International Journal of Business and Economic Sciences Applied Research

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Quantifying the Relationship between GDP per capita and Inequality in the Balkan Region

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ARTICLE INFO	ABSTRACT
	Purpose: The paper aims to estimate the effect of inequality on the economic growth of Balkan countries for the period 2001-2017. In addition, the effect of capital stock on GDP per capita (GDPpc) for the Balkan countries was estimated. The low level of financial inclusion on the Balkan region produces an underinvestment of human capital and affects the low-income households, leading to an increase in inequality. Low levels of equality and capital stock negatively impact economic growth. **Design/methodology/approach:** An unbalanced panel data for Balkan countries for the period 2001-2017 was applied. The Balkans' neighboring countries were included, because a lot of Balkan countries lack data in many years, therefore more countries were added for statistical considerations. A random effects model was run. **Finding:** The Gini index negatively impacts the GDPpc of Balkan countries for the period 2001-2007. The reduction of inequality may increase the economic growth of the region. Capital stock positively impacts the GDPpc of the region. **Research limitations/implications:** Due to statistical considerations, we have included neighboring countries of the Balkans, because many Balkan countries do not have data for the entire series from 2001 to 2017. We have not estimated the bi-directionality of the relationship between inequality and GDPpc. The results suggest that public policies against inequality may increase economic growth. Therefore, governments of the region should apply public policies to reduce the income gap. **Originality/value:** There are many papers that have estimated the effect of the Gini index on economic growth in different regions around the world, but there are not many studies applied to the Balkan region. Therefore, this paper's novelty is the measure of the effect of the Gini index on the GDPpc of the Balkan region.

1. Introduction

Public policies against inequality have been considered as a cost for efficiency, due to the amount of financial sources applied that could be invested in public goods. According to the previous perspective, governments should not apply public policies to reduce inequality, or at least, not huge amounts. Linked to the above, Kuznets (1955) points out that the relationship between inequality and GDPpc is shaped as an inverted U, meaning that at the first stages of development inequality increases due to economy industrialization, and therefore the wage gap between the agricultural and industrial sector increases to a maximum point. Then, there is a reduction of inequality due to the labor unions demanding higher wages. According to the Kuznets perspective, the government should not intervene to reduce inequality, because this variable would reduce naturally when GDP per capita increases.

Other authors, such as Stiglitz (2012), consider that inequality negatively affects GDP per capita, due to the fact that in societies with high levels of inequality, workers perceive the economy system as unfair and therefore they do not have incentives to increase productivity. Another perspective, similar to the previous one, highlights that there is

a sub-optimal human capital investment in societies with high levels of inequality, due to the low levels of banking penetration.

The Balkans is not the region with the highest levels of inequality around the world. Nevertheless, the Gini index of the countries of the region is higher than Western European levels. Besides, the GDPpc of this region is not at the same level as the rest of the European economies. So, the research question that arises is: has the level of inequality affected the low economic growth of the Balkan economies? To answer the previous question, the relationship between inequality and economic growth has to be considered. Previous studies have estimated that inequality negatively affects economic growth in developing countries, and positively affects it in developed countries. This paper aims to estimate the effect of inequality on economic growth in Balkan economies. Even though the relationship between inequality and economic growth has been estimated previously, there are few studies which have quantified this relationship in the Balkan region.

A model of random effects panel data was estimated with an unbalanced panel, due to the fact that for some countries only short series were available. The results show a negative relationship between the Gini index and the GDPpc for 16 Balkan economies for the period 2001-2016.

2. Literature Review

The effect of inequality on economic growth depends on the national income level (Cingano, 2014), that is to say, this effect varies according to the national level of GDPpc. Stiglitz (2012) points out that inequality has a negative impact on national income, because in unequal societies workers with low incomes tend to consider the economic system as unfair and not meritocratic, therefore there is an impact on productivity. Piketty (2014) points out that even in meritocratic societies, such as the United States, it is not clear that wage differentials are fair, because it is complex to measure the marginal productivity of high-income workers.

Other authors consider that inequality has a negative effect on economic growth, due to the underinvestment in human capital (Galor and Zeira, (1993); Checchi et al., (1999); and Hassler et al., (2007)). Galor and Zeira (1993) point out that financial market imperfections cause low-income workers to invest in themselves using only their wages. Cingano (2014) points out that workers in the first deciles tend to invest a low amount of income in education and training, despite the fact that the returns on such investments are high, which causes a sub-optimal level of investment in human capital. Low levels of human capital, as well as physical capital, have medium and long-term negative effects on GDPpc. In this way, societies with high levels of income inequality tend to grow less than more egalitarian societies.

There are several studies that analyze the effect of inequality on economic growth (Cingano, (2014); Berg et al., (2018), OECD, (2015)). Table 1 shows some studies that link economic growth with inequality for high-income and low-income countries. In addition, this table shows several methods, and most of these studies use the Gini index as a measure of inequality.

Table 1. Previous studies of Inequality and GDP per capita

Author	Inequality variable	Method	Results
Forbes (2000)	Gini index	First-diff GMM	-Inequality positively affects economic growth on countries with high and medium income.
Barro (2000)	Gini index	3SLS	-Positive effect of inequality on GDP for rich countries -Negative effect of inequality on GDP for poor countries
Banerjee and Duflo (2003)	Gini index	Kenel regressions	-Inequality negatively affects economic growth
Knowles (2005)	Gini index, ratios 90/75, 50/10	Systems GMM	-Inequality positively affects GDP on top inequality distribution. -Inequality negatively affects GDP on bottom inequality distribution.
Castelló-Climent (2010)	Gini index	Systems GMM	-Inequality positively affects GDP for rich countries. -Inequality negatively affects GDP for poor countries.
Halter, Oechslin and Zwemuller (2014)	Gini index	Systems GMM, and First -diff GMM	-Inequality positively affects GDP for rich countries -Inequality negatively affects GDP for poor countries.
Cingano (2014)	-Gini index -Bottom inequality -Top inequality	Systems GMM	-Inequality (Gini index, bottom inequality and top inequality) negatively affects economic growth for OECD countries.
Berg et al., (2018)	-Gini index	Systems GMM	-Inequality (Gini index, bottom

	−Bottom inequality −Top inequality		inequality and top inequality) negatively affects economic growth, due to lower education.

Source: Own elaboration

Forbes (2000) found a positive relationship between the Gini index and economic growth in the period 1970-1995. Due to the availability of data, this author used middle and high-income countries, and half of them were from the OECD. Barro (2000) found a positive relationship between inequality and GDP for high-income countries, while for low-income countries the previous relationship was negative. Banerjee and Duflo (2003) pointed out that inequality has a negative impact on economic growth, and their results also showed that there is an inverted U-shaped relationship between the previous variables.

Knowles (2005), Castelló-Climent (2010) and Halter, Oechslin and Zwemuller (2014) found that inequality positively affects GDP in high-income countries, while this relationship turns negative when low-income countries are analyzed. Cingano (2014) found that inequality negatively affects the economic growth of OECD countries. Berg et al. (2018) pointed out that inequality negatively affects economic growth, because in unequal countries there are low levels of investment in human capital, which has a negative effect on economic growth.

Most of the papers in table 1 use dynamic panels as a methodology, through GMM systems, with the independent variable as inequality measured through: Gini index, top inequality, bottom inequality, income ratios 90/75 and 50/10.

Table 2 shows studies that analyze the relationship between inequality and GDP in the Balkans. Most of the studies use the Gini index as an independent variable.

Table 2. Inequality and GDP per capita for Balkan countries

Author	Inequality variable	Countries	Method	Results
Ouardighi & Somun-Kapetanovic (2009)	−Theil index (income inequality among countries)	Western Balkans	OLS, GIV	−Real convergence of income and inequality
Koczan (2016)	−Gini index −Bottom inequality −Top inequality	Western Balkans	Fixed effects panel	−Positive relationship between inequality and lagged GDP growth −Negative relationship between inequality and lagged GDPpc
Nikoloski & Gveroski (2017)	−Gini index	North Macedonia	−OLS	−Positive correlation between average income and inequality −Positive correlation between inequality and Headcount ratio.

Source: Own elaboration

3. Data and Methodology

The research question is: has the level of inequality affected the low economic growth of the Balkan economies? Capital stock has been included as a control variable, because it has a lot of variability on the chosen countries, and we consider that the inclusion of capital stock induces more variability to the model and impacts on the link between inequality and GDPpc.

3.1. Data

The effect of income inequality on GDPpc was estimated for the Balkan economies from 2001 to 2017. The variables and databases in table 3 were used. GDP is measured through the level of production at constant US dollars (2010) and is then divided by the population. For that variable the World Development Indicators from the World Bank were used. The Gini index measures income inequality, and we used two databases: The World Development Indicators (World Bank) and The Standardized World Income Inequality Database (SWIID) which collects

information from different databases concerning the inequality of 198 countries. According to Farris (2010: 1) the Gini index is "… a summary statistic that measures how equitably a resource is distributed in a population". Finally, the capital stock at current PPPs (in mil. 2011US$) is estimated by Feenstra, Inklaar & Timmer (2015) for the Penn World Table. According to Inklaar and Timmer (2013: p. 6) capital stock is defined as "Capital stocks are estimated based on cumulating and depreciation past investments using the perpetual inventory method (PIM)".

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Table 3. Variables and Databases

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Variable	Description	Values	Data base
GDPpc	-Measures the level of production per person	- Constant 2010 US$	-World Development Indicators, World Bank.
Gini index	-Measures the income inequality	-Takes values from 1 to 100	-World Development Indicators, World Bank. - The Standardized World Income Inequality Database (SWIID) (https://fsolt.org/swiid/swiid_source/)
Capital stock	-Measures the capital stock	- Capital stock at current PPPs (in mil. 2011US$)	-Penn world Table

Source: Own elaboration

Initially, the criterion was to choose only the Western Balkan economies according to the World Bank classification: Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia. Nevertheless, those countries do not have data for the entire series (2001-2017), for instance, for Albania there are just four years for the Gini index and it is almost the same for other countries, due to the Gini index not being estimated every year, unlike GDP. From an econometrical point of view, and in order to run a regression using panel data, an (n/t) higher than 1 is required (Roodman, 2009), where n are the countries and t the number of years. So that, using only the World Bank classification (n/t) would be less than 1. Therefore, we included more countries of the region.

We included countries considered as the Balkan region, such as: Bulgaria, Croatia, Greece, and Slovenia. Nevertheless, it was not enough to get an (n/t) closer to 1. Therefore, we decided to include neighboring countries that are linked to the region (culturally or geographically) such as: Hungary, Italy, Moldova, Romania, Turkey and Ukraine. Using all the countries (n/t) is closer to 1, and it was possible to apply panel data analysis. Most of the included countries have larger series of Gini index.

3.2 Econometric Model
An unbalanced panel data from 2001 to 2017 for 16 Balkan economies was integrated. The following general panel specification was used (Hsiao, 2014):

$$Y_{it} = m_{it} + X_{it} + m_{it}$$

The panel data analysis captures a cross-sectional and time series analysis (Wooldridge, 2010).

The following equation was estimated:

$$Lngdp_{it} = b_0 + b_1 lngini_{it} + b_2 lncs_{it} + m_{it} \ldots (1)$$

Where:

i is the country and t is the time period.

m_{it} is the error term

lngdppc: is the natural logarithm of aggregation of gross value added divided by population. The GDPpc is at constant 2010 US dollars.
lngini: is the natural logarithm of the Gini index. This index measures the income inequality and can take values from 0 (total equality) to 100 (total inequality).
lncs: is the natural logarithm of capital stock and measures the capital of nations. The capital stock is at current PPPs in millions of 2011 US dollars.
Equation (1) is theoretically based on the fact that due to financial market imperfections (Hassler et al., 2007) and that low-income households do not have enough money to invest in themselves, low-income households do not go to school, and there is an under-investment in human capital (Cingano, 2014). Low levels of human capital have a negative impact on GDP. Therefore, we consider that b_1 should be negative. The variable capital stock was included

as a control variable, because this variable has a high impact on GDP. Besides, there is a high variation in the capital stock of the Balkan economies. We consider that the inclusion of this variable induces more variability to the model. Table 4 shows statistics of the used variables. Capital stock has the highest variability and the Gini index the lowest.

Table 4. Summary of statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
LnGDPpc	226	8.985	0.874	7.119	10.552
LnGINI	226	3.478	0.150	3.122	3.758
LnCS	214	13.173	1.671	9.781	16.636

Source: Own elaboration

Table 5 shows the correlation matrix of dependent and independent variables. The correlation between the independent variables is low (0.128), which means no multi-correlation problems. Besides, the correlation between the Gini index and GDPpc is negative which indicates a negative relationship between these variables. The correlation between capital stock and GDPpc is positive, which means a positive relationship. Finally, the coefficient of capital stock is the highest.

Table 5. Correlation matrix

	LnGDPpc	LnGINI	LnCS
LnGDPpc	1.000		
LnGINI	-0.053	1.000	
LnCS	0.602	0.128	1.000

Source: Own elaboration

The Hausman test was applied and the value of the probability of Chi2 was 0.0740, which means that the random effects model was applied. Then, the autocorrelation Wooldridge test was applied and the results show that there is no such problem.

4. Results

Figure 1 shows the relationship between the logarithm of GDPpc and the logarithm of the Gini index. The trend line (right-hand side figure 1) shows a negative relationship between the Gini index and GDPpc as in the previous correlation matrix.

Figure 1. GDP per capita and the Gini index for Balkan economies
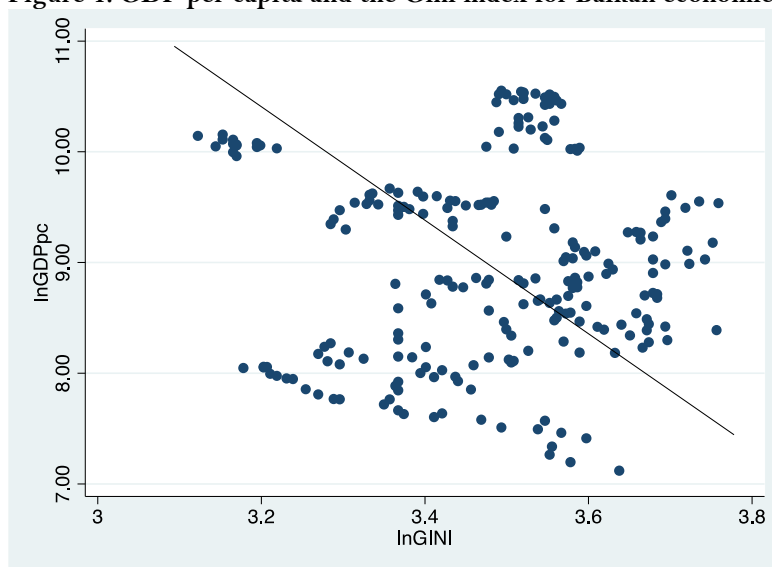
Source: Own elaboration

Figure 2 (left-hand side) shows a positive relationship between GDPpc and capital stock. Besides, the trend line (right-hand side figure 2) shows a positive relationship.

Figure 2. GDP per capita and capital stock for Balkan economies
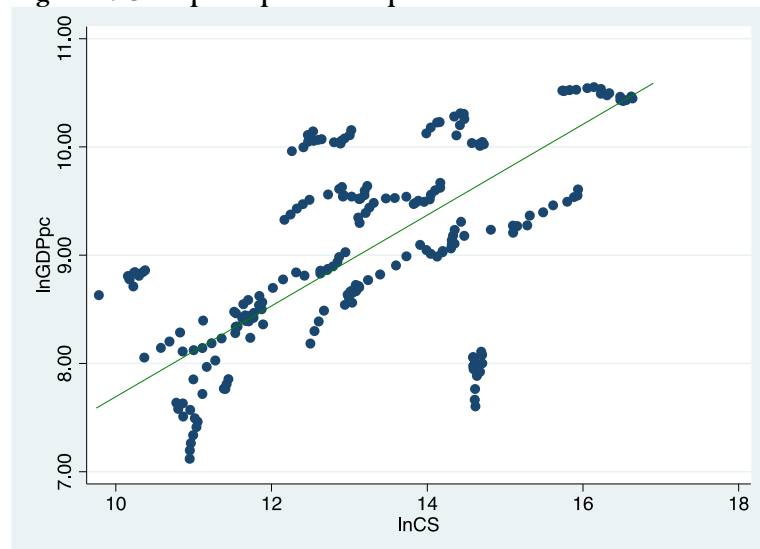
Source elaboration

Table 6 shows the relationship between GDPpc and the independent variables. The results indicate a negative effect of the Gini index on GDP per capita with a 5% level of significance. Capital stock impacts positively on GDPpc at a 1% level of significance. The coefficient of capital stock (12.50) is higher than the coefficient of the Gini index (-2.03), and the R^2 (overall) is 0.36.

Table 6. GDP per capita, Gini and Capital stock for Balkan economies: Panel estimation

LnGDPpc	Coef.	P	s.e.
LNGINI	-2.030	0.042	0.073
LNCS	11.480	0.000	0.025
Constant	12.250	0.000	0.460
Hausman test	8.53	0.0740	Prob>chi2
R-sq (within)	0.55		
R-sq (between)	0.37		
R-sq (overall)	0.36		
Wald (chi-sq)	137.55	0.0000	Prob>chi2
Observations	214		

P = Robust standard error
Random effects

5. Discussion and Conclusions

Some authors suggest that policies against inequality are a cost for national economies and therefore governments should focus on activities that boost economic growth. According to Kuznets, inequality will go down alone, after a long period of high economic growth. However, inequality can negatively affect economic growth, due to the fact that in societies with high levels of inequality, workers see the economic system as unfair and productivity levels are not optimal. The objective of the paper was to estimate the effect of inequality on GDPpc for the Balkan countries. The Balkan region includes countries with lower levels of GDPpc than the rest of Europe, therefore it is important to analyze the previous relationship. The findings are related to the objectives of the paper, because the effect of the Gini index on GDPpc for the Balkan countries was estimated through a panel data model. The results show a negative relationship between inequality and GDPpc.

