economic growth, helping to create jobs, foster innovation and foster development. The economy of a region or country.

Innovation is critical to economic growth as it creates new business opportunities, increases productivity and enhances competitiveness. Innovative companies are more likely to develop new products and new markets, thereby strengthening their position in the market and gaining market share. Innovation can also help improve profitability by increasing the efficiency of production processes, reducing costs and improving product quality. In addition, innovation can boost demand for goods and services, which can have a positive impact on employment, wages, and overall economic growth. Ultimately, innovation is a key factor in long-term economic growth. Research and development (R&D) are taken into consideration a key motive force of monetary growth because it allows corporations and nations to supply new technology, services and products that enhance productivity, competitiveness and great of life. R&D allows corporations to innovate through growing new products, offerings and manufacturing strategies that meet purchaser needs, create new industries and stimulate monetary growth. In addition, corporations that put money into R&D can increase extra aggressive services and products, lessen their manufacturing prices and enhance the great in their products, which allows them to higher compete in country wide markets and international. Similarly, R&D allows the trying

out of recent manufacturing methods, new materials, and new technology which can enhance enterprise performance and productivity, that can result in expanded earnings and monetary growth.

Alternatively, investments in R&D can stimulate process advent in excessive-tech sectors, rising industries and businesses that undertake new manufacturing technologies. On the opposite hand, R&D can assist discover answers for environmental, social and financial issues via way of means of encouraging the improvement of clean, sustainable and inclusive technologies, which help long-time period financial increase. In sum, R&D is critical to permit organizations and economies to develop via way of means of locating revolutionary approaches to enhance their productivity, competitiveness and sustainability. Countries and businesses that put money into R&D are higher organized to prevail withinside the ever-converting international financial system and turn out to be main gamers withinside the global of tomorrow.

MENA (Middle East and North Africa) international locations have skilled various financial tendencies during the last decades. Countries inclusive of Saudi Arabia, Qatar, the United Arab Emirates and Iran have certainly loved sturdy financial increase way to the export of herbal resources. Some international locations inclusive of Tunisia, Morocco and Egypt have installed region rules favorable to overseas funding to inspire the advent of recent organizations in those sectors. The MENA place has one of the youngest populations withinside the global, with excessive start rates. This spurred financial increase thru a bigger patron marketplace and an accelerated wide variety of workers. Despite those increase elements, many nations withinside the MENA place have skilled erratic financial increase. Political and financial issues, inclusive of the civil conflict in Syria, geopolitical tensions withinside the place, and overreliance on oil, have adversely affected the financial increase of a few international locations. The Covid-19 pandemic has additionally caused financial contraction in maximum MENA international locations. For this, the exam of the determinants of financial increase in MENA international locations is important to assist policymakers increase powerful financial rules, perceive limitations to financial increase, apprehend the effect of financial coverage on increase and appeal to investments.

The financial situation of domestic investments in MENA (Middle East and North Africa)

international locations is complicated and varied. On the only hand, a few international locations withinside the place is going through financial difficulties, appreciably because of the low rate of oil, the deterioration of the political and protection environment, corruption and political instability. These elements influence financial increase, enterprise improvement and the enchantment of home funding. On the opposite hand, a few international locations have installed region rules to inspire home funding via way of means of imparting tax incentives and financial blessings to neighborhood organizations. This has allowed a few businesses to develop and diversify into sectors inclusive of agriculture, production and services. Additionally, a few international locations withinside the place has invested closely in infrastructure projects, inclusive of ports, railways and roads, developing new funding possibilities for neighborhood organizations. Ultimately, the financial situation of home funding in MENA international locations relies upon on many elements, inclusive of authority's financial coverage, political stability, enterprise environment, corruption, and protection. Local organizations which have correctly conquer those limitations had been capable of develop and prosper, developing new possibilities for different domestic investors.

MENA (Middle East and North Africa) countries have experienced rapid economic growth over the past few decades, but their economic dependence on extractive industries and commodity exports has led to little diversification of their economies. This limits their ability to innovate and invest in research and technology development. Additionally, R&D investment is constrained by a lack of government funding and support, as well as a lack of a strong ecosystem for start-ups and innovative companies. This has resulted in lower participation of private companies in these areas, as most of them prefer to invest in short-term projects rather than venture into more ambitious R&D projects. Lack of collaboration between the private sector, government and academic institutions also limits research and development. Extractive industries such as the oil and gas industry often limit interaction with local universities and research centers, preferring to import technology and expertise from abroad rather than develop it locally.