The results are novel, because the effect of the Gini index on GDPpc in the Balkan countries had not previously been quantified, mainly due to data availability. We run an unbalanced panel for Balkan countries and Balkan neighboring countries were included for statistical purposes. The results are similar to those that find a negative relationship between inequality and GDPpc (Barro, 2000; Banerjee and Duflo (2003); Knowles (2005); Castelló-Climent (2010); Halter, Oechslin and Zwemuller (2014); Cingano (2014); Berg et al., (2018)). Those authors found such a relationship in developing countries, as is the case of the Balkan economies, but not for developed countries, in which there is a positive relationship. Our results are similar to those obtained by Koczan (2016), who found a negative effect of inequality on GDPpc for the Balkan countries.

The findings suggest that policies against inequality can induce higher economic growth in the Balkan region, so we suggest that governments of the region should apply public policies to reduce the wage gap. Piketty (2014) has suggested increasing capital taxes, in order to reduce inequality around the world. This proposal should be applied at an international level, because in that way the capital cannot move to other countries looking for low taxes. We

consider that in the Balkan region the governments should consider applying a marginal increase of direct taxes, because such a policy could increase equality. Besides, public policies that boost education help to reduce income inequality, therefore, we consider that the governments of the region should invest in educational matters, because it is well known that these public policies reduce inequality. We consider that previous public policies reduced inequality, but also boosted economic growth.

Many papers have estimated the effect of inequality on economic growth using different methodologies and have been applied to specific groups of countries around the world. The paper highlights the importance of the policies against inequality because they boost economic growth. There are indications that the COVID19 pandemic has increased inequality around the world, because the unemployment rate has increased. Concerning the Balkan region, the pandemic has increased the income gap at present but also inequality will increase in the future, due to the pandemic's impact on education. Therefore, the public policies against inequality in the Balkan region are quite important, because they increase equality and induce a faster economic growth.

We did not estimate the bi-directionality of the Gini index and GDPpc, and it is rather important, because in the case of bi-directionality a faster economic growth induces a reduction of inequality and vice versa. Using a public policy in the case of bi-directionality of these variables would yield more efficient results. Therefore, we consider that the paper has this limitation. Besides, the inclusion of neighboring Balkan countries, because of statistical considerations, may bias the results.

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Trends and Patterns of Greek Outward FDI in CEE Countries

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ARTICLE INFO	ABSTRACT
Article History Received 2 July 2021; Accepted 16 August 2021 *JEL Classifications* F23 **Keywords:** FDI, Multinational Enterprises, CEEC, internationalization, Greece, debt crisis	**Purpose**: This paper focuses on the internationalization of the Greek Multinational Enterprises in Central and Eastern European Countries. Its purpose is twofold. Firstly, to describe the process through which Greece became a major investor in the region following the collapse of the central planned economies. Secondly, to investigate if there are any different patterns between firms investing in Central and Eastern European Countries and those investing in other EU countries. **Design/methodology/approach:** Using firm level data and a descriptive qualitative approach we analyse the investment trends in the two regions and find indications of different patterns in the volumes and sectoral allocation of FDI. **Findings:** A major finding of this study is that Greek FDI in Central and Eastern European Countries follow different patterns in terms of volume, sector and industrial activity, compared to the respective FDI in other EU countries **Research limitations/implications:** The firm level data used in this study refer to the specific year that each FDI was announced; In this respect one major limitation is that we cannot trace any increase of invested capital or disinvestment to subsidiaries which are already established. **Originality/value:** This paper contributes significantly to the existing literature since it is one of the few studies examining the total of a country's outward FDI in the CEE Countries at sectoral level, using firm lever data in an extended time series extending both in pre-crisis and post-crisis periods.

1. Introduction

Following the collapse of the central planned market economies and the adoption of the market economy in the 1990s, transition economies of the Central and Eastern Europe (CEE) began to attract, initially low in volume but rapidly increasing, FDI flows at a significantly higher level than the rest of the world. Foreign Direct Investment (FDI) inflows were multiplied in volume during mid-2000s especially for the countries that joined the EU, while after 2009 inflows collapsed due to the global recession. The internationalization path for the Greek multinational Enterprises (MNEs) is somehow interwoven to the opening of the CEE Markets. Greece's geographical and cultural proximity created a comparative advantage for Greek MNEs to expand their operations to the region, compared to the MNEs from other EU countries.

This paper is an effort to explore the trends and patterns of Greek outward FDI in CEE Countries, focusing specifically on those characteristics that constitute different patterns of the Greek MNEs' motives and strategies for an extended period ranging from the late 1990s to the post debt crisis period. The paper also attempts a comparison of Greek MNEs' investment patterns in CEE Countries and to the rest EU Countries.

The main contribution of this paper is that it is not restricted to aggregate country level analysis. Using a database that includes firm level data, we are able to go a step further and investigate FDI trends and patterns through a conjunction of the sectoral and the geographical level. Specifically, the extended time series from 2003 to 2019 cover

both the pre-crisis and post crisis periods. In this respect the uniqueness and novelty of this study is that it investigates the impact of the crisis on the trends of outward FDI of a peripheral economy such as Greece to core and peripheral host counties.

This paper is structured as follows. It begins with a retrospect of CEE Countries transition and the consequent gradual inflow of Foreign Direct Investment (FDI). In this context, the paper examines the internationalization of Greek MNEs in CEE Countries from the early 1990s to the advent of the debt crisis. It specifically focuses on how Greek MNEs have evolved through time and exhibited different qualitative and quantitative characteristic. It also presents the perception of the Greek policy makers over this internationalization phenomenon and particularly to the policies they pursued.

Then follows the description of the research question and the data and methods used in the current study. The approach is descriptive.

The empirical part initiates with a brief presentation of the major destinations of Greek MNEs and the impact of the debt crisis on the activities of Greek MNEs.

In the next section we make an extensive descriptive analysis of the different patterns of Greek FDI in the CEE Countries and the rest of the EU and finally, in the last section there is a discussion of the conclusions along with some key policy recommendations and suggestions for future research.

2. Review of Literature

### 2.1 CEE Countries transition and FDI inflows

During their industrial development, CEE Countries' centrally planned economies, were almost completely closed to foreign investment until the end of the 1980s. Following the collapse of the communist governments, the actual dissolution of COMECON and the adoption of market oriented economic systems, the transition economies of CEE Countries began to attract low but rapidly increasing FDI flows (Johnson, 2006, p. 5-9). Their transition process included liberalization and stabilization of their economies including structural and institutional reforms and privatizations and restructuring of state-owned enterprises in order to develop location advantages that would attract foreign investors. Initially, the lifting of protectionism led to crowding out their domestic industries resulted in an increase of imports and a decline of exports. This was a result of the low competitiveness of the domestic CEE industries against western imports. Under these circumstances, and with the domestic private and public investments diminishing, attracting foreign capital was probably the only choice for CEE Countries (Bitzenis & Marangos, 2007) for pursuing growth.

The transition to the market economy and the consequent attraction of FDI has not been an identical process for all CEE economies, since their centrally planned economic systems differed substantially. The Soviet Union, for example, implemented a much stricter and more closed centrally planned economic system compared to other countries such as Hungary, Poland, the Czech Republic and Yugoslavia which maintained some relations with the western economies, allowing some foreign capital inflows and private sector activity in their economies. These differences combined with a great deal of political upheavals and institutional changes that took place after 1991 shaped a very disparate business environment. In this respect, three countries alone, the Czech Republic, Poland and Hungary accrued over 50% of total FDI inflows in the region (McMillan & Morita, 2006).

Most of the investments came from developed neighbouring countries, mainly Germany and Austria. The main motive of foreign investors was to acquire a dominant position over their competitors by expanding into a new market with increasing demand potential (McMillan & Morita, 2006) as well as the potential for establishing export platform production activities due to its low labour cost. Of course, only part of these FDI were greenfield since acquiring formerly state-owned enterprises at remarkably low prices has been a popular strategy among foreign investors. A striking example is the automotive industry, with prior state-owned firms been partially or wholly acquired by German, French and Italian automotive industries (eg. the acquisition of Czech Skoda by Volkswagen and Romanian Dacia by Renault (Radosevic & Roziek, 2005).

It should be emphasized that foreign investors, apart from funds, also brought intangible assets such as new technology and innovation, production and marketing know-how and modern administrative structures that improved the competitiveness of acquired firms (Bradshaw, 2005). For most CEE countries, actual benefits from the inflows of FDI were not visible prior to late 1990s since, as mentioned above, FDI inflows were ranging at a relatively low level. After 1998, this trend began to shift. Following the gradual stabilization of CEE economies and managing to restrain inflation (Kornecki, 2010, p. 7), FDI flows starter to accrue. The EU membership status and the subsequent accession of many of CEE Countries in the EU in 2004 and 2007 has been a determining factor for increasing FDI inflows since it induced structural reforms related to business environment and governance (Jirasavetakul & Rahman, 2018). Countries of Central Europe and especially Poland, Czech Republic, Romania and Hungary have been the major FDI attractors since the opening of CEE economies, while Bulgaria also became a major host country after its accession in the EU (PriceWaterhouseCoopers, 2010, p. 2).

The crisis of 2008 had a major impact on FDI flows globally. FDI in CEE Countries certainly experienced some suspension in the previous years' expansion trend. Yet, we could assert that the crisis did not have the same impact on all CEE Countries. Poland, Estonia, Slovenia and North Macedonia, for example, did not experience any severe decrease in inflows while Slovakia, Hungary and Bulgaria witnessed a collapse in their inflows of FDI. After a difficult and, in some cases, painful transition process, FDI inflows to CEE Markets played a major role in their development path and their integration in the international economic environment (Popescu, 2014).

Figure 1. World FDI flows to the CEEC
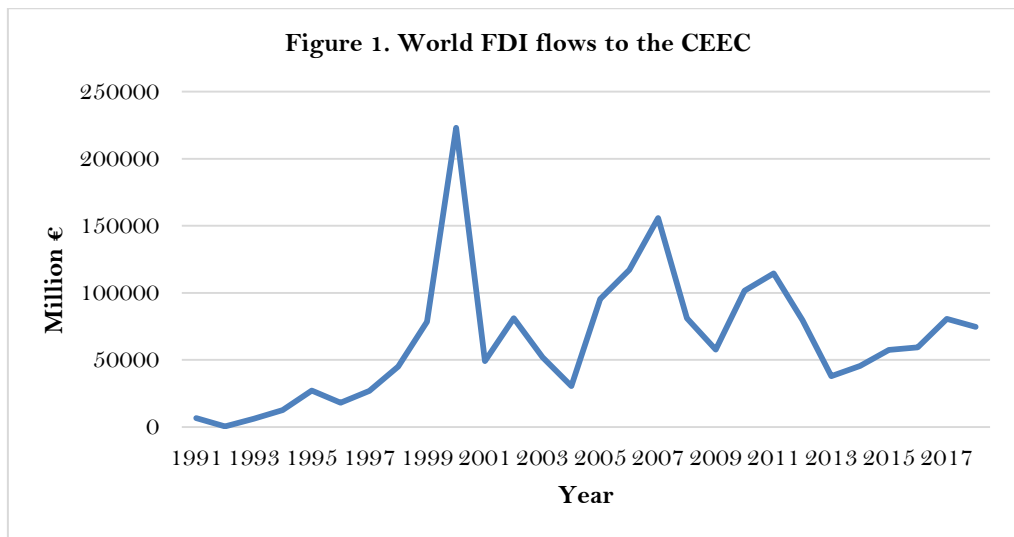
Source: UNCTAD

2.2 Greek MNEs early internationalization into the Balkans

The path for Greece, as an FDI investor, can be traced back to the early 1990s with the collapse of the centrally planned economies of CEE and the consequent opening up of their borders to foreign capital. As a result, many Greek firms found a prolific area to build their internationalization path, taking advantage of the cheaper production factors and the enlarged new market in terms of demand.

The first wave of Greek MNEs' expansion emerged just after the opening of CEE markets in the early 1990s was driven by the Greek "migrant entrepreneurs" living there. These individuals gained from the increasing demand conditions by channelling Greek exports in CEE Countries while many of them acquired managerial positions at the subsidiaries of Greek MNEs in these countries (Kamaras, 2001).

This type of early internationalization was followed by a second "wave" in mid-1990s, consisting of Greek labour-intensive firms such as the textile industries. These firms relocated production processes in the neighbouring countries in order to gain from the lower labour costs (Karagianni and Labrianidis, 2001) and survive, since the domestic environment had become increasingly hostile as a result of the continuous increase in domestic labour costs and foreign imports. Many of these firms found themselves acting as intermediaries within "triangle-like industry networks". Within these networks, firms from core-EU countries such as Germany, directly purchased Greek firms' products that were partially (or totally) produced in CEE Countries, since Greek firms used to transfer labour-intensive processes of their production chain in their neighbouring Balkan countries (Labrianidis, 2003). In this respect, Greek firms that were previously export oriented turned into MNEs controlling export platform FDI in the Balkans. This type of resource seeking FDI in the manufacturing sector exists until today but its added value in the Greek economy is diminishing. The geographical allocation of Greek FDI in this period was rather limited, since the majority of Greek controlled subsidiaries that were established in the Balkan countries and especially in those sharing common boarders with Greece (Bulgaria and Romania). There has also been an opposite flow of migrant labour coming to Greece from the FDI host countries and especially from Albania. (Labrianidis, Lyberaki, Tinios & Hatziprokopiou, 2004).

Moreover, it is worth mentioning that almost 50% of Greek controlled subsidiaries were established in Bulgaria (Bank of Greece, 2006, p. 118). The importance of proximity is also highlighted by the fact that most of the parent companies were based in Northern Greece. It seems that the proximity of Northern Greece's firms with the Balkan markets gave them an advantage towards the bigger, better organized and near the policy makers firms that were based in Athens (Dimitratos & Lioukas 2002). It is also worth mentioning that a significant share of Greek parent firms, especially in the textiles industry were partially owned by German firms (Labrianidis & Kalantaridis, 1997) while many of the Greek parent firms had previously strengthened their position through mergers and acquisitions (Labrianidis, 2000).

The general impression regarding the multinational characteristics of the Greek MNEs investing in CEE Countries of that period is that with the exemption of a small number of big Greek MNEs, the vast majority were not presenting the typical characteristics of multinational firms as observed in the relevant literature. They were basically small and medium sized firms, labor intensive, using obsolete technology and production processes, and with limited innovation, marketing strategies and managerial capacity (Labrianidis, 2000b); Labrianidis et al, 1997).

For the period described above (1990-1997), there are not available consistent data on the volume of Greek FDI in CEE Countries. Available data with extended time series from UNCTAD include only the aggregate of global outward FDI, while more analytical data from the Bank of Greece include time series only from 2001 onwards. If we take into account evidence showing that above 90% of Greek MNEs were investing in Albania, Bulgaria and North Macedonia (Bank of Greece, 2006, P. 118) along with UNCTAD's data, we could safely estimate that the amount of Greek outflows in CEE Countries was around 2.5 million € in 1990 and slowly increased at around 3 million € in 1997.

2.3 Maturing of the internationalization strategies and increase of invested capital

The third wave of Greek MNEs expansion covers the period from 1998 until the outbreak of the 2008 financial crisis. This period is characterized by the maturity of the internationalization process, the increase of invested capital and of the number of Greek controlled subsidiaries and the expansion to new markets (Giakoulas et al. 2012). It began around 1998 and lasted till the outbreak of the debt crisis.

The major characteristic of this period is the entry of large enterprises of Greek oligopoly-sectors such as constructions, telecommunications and banking and the huge increase in the invested capital. These firms expanded their business abroad, often operating as intermediaries of other larger European firms (Bank of Greece). The geographical spread of Greek MNEs subsidiaries has also expanded beyond the boundaries of the neighboring Balkan countries to other CEE Countries. Apart from CEE Countries and Cyprus which had been the major Greek FDI recipients up to then, Greek MNEs started also expanding in core EU economies such as Germany, France, Italy, UK and Spain and also to some international tax havens (Kalogeresis, 2003, p. 165-165).

According to the calculations on data retrieved from the FDI Markets database, Greek FDI outflows in CEE Countries rose from 863 million € in 2003 to 3068 million € in 2008. Especially Greece's FDI skyrocketed from 2005 to 2008. Probably this substantial increase of invested capital from late 1990s up to the advent of the crisis happened because of the following reasons.

Firstly, Greek MNEs were following the global patterns on outward FDI flows which were also rushing during the same period, as a result of the deepening of globalization and increased market openness. Secondly, many sectors grew rapidly and reached the restricted boundaries of the Greek market. In this respect, big firms (especially those of the financial and the telecommunications' sector), sought for new markets, thus shifting part of the internal competition abroad (oligopolistic reaction). Upsizing of these sectors has been the outcome of certain conditions that occurred in the domestic market, thereby leading to their internationalization. Some of the most important of these conditions have been:

- the rise of the stock market in the second half of the 1990s, which enabled a considerable number of Greek firms to raise funds and grow,
- the large-scale mergers and acquisitions that occurred in Greece during the 1997-2003 period, largely caused by the stock market growth (Papadakis and Thanos, 2008) and
- the Olympic Games which had been a major driver of growth in Greece, especially for the constructions sector (Giakoulas 2015).

Thirdly, many of these investments have been escapism FDI as a result of the increasingly hostile business and institutional environment in Greece (Kottaridi et al, 2019).

2.4 The policy scene

FDI were believed to improve (at least in the short run) the efficiency of the Greek MNEs and there was evidence that there has been a rather positive impact on Greece's GDP (Kalogeresis, 2003, p. 217-219). There was also a strong belief that Greece could emerge as the leading economic and political player in the Balkan Region (Tsardanidis, 2001). In this respect, Greek governments, from mid-1990s to mid-2000s pursued policies fostering the expansion of Greek MNEs in the region.

Typically, Greece's investment relations with the non-EU member countries were regulated by Bilateral Investment Treaties (BITs) and Double Taxation Treaties (DDTs). Since the mid-1990s Greece had become increasingly active in pursuing policies fostering regional cooperation through various international initiatives and supporting the European perspective of the Balkan transition countries (Wallden, 1999). Greece has been promoting growth and stabilization of its neighbouring countries and specifically promoted the EU membership and the "Stabilization and Association Process" of Bulgaria, Romania, Albania, Croatia, North Macedonia, Montenegro, Serbia, and Turkey (Bitzenis and Vlachos 2011). Greece has also been providing aid to the Balkan countries through bilateral agreements and funds allocated directly by the Ministry of Finance and Economics, though not under a holistic approach but rather fragmentally (Giakoulas, 2015). In this context, Greece's most holistic attempt has been the Hellenic Plan for the Economic Reconstruction of the Balkans (HiPERB) initiated in 2002 (HiPERB) (Monastiriotis & Tsamis, 2007). The general aim of this programme has been to contribute to political, economic and social stability in South-East Europe and to support recipient countries' European perspective. The programme particularly funded actions for the improvement of infrastructures, human capital, institutions and the welfare state. All these policies began fading after the accession of many CEE countries in the EU and especially after the advent of the 2008 debt crisis.

2.5 FDI patterns between CEE Countries and the EU Countries

Studies have shown (Jones et al, 2020) that there are significant differences in the motives of FDI in CEE Countries and in the rest EU countries. This is a result of differences in production factors endowment and market demand structure between the two areas. These differences have created a pattern according to which, FDI in CEE Countries are often used as export platforms (Neary, 2008) to the near core EU economies as reflected in the core-periphery model (Krugman and Venables, 1990). This pattern will probably boost FDI in the manufacturing sector of CEE Countries.

Furthermore, in the case of Greek FDI, Giakoulas (2015) and Giakoulas and Kottaridi (2020) found that there are different motives of Greek FDI in CEE Countries and in Western European countries. Greek FDI in CEE Countries are mostly attracted by lower production costs and taxation while in the case of core EU countries, they follow more complex, efficiency seeking strategies such as the expansion into new markets and searching for synergies, expertise and strategic partnerships.

3. Research question, data and methods
The aim of the empirical part of this study is to investigate whether there are different patterns of Greek outward FDI in Central and Eastern European Countries and in the rest EU countries. The approach is rather descriptive using data retrieved from fDi Markets database which is a private database provided by Financial Times Ltd. The database includes detailed information such as sectoral and geographical information, financial data, investment data etc. for all parent enterprises and their subsidiaries from 2003 onwards and is constantly updated. One major setback of the database is that it cannot trace any increase of invested capital or disinvestments to subsidiaries which are already established. Nevertheless, though compared the total aggregate Greek FDI outflows from fDi Markets database with the respective data from UNCTAD and the trends are coinciding. Information about the FDI are tracked from media sources, industry organizations and investment agencies, as well as information from market research and publication companies.

Using these data, we initially present the main destinations of Greek FDI in terms of invested capital and number of projects, followed by a description of the case for the major destination countries. We subsequently investigate the impact of Greece's debt crisis on the volume of outward FDI by group of destination countries. We specifically use three groupings, Central and Eastern European Countries (CEEC), rest of EU countries (RoEU) and all the other countries (Rest of the World = RoW = Total – CEEC- RoEU).
Using the Peason correlation coefficient and scatterplots we then try to investigate if there are any different patterns among the major destination categories of Greek MNEs. Finally, we compare Greek FDI, both in terms of sector and industrial activity between Western European Countries and Central and Eastern European Countries.

4. Geographical allocation of Greek FDI in CEE Countries
Figures 2 and 3 show the geographical allocation of the sum of Greek outward FDI flows from 2003 to 2019. It seems that Romania is by far the most attractive host country in terms of invested capital and along with Bulgaria which comes second, are the main Greek outward FDI recipients through this period (2003-2019) accruing approx. 70% of the total of invested capital. Serbia is also concentrating around 10%, Albania and Poland around 6% and North Macedonia around 3%. It should be emphasized that Poland is not a typical Greek FDI host country. Its relatively high amount of investment is a result of a sole huge investment of Titan Cement in 2008.

Figure 2. Greek FDI in the CEEC. Sum of invested capital 2003-2019.

Country	Sum of invested capital in Mil. €
Romania	4,333.84
Bulgaria	3,042.61
Serbia	1,029.01
Albania	643.30
Poland	616.79
North Macedonia	337.97
Hungary	248.95
Czech Republic	151.00
Croatia	52.70
Bosnia-Herzegovina	39.70
Slovenia	37.60
Lithuania	27.00
Estonia	16.30
Slovakia	11.60
Montenegro	8.50

Figure 3. Greek FDI in the CEEC. Sum of projects 2003-2019

Country	Number of investment projects
Romania	133
Bulgaria	117
Serbia	30
North…	15
Poland	12
Hungary	12
Czech…	11
Albania	7
Slovenia	4
Croatia	4
Estonia	3
Slovakia	2
Monte…	2
Bosnia…	2
Lithua…	1

Source: FDI Markets

Romania

Since 2004, Romania has become a particularly attractive destination for foreign investors. Factors such as its market size, its rapidly growing economy, its industrial production background combined with low labour cost, and the country's accession to the EU strengthen its position as an FDI recipient country (Birsan & Buiga, 2009). Romania lagged in attracting FDI compared to other CEE Countries, especially during the 1990-1998 period. This was a result of its delayed and slower economic reform process. The pattern described above started to shift after 1998, when massive privatizations in the country attracted foreign capital in the emerging new enterprise schemes (Birsan & Buiga, 2008). After signing the Treaty for accession in the EU in 2005, significant FDI inflows started rushing in Romania (UNCTAD, 2006, p. 263-265). The reduction of its corporate tax rate from 18%-40% to a flat 16% in 2005 has also been a decisive determinant for foreign investors.

Greek FDI flows in Romania peaked in 2008 reaching the level of 1259 million € and ever since they remain at a significantly low level, ranging below 200 € million. Major investment sectors are ICT and electronics, constructions, and financial services, cumulatively summing up at 74% of total Greek FDI in the country. The Hellenic Telecommunications Organization (OTE) has been the major investor in the ICT and Electronics sector. Also, OTE is probably the only Greek company that made a noticeable investment in Romania after the outbreak of the crisis, investing in Telekom Romania (Romtelecom) in 2016.

In the construction sectors we observe a great deal of bigger and smaller Greek companies, mainly investing in private sector's construction activities.

In the financial sector, Alpha Bank and Pireaus Bank are the major investors while National Bank of Greece has also a significant share. It must be noted that 97% of Greek FDI in the financial sector in Romania took place before the crisis.

Bulgaria

Bulgaria followed a similar internationalization path with Romania. After some failed early attempts for reforms and attracting foreign capital, Bulgaria faced an economic collapse in 1997 (Shteryanova, 2009). A new government

pursuing economic reform policies focused on attracting foreign investments. Some of the key reforms adopted had been the establishment of a currency board, the development of a programme for the consolidation its banking system and the adoption of a new legislative framework for attracting foreign investment (Petranov, 2003).

The most determining element of the new legislative framework was the non-discrimination principle between domestic and foreign investors and the safeguarding and protection of foreign properties. The privatization of most of the state-owned enterprises that took place during this period, were also significant determinants for FDI inflows in Romania (Shteryanova, 2009). Probably the most important factor in attracting FDI has been the substantial decrease of the corporate tax rate (Gertchev, 2006) which gradually dropped from 40.2% in 1997 to 15% in 2005 and to 10% in 2007, making Bulgaria's tax rate the second lowest in the EU today. As a result, Bulgaria has evolved into one of the most dynamic FDI recipient countries, with FDI inflows reaching 30% of its GDP in 2007.

Greek FDI outflows in Bulgaria peaked after 2007 reaching a maximum of 1065 million € in 2008. After the outbreak of the crisis, Greek outflows ranged at a rather low level below 100 million €. The sectors of environmental technology, constructions and retail trade make up for 73% of total Greek FDI outflows in the country. Marivent a real estate company, Copelouzos Group and Damco Energy are the major Greek investors in renewable energy in Bulgaria while Danaos, Global Finance and Gek Group are the major investors in the constructions' sector. Regarding Greek FDI in retail trade, a remarkable finding is that FDI did not stop abruptly as in other sectors but continued to accrue till 2012.

Serbia

Serbia's internationalization path and transition process were supposed to be smoother compared to the other CEE Countries. This is because since 1967, Yugoslavia passed a law, permitting minority holdings in foreign investors, with certain restrictions in repatriations of its state-owned firms. In 1989, a new law provided more freedom to investors, making the country more attractive to FDI (Artisien & Buckley, 1992). One particular feature of the country was that its economic system differed substantially from the others' socialist economies since it focused more on self-management of the means of production rather on a strictly centrally controlled socialist system. (Popov, 2004, p. 17).

Despite its comparatively favourable investment environment, Serbia fell short on FDI inflows compared to other former socialist countries such as Bulgaria, Romania and Hungary. This was a result of many major problems faced by the country in the 1990s, such as the sanctions imposed by the UN Security Council in 1992 and 2000, over-inflation in 1993 and the bombing by NATO in 1999. Foreign investments actually appeared after 2000, when the country restarted its connection with the international economic environment. In this context, Serbia revisited its relations with major financial institutions, signed bilateral investment protection agreements, and developed the necessary legislative framework that regulated privatizations and FDI. (Ljubenovic Ralevic, Djuric & Djuric, 2009, p. 2).

Greek FDI outflows in Serbia have been ranging at a relatively low level below 100 million per year, except from 2012 when there was a significant investment of 512 million € in the constructions' sector by Latsis Groups, aggregating to more than half of total Greek FDI outflows in the country during the 2003-2019 period. Major Greek retailers such as Veropoulos and Jumbo also invested in Serbia throughout this period.

5. The crisis impact and Greece's withdrawal from CEE Countries

The advent of the debt crisis halted the expansion of Greek MNEs in the CEE region and FDI outflows started falling substantially after 2008 and ranging at near zero level after 2015. Combined with the increasing role of MNEs from core EU countries that had been also expanding in the region from early 2000s, Greek MNEs lost their leading position in the CEE region.

In figure 4 below, we combine data on global FDI outflows to CEE Countries retrieved from UNCTAD's FDI database with data on Greek FDI outflows to CEE Countries retrieved from FDI Markets database. In this respect we are able to construct the ratio of Greek outflows as a percentage of world outflows in the region. As clearly seen in figure 4, Greece had initially a rather significant share, ranging from 1% to 5%. After the advent of the crisis in 2008 Greece's share fell in 0.5% in 2010 and after a small rise in 2012 ranged at a level below 0.5% in 2018.

Figure 4. Greek FDI outflows against global FDI outflows to the CEEC
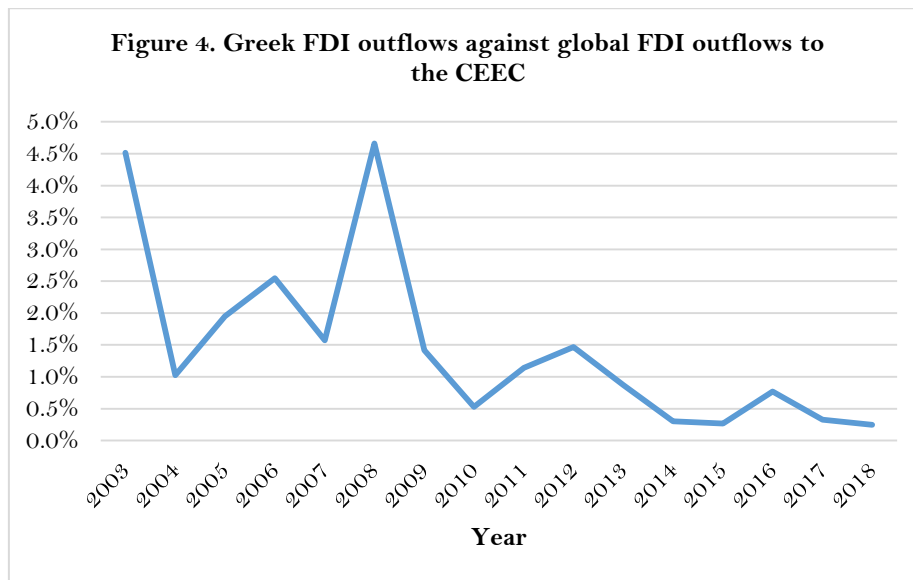
Source: UNCTAD and FDI Markets

The crisis has of course significantly affected Greece's outward FDI globally and not only in the CEE region. In this respect Greek MNEs withdrawal from CEE Countries could be, at least partially, explained by this trend. However, after the breakout of the crisis we observe a rather interesting phenomenon. The gradual fall of Greek FDI to CEE Countries as a share of its global outflows (Figure 5).

Figure 5. Greece's FDI outflows to the CEEC as a share of its global outflows
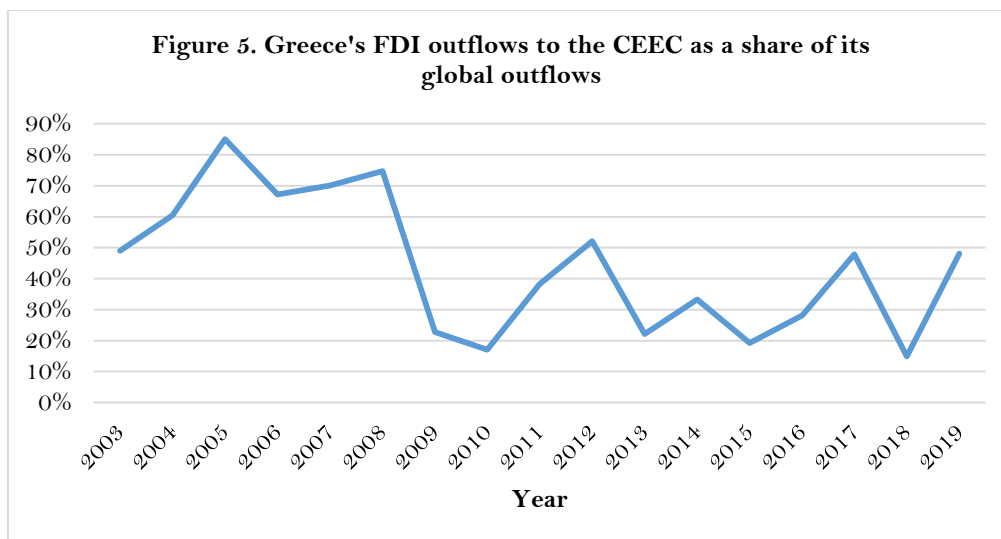
Source: FDI Markets

Historically CEE countries have been the main recipients of Greek outward FDI and as seen in the figure 6 below, outflows to CEE countries surpassed the flows to other EU countries (RoEU) and outflows to the rest of the world (RoW = Total – CEEC- RoEU). This trend peaks in 2008 when outflows in CEE countries surpassed the amount of 4 billion €, accounting for 75% of the total outward FDI in the same year. It's worth mentioning that during this period, FDI outflows to RoEU were at a significantly low-level ranging from 2% to 10% of total outflows while outflows to RoW surmounted them.

This trend changes rapidly after the advent of the debt crisis. We observe (figure 6) that Greek outward FDI to CEE countries and to extra-EU countries fell substantially after 2008 while FDI to RoEU increased and this consists of a pattern change. Greek outflows in CEE countries start falling substantially ranging at almost zero level in 2015, followed by a very slight resurgence. In this respect, during the crisis period CEE Countries lost their primary position as host countries for Greek outward FDI. All the above probably signify a change in Greek MNEs' location decisions after the crisis. An impact of the crisis that cannot been traced though this analysis, is the case that Greek MNEs weakened their position in the capital share of their subsidiaries or even shut them down completely.