However, it should be noted that some MENA countries have taken steps to encourage innovation and R&D by increasing budgets devoted to these areas, establishing incubators, strengthening public-private partnerships and encouraging university-business collaborations.

These actions have enabled some countries to make progress in these areas, but more needs to be done to make the region a global innovation hub. In fact, the objective of this work is to empirically examine the impact of innovation, domestic investment and R&D investment on economic growth in the case of MENA countries. For this reason, this work will be organized as a follow-up. In the second section, we will present our review of the literature. In the third section, we will explain our empirical methodology. In the fourth section, we will present our results and interpretations. Finally, we will devote our conclusions and recommendations in the fifth section.

2. Literature survey

This section is devoted to presenting the various recent works that have related to our case study with the aim of inspiring a suitable empirical methodology. For this reason, this section will be divided into two paragraphs. In the first paragraph, we will present the work on the link between domestic investment and economic growth. On the other hand, we will present the work that has focused on the relationship between innovation, R&D and economic growth. We begin by reviewing the literature on the link between domestic investment and economic growth.

2.1.Domestic Investment and Economic growth

The link between investments and economic growth is very strong, as investments provide the capital needed to sustain economic growth. Companies need to invest in new equipment and machinery to increase their production capacity, which stimulates the growth of the economy. Investments can also be devoted to research and development, which enables companies to improve their efficiency, productivity and competitiveness. By increasing investment in the economy, businesses can create more jobs, raise wages and incomes, and stimulate demand for goods and services. Ultimately, this can lead to stronger economic growth, greater productivity and greater prosperity for society as a whole. In addition, domestic investments can contribute to economic stabilization. Investments can help maintain the level of production and employment, even in times of economic downturn. This can help mitigate the negative effects of recession and accelerate economic recovery {See: Romer (1986); Lucas (1988); Barro (1991); Fischer (1993); Choe (2003); Tang et al (2008); Adams (2009); Ghazali (2010); Lean and Tan (2011); Mohamed et al (2013); Ullah et (2014)}. Among recent research, Metu, et al

(2020) studied the effects of domestic investment on economic growth in the case of 28 African economies during the period 1995 – 2017. By using GMM model, they found that domestic investment has a positive incidence on economic growth. Mutenyo et al (2022) searched the impact of domestic investment on economic growth in the case of 32 Sub Saharan African countries during the period 1990 - 2019. By using GMM model, they found that domestic investment has a positive impact on economic growth. Using estimation based on cointegration analysis and ARDL model, Anwar and Elfaki (2021) detected the effect of domestic investments on economic growth during the period 1965 - 2018. They found that domestic investments are presented as a source of economic growth. For the case of Vietnam and during the period 1990 - 2016, Nguyen and Trinh (2018) found that domestic investment positively affects economic growth. In the case of Uzbekistan, Kobilov (2020) confirmed that domestic investments have a positive impact on economic growth. Bakari and El Weriemmi (2022) examined the relationship between domestic investment and economic growth in the case of Arab countries over the period 1990 - 2020. By applying cointegration analysis and VECM Model, they found that there is no relationship between domestic investment and economic growth in the long run. In the case of Spain, Bakari (2021) searched the impact of domestic investment on economic growth during the period 1970 - 2017. Results indicated that domestic investment cause economic growth in the long run. Bakari et al (2020) searched the relationship between taxation, domestic investment and economic growth in the case of Germany. They found that taxation and domestic investment cause economic growth in the long run. By using cointegration analysis, VECM Model and the Granger Causality tests, Bakari (2016) searched the nexus between domestic investment and economic growth in the case of Canada. Empirical results indicated that there is no relationship between domestic investment and economic growth in the long run. In the short run, results indicate that domestic investment causes economic growth. In the case of Urugay, Bakari et al (2019) found that there is no relationship between domestic investment and economic growth in the long run and int the short run. In their analysis, they applied cointegration analysis, VECM model and annual data over the period 1960 - 2017. In the case of Tunisia, Bakari (2020) found that domestic investment has a negative impact on economic growth in the long run by using Cointegration analysis, VECM Model and annual data over the period 1965 – 2016. In the case of France, Bakari (2019) searched the nexus between domestic investment, economic growth and tax revenue over the

period 1972 -2016. By using cointegration analysis and VECM Model, empirical analysis confirmed that tax revenue and domestic investment have a negative effect on economic growth in the long run. Bakari and Tiba (2019) examined the determinants of economic growth in the case of USA during the period 1970 - 2016. They found that domestic investment affects positively economic growth in the long run. In the case of Nigeria, Bakari et al (2018) found that there is no relationship between domestic investment and economic growth in the long run over the period 1981 - 2015. In the case of Japan, Bakari (2017) used regression analysis and annual data for the period 1970 - 2015 to search the impact of domestic investment on economic growth. He found that domestic investment has a positive incidence on economic growth. Fakraoui and Bakari (2019) searched the nexus between domestic investment and economic growth in the case of India over the period 1960 - 2017. By applying cointegration analysis and VECM Model, they found that there is no relationship between domestic investment and economic growth in the long run. In the case of Brazil, Bakari et al (2021) found that domestic investment has a positive impact on economic growth in the long run during the period 1970-2017. In the case of Peru, Bakari et al (2020) found that there is no relationship between domestic investment and economic growth in the long run and in the short run during the period 1970-2017. By using data for G7 countries over the period 1991–2018, Bakari (2021) found that domestic investment affects positively economic growth. In the case of Greece, Bakari (2022) found that there is no relationship between domestic investment and economic growth over the period 1970-2020. For the case of 28 Developed Countries, Bakari (2022) found that domestic investment affects positively economic growth over the period 1998 - 2021.

In the case of Pakistan, Ali (2015) examined the link between domestic investment and economic growth during the period 1981 - 2014. Using estimation based on cointegration analysis and VECM model, he found that there is a positive relationship between domestic investment and long-term economic growth. In fact, these are the same results found by Javid (2019) over the period from 1972 to 2015. Similarly, Shabbir et al (2021) found that domestic investment positively affects economic growth in the case of Pakistan. Ogunjinmi (2022) studied the link between domestic investments and economic growth in the case of Nigeria during the period 1981 - 2019. Using estimation based on cointegration analysis and ARDL model, he confirmed the absence of a causal relationship between domestic investment and economic growth. Another study in the case of Nigeria, Ewubare and Worlu (2020) found that

domestic investments negatively affect economic growth during the period 1990 - 2017. Using a database that includes a set of developing countries, Aslan and Altinoz (2021) found that domestic investment negatively affects economic growth. In their study, they used the Panel VAR model.

2.2.Innovation, R&D and Economic growth

Innovations are one of the engines of economic growth since they give rise to new products, services and technologies that can improve people's productivity, competitiveness and quality of life. Spending on research and development (R&D) can facilitate innovation by enabling businesses and industries to discover new ideas, develop new products and improve existing processes. In many cases, companies that invest more in R&D are also the most successful in terms of economic growth. Indeed, these companies can derive additional profits through the marketing of new products, the increase in their clientele and the improvement of their brand image. In addition, innovations can also help create new jobs and increase average wages, which can boost economic growth by improving people's ability to spend more money. Overall, innovations, R&D spending and economic growth are all interconnected. Innovations attract new R&D investment, which can then drive long-term economic growth. For the period 1990 - 2005, Altın and Kaya (2009) found that there is no causal relationship between R&D expenditure and long-term economic growth in the case of Turkey. Analyzing R&D activities in Turkey and OECD countries with cluster analysis Şimşek and Behdioğlu (2006) found that Turkey lags behind OECD countries in R&D indicators during 1999 - 2002. In the case of OECD countries, Gülmez and Yardımcıoğlu (2012) found that R&D expenditure positively affects long-term economic growth during the period 1990 - 2010. Using the Cobb-Douglas production function based on R&D and an annual database during the period 1976-2009, Kim (2009) studied the impact of R&D on economic growth in the case of Korea. He found that R&D in the public and private sectors has a positive effect on economic growth. In the case of China, Peng (2010) found that a 1% increase in R&D expenditure leads 0.92% of economic growth. In the case of 32 industrialized and developed countries, Sadraoui et al (2014) sought the link between R&D collaboration and economic growth during the period 1970 - 2012 using Granger causality tests. The empirical results indicate that there is a strong causality between economic growth and R&D collaboration. In the case of 30 developing countries, Samimi and