Figure 6. Comparison of Greek outward FDI (flows)
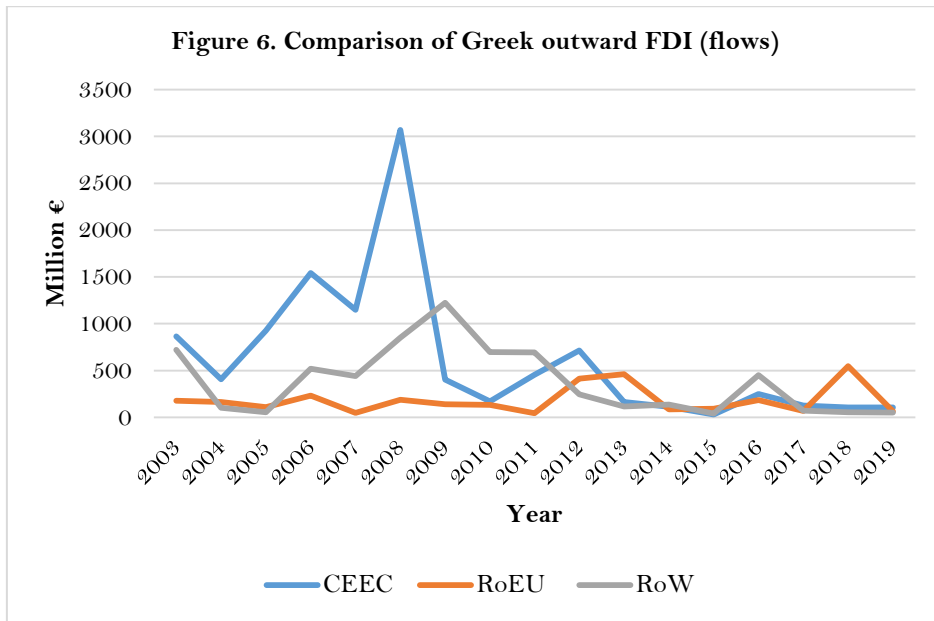
Source: FDI Markets

6. The relationship between FDI flows to CEE countries and other destinations

In this section we perform a comparison between Greek FDI in the CCE Countries and Greek FDI in other EU countries in order to identify whether there are indeed any different patterns in terms of growth, sectoral allocation, and operations of the subsidiaries of Greek MNEs. First, we calculate the correlation of FDI flows between the three country groups: CEE Countries (CEEC), EU countries excluding CEEC (RoEU) and extra EU-extra countries (RoW). It seems that while there is a positive correlation between Greek FDI in CEE and RoW countries (Pearson's r=.431, p-value=.084, N=17), there is no correlation between Greek FDI in CEE and RoEU countries (Pearson's r=-.031, p-value=.905, N=17). This finding is confirmed by the examination of the respective scatterplots (Figures 7 and 8) where the linear fit between CEE and RoW countries, regardless of the years that could be considered as outliers, while the linear fit between CEE and RoEU countries is completely flat. This finding clearly implies that the pattern of Greek FDI in CEE countries is not correlated with the respective trends in other EU countries but rather follows the pattern of FDI in non-EU countries. These results indicate that Greek FDI in CEE Countries are determined from different motives compared to the respective FDI in other EU Countries.

Figure 7. Scatterplot and linear fit with 95% confidence intervals between Greek FDI towards CEE Countries and RoW countries.
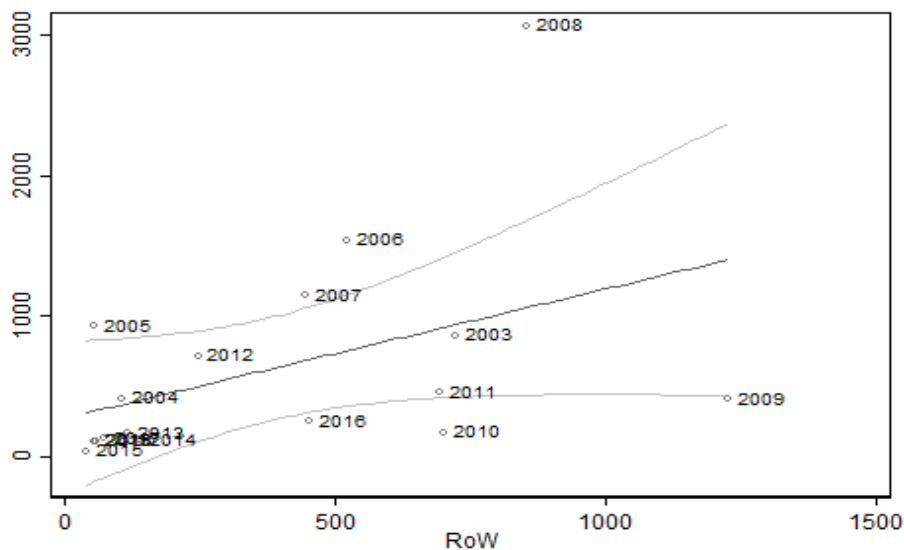
Source: FDI Markets – Author's calculations

Figure 8. Scatterplot and linear fit with 95% confidence intervals between Greek FDI towards CEE Countries and RoEU countries.
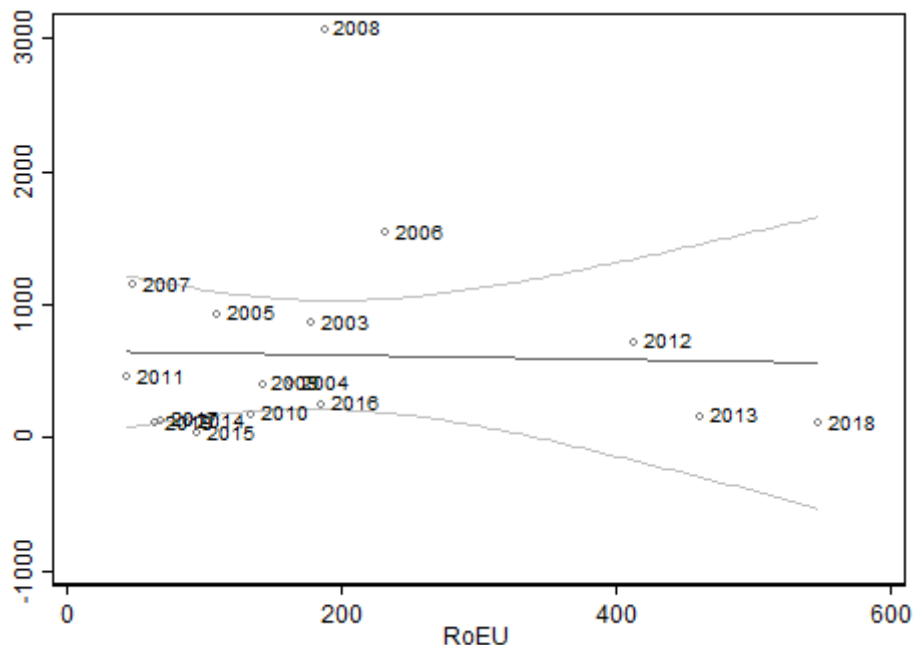
Source: FDI Markets – Author's calculations

7. Comparison of Greek FDI to CEE countries and to the rest of EU by sector and type of activity

We then compare the sectoral aggregate Greek FDI outflows in CEE Countries and in the other EU Countries for the period 2003-2019. For CEE Countries, the most important sectors in terms of aggregate invested capital outflows (figure 9) are Constructions (26.9%), ICT and Electronics (14.5%), Retail Trade (12%), Environmental Technology (11.2%), Financial Services (9.1%), Energy (8.1%) and Food, Beverages and Tobacco (8.1%). The same sectors but with a slightly different hierarchy are important in terms of investment projects (number of subsidiaries) (figure 10), i.e. Retail trade (31.5%), Financial Services (149%), Food, Beverages and Tobacco (10.7%), Constructions (6.5%), ICT and Electronics (6.2%).

It seems that constructions have been by far the most important sector of Greek FDI in CEE Countries in terms of aggregate outflows throughout this period with 2.8 billion €. Titan Cement sums up to almost ¼ of Greek outflows in the constructions' sector with 80% of its investments hosted in Albania, while Latsis Group, holding almost 20% of the sector has mainly invested in Serbia after the advent of the crisis but also in Bulgaria and Romania. Global Finance has also an important share of the sector (11.30%) with subsidiaries in Bulgaria and Romania.

What follows is FDI in ICT and Electronics, reflecting the telecommunications sector. With a total of 1.5 billion € of FDI outflows, the sector is almost exclusively (above 90%) comprised of the FDI of the Hellenic Telecommunications Organization (OTE) in Romania and some minor OTE's FDI in Bulgaria and North Macedonia. Retail trade is the third most important sector, market seeking by definition, with 1.3 billion € of aggregate invested capital. The difference, compared to the other sectors, is that in retail trade instead of having a rather small number of very big MNEs such as in the telecommunications and the financial sectors, we have instead a rather big number of internationalized firms and quite many of them have a significant weight on the sector's FDI outflows in CEE Countries. The most important investors in the sector are Fourlis Group (20.8%) operating a number of subsidiaries in the textiles and consumer products sectors in many CEE Countries, Jumbo (19.9%) a Greek consumers' products company operating in Bulgaria, Romania and Serbia and Veropoulos (16.7%) operating in the Food, Beverages and Tobacco sector investing in North Macedonia and Serbia. Hellenic Petroleum owning gas stations in Bulgaria has also a significant share of 12.4% and OTE with 8.4% operates in telecommunications' equipment and electronics and appliances stores in Bulgaria and Romania.

The Environmental Technology sector with 1.2 billion € is dominated by a small number of Greek companies with the most important being Marivent with 62.6% and Copelouzos Group with 25.6% both operating wind electric power plants in Bulgaria.

Regarding Financial services with 965 million €, it is worth mentioning that all the Greek systemically important banks had expanded their operations in CEE Countries. Piraeus Bank (34.3%) owns subsidiaries in Romania and Serbia, Alpha Bank (31.8%) in Bulgaria and ATEbank (13.4%) in Romania respectively. It should be noted that the Greek banks had a rather aggressive approach on their internalization path in CEE Countries, compared to the banks of other EU countries who had been more risk aversive (Vasiliadis, 2009, p. 95).

The Energy sector with 857 million €, by definition oligopolized, similarly to the banking and telecommunications' sectors, and is dominated by two non-energy sector firms. Titan Cement (54%) built in 2008 a fly ash separation and processing unit in Janikowo, district of Poland, using as raw material the fly ash, which is a waste of the power plants, of the major polish chemical group CIECH. In the same year Coca-Cola Hellenic Bottling (CCHBC) (36%) built a thermoelectric power plant in Romania. Hellenic Petroleum (6.3%) has also made considerable amounts of FDI in Montenegro, North Macedonia and Serbia.

Finally, in the Food Beverages and Tobacco sector with 568 million €, the major investors are CCHBC (46.8%) which has established production units in Bulgaria, Hungary, Lithuania and Romania while Tyras, a dairy producer firm with 37.4%, established production units in Romania and Bulgaria.

Regarding the impact of the crisis on these major sectors, it seems that those more affected had been Financial Services (which actually collapsed after 2009), Energy, Telecommunications and Constructions. On the contrary, the sectors of Food, Beverages and Tobacco, Retail Trade and Environmental Technology were significantly less affected.

Figure 9. CEEC – capital outflows

Sector	Value
Construction	2,852.43
ICT & Electronics	1,534.99
Retail Trade	1,273.24
Environmental...	1,185.00
Financial Services	965.30
Energy	857.20
Food, Beverages &...	567.79
Tourism	330.85
Agribusiness	321.17
Life sciences	198.18
Industrial	167.10
Physical Sciences	164.55
Consumer Goods	51.27
Professional Services	41.80
Transportation,...	31.80
Wood, Apparel &...	31.50
Creative Industries	21.30
Transport Equipment	1.40

Sum of invested capital in Mil. €

Figure 10. CEEC – number of investment projects

Sector	Value
Retail Trade	112
Financial Services	53
Construction	38
ICT & Electronics	23
Agribusiness	22
Food, Beverages &...	21
Life sciences	14
Physical Sciences	13
Industrial	12
Energy	9
Tourism	8
Wood, Apparel &...	7
Environmental...	6
Creative Industries	5
Consumer Goods	5
Professional Services	4
Transportation,...	2
Transport Equipment	1

Number of investment projects

Source: FDI Markets

In contrast to the pattern described above, the sectoral hierarchy of Greek outward FDI in the rest of EU countries seems to follow a different pattern (Figures 11 &12). In particular, retail trade is the most important sector in terms of invested capital (30.3%) and in terms of investment projects (46.1%). The same Greek MNEs that have a dominant role in Greek FDI in CEE countries (Fourlis, Folli Follie, Agora Trading and Jumbo) are also the major investors in the rest of EU countries. The UK, Cyprus, France and Spain concentrate approximately 70% of Greek FDI in the sector in terms of invested capital and 72% in terms of investment projects. What actually ranks retail trade first is the significantly lower participation of the construction and telecommunication sectors.

Energy is the second most important sector (26.6%) but with only few investment projects. In terms of invested capital, Greek FDI in the sector are completely dominated by investments of the Greek Aegean Marine Petroleum Network in Spain.

The case for FDI in the tourism sector is exactly the same, with only a few investment projects and two big investments in Spain sourcing from two Greek MNEs operating in the sector.

Finally, in the food and beverages sector, which ranks 4th in terms of invested capital, CCHBC has the leading position. CCHBC acquired significant shares of several Coca Cola's subsidiaries, mainly in the UK, but also in Switzerland and Italy. This strategy followed by the Greek division of Coca Cola was already noticed by the Bank of Greece in 2001, when the company during the previous year had acquired a mammoth share of the UK's Coca Cola (Bank of Greece, 2001, p.253). It was implied that these investments were part of an intra-Group triangular transactions strategy.

Figure 11. Rest of EU – capital outflows

Sector	Sum of invested capital in Mil. €
Retail Trade	966.55
Energy	849.90
Tourism	536.22
Food, Beverages &…	218.08
Agribusiness	131.80
ICT & Electronics	112.96
Creative Industries	57.60
Wood, Apparel &…	49.86
Construction	47.30
Consumer Goods	44.59
Professional Services	40.40
Financial Services	35.50
Life sciences	34.00
Industrial	29.49
Transportation,…	23.50
Transportation &…	12.40
Transport Equipment	0.10

Figure 12. Rest of EU number of investment projects

Sector	Number of investment projects
Retail Trade	65
ICT & Electronics	10
Tourism	9
Food, Beverages &…	9
Transportation,…	7
Industrial	7
Energy	6
Professional Services	5
Wood, Apparel &…	4
Financial Services	4
Agribusiness	4
Consumer Goods	4
Life sciences	2
Creative Industries	2
Transportation &…	1
Transport Equipment	1
Construction	1

Source: FDI Markets

The sectoral analysis is useful but can also lead to biased deductions. This is because the sectoral allocation of a parent enterprise or its subsidiaries might not absolutely reflect its exact activities. Furthermore, many of the major Greek MNEs are found to invest in both areas.

According to Porter's value chain concept (Porter, 1985), the enterprise as an organization is a collection of different but interdependent activities that take place within and create value. Therefore we compare the exact business activities of the Greek MNEs' subsidiaries in the two regions (Figures 13 and 14). This we are able identify, what is the actual role of the subsidiary within the MNE's values chain and guess the motives for investing in each respective region.

It can be clearly seen that FDI in CEE Countries focus more on activities that are related to manufacturing while the respective FDI in the rest of EU countries are much more services oriented.

Figure 13. CEEC – Industrial activity

Activity	Sum of invested capital in Mil. €
Construction	2,482.36
Manufacturing	2,470.25
ICT & Internet…	1,437.58
Electricity	1,352.40
Retail	1,221.94
Business Services	980.60
Sales, Marketing &…	248.38
Extraction	137.10
Logistics,…	129.00
Research &…	51.80
Recycling	40.00
Design,…	18.00
Customer Contact…	12.61
Shared Services Centre	8.30
Maintenance &…	6.55

Figure 14. RoEU – Industrial activity

Activity	Number of investment projects
Retail	963.95
Logistics, Distribution & Transportation	890.94
Manufacturing	546.11
Construction	527.32
Sales, Marketing & Support	129.29
Business Services	89.48
Headquarters	29.36
Maintenance & Servicing	8.80
Design, Development & Testing	2.60
Research & Development	2.40

Source: FDI Markets

8. Conclusions

The purpose of this paper is from the one side to describe the internationalization process of Greek MNEs in Central and Eastern European Countries from a historical perspective and from the other side to investigate if Greek FDI in Central and Eastern European Countries follow the same or different trends and patterns with the respective FDI in other core EU countries.

The path for Greece, as an FDI investor, originates back in the early 1990s after the collapse of the centrally planned economies of CEE and the consequent opening of their borders to foreign capital. After three phases of expansion, Greek MNEs in CEE Countries had been reaching maturity of their internationalization path, at least at regional level. They are basically big MNEs that are motivated by seeking of new markets, strategic positioning and overall improving of their effectiveness. They have little resemblance to the smaller Greek firms that made the early Greek FDI in the region in the 1990s. The latter still exist and invest in the Balkans, but their importance, at least in terms of invested capital, is limited compared to bigger MNEs of the early 2000s.

FDI in CEE Countries were expected to improve the efficiency of Greek MNEs and have a positive impact on the Greek Economy. This given, Greek governments had been pursuing policies for the growth and stabilization of neighboring countries and specifically promoted their EU membership. All these policies began fading with the accession of many CEE countries in the EU and especially after the advent of the debt crisis which halted the expansion of Greek MNEs in the CEE region and FDI outflows started falling substantially after 2008. Combined with the increasing role of MNEs from core EU countries, Greek MNEs lost their leading position in CEE Countries. At the same time Greek MNEs that survived the crisis started focusing more on EU core countries.

The empirical part of this study, using a dataset of firm level data through an extended time series, indicates that the pattern of Greek FDI in Central and Eastern European Countries does not follow the pattern of Greek FDI in core EU countries. Specifically, we found different patterns in terms of aggregate volumes and in terms of sectoral allocation. However, sectoral allocation does not provide a clear view of these different patterns since the sector of a firm does not necessarily reflect its exact operations and furthermore many of the major Greek MNEs are found to invest in both areas. Therefore, through analysing data that reveal the exact operations of Greek firms abroad, we are able to better identify these distinct patterns of Greek MNEs in the two areas. We conclude that Greek MNEs in CEE Countries are mostly focusing on activities that are related to manufacturing while the respective FDI in the rest of EU countries are much more services oriented.

Considering factor endowments and market potential in the two regions along with the sectoral allocation and organizational structure of the investing MNEs, it seems that FDI in the EU region are more driven by market seeking motives and especially for the fast-moving consumer goods (FMCGs). There are also many dynamic Greek MNEs performing manufacturing activities in core EU countries and producing industrial and consumer goods for the local markets. These are characterized by market seeking along with strategic market seeking motives. The latter are the most mature and promising of Greek MNEs since their structure resembles to that of bigger MNEs from core EU countries.