Alerasoul (2009) examined the link between innovation and economic growth during the period 2000 - 2006. Using three indicators of innovation as the share of public expenditure on research in the GDP, the number of researchers in each million inhabitants and the scientific production of countries, the empirical results showed that innovation has no effect on economic growth. Gyedu et al (2021) detected the effect of innovation on economic growth in G7 and BRICS countries during the period 2000 - 2017 using VAR model and GMM model. They found that R&D, patents, and trademarks have a positive impact on economic growth. In the case of 52 African Countries, Bakari (2022) searched the impact of domestic investment and innovation on economic growth during the period 1996 - 2021. By using random effect model, fixed effect model and Hausman test, empirical results indicated that domestic investment has a positive impact on economic growth. However, results indicated that patent has not any effect on economic growth. Bakari (2019) analyzed the nexus between innovation and economic growth in the case of 76 developed and developing countries during the period 1995 - 2016. By using cointegration analysis and Panel ARDL Model, empirical results indicated that there is a positive relationship between innovation and economic growth in the long run. Bakari et al (2022) searched the nexus between innovation and economic growth in the case of Tunisia during the period 1985 - 2018. By using cointegration analysis and ARDL model, they found that innovation has a negative impact on economic growth in the long run. In the short run, they indicated that there is no relationship between innovation and economic growth. In the case of Romania, Bakari (2022) investigated the impact of innovation on economic growth during the period 1990 - 2020. Empirical results indicated that innovation has a positive impact on economic growth in the long run. In the case of emerging economies, Ahmad et al (2020) searched the nexus between innovation and economic growth during the period 1984 to 2016. By using cointegration analysis and CS-ARDL, they found that there is a positive relationship between innovation and economic growth in the long run. In the case of Turkey, Adak (2015) searched the nexus between innovation and economic growth during the period 1980 - 2012 by using error correction model. Results indicated that innovation has a positive effect on economic growth in the long run. In case of G7 countries, Ahmad et al (2021) searched the nexus between eco-innovation and economic growth during the period 1980 - 2016. Empirical results that eco-innovation has a favorable incidence on economic growth. Jian et al (2021) used a panel of China's 31 provinces over 1978–2017 to detect the nexus between innovation and

economic growth. They found that innovation affect positively economic growth. In the case of 69 developed and developing countries, Phung et al (2019) found that innovation has a positive effect on economic growth over the period 2006 - 2014. In their works, they applied the two-step system Generalized Method of Moments (GMM). For the case of 27 OECD countries, Mtar and Belazreg (2021) examined the link between innovation and economic growth during the period 2001 - 2016 using the VAR approach. The empirical results indicate innovation is a source of economic growth. Bakari (2022) searched the impact of researchers on economic growth in the case of 104 countries over the period 1996 - 2018. Empirical results indicated that researchers affect positively economic growth.

3. Empirical methodology

According to Anderson (2010), the static gravity model has always been considered as one of the most effective and robust empirical models in terms of economic analysis, analyzing economic interactions across space in the determinants of economic growth, foreign direct investment, exports, imports, domestic investment, innovations, foreign debt, exchange rate and factor movements. In fact, the estimates made by the static gravity model have made some very strong and clear empirical conclusions in economics. For the construction of our basic model, we will base on the work of Bakari and Mabrouki (2017), Shahriar et al (2019), Bekele and Mersha (2019), Mishra and Jena (2019), Raźniak et al (2020), Abafita and Tadesse (2021), Alvarez-Diaz et al (2020), Xu et al (2019), Kahouli (2019), Shahriar et al (2019), Nguyen (2022) Chavez (2023), Pelegrini et al (2023), Elleby et al (2023), and Rahman et al (2019). The basic model is presented as follows:

$$\mathbf{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{FCE_{it}} + \boldsymbol{\beta_2}\mathbf{K_{it}} + \boldsymbol{\beta_3}\mathbf{L_{it}} + \boldsymbol{\beta_4}\mathbf{X_{it}} + \boldsymbol{\beta_5}\mathbf{M_{it}} + \boldsymbol{\beta_6}\mathbf{P_{it}} + \boldsymbol{\beta_7}\mathbf{RD_{it}} + \boldsymbol{\beta_8}\mathbf{RRD_{it}} + \boldsymbol{\beta_9}\mathbf{TRD_{it}} + \boldsymbol{\gamma_i} + \boldsymbol{\varepsilon_t}$$

To linearize the equation, all variables are logarithmically transformed. Table 1 denotes the selected variables and their sources. The aim of this study is to examine the impact of national investment, innovation and R&D spending on economic growth in 14 countries in the Middle East and North Africa during the period 2000-2021. All data are from the World Bank database and Perspective Monde (See table 1). Similarly, the analysis of the descriptive statistics shows that there is a large variation between the minimums and maximums of each variable. This

shows that all the variables vary over time (See: Table n°2). In the estimation framework based on the gravity model, it is necessary to consider whether there are prominent figures in the sample elements and what is the relationship between them. In theory, the problem is to specify the equation using a panel data approach with fixed or random effects. We will attempt to describe the two types of individual effects most used in the literature. The most widely used theoretical solution for determining which of two estimation types is most appropriate is the Hausman test.

Table n°1: Presentation of the database

Variables	Descriptions	Measures	Sources
K	Domestic Investment	Gross fixed capital formation (constant 2015 US$)	World Bank Indicators / Perspective Monde
X	Export	Exports of goods and services (constant 2015 US$)	World Bank Indicators / Perspective Monde
RD	Expense in Research and development expenditure	Research and development expenditure (constant 2015 US$)	Calculated by the authors using World Bank indicators / Perspective Monde
FCE	Final Consumption Expenditure	Final consumption expenditure (constant 2015 US$)	World Bank Indicators / Perspective Monde
L	Labor	Labor force, total	World Bank Indicators / Perspective Monde
M	Imports	Imports of goods and services (constant 2015 US$)	World Bank Indicators / Perspective Monde
RRD	Researchers in R&D	Researchers in R&D (per million people)	World Bank Indicators / Perspective Monde

TRD	Technicians in R&D	Technicians in R&D (per million people)	World Bank Indicators / Perspective Monde
P	Innovation	Patent applications, residents	World Bank Indicators / Perspective Monde
Y	Economic growth	Gross Domestic Product (constant 2015 US$)	World Bank Indicators / Perspective Monde

Source: Constructed by the authors

Table n°2: Descriptive Statistics

Variables	**LOG(Y)**	**LOG(FCE)**	**LOG(K)**	**LOG(L)**	**LOG(X)**
Mean	24.97985	24.69773	23.36784	15.13238	24.13022
Median	25.08905	24.59428	23.88906	15.24164	24.33139
Maximum	26.84675	26.55511	25.56906	17.24823	26.72966
Minimum	22.63969	22.40141	20.68861	11.99806	22.73795
Std. Dev.	1.409812	1.445668	1.426936	1.932128	0.739938
Skewness	-0.313288	-0.248388	-0.423621	-0.543530	0.724261
Kurtosis	1.710856	1.697337	1.895317	1.852383	4.315267
Sum	1224.012	1210.189	1145.024	741.4868	1182.381
Sum Sq. Dev.	95.40329	100.3178	97.73507	179.1896	26.28037
Variables	**LOG(M)**	**LOG(P)**	**LOG(RD)**	**LOG(RRD)**	**LOG(TRD)**
Mean	24.25455	4.660039	-0.869808	6.643847	5.042990

Median	24.15990	5.003946	-0.570257	6.546875	5.241948
Maximum	26.46687	9.633252	0.245578	7.774389	6.881771
Minimum	22.68376	1.098612	-3.214635	4.186772	2.845758
Std. Dev.	0.814596	2.244020	0.800448	0.886813	1.294200
Skewness	0.308747	0.138901	-1.705657	-0.851076	-0.053128
Kurtosis	2.556517	2.299006	5.218306	3.100873	1.581268
Sum	1188.473	228.3419	-42.62057	325.5485	247.1065
Sum Sq. Dev.	31.85121	241.7100	30.75439	37.74901	80.39774

Source: Authors' calculations using EViews 12 software.

Illustrate descriptive statistics for landscape photography by creating the boxplot in Figure 1. It shows that the mean is around the median, indicating that the distribution is roughly normal. There are no extreme or widespread outliers in the sample. Therefore, our data are suitable for panel analysis.