From the other side Greek FDI in CEE Countries are mostly focused on production of consumer and industrial products and the development of infrastructure for CEE Countries. It is hard to say if the export-platform FDI is the case here since the purpose of many of these manufacturing activities is to produce products and services that are exported back to the Greek market.

A question arising from this finding is which of these two trends is more beneficial to the growth, competitiveness and internalization of Greek MNEs and by extension to the increase of their added value in the economy of Greece. According to previous relevant studies there are two major trends in Greece's FDI. One trend concerns internationalization, driven by taxation avoidance, lower production costs and possibly search of a more friendly business and institutional environment. To some extent this trend most likely consists of disinvestment. The other trend is that of internationalization that apart from seeking a more business friendly environment is mainly driven by strategic growth in new markets and the search for synergies, know-how and strategic partnerships.

We would argue that Greek FDI in CEE Countries better match the first category (but with several exemptions) while Greek FDI in the rest EU Countries better match the latter category. Therefore, a key policy recommendation that can be drawn from this study is that there is an urgent need for reforming Greece's business environment so as to revert escapism FDI outflows and thus restrict the loss of added value in the Greek Economy. At the same time, more dynamic and efficient Greek MNEs could further strengthen their position and produce additional positive effects for the Greek economy. A managerial implication that could be extracted in this framework is that innovation-driven strategic partnerships with local firms abroad can both strengthen the firms' capabilities and further boost their internationalization dynamism (Livieratos et al., 2020).

This study has some limitations. The firm level data from the FDI Markets database only refer to FDI at the time of their announcement. In this respect we cannot monitor the progress of these investments through time. A research using panel data would give us a better insight of the trends of Greek outward FDI before and after the crisis. Furthermore, this study is a mixture of a descriptive analysis and a review of the relevant literature. A future research on panel data could probably investigate the impact of specific FDI determinants such as the institutional framework on Greek outward FDI on Central and Eastern Europe and core European countries respectively.

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An Analysis of the Monetary Transmission Mechanism of M&A, Greenfield FDI, Domestic Investment, and GDP Per Capita Growth: The Structural Vector Correction Model in Indonesia

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ARTICLE INFO	ABSTRACT
	Purpose: The study aims to evaluate the different implications of mergers and acquisitions (M&A) and Greenfield foreign direct investment in the transmission mechanism effects on the growth of gross domestic product per capita (GDP per capita) in Indonesia. The origin of the study stems from past academic debates that contested whether Greenfield FDI or M&A bear more effect on the economic growth in emerging markets. **Design/methodology/approach:** The study deployed a structural vector error correction (S-VECM) time series model to evaluate the short-term and long-term effects of M&A and Greenfield investment effects on the growth of GDP per capita in Indonesia. The research gathered secondary time series data from the first quarter of 2003 until the fourth quarter of 2019. The stages of the economic regression consisted of a stationary test, a co-integration test, an impulse response assessment, and a variance decomposition analysis. **Finding:** The study discovered the significance of the short-term effect of M & M&A to stimulate greenfield investment, which then ramps up more domestic investment and GDP growth. However, greenfield investment galvanised a stronger intermediary effect to augment GDP growth per capita over the long-term. This study remarks greenfield investment as the essential mediator to enhance domestic investment and GDP growth in long-term horizon **Research limitations/implications:** The study stems from past academic discussions that widely tested the exogenous effects of M&A and Greenfield investment on economic growth by pooling heterogeneous developing and developed countries. This study specifically removed the heterogeneous effects and added an endogenous analysis by devising S-VECM in Indonesia. However, this specific case study cannot reflect the association in other countries in Southeast Asia. More replicated studies can be undertaken on other Southeast Asian countries. **Originality/value:** Firstly, the academic contribution of this research mediates the past academic debates about the relative importance between M&A and Greenfield to drive economic growth. This study demonstrates the complementary functions of M&A and Greenfield in different time horizons, respectively in long-term and short-term time horizons. The study synthesizes more negotiating economic considerations of both M&A and Greenfield investment to affect economic development in different economic horizons. Secondly, this study enriches the econometric analysis by echoing the greenfield investment as the mediator function to stimulate domestic investment and GDP growth per-capita from the shock of M&A. from the transmission mechanism is on order initiated shock from M&A, Greenfield investment, domestic investment and then to the growth of GDP per capita. This mechanism transmission was not available in the past academic debates with the panel econometric studies.

Keywords:
M&A;
Greenfield;
FDI;
GDP per Capita Growth;
Indonesia

1. Introduction

Indonesia has been attractive emerging economy for foreign direct investment destinations. In 2019, Indonesia was in the third position of the total M&A and Greenfield investment host countries in Southeast Asia (see Graph 1). Unfortunately, with the COVID-19 pandemic, there has been severe economic shock to attract investments in Southeast Asia. With the economic disruption and restricted mobility from the COVID-19 pandemic, OECD (2020) predicts falling foreign direct investments by 30% throughout the world in 2020. The remaining question is what kinds of investment options should be prioritised to sustain economic development in Southeast Asia.

Graph 1. FDI & M&A in Southeast Asia (in Millions of US Dollars) in 2019
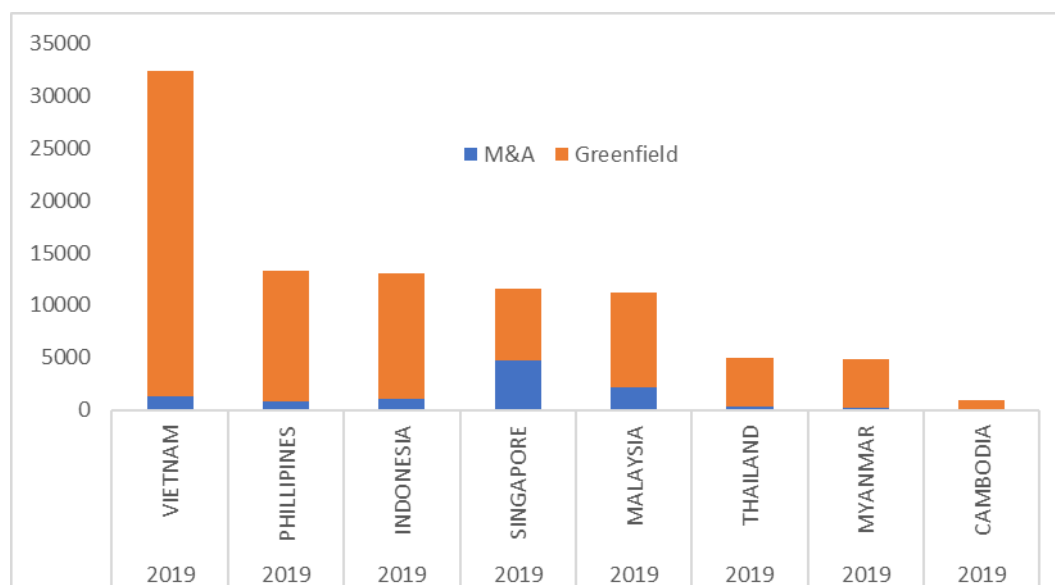
Source: World Investment Report 2020
Note: Brunei Darussalam & Laos were not reported due to incomplete information

This study has acknowledged wide array investments, including greenfield investment, mergers and acquisition and brownfield investment. However, with the constraint to demote more detailed investment data, especially brownfield investment in southeast Asia, the locus of this study is on M&A and greenfield investments. Forgoing research have conferred comparison of M&A and Greenfield investment to uplift economic growth in Southeast Asia. In the past, Aguiar and Gopinath (2002) argued that mergers and acquisitions had solved the illiquid problems of domestic companies during the Asian Crisis in 1997/1998. Given the complexities and reluctance of overseas investors to commit to the total Greenfield investment, M&A was an considered as viable choice to increase economic growth (Calderón et al., 2004). With panel data, Calderón et al. (2004) confirmed the significant influence of M&A to drive economic growth throughout the 100 countries. Calderon et al (2004) observed that pattern from 1987 to 2001, where they asserted in 1987 was a boom of mergers and acquisition in major developing countries.

Later on, Harms and Méon (2018) refuted the idea and found an insignificant influence of M&A on economic growth due to the limited effect of transfer rent to the previous owner. In their observation, while M & M&A has provided substantiated capital. However, they measured from 1990 that the subsequent effects of greenfield investment are pertinent to induce more growth, especially in the Southeast region. Harms and Méon (2018) advocated Greenfield investment since it is associated with economic development contributions from multinational companies to purchase physical capital and trained workers from scratch. However, they overlooked the effect of M&A to sustain growth permanently. Their premier argument was that the rent from M & M&A has adverse effects on surging consumptive expenditure and decelerating long-term productivity. The conflicting perspective among economists related to M&A sparked more debates in international economics. From the author's perspective, those debates appeared in the past panel data study to aggregate developing economies instead of different economic contexts among the country. This study acknowledges data heterogeneity of developing nations and time frames in panel data regression. Hence, this study examines the transmission of M&A, greenfield investment, domestic investment, and GDP growth per capita in the short term and long term in Indonesia.

This paper aims to investigate the effects of M&A and Greenfield investment on the growth of GDP per capita in the short-term and long term. This study benchmarked the past study on availing structural VAR by Nguyen et al. (2020). Nguyen et al. (2020) focused more on one country to remove the heterogeneity characteristics of panel data. Besides that, structural VAR helps to seek that in a series of transmissions. Nguyen et al. (2020) preferred Greenfield investment to M&A, but they did not separate their analysis in short-term and long-term horizons in Vietnam. To enrich more academic discussions, this study investigates the transmission mechanisms of M&A, Greenfield

investment, and domestic investment on the growth of GDP per capita in the short term and long term. From a time-series perspective, the short term ranges about one year, but the longer term periods are more than three years or more. These short-term and long-term horizons follow previous studies (Calderón et al., 2004; Harms & Méon, 2018; Nguyen et al., 2020). Hence, The academic contribution of this study is to elaborate on the complementary function of M&A to drive more GDP per capita growth in the short-term and long term. Greenfield investment has more affected the domestic investment and growth GDP per capita in the long term.

Nevertheless, M&A is needed in the short term to attract greenfield investment inflow to Indonesia. Secondly, the study frames the observed variables in a structural transmission mechanism rather than just observing the simplistic exogenous effects of M & M&A, Greenfield investment, and domestic investment on GDP growth per capita. The theoretical implication is the necessity to investigate the influence of M&A and greenfield investment on domestic investment and GDP growth per capita from a transmission mechanism perspective. The transmission mechanism exhibits those variables' interdependence rather than the exogenous effects of M&A and greenfield investment on GDP growth per capita.

The structure of this paper comprises the introduction, literature review, methodology, results, and Conclusion. Firstly, as explained beforehand, the introduction briefly unveils the study's aim and prompts an argument to select the Indonesian economy as a locus. Secondly, the literature review exposes the various academic perspectives over M&A and Greenfield investment to boost economic growth. Thirdly, the research methodology details the rationale and steps of utilizing S-VECM to expose Indonesian time series data. Furthermore, the result shows the empirical findings of the observed variables. Besides, the conclusion summaries the findings, admires the limitations, and propose a policy recommendation and future research.

2. Review of Literature

2.1. The effect of FDI in economic growth per capita

In international economics and business literature, investment is composed of portfolio and direct investments. From the macroeconomic perspective, portfolio investment was a short-term investment and bore the uncertainty in the easing investment outflow during the Asian crisis (Krugman et al., 2015). In contrast, foreign direct investment is the permanent investment, where the foreign investor spent their money to embrace their corporate business (Krugman et al., 2015). Due to their investment characteristics to endure permanent capital investments, many prominent economists urge this investment as the driver for economic growth in emerging markets. In fact, for the host country, foreign direct investments may enhance more domestic investments due to their business spillover to extent more domestic entrepreneurship (Harms & Méon, 2018).

From a microeconomic perspective, FDI is seen by multinational companies as an investment arrangement to enhance their business competitiveness across the global market (Radulescu et al., 2020). Firms from developed countries have branched more of their production and commercial activities overseas, as they view more expensive and saturated market shares in their countries because of the expectation that they will increase their market shares and new business margins with production costs that are cheaper than producing in their own countries (Cavusgil et al., 2020). Many of them have globalized their businesses in emerging markets in Southeast Asia, as the region offers vast market shares and lower production costs (Cavusgil et al., 2020). This configured strategy is undertaken to enhance their competitiveness in the global market, which is meant for foreign direct investments (Baumgarten et al., 2013). Hence, regional FDI is a significant driver to create industrial knowledge spillover in Southeast Asia (Raeskyesa & Suryandaru, 2020).

With the fast-growing global value chain transformation in emerging markets (Hasudungan & Raeskyesa, 2021), there has been a mixed consensus on the effects of FDI on growth. Bair (2005) mulled that the production of commercial commodities has decentralized in different countries, not in a single country anymore. Some multinational firms may use M&A if the intention is to provide more liquid capital to their domestic partners by acquiring those firms, but other firms use Greenfield investment if the intention is to build manufacturing from scratch in that global value chain reality. Furthermore, Harms and Méon (2018) acknowledged past studies to overlook the heterogeneity of FDI, comprising Greenfield investment and mergers and acquisitions (M&A). Financially, M&A is associated with rent given to previous owners. However, Greenfield investment does more than that as it injects new physical and human capital investments to the host countries. With this buoyancy, this economic aspiration induces more academic discussions to assess the different effects of M&A and Greenfield investment on economic growth.

2.2. The relationship of M&A, domestic investments, and economic growth per capita

M&A is an action of foreign companies to purchase the ownership of established domestic firms (Calderón et al., 2004; Cavusgil et al., 2020; Harms & Méon, 2018). With that particular investment, these multinational companies may have a greater authority to control domestic companies to support their business operations in the host country (Cavusgil et al., 2020). In international economics, the impact of cross-border M&A on economic growth has been sparking controversies among different economic scholars. The advocates argue for more significant impact mergers and acquisitions to enhance economic growth, but the opposing side rejects that hypothesis.

From the academic supporters, M&A is associated with several economic benefits in the host countries. Firstly, M&A drives more business efficiency of previous domestic-owned companies (Aguiar & Gopinath, 2002; Blomström & Sjöholm, 1999; Calderón et al., 2004). It was found that foreign acquirers have superior technology and skills

(Blomström & Sjöholm, 1999). These foreign companies are believed to transfer their superior technology and skills to their subsidiaries in the host countries (Ibid.). Hence, business operations can improve due to the support from these multinational interventions. Secondly, the advocates of M&A believe there will be more liquid financial resources with that intervention. Calderón et al. (2004) discovered that M&A boosts more inflow on the domestic investments. Later, Aguiar and Gopinath (2002) revealed that cross-borders solved some host countries' firms' liquidity problems during the global crisis of 2008. Hence, they concluded that mergers and acquisitions are fire-sale acquisitions to enhance host countries' economic resilience (Aguiar & Gopinath, 2002). Balsvik and Haller (2010) also found a positive relationship between cross-border M&A and domestic wages and plan productivity. Ashraf et al. (2016) confirmed those claims by showing a positive impact of the mergers and acquisitions on total factor productivity and economic growth of the host country. The abovementioned reasons embark from the positive influence of M&A on economic growth.

Conversely, the critics of M&A demonstrated insignificant M&A towards the economic growth of the host countries. Firstly, M&A will be insignificant if the domestic stakeholder's host country cannot utilise it for economic growth. For instance, Wang and Wong (2009) observed the hampering impacts of M&A if the country does not own sufficient human resource capabilities to absorb multinational spill-overs. Besides that, Eren and Zhuang (2015) elucidate no significant impact of M&A on economic growth if the country does not have a credible financial system. Secondly, mergers and acquisitions can transfer the rent to previous owners with weak economic spillover to domestic investments and economic growth. For instance, Gopalan et al. (2018) criticized mergers and acquisitions as having a short-term interest in buying domestic firms to transform ownership but limited to drive more technological and institutional development in the host countries. Using panel data of 24 Asian economies, Gopalan et al. (2018) found an insignificant impact of M&A on economic growth. In addition, Harms and Méon (2018) argued that M&A is a weak foreign direct investment as it only shows rent accrual for previously owned firms without additional investment impacts. Then, their panel data found a non-significant impact of mergers and acquisitions on host countries' GDP per capita. Besides that, Nguyen et al. (2020) found that M&A is ineffective as it has a detrimental effect on domestic investments and economic growth in Vietnam.

2.3. The relationship of Greenfield investment, domestic investment, and growth
The past assessment between Greenfield investment and a country's economic growth itself is mixed. Greenfield investment in an economic perspective is a multinational firm's investment to build new production from the beginning (Harms & Méon, 2018). Academic debates have weighed the effects of Greenfield investment on economic growth.

In a previous supporting assessment, Greenfield investment is associated with a more sustainable positive shock to the domestic economy. For instance, Marin and Bell (2006) analysed a positive Greenfield investment with economic growth through a time series multiple regression. In their proposition, the more substantial an investment is in the host country, the more activities will spill knowledge and economic accumulation benefits for the host country. Secondly, Greenfield investment will encourage innovation that in turn induces positive economic growth. For instance, while the effects of FDI on economic growth are heterogeneous in the study of Marin and Sasidharan (2010), there has been a positive correlation of whole capital investment expenditures on FDI rather than a partial investment that is associated with acquiring an existing firm. Besides that, Liu and Zou (2008) tested the association of the impact of Greenfield investment on domestic innovations. They found a significant impact on domestic company innovations from Greenfield investment, whether from within one industrial sector or inter-industrial sectors. From the Keynesian point of view, this domestic investment is fixed gross capital accumulation that can induce more gross domestic product (Kriesler & Halevi, 2016). Wang and Wong (2009) also demonstrated the significance of the positive relationship between Greenfield investment and economic growth in developed and developing countries. Furthermore, Greenfield investment is associated with new capital investment associated with higher capital to investment rent. For instance, Harms and Méon (2018) found that with new capital investment, there is a significant relationship of Greenfield FDI on the growth of GDP per capita in their panel data estimation in developing countries.