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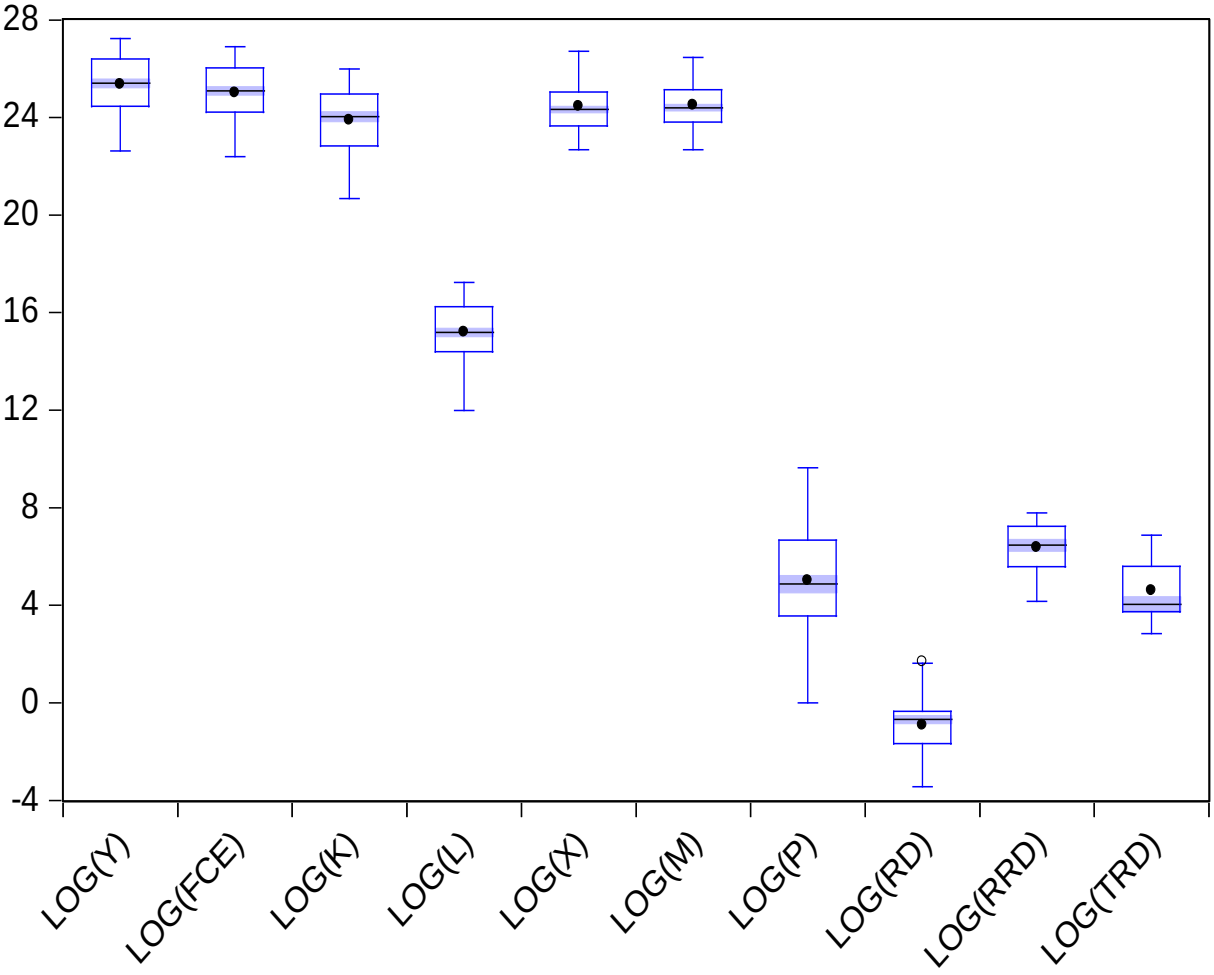
Figure 1. Boxplot of variables



Source: Authors' calculations using EViews 12 software.

The estimation based on the static gravity model is important because it allows analyzing the impact of domestic investments and innovation on economic growth in a precise and rigorous way. This model is based on a solid theoretical approach that views the economy as a complex system of trade flows between different countries. Using this estimate, economists can measure the impact of domestic investment and innovation on economic growth by taking into account international trade and economic relations between different countries. For this reason, we took exports and imports as control variables. Using this estimate, governments can make informed decisions about investment and innovation, taking into account their impact on long-term economic growth. Indeed, the objective of the following section is to present our empirical results.

4. Empirical results

In this section, we present our empirical results. As mentioned in the previous section, we will start with a global estimation of the static gravity model. Next, we will apply two different estimates of the static gravity model, one is based on the fixed-effect gravity model, on the other hand, the other is based on the random-effect gravity model.

Table n°3: Estimation of Panel Ordinary Least Squares

Dependent Variable: LOG(Y)				
Method: Panel Least Squares				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.235617	0.761480	-1.622651	0.1127
LOG(FCE)	0.692634	0.090661	7.639807	0.0000
LOG(K)	0.147600	0.029672	4.974405	0.0000
LOG(L)	0.033355	0.050711	0.657744	0.5146
LOG(X)	0.343550	0.074572	4.606939	0.0000
LOG(M)	-0.126766	0.116799	-1.085338	0.2844
LOG(P)	0.007684	0.013490	0.569639	0.5722
LOG(RD)	-0.019285	0.042446	-0.454351	0.6521
LOG(RRD)	-0.011792	0.040999	-0.287608	0.7752
LOG(TRD)	-0.006820	0.017221	-0.395993	0.6943
R-squared	0.997762	**Mean dependent var**	24.97985	
Adjusted R-squared	0.997245	**S.D. dependent var**	1.409812	
S.E. of regression	0.073994	**Akaike info criterion**	-2.189772	
Sum squared resid	0.213527	**Schwarz criterion**	-1.803687	
Log likelihood	63.64942	**Hannan-Quinn criter.**	-2.043292	
F-statistic	1931.789	**Durbin-Watson stat**	1.081715	
Prob(F-statistic)	0.000000			

Source: Authors' calculations using EViews 12 software.