In the opposing view, several studies show the uncertain effects between Greenfield investment and economic growth. Firstly, Calderón et al. (2004) refuted the effect of Greenfield investment on a country's economic development. Using annual data of 1987-2001 of developing and industrial countries, their panel data shows insignificant effects of Greenfield investment on economic development. Hence, they concluded that Greenfield investment has not always fostered economic growth (Calderón et al., 2004). They also argued that Greenfield investment can hamper domestic investment and is unsuitable for countries with low human capital absorption. For instance, Eren and Zhuang (2015) inferred that Greenfield investment has not significantly influenced a country's human resource absorptive capacity. Another insignificant effect of Greenfield investment was also demonstrated in a study by Jude (2019). In her proposition, expanding Greenfield investment exacerbates crowding out of the capital accumulation effect that hampers domestic investment. This argument echoed more negative effects of FDI on domestic investment (Jude, 2019).

The debates focus more on the direct association of M&A and Greenfield investment. While few literature studies suggested an association with domestic investment (e.g. Liu & Zou, 2008; Kriesler & Halevi, 2016), the discussion partially separates the direct effects of those variables to examine the economic growth and GDP per capita. Nonetheless, the limitations of past studies do not show the economic pathways in how M&A can affect economic growth. Nguyen et al. (2020) observed the shock order of M&A to Greenfield and then to domestic investment, and then the effect of GDP per capita growth. However, since they did not distinguish the long-term and short-term

impacts, they saw incompatibility between M&A and Greenfield investment. This research uses the S-VECM to examine the compatibility between M&A and Greenfield investment in short-term and long-term periods.

2.4. Economic Transmission M&A, Greenfield Investment, Domestic Investment, and GDP per capita growth

Some studies provide the significant effect of foreign direct investment on inducing domestic investment or GDP growth per capita in Indonesia (Jude, 2019; Verico, 2008; Verico & Pangestu, 2020). However, there has been deficit research to map the economic transmission of M&A, Greenfield Investment, domestic investment, and GDP growth per capita. Balsvik & Haller, (2010) indicates that M&A can drive more greenfield investment if the transformation resulted in more economic capacity to induce firm productivity. The shortcoming is that Balsvik & Haller (2010) does not exhibit the implication to domestic investment. Kriesler & Halevi (2016) assert that fixed gross capital accumulation can induce more gross domestic product. It means that greenfield investment is required more to sustain long-term economic growth(Kriesler & Halevi, 2016). However, their study does not explore the specific connection between M&A and Greenfield. Nguyen et al. (2020) assert in Vietnam an interdependence of M&A, greenfield investment, domestic investment, and GDP per capita growth in Vietnam. The contribution of this study is to scrutinise the interdependent of M&A, greenfield investment, domestic investment, and GDP growth per capita in Indonesia.

3. Data, Methodology and Empirical Results

3.1. Data

The data is originated from some credible secondary sources. The Greenfield investment and M&A data are withdrawn from the series of UNCTAD's World Investment Reports (UNCTAD, n.d.). This study represents a domestic investment by the gross fixed capital formation. GDP per capita and domestic investment were retrieved from the World Bank database (World Bank, n.d.). The researchers were constrained by the limited data of Greenfield and M&A in a quarter-time series. With those data constraints, this study strove to transform the annual data of M&A, Greenfield investment, domestic investment, and GDP per capita growth into quarterly reports using quadratic match average methods, as it was conducted from past research (Grossman et al., 2014; Marcellino & Musso, 2011; Nguyen et al., 2020). The differentiation and logarithmic data transformation were devised to avoid heteroscedasticity and multicollinearity problems (Xu et al., 2016).

3.2. Methodology

This research measures the transmission mechanism of M&A, Greenfield investment, domestic investment, and capita growth with the structural vector error correction model (S-VECM). VECM observes long-term and short-term relationships from availing co-integration in that mechanism transmission (Pesaran et al., 2000). In VECM, the model was evolved based on individual experiments and experiences in observing economic phenomena (Hasudungan, 2006). In S-VECM, the mechanism and order of the variables was developed according to the theories of previous literature (Gujarati & Porter, 2008). When co-integration takes place, the structural VAR (vector autoregression) is transformed into a structural analysis of the vector error correction model (Letson & Carter, 2009). Specifically, data is transformed in the first difference in S-VECM (Letson & Carter, 2009), as follows:

$$\Gamma_{\Delta \mathbf{y}_t} = \alpha \left((1-\beta)\mathbf{y}_{t-1} + \mu + \delta\, t_{t-1} \right) + \sum \boldsymbol{B}_i \Delta \mathbf{y}_{t-i} + \mathbf{G}\mathbf{x}_t + \boldsymbol{\varepsilon}_t$$

This equation is in a matrix format. In the equation, Γ stands for the matrix of the contemporaneous effects of the vector variables of y, given the influence of the vector of variables of x. The difference transformation of the observed variable is denoted with Δ. The co-integrating effect is shown as $\boldsymbol{B}.$ In that equation, β is the long-run co-integrating relationship, while Δ donates for the first difference of vector variables.

In the structural vector error correction model, the initiated shock is function of function of the past inter-temporal shocks in n-lag time (Hashem, 2016). In the past study, M&A has been identified as initiated shock in the transmission mechanism of greenfield investment, domestic investment and GDP (Nguyen et al., 2020). Nonetheless, in the dynamic time series framework, this initiated shock functions of past vector variables and cointegrating variables to exemplify the vector error correction model (Fukuda & Dahalan, 2012). Modified into the equation will be that the current merger is subject to influence past merger, cointegrating factor, $_{1t}$, and error, e_{it}, as follow:

$$\Delta MA_t = \sum_{j=1}^{p-1} b_{11j} \Delta MA_{t-j} + \quad _{1t} + e_{1t}$$

Overtime, the existence of merger is pathway foundation for the firm to deliver greenfield investment. Hence, with that stable merger in place, there are more convincing investment climate to deliver greenfield investment (Balsvik & Haller, 2010). The influence of the past mergers and past greenfield investment will influence the condition of the current greenfield investment (Nguyen et al., 2020). Reflected into the equation and considering the cointegration, and the error this would be as follow:

$$\Delta Greenfield_t = \sum_{j=1}^{p-1} b_{21j}\Delta MA_{t-j} + \sum_{j=1}^{p-1} b_{22j}\Delta Greenfield_{t-j} + \quad_{2t} + e_{2t}$$

This greenfield investment will give the shock as hypothesised in the intertemporal time series perspective to domestic investment (Grossman et al., 2014; Nguyen et al., 2020). With that mechanism in place, the current domestic investment is endogenous function of the past greenfield investment, merger and acquisition, domestic investment, and error e_{it}. That relationship will be symbolized as follow:

$$\Delta Domestic_t = \sum_{j=1}^{p-1} b_{31j}\Delta MA_{t-j} + \sum_{j=1}^{p-1} b_{32j}\Delta Greenfield_{t-j} + \sum_{j=1}^{p-1} b_{33j}\Delta Domestic_{t-j} + \quad_{3t} + e_{3t}$$

As the investment target is the GDP, then greenfield investment will influence domestic investment in the long run. Later on, domestic investment will lead to higher GDP and growth (Kriesler & Halevi, 2016; Nguyen et al., 2020). Therefore, the equation will be as follow:

$$\Delta GDP_t = \sum_{j=1}^{p-1} b_{41j}\Delta MA_{t-j} + \sum_{j=1}^{p-1} b_{42j}\Delta Greenfield_{t-j} +$$
$$\sum_{j=1}^{p-1} b_{43j}\Delta Domestic_{t-j} + \sum_{j=1}^{p-1} b_{44j}\Delta GDP_{t-j} + \quad_{3t} + e_{4t}$$

Elaborating from that equation, vector error correction matrix can be structured with the first difference, hypothetical parameters, cointegrating factor, and error (IHS Markit, 2017). Then, the matrix function will be as follow:

$$\begin{bmatrix} \Delta MA_t \\ \Delta Greenfield_t \\ \Delta Domestic_t \\ \Delta GDP_t \end{bmatrix} = \begin{bmatrix} b_{11j} & 0 & 0 & 0 \\ b_{21j} & b_{22j} & 0 & 0 \\ b_{31j} & b_{32j} & b_{33j} & 0 \\ b_{41j} & b_{42j} & b_{43j} & b_{44j} \end{bmatrix} \begin{bmatrix} \sum_{j=1}^{p-1}\Delta MA_{t-j} \\ \sum_{j=1}^{p-1}\Delta Greenfield_{t-j} \\ \sum_{j=1}^{p-1}\Delta Domestic_{t-j} \\ \sum_{j=1}^{p-1}\Delta GDP_{t-j} \end{bmatrix} + \begin{bmatrix} _{1t} \\ _{2t} \\ _{3t} \\ _{4t} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix}$$

The data is originated from some credible secondary sources. The Greenfield investment and M&A data are withdrawn from the series of UNCTAD's World Investment Reports (UNCTAD, n.d.). This study represents a domestic investment by the gross fixed capital formation. GDP per capita and domestic investment were retrieved from the World Bank database (World Bank, n.d.). The researchers were constrained by the limited data of Greenfield and M&A in a quarter-time series. With those data constraints, this study strove to transform the annual data of M&A, Greenfield investment, domestic investment, and GDP per capita growth into quarterly reports using quadratic match average methods, as it was conducted from past research (Grossman et al., 2014; Marcellino & Musso, 2011; Nguyen et al., 2020). The differentiation and logarithmic data transformation were devised to avoid heteroscedasticity and multicollinearity problems (Xu et al., 2016).

3.3. Empirical Results
Several examinations were conducted to assess the impacts of cross-border M&A and Greenfield investment towards domestic investment and GDP growth per capita. They included stationary, co-integration, lag length criteria, vector error correction, impulse response, and variance decomposition assessments.

3.3.1. Stationary Test
One of the issues when estimating short-term and long-term impacts in a time series is non-stationary data. This non-stationary data will result to spurious econometric result. Aside of that (Mills, 2019) the model is not robust when non-stationary variables are estimated with a stationary econometric model. To overcome that, a stationary test was first examined in those observed variables by using an Augmented Dickey Fuller (ADF) test. There are different levels to test from the original data, first difference, and then second difference (Enders, 2014). Stationarity is important to assure that the probability of statistics does not change over time in the time series data processing (Enders, 2014; Gujarati & Porter, 2008).

The stationary data indicates no random walk or a non-consistent trend (Mills, 2019). If the variables are non-stationary, the probability of the ADF test will be higher than 0.05. From the following table, the variables did not have stationary properties in the original (level) data format, except for the domestic investment variable, as in Table 1. The solution was to transform it into the first difference. The stationary tests were reconstructed in the first difference data. The assessment shows the stationarity in the first difference degree, as seen in Table 2.

Table 1: Stationary Test in the Level (Original Data)

Variables	Prob-ADF Test (Ho: Data has a unit root)
Merger	0.1633
Greenfield	0.3603
Domestic Investment	0.0083

Growth of GDP per Capita	0.3534

Source: Constructed from the data

Table 2: Stationary Test in the First Difference

Variables	Prob-ADF Test
Merger	0.0070
Greenfield	0.0180
Domestic Investment	0.0060
Growth of GDP per Capita	0.0034

Source: Constructed from the data

3.3.2. Co-integration Test

In econometrics, when a non-stationary data pattern exists, the alternative solution to avoid spurious regression is to examine a long-term relationship among the observed variables (Enders, 2014). In the stationary data as table 2 above, the stationarity in level occurred in solely domestic investment, the other is on the first difference stationarity. The detected co-integration suggests a co-integration model (a long-term relationship). In this study, the co-integration was scrutinised by using the Johansen co-integration test. It was tested first examined the co-integration test on those MA, GDP, and Greenfield Investment. Our findings suggest no cointegration among those MA, GDP and Greenfield Investment as shown in Table 3.

Table 3: No-cointegration among of MA, GDP, and Greenfield Investment (Original Data)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.270417	33.13608	35.01090	0.0784
At most 1	0.144425	12.32746	18.39771	0.2854
At most 2	0.030329	2.032705	3.841466	0.1539

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.270417	20.80861	24.25202	0.1339
At most 1	0.144425	10.29476	17.14769	0.3706
At most 2	0.030329	2.032705	3.841466	0.1539

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Nonetheless, when the domestic investment is included, as shown in Table 4, the eignvalue and the trace test found co-integration among the observed variables. This study suggests that to weigh the influence of M&A and Greenfield, the panel data estimation is insufficient, as proposed in previous studies (Calderón et al., 2004; Harms & Méon, 2018). It then requires more structural chain economic analysis, as this study initiated with the vector error correction model.

Table 4: Cointegration among all variables (Original Data)

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.400374	59.61474	47.85613	0.0027
At most 1	0.221819	26.37056	29.79707	0.1180
At most 2	0.129095	10.06877	15.49471	0.2755
At most 3	0.016543	1.084308	3.841466	0.2977

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.400374	33.24418	27.58434	0.0084
At most 1	0.221819	16.30178	21.13162	0.2077
At most 2	0.129095	8.984466	14.26460	0.2875
At most 3	0.016543	1.084308	3.841466	0.2977

The table provides the results of the trace test and the Max-Eigen value test. Both tests indicate 1 co-integrating equation at the 0.05 level.
* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Constructed from the data

3.3.3. Lag Length Selection

In econometric studies, if the econometric model owns inappropriate lag structures, it tends to be biased and has inefficient estimation problems (Song & Witt, 2006; Xu et al., 2016). If the lag is too short, the data does not generate autoregressive processing, but if the lag is too large, the equation suffers from a lack of the degree of freedom and unreliable estimations (Song & Witt, 2006). With those considerations, this study discovered the best lags to be used in the econometric regression. From that assessment, it was found that the most stable lag was 2 lags, as shown in Table 5.

Table 5: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	179.9348	NA	9.42e-07	-5.361662	-5.262132	-5.322333
1	919.9456	1390.323	2.26e-16	-27.51350	-27.11538	-27.35619
2	983.8411	114.2374*	4.29e-17*	-29.17700*	-28.48030*	-28.90170*

* Indicates a lag order selected by the criterion

LR: sequential modified LR test statistic (each test at a 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Constructed from the data

Also, in Graph 2, to prompt lags stability, this study examined it with AR-Inverse Root. The lag is stable if the dots were located in the inner circle (IHS Markit, 2017). From Graph 2, the stability of the lag of 2 was obvious as the data was located in the inner circle of the AR-Inverse Root Polynomial Graph. Hence, the structural vector error correction model was generated with a lag of 2.

Graph 2. Inverse Root of the AR Polynomial
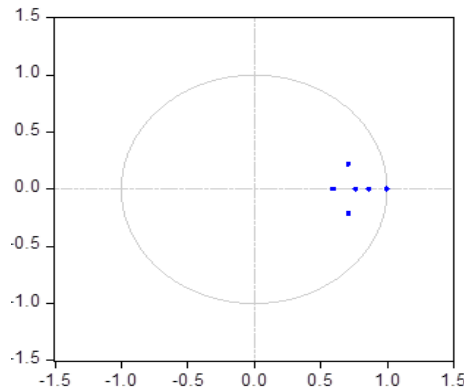
Source: Constructed from the data

3.3.4. Structural Vector Error Correction Model

With the structural vector error correction model, the order of the variables (Cholesky variable order) was decided from the past studies or models (Letson & Carter, 2009). Based on the past literature reviews (Calderón et al., 2004; Nguyen et al., 2020), the shock of M&A will influence Greenfield investment, domestic investment, and GDP growth. The S-VECM showed the short-term and co-integrating effects.

In the short-term effects, as mapped out in columns 3 and 4, the domestic investment and GDP per capita growth variation was explained positively by the Greenfield investment from the first two periods. However, a reverse relationship between mergers and domestic growth and the growth of GDP per capita existed. In the long-term horizon, however, the shock of M&A will reduce domestic investment and economic growth. The impulse response and variance decomposition analysis in the following sub-sections explained the short-term and long-term shock impacts.

Table 6: Structural Vector Equation Model

Cointegrating Eq:	CointEq1		
GREENFIELD(-1)	1.000000		
DOMESTIC(-1)	-0.505276		
	(0.37819)		
	[-1.33603]		
GDPCAPGROWTH(-1)	0.082103		
	(0.03814)		
	[2.15285]		
C	-0.532595		

Error Correction:	D(GREENFIELD)	D(DOMESTIC)	D(GDPCAPGROWTH)
CointEq1	-0.184770	-0.004769	-0.015831
	(0.05606)	(0.02849)	(0.01738)
	[-3.29613]	[-0.16743]	[-0.91092]
D(GREENFIELD(-1))	0.466472	0.006246	-0.005547
	(0.12499)	(0.06352)	(0.03875)
	[3.73194]	[0.09833]	[-0.14315]
D(GREENFIELD(-2))	0.216503	-0.001169	-0.007041
	(0.13403)	(0.06811)	(0.04155)
	[1.61539]	[-0.01717]	[-0.16946]
D(DOMESTIC(-1))	0.262660	0.568735	-0.016635
	(0.41437)	(0.21056)	(0.12846)
	[0.63388]	[2.70101]	[-0.12950]
D(DOMESTIC(-2))	-0.331226	0.119462	-0.049126
	(0.38624)	(0.19627)	(0.11974)
	[-0.85755]	[0.60866]	[-0.41026]
D(GDPCAPGROWTH(-1))	-0.450845	-0.042861	0.524804
	(0.68106)	(0.34609)	(0.21114)
	[-0.66197]	[-0.12385]	[2.48554]
D(GDPCAPGROWTH(-2))	0.544138	0.013916	0.135561
	(0.60406)	(0.30696)	(0.18727)
	[0.90080]	[0.04534]	[0.72388]
C	-0.000773	0.000607	0.003501
	(0.00406)	(0.00206)	(0.00126)
	[-0.19042]	[0.29426]	[2.78171]
MERGER	-0.100962	-0.042162	0.008728
	(0.16983)	(0.08630)	(0.05265)
	[-0.59448]	[-0.48855]	[0.16577]
R-squared	0.384656	0.441669	0.430433
Adj. R-squared	0.296749	0.361907	0.349066
Sum sq. resids	0.000873	0.000225	8.39E-05
S.E. equation	0.003948	0.002006	0.001224
F-statistic	4.375742	5.537358	5.290040
Log likelihood	272.3598	316.3629	348.4827
Akaike AIC	-8.103378	-9.457320	-10.44562
Schwarz SC	-7.802309	-9.156251	-10.14455
Mean dependent	-0.000322	0.001049	0.010076

S.D. dependent	0.004708	0.002511	0.001517

3.3.5. Impulse Response Analysis

Impulse response graphics were visualised to clarify the relationship between M & M&A, Greenfield investment, domestic investment, and the growth of GDP per capita. In the equation system, mergers and acquisitions were treated as a nascent shock to transmit to other endogenous variables.

In the short-term perspective, the injection of M&A will give a positive shock to investment (see the first two quarters in part D of graph 2). In that short-term perspective, M&A functions to stabilise domestic investment and temporarily increase the GDP per capita. In a past study, Aguiar and Gopinath (2002) asserted the function of M&A to solve some illiquid problems of domestic companies. Calderón et al. (2004) confirmed the significance of M&A in the short-term. This empirical study prevailed over previous findings in the short-term.

In the long-term perspective, the shock of M&A was associated with declining domestic investment and fluctuating GDP per capita growth. Despite that decline, sustaining the increase of foreign direct investment in Indonesia corrected the M&A failure in the long-term. The rising Greenfield investment in the long-term (see after quarter 3 in graph 3, part D) was associated with a rebounding increase of the domestic investment and GDP growth per capita. The past studies asserted the long-term economic effects of economic spillover and human capital upgrading from the Greenfield investment (Harms & Méon, 2018; Nguyen et al., 2020). This long-term spillover effect happened in these empirical econometrics results. A more detailed variation of that shock can be clarified from the variance decomposition analysis.

Graph 3. Impulse Response Analysis as a Shock from M&A and Greenfield Investment

A
Response of Greenfield to M&A

B
Response of Domestic Investment to M&A

C
Response of GDP per Capita Growth to M&A

D
Response of Greenfield to Greenfield Investment

E
Response of Domestic Investment to M&A
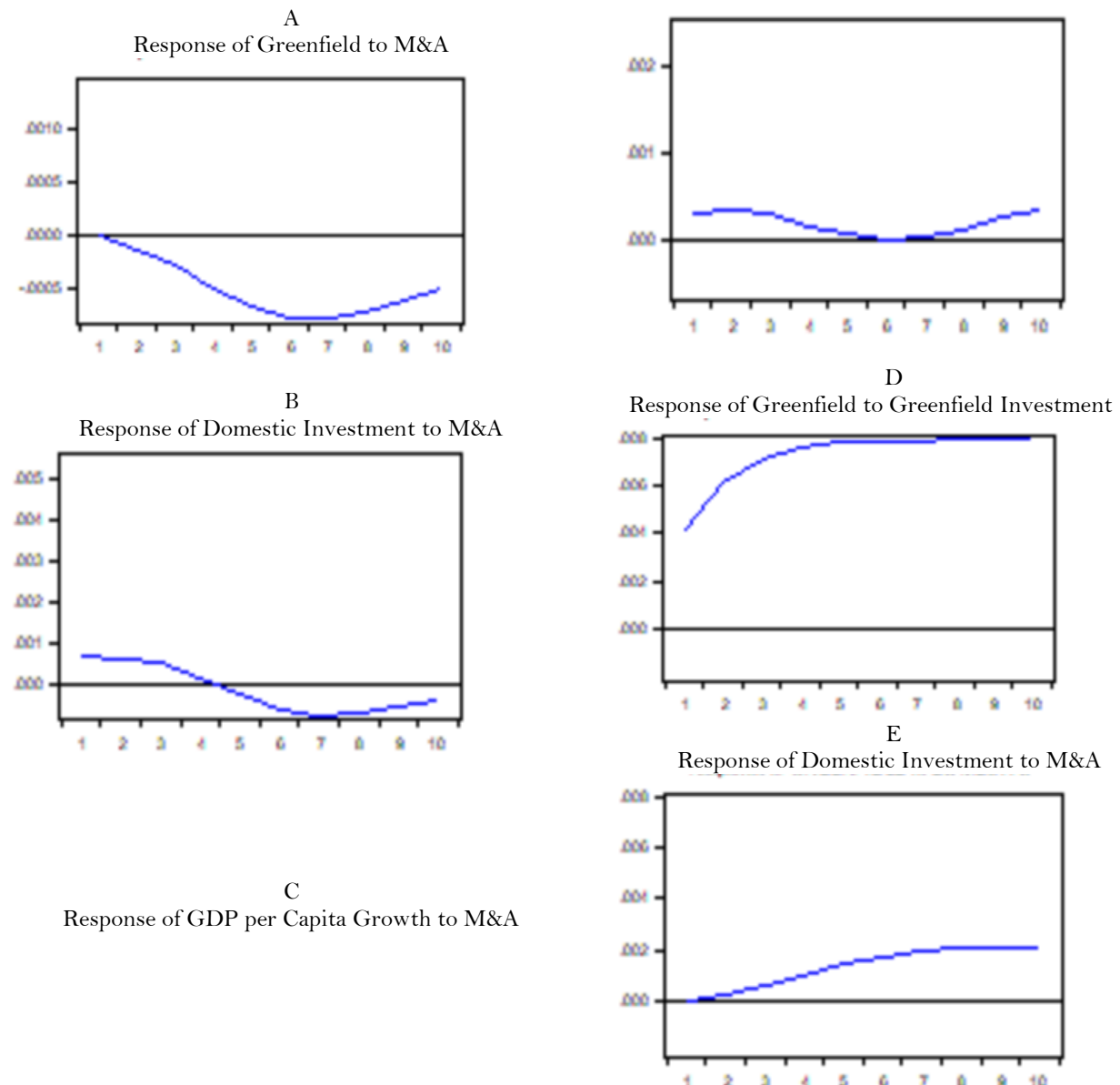
F
Response GDP per Capita Growth to Domestic
Investment
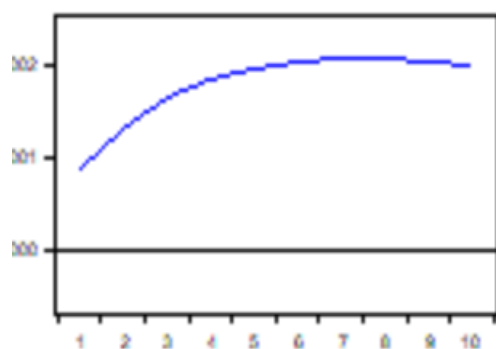
Source: Constructed from the data

3.3.6. Variance decomposition analysis

Variance decomposition statistics were further established to validate the impulse response analysis. The variance decomposition data was deployed to trace some variables' short-term and long-term forecast error variation to the observed variables (Nguyen et al., 2020). The observed variables consisted of the growth of GDP per capita and domestic investment.

In scrutinising the effects of M&A and Greenfield investment on the growth of GDP per capita, this study classified the short-term and long-term analyses. From Table 6, it was obvious that the variation of GDP per capita was influenced more by the variance error shock of M&A than the Greenfield investment in the first four quarters (see Table 6). Nonetheless, in the long-term, there has been a declining influence of M&A and an increasing influence of Greenfield investment to explain the variation of GDP per capita growth. Rather than examine the objections of supporters (e.g., Aguiar & Gopinath, 2002; Calderón et al., 2004) and oppositions (e.g., Harms & Méon, 2018), this decomposition asserted the complementary function of M&A in the short-term while underscoring the necessity of more Greenfield investment for long-term economic development. Due to the stronger effect of M & M&A in the short-term, while Greenfield investment had a stronger influence to drive more GDP per capita growth in the long term. Hence, domestic investment had the strongest influence on GDP growth per capita, as shown in Table 7.

Table 7: Variance Decomposition Growth of GDP per Capita

Period	S.E.	MERGER	GREENFIELD	DOMESTIC	GDPCAPGROWTH
1	0.001158	8.507603	0.321002	47.83005	43.34134
2	0.002120	5.999154	0.995731	41.14660	51.85851
3	0.003000	3.922604	2.137828	35.03942	58.90015
4	0.003811	2.581011	3.664259	29.56654	64.18819
5	0.004565	1.811798	5.397666	24.89543	67.89510
6	0.005270	1.363210	7.169704	21.06700	70.40009
7	0.005931	1.092153	8.869090	18.00153	72.03723
8	0.006552	0.944959	10.44015	15.57188	73.04301
9	0.007138	0.889193	11.86435	13.65210	73.59437
10	0.007692	0.887368	13.14135	12.13453	73.83675
11	0.008216	0.904738	14.27562	10.93186	73.88778
12	0.008712	0.919900	15.27053	9.974669	73.83490
13	0.009183	0.925472	16.12862	9.208410	73.73750
14	0.009630	0.922479	16.85445	8.590419	73.63265
15	0.010056	0.914726	17.45677	8.087481	73.54102
16	0.010462	0.905666	17.94879	7.673890	73.47165
17	0.010850	0.897387	18.34671	7.329944	73.42596
18	0.011222	0.890672	18.66773	7.040686	73.40091
19	0.011579	0.885439	18.92814	6.794822	73.39160
20	0.011924	0.881219	19.14209	6.583797	73.39289

Source: Constructed from the data

Table 8: Variance Decomposition Growth of Domestic Investment

Period	S.E.	MERGER	GREENFIELD	DOMESTIC	GDPCAPGROWTH
1	0.001828	15.18070	0.731707	84.08759	0.000000
2	0.003238	12.16321	0.905526	86.89804	0.033217
3	0.004361	8.884079	1.080423	89.92060	0.114895
4	0.005221	6.428712	1.275480	92.05271	0.243097
5	0.005874	5.107989	1.510797	92.96833	0.412880
6	0.006360	4.587077	1.799545	92.99737	0.616004
7	0.006708	4.398696	2.135566	92.62370	0.842041
8	0.006947	4.273033	2.487163	92.16124	1.078567
9	0.007107	4.146022	2.806283	91.73552	1.312174
10	0.007212	4.036958	3.050408	91.38156	1.531073
11	0.007280	3.961659	3.202005	91.10880	1.727536
12	0.007324	3.915253	3.272093	90.91417	1.898488
13	0.007354	3.886071	3.288616	90.78087	2.044448
14	0.007373	3.866105	3.280689	90.68519	2.168015
15	0.007387	3.851663	3.268499	90.60718	2.272658
16	0.007398	3.840933	3.261366	90.53577	2.361931
17	0.007406	3.832739	3.260937	90.46730	2.439028
18	0.007412	3.826371	3.265408	90.40163	2.506595
19	0.007417	3.821436	3.272423	90.33942	2.566719
20	0.007421	3.817629	3.280289	90.28106	2.621022

Source: Constructed from the data

Table 8 above shows this study's further investigation to explore the drivers of domestic investment. This study found that mergers on domestic investment had a dominant effect on domestic investment in the short term. However, their influence had sluggish the longer term. When tracing the long-term horizon, the stronger effect of the Greenfield investment to domestic investment was apparent. That movement underscored the significance of the mediator effect of that Greenfield investment to sustain the domestic investment in the long-term to offset the eroding influence of M&A that had been dominant in the short-term horizon.

3.3.7 Robust Assessment

The VECM model is robust when the model does not posit unstable error disturbance (Enders, 2014). The model stability property is met when their variances are not overshot (homoscedastic) (Enders, 2014; IHS Markit, 2017). From table 9, the test showed an insignificant p-value of more than 0.05, which fulfilled the econometrics' stability (see table 9). This result has proven the robustness time frame model.

Table 9: Heterocedasticity Test
VEC Residual Heteroskedasticity Tests (Levels and Squares)
Date: 08/07/21   Time: 18:52
Sample: 2003Q1 2019Q4
Included observations: 65

Joint test:

Chi-sq	df	Prob.
66.27290	96	0.9911

Individual components:

Dependent	R-squared	F(16,48)	Prob.	Chi-sq(16)	Prob.
res1*res1	0.172836	0.626851	0.8461	11.23435	0.7948
res2*res2	0.181672	0.666010	0.8116	11.80865	0.7570
res3*res3	0.082821	0.270897	0.9969	5.383333	0.9935
res2*res1	0.128177	0.441066	0.9622	8.331510	0.9384
res3*res1	0.087078	0.286150	0.9958	5.660046	0.9914
res3*res2	0.105078	0.352249	0.9872	6.830098	0.9764

Source: Constructed from the data

4. Conclusion

This study aims to evaluate the different implications of mergers and acquisitions (M&A) and Greenfield foreign direct investment in the monetary transmission mechanism effects on the growth of gross domestic product per capita (GDP per capita) in Indonesia Our findings demonstrate the complementary functions of M&A and Greenfield investment respectively in the short-term and long-term on the growth of GDP per capita in Indonesia. These findings provide some academic and practical implications. Greenfield investment is a mediator for M&A to induce more domestic investment and GDP growth per capita. The academic implication is to reject the dichotomy of M&A and Greenfield investment on economic growth as shown in the past international economic debates. Meanwhile, in practice in economic development policy, the synthesis of this study reveals more balanced considerations of M&A and Greenfield investment on economic development in Indonesia.

The limitation of this study is that the observation was specific to Indonesia. Other studies can replicate the transmission mechanism effects of M&A and Greenfield investment in other Southeast Asian countries to echo that common pattern. Besides, other econometric experiments may add other mediated variables such as inflation that may arise as the capital injection expands to host countries.

For Indonesian economic development policies, the policymakers can devise policies to enhance the influx of M&A and Greenfield investment based on the time horizon objectives. However, the priorities should be carefully examined as to what is required for economic development, whether short-term improvement or sustainable long-term economic spill over to the Indonesian economy.

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Strategic Resources, A Driver of Perfomance in Small and Medium Manufacturing Enterprises in Kenya

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ARTICLE INFO	ABSTRACT
	Purpose: This study sought to establish the effect of strategic resources on performance of small and medium manufacturing enterprises. Specifically, the study sought to identify how financial resources, human resources, physical resources and intellectual capital affect performance of small and medium manufacturing enterprises in Kenya. **Methodology:** Positivism research philosophy was utilised. Cross-sectional descriptive survey as well as explanatory study design were used in the study. The target population for the study was 350 Kenyan SMEs in the manufacturing sector. A sample of 183 firms was selected using stratified random sampling. One respondent from each firm was selected being the managing director. Data was collected using a semi-structured questionnaire. Diagnostic tests for multicollinearity and normality were conducted before data analysis. The research questionnaire was tested for content validity and reliability after. Data was analysed using inferential and descriptive statistics. Data collected was analysed using SPSS V23. **Finding:** The study found that strategic resources have a significant influence on significant influence on performance of manufacturing SMEs in Kenya. Specifically, financial, human and physical resources all positively and significantly influenced the performance of Kenyan SMEs while intellectual resources as no effect on performance. The study therefore concluded that financial resources have a positive and significant influence on performance of manufacturing SMEs in Kenya, human resource was found to be significant in predicting performance. Physical resources have a significant influence on performance of manufacturing SMEs in Kenya while intellectual capital has no significant influence on performance of manufacturing SMEs in Kenya. **Study Implication**: The study recommended that Management of manufacturing SMEs should ensure that there are enough financial resources to meet their daily transactions and ensure that they are able to acquire the relevant strategic resources for efficient running of their firms; have adequate, committed and well-skilled personnel with the required expertise; should invest significantly in physical resources in order to maximise the performance of these firms; carry our cost benefit analysis before committing their resources to protect their intellectual capital in form of patents. **Value of the Study:** The study showcases the influence of strategic resources on performance of manufacturing SMEs in Kenya.

1. Introduction

Overtime, the business environment in which firms operate has significantly changed. According to Ahmad and Schroeder (2011), changes in the business environment have been observed in the 21st century due to factors such as globalisation, technological growth and changes in customers' wants and preferences. According to Ombaka, Machuki

and Mahasi (2015), Resource Based View (RBV) stresses that resources of a firm are the basic determinants of competitive advantage and performance. Organisations strategic resources include all financial, physical, human, intellectual, and other form of assets used by the firm to competitively create, produce, and offer products or services to its clients (Barney, 1991).

As Barney (2007) explains, there are both internal and external financial resources and some of the most popular ones include cash, cash equivalents, debt capital, retained earnings, and share capital. Physical resources include plant and machinery, manufacturing equipment and company buildings. Zarutskie (2010) opined that physical resources also include machines, fixtures and fittings, furniture and materials that provide essential service in the process of manufacturing. Other than human resources, physical resources are among the most significant resources of the organization (Barney, 2014). Human resources include all individuals' experience, expertise, judgement, risk-taking propensity and wisdom (Sirmon, Hitt, Ireland & Gilbert, 2011).

According to Kim and Mauborgne (2014), for the organisation to continue enjoying the benefits of strategic resources. The resources must be inimitable or difficult to imitate. At the same time resources must be rare, valuable, and imperfectly substitutable. The assumed heterogeneity and immobility though necessary are however not sufficient conditions for sustained competitive advantage. Interestingly, Kim and Mauborgne (2014) also observed that resources in themselves are not valuable. However, it is their capability to enable the firms to perform activities that create advantages that makes them strategic. This forces small and medium manufactures to identify such critical resources to gain competitive advantage.