Table 3 presents the results of the estimation of the static gravity model by its general form. It is clear that domestic investments {Log (K)} have a significant and positive effect on economic growth {Log (Y)} because the coefficient of this variable is positive (0.147600) and has a probability less than 1%. On the other hand, the results of table n°3 indicate that patents {Log (P)}, R&D expenditure {Log (RD)}, R&D technicians {Log (TRD)} and the number of researchers {Log (TRD)} have no effect on economic growth since their coefficients

respectively have probabilities greater than 5% (0.5722; 0.6521; 0.7752 and 0.6943).

For the other control variables, the general estimate of the static gravity model indicates that exports {Log (X)} and final consumption expenditure {Log (FCE)} have a positive and significant effect on economic growth. However, imports {Log (M)} and labor force {Log (L)} have no effect on economic growth. As a summary of the results in Table 3, we find that domestic investment is a source of economic growth. On the other hand, innovation, research and development are not presented as a source of economic growth in MENA countries. The next step is to verify the model that will be retained in our estimate using the fixed-effect static gravity model, the random-effect static gravity model and the Hausman test. We start with the estimation of the fixed-effect gravity model.

Table n°4: Estimation of the static gravity model (Fixed effect)

Dependent Variable: LOG(Y)				
Method: Panel Least Squares:				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.055945	1.518389	-0.695437	0.4932
LOG(FCE)	0.639895	0.159618	4.008910	0.0005
LOG(K)	0.133462	0.044618	2.991221	0.0062
LOG(L)	0.051357	0.094565	0.543085	0.5919
LOG(X)	0.299789	0.108787	2.755742	0.0108
LOG(M)	-0.026655	0.162724	-0.163803	0.8712
LOG(P)	0.010360	0.019101	0.542380	0.5924
LOG(RD)	0.000893	0.067742	0.013187	0.9896
LOG(RRD)	-0.038333	0.064023	-0.598743	0.5547
LOG(TRD)	-0.008792	0.032789	-0.268140	0.7908
R-squared	0.998163	**Mean dependent var**	24.97985	
Adjusted R-squared	0.996472	**S.D. dependent var**	1.409812	
S.E. of regression	0.083735	**Akaike info criterion**	-1.815669	
Sum squared resid	0.175289	**Schwarz criterion**	-0.889063	

Log likelihood	68.48390	**Hannan-Quinn criter.**	-1.464116
F-statistic	590.5023	**Durbin-Watson stat**	1.312117
Prob(F-statistic)	0.000000		

Source: Authors' calculations using EViews 12 software.

Table 4 presents the results of the estimation of the fixed-effect static gravity model. It is clear that domestic investments {Log (K)} have a significant and positive effect on economic growth {Log (Y)} because the coefficient of this variable is positive (0.133462) and has a probability lower than 1% (probability equal to 0.0062). On the other hand, the results of table n°4 indicate that patents {Log (P)}, R&D expenditure {Log (RD)}, R&D technicians {Log (TRD)} and the number of researchers {Log (TRD)} have no effect on economic growth since their coefficients respectively have probabilities greater than 5% (0.5924; 0.9896; 0.7908 and 0.5547).

For the other control variables, the estimation of the fixed-effect static gravity model indicates that exports {Log (X)} and final consumption expenditure {Log (FCE)} have a positive and significant effect on growth economic. However, imports {Log (M)} and labor force {Log (L)} have no effect on economic growth. As a summary of the results in Table 4, we find that domestic investment is a source of economic growth. On the other hand, innovation, research and development are not presented as a source of economic growth in MENA countries. We now turn to examine the results of the estimation of the random-effect static gravity model.

Table n°5: Estimation of the static gravity model (Random effect)

Dependent Variable: LOG(Y)				
Method: Panel EGLS (Period random effects)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.235617	0.861732	-1.433876	0.1596
LOG(FCE)	0.692634	0.102597	6.751010	0.0000
LOG(K)	0.147600	0.033578	4.395695	0.0001
LOG(L)	0.033355	0.057387	0.581223	0.5644
LOG(X)	0.343550	0.084390	4.070979	0.0002
LOG(M)	-0.126766	0.132176	-0.959073	0.3434
LOG(P)	0.007684	0.015266	0.503369	0.6175
LOG(RD)	-0.019285	0.048034	-0.401493	0.6902

LOG(RRD)	-0.011792	0.046397	-0.254148	0.8007
LOG(TRD)	-0.006820	0.019489	-0.349924	0.7283
R-squared	0.997762	**Mean dependent var**	24.97985	
Adjusted R-squared	0.997245	**S.D. dependent var**	1.409812	
S.E. of regression	0.073994	**Sum squared resid**	0.213527	
F-statistic	1931.789	**Durbin-Watson stat**	1.081715	
Prob(F-statistic)	0.000000			

Source: Authors' calculations using EViews 12 software.

Table 5 presents the results of the estimation of the random-effect static gravity model. It is clear that domestic investments {Log (K)} have a significant and positive effect on economic growth {Log (Y)} because the coefficient of this variable is positive (0.147600) and has a probability lower than 1% (probability equal to 0.0001). On the other hand, the results of table n°5 indicate that patents {Log (P)}, R&D expenditure {Log (RD)}, R&D technicians {Log (TRD)} and the number of researchers {Log (TRD)} have no effect on economic growth since their coefficients respectively have probabilities greater than 5% (0.6175; 0.6902; 0.7283 and 0.8007).

For the other control variables, the estimation of the random-effect static gravity model indicates that exports {Log (X)} and final consumption expenditure {Log (FCE)} have a positive and significant effect on growth economic. However, imports {Log (M)} and labor force {Log (L)} have no effect on economic growth. As a summary of the results in Table 5, we find that domestic investment is a source of economic growth. On the other hand, innovation, research and development are not presented as a source of economic growth in MENA countries. As soon as the estimation of the gravity model with fixed effect and the estimation of the gravity model with random effect are carried out, we proceed to detect the most credible and favorable model by applying the Hausman test.

Table n°6 : Hausman Test

Correlated Random Effects - Hausman Test			
Test period random effects			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Period random	2.802734	9	0.9716

Source: Authors' calculations using EViews 12 software.

Table 6 presents the results of the estimation of the static gravity model. The Hausman test has a probability higher than 5% with a probability equal to 97.16%, which means that the random effect gravity model will be retained. In this case, we can confirm that domestic investments are a source of economic growth. On the other hand, innovation, research and development are not presented as a source of economic growth in MENA countries.

5. Conclusions and recommandations

The objective of this work is to empirically examine the impact of domestic investment, innovation and R&D expenditure in the case of 14 MENA countries during the period 2002 – 2021. To achieve this goal, we used an estimation based on the gravity model. The empirical results indicated that domestic investments are presented as a source of economic growth. On the other hand, we found that the variables that explain innovation and R&D expenditure are not presented as a source of economic growth in the case of the MENA countries. In fact, there are several possible reasons for this. First, domestic investments, such as building new factories and upgrading infrastructure, can create jobs, stimulate local demand and increase overall production, which can have a positive impact on economic growth in the region. MENA region. Moreover, patents for inventions and research and development often require considerable investment and are often carried by large multinational companies instead of local companies and individuals. Therefore, these investments may not be accessible or profitable for many businesses and individuals in the MENA region. MENA countries generally invest less in R&D compared to other regions of the world. The private sector should also play a greater role in

R&D investments. They tend to work in silos without coordinating their innovation and R&D efforts. Governments should facilitate cooperation between businesses, universities and research centers to stimulate innovation. Alternatively, in some countries in the MENA region, there may also be problems with infrastructure, regulations and other factors that may hinder research and development and innovation. In these cases, domestic investments may be more beneficial for economic growth than investments in research and development. Finally, it can be noted that education levels in some MENA countries are low. It is therefore difficult for companies to find qualified personnel to carry out R&D projects. However, it is important to note that these factors can vary from country to country, and that investments in research and development can be very beneficial for some countries in the MENA region in the long term. In summary, to drive innovation and economic growth, MENA countries need to invest more in R&D, promote cooperation, improve the quality of education, and ease regulatory barriers. As future research perspectives, we propose to examine the determinants of innovation and the factors that can improve the situation of research and development in the context of MENA countries.

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