Literature supports that SME's play a crucial role in achieving the industrial and economic development objectives of any economy in the world. This is mainly achieved through employment creation, especially for the unskilled and semi-skilled. In the views of Koontz and & Thomas (2012), the success of any SME depends on its performance levels and the ability to maintain its performance levels. They stated that manufacturing SME's performance is of great significance since it determines the survival or demise, prosperity or non-prosperity, expansion or decline and the rate of investments. However, even with the rich literature on the role of strategic resources on business performance in the global spectrum, their role in the performance of manufacturing SMEs still remain scanty which calls for the need to determine the effect of financial resources, human resources, physical resources and intellectual capital on performance of small and medium manufacturing enterprises in Kenya.

Objectives of the Study

The study pursued the following objectives;

i.   To evaluate the influence of financial resources on performance of small and medium manufacturing enterprises in Kenya;

ii. To determine the influence of human resources on performance of small and medium manufacturing enterprises in Kenya;

iii. To examine the influence of physical resources on performance of small and medium manufacturing enterprises in Kenya;

iv. To investigate the influence of intellectual capital on performance of small and medium manufacturing enterprises in Kenya;

Research Hypotheses

The study was guided by the following hypotheses;

H_{o1} Financial resources have no significant influence on performance of small and medium manufacturing enterprises in Kenya.

H_{o2} Human resources have no significant influence on performance of small and medium manufacturing enterprises in Kenya.

H_{o3} Physical resources have no significant influence on performance of small and medium manufacturing enterprises in Kenya.

H_{o4} Intellectual capital has no significant influence on performance of small and medium manufacturing enterprises in Kenya.

2. Review of Literature

Resource Based View advanced by Penrose (1959) holds that a firm's superior performance is achieved through the resources, which are owned and controlled by the firm. The theory postulates that how the firm controls its key resources determines its performance (Wernerfelt, 1984). The focus of the RBV is on attributes of resources and capability from the source they are gained to clarify a firm's heterogeneity, performance and sustainability (Kraaijenbrink, Spender & Groen, 2010). Through the theory firm managers are able to check whether factors relevant to superior performance exist or not hence they can be in a position to exploit market imperfection to advance their performance. For a firm to have CA and superior performance, resources and capabilities have to qualify as exceedingly valuable, rare, inimitable, and non-substitutable. Resources that are valuable add to advancing the firm's performance. Rareness creates ideal competition in view of the fact that resources in that category are possessed by fewer firms. Inimitable resources are costly to duplicate and non-substitutable, meaning that there is no alternative to accomplishing an equal function instantly available to competitors (Barney & Hesterly, 2010). Through the theory, Resource the study is able to evaluate and explain financial and physical resources and capability of a firm that have the capability to create and maintain a competitive advantage and thus higher performance among small and medium manufacturing enterprises in Kenya.

The Balanced Score Card (BSC) (Kaplan and Norton, 1992, 1996) provides the enterprise with a view of organization's overall performance by integrating financial measures with other key performance indicators around customer perspectives, internal business processes, and organizational growth, learning and innovation (Biazzo & Garengo, 2012). The BSC model is based on the four pillars of performance measures of financial, customer, learning and growth, and internal processes (Kaplan & Norton, 1992). The financial perspective of the BSC tool provides for the firm to succeed financially it should meet the demands of the owners (shareholders) through delivery of measurable like the financial ratios, customer share and other measurable cash flow measures (Kaplan, Norton & Rugelsjoen, 2010). This perspective is what had been used widely to measure a firm's performance previously and therefore needed to be balanced with other perspectives. In line with the constructs of the theory, this study used it to anchor performance of small and medium manufacturing enterprises. As outlined in the model this study measured performance using both financial and non-financial measures through profitability, sales volume, market share, number of customers and efficiency of resource utilization.

Financial resources represent the money available to an enterprise for spending in the day to day running of the business and for investment purposes (Phillips, 2012). These resources are in the form of cash, liquid securities and credit lines that are at the disposal of the firm. Literature supports that financial resources significantly influence the performance of the firm. Zarutskie (2010) observed that financial resources constitute a vital factor in the functioning of any business enterprise. The importance of financing resources in a firm cannot be over emphasised since many of the factors that contribute to business failure can be addressed using strategies and financial resources that drive growth and the achievement of organizational objectives (Salazar, Soto & Mosqueda, 2012). As noted by Memba and Nyanumba (2013), the finance factor is the main cause of financial distress. The objective of all financing decisions is wealth maximisation and the immediate way of measuring the quality of any financing decision is to examine the effect of such a decision on the firm's performance.

Literature supports that human resource as a strategic resource has a positive relationship with superior organisation performance. This is because they are directly involved in the manufacture of goods and services. Superior performance of staff of a company, however, is created through social intricacy that makes it duplication difficult for competitors (Jiang, Lepak, Hu & Baer, 2012). According to Wernerfelt (2011), technology and human capital are among the most important attributes in generating superior performance. Additionally, Nyberg, Moliterno, Halo and Lepak (2014) human capital generates superior performance if it is definite to the original firm and changing cost to new environment avert immediate impound by rivals. Further, Lazear (2009) concluded that a firm must invest in its employees through education, training and development if its human capital was unique and ultimately generate greater performance than competitors. For this reason, this study concludes that strategic human resource is a great predictor of firm performance among small and medium manufacturing enterprises in Kenya.

In order to gain and sustain long-term competitive advantage firms must be in a position to gain access and control resources such as physical resources and deploy then in a coherent manner to the organization's competitive needs as well as profit appetite and institutional philosophies. Grant (1991) argued that lasting competitive advantage requires synergic coordination and configuration of resources and capabilities to positively influence firm performance. According to the resource-based view, physical resources of a firm include plant, machinery, equipment and finances (Barney, 1991). According to Benjamin and Orodho (2014), physical facilities represent one of the most important components of organizational resources that stimulate production and superior performance. Myeda and Pitt (2014) emphasized on the responsibility of FM in encouraging organizational performance, and in giving competitive advantage. On the other hand, examining the relationship between facility management, customer satisfaction and service relationship in the Bangkok healthcare system, Pitt, Chotipanich, Issarasak, Mulholland, and Panupattanapong (2016) identified customer satisfaction and service delivery as measures of firm performance. In addition, the study concluded that there is a strong relationship between facility management, customer satisfaction and service relationship.

Moreover, intellectual capital has been defined by several scholars to mean different things but is generally used to refer to the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a firm with a competitive advantage in the market (Dumay & Garanina, 2013). According to Chu, Chan,Yu, Ng and Wong (2011) intellectual capital represents the relationships with customers and partners, innovations, the infrastructure of the firm and the knowledge and skill of the members of the organisation. Similarly, Vafaei, Taylor and Ahmed (2011) indicated that intellectual capital is that knowledge that can be converted into future profits and comprises resources such as ideas, inventions, technologies, designs, processes and informatics programs. On the other hand, Kianto, Andreeva and Pavlov (2013) postulated that the term intellectual capital and intellectual property are used interchangeably even when they mean different things. In the Turkish automotive supplier industry, human capital, structural capital and customer capital had significant positive relationships with innovation performance. This was established in a study carried out by Zerenler, Hasiloglu and Mete (2008) to investigate the influence of intellectual capital and its components, employee capital, structural capital and customer capital, upon their innovation performance. However, the study covered intellectual capital only ignoring other strategic resources such as physical resources, human resources and financial resources. Additionally, the study was carried out in the Turkish automotive industry while the current study was conducted on small and medium manufacturing enterprises in Kenya.

In Kenya, Magutu, Kipchumba, Chepkuto and Nyaoga (2010) studied knowledge management as source of sustainable competitive advantage. The study established that the private farms were more profitable than Egerton University farms. Private Farms were more productive in both crops and milk productivity. Conversely, evaluating

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strategic capabilities for competitive advantage in British broadcasting corporation Africa, Ngugi (2011) adopted a case study research design and established that strategic capabilities range from a strong human resource pool that is well trained, strong brand, credibility, technologically advanced equipment, wide audience coverage.

3. Research Methodology

Positivism paradigm which states that real knowledge exists and can be obtained by collecting data and subjecting it to analysis and tests was adopted. The paradigm also allows for theory and hypotheses to be tested and validated. Furthermore, the philosophical basis is based on objectivity, neutrality, results validity, measurement and actual facts (Saunders, 2011). The philosophy of positivism was also used because its emphasis on studying facts through experimentation and critical analysis of findings based on observable trends. Finally, since the study was based on statistical analysis of the variables through the explanatory design aimed at establishing the influence of strategic resources on performance of manufacturing SMEs, the philosophy was found appropriate.

A cross-sectional descriptive survey as well as explanatory study design were the designs of choice for this study. As noted by Marshall and Rossman (2014), a descriptive survey involves the method adopted in gathering information to test hypotheses and answer questions about the current status of the phenomenon. Besides, in order to conclusively address the question of what, when, where, how and by who, Lewis (2015) advises that a descriptive study is more appropriate. The explanatory study design as supported by Sekaran and Bougie (2010), Ali (2016) and Gitia (2017) sought to establish how changes in the explanatory variable influenced the predicted variable.

This study targeted all SMEs in the manufacturing sector in Kenya. According to (KAM, 2017), Kenya has approximately 350 SMEs in 14 industries (Building, Mining & Construction, Chemical & Allied, Energy, Electrical & Electronics, Food & Beverages, Leather & Footwear, Metal & Allied, Automotive, Paper & Board, Pharmaceutical & Medical Equipment, Plastics & Rubber, Services & Consultancy, Textiles & Apparel, Timber, Wood & Furniture, Agriculture/Fresh Produce). The study adopted stratified sampling technique in selecting 183 respondents from Kenya's manufacturing SMEs representing 52% of all Kenya's small and medium manufacturing enterprises (Kothari, 2004). Primary data was collected through semi-structured questionnaire having both closed and open-ended questions.

Collected data was analysed via descriptive statistics as well inferential analysis. Inferential analysis was conducted through correlation analysis and ordinary least squares regression analysis. Reliability of the research instrument was tested via Cronbach's alpha where a coefficient greater than 0.7 was considered acceptable. The predictive power of the model was tested following the recommendations of Blumberg, Cooper and Schindler (2014) via coefficient of determination (r^2) at 95% confidence level. F-statistic was conducted at 5% significance level to test the fitness of the model. The significance of the study variables was tested at 0.05 significance level.

4. Results and Discussions

This section presents the results of the study and the discussions thereof. First the reliability of the research instrument followed by descriptive results, regression analysis results and correlation analysis results.

4.1 Reliability of Research Instrument

Reliability of the research instrument in this study was tested using internal consistency test. Cronbach's alpha coefficient (α) was used as the most appropriate measure of internal consistency as advised by Lampard and Pole (2015). As rule of the thumb, reliability value of 0.7 or more was considered adequate to conclude that an instrument is reliable.

Table 1: Variable Reliability Statistics

Variable	Cronbach's Alpha		
	Pilot	Main Study	Remarks
Financial resources	.673	.734	Reliable
Human resources	.934	.857	Reliable
Physical resources	.872	.883	Reliable
Intellectual capital	.953	.905	Reliable
Performance	.904	.904	Reliable

Source: Survey Data (2018)

It was observed that all the variables had coefficients ranging between 0.905 (intellectual capital) and 0.734 (financial resources). Based on these results, it was noted that all the variables had coefficients that were higher than 0.7 and therefore it was concluded that the questionnaire was reliable.

4.2 Descriptive Results

Descriptive statistics provide a summary of study variables characteristics through measures of central tendency (mean and standard deviation). The respondents were asked to indicate the extent to which they agreed to statements in a 5-point Likert scale on each of the study variable where 1 did not represent an extent while 5 represented a very big extent. Financial resources were operationalized using short-term investments, financial securities, owners' equity and debt capital in this study. Barney (2007) observed that financial resources includes both internal and external

income sources such as debt, equity, retained earnings and others cash and cash equivalents. Table 2 shows the mean score and standard deviations of the attributes of financial resources.

Table 2: Descriptive Statistics for Financial Resources

	N	Mean	Std. Deviation	Coefficient of Variation	t-Statistic	Sig. (2-tailed)
We endeavour to retain much of our profits for our operations	131	3.84	1.156	0.301	38.027	.000
The share capital provided by the owners of this business form the major source of our equity.	131	3.63	1.210	0.333	34.363	.001
Our short-term investments are key in ensuring steady cash flows	131	3.53	.995	0.282	40.575	.000
Owners of this business always provide capital when called upon	131	3.41	1.221	0.358	31.991	.001
Our firm always actively seek short-term securities for investments	131	3.03	.976	0.322	35.533	.003
Our development partners are always willing to provide debt capital for our expansion programs	131	3.02	1.170	0.387	29.496	.000
This firm invest adequately in ordinary shares	131	2.94	1.352	0.460	24.886	.000
This business relies on borrowings to finance its operating activities	131	2.79	1.045	0.375	30.511	.002
These firm results to capital market for long-term capital	131	2.74	1.298	0.474	24.157	.000
The company has bought debt instruments in other companies	131	2.50	1.273	0.509	22.508	.000
Aggregate Score	**131**	**3.09**	**1.17**	**0.386**		

Source: Survey Data (2018)

The results in Table 2 above showed that on aggregate, financial resources had a mean score of 3.09, a standard deviation of 1.17 and a coefficient of variation of 0.386. These results showed that manufacturing firms sought to obtain financial resources to a moderate extent and that the resources are relevant in influencing performance of manufacturing firms in Kenya. There were however, high levels of dispersions as depicted by the high values of the standard deviation and coefficient of variation. Individually, the manufacturing SMEs in Kenya endeavour to retain

much of their profits to meet their operations to a great extent as evidenced by a mean score of 3.84. On the other hand, most small and medium-sized manufacturing firms do not buy debt instruments in other firms as the attribute had the lowest average score of 2.50. This means that most manufacturing SMEs in Kenya relied on retained earnings as a major source of financing their operations. These results were consistent with observations made by Zarutskie (2010) who concluded that financial resources constitute a vital factor in the functioning of any business enterprise. In addition, the study showed that internal sources of capital are less expensive compared to external sources of capital because of the floatation costs involved. In light of this revelation, the small and medium manufacturing firms relied more on retained earnings, an internal source and less on debt capital.

The statistical findings showed that all the statements measuring financial resources had P-values less than 0.05 meaning that they were all statistically significant. This implies that they the statements were statistically relevant in measuring financial resources. These findings were consistent with Barney (2007) who concluded that financial resources are essential for firm performance. Zarutskie (2010) also noted that financial resources constitute a vital factor in the functioning of any business enterprise.

The second objective of the study was human resources adopted in this study due to the role it plays in ensuring that the firm optimally employ all other resources to make the most of their utility and maximising firm performance. The variable was measured in this study using personnel expertise, level of commitment, loyalty of employees and decision-making skills as recommended by Sirmon, Hitt, Ireland and Gilbert (2011).

Table 3: Descriptive Statistics for Human Resources

	N	Mean	Std. Deviation	Coefficient of Variation	t-statistic	Sig. (2-tailed)
The board of directors and their respective committees are the topmost decision-making organ in the company.	131	3.98	1.153	0.290	39.467	.000
Our company highly rely on the skills possessed by our employees	131	3.95	1.125	0.285	40.140	.000
The experience of our staff is a key pillar of performance	131	3.90	1.073	0.275	41.604	.000
We always recruit skilled employees	131	3.88	1.177	0.303	37.714	.000
This firm always attempt to match the level of expertise required with the employees' expertise.	131	3.87	1.033	0.267	42.871	.000
We encourage our employees to undergo in the job training to enhance their capability	131	3.67	1.034	0.282	40.659	.000
We regularly carry out competence assessment on our employees	131	3.56	1.075	0.302	37.863	.000
When promoting our staff, we always assess their decision-making skills	131	3.56	1.110	0.312	36.756	.000

	N	Mean	Std. Dev	CV	t	Sig.
We regularly organize workshops for our employees	131	3.50	1.173	0.335	34.200	.000
Every year we offer training programs for our employees	131	3.49	1.236	0.354	32.294	.000
Decision making in this company is always inclusive	131	3.49	1.218	0.349	32.792	.000
This company offer career development opportunities to our employees	131	3.47	1.112	0.320	35.760	.000
We encourage our employees to participate in decision making	131	3.45	1.158	0.336	34.093	.000
Our management regularly hold consultative meetings with the members of staff	131	3.43	1.164	0.339	33.709	.000
We only recruit experienced staff in our business	131	3.11	1.083	0.348	32.831	.000
It is the policy of the company to always recruit internally.	131	3.03	1.202	0.397	28.853	.000
Aggregate Score	**131**	**3.58**	**1.13**	**0.318**		

The results showed the aggregate mean score for human resources of 3.58 and a standard deviation of 1.13 and a coefficient of variation of 0.318. These results indicate human resources were that Positive relationships between human resource management practices and general financial results have been demonstrated in determining performance of manufacturing SMEs to a great extent. These results were consistent with the findings reached by Nyberg, Moliterno, Halo & Lepak (2014) who concluded that human capital generates superior performance and Lazear (2009) also concluded that a firm must invest in its employees through education, training and development if its human capital was unique and ultimately generate greater performance than competitors.

In majority of manufacturing SMEs, the board of directors and their respective committees are the top most decision-making organ in the company evidenced by a mean of 3.98 and a standard deviation of 1.153, implying that there were structures within the manufacturing SMEs that guided decision making to a great extent. In addition, the statement that had the least mean score was that it is the policy of the company to always recruit staff internally as evidenced by a mean score of 3.03 and a standard deviation of 1.202 respectively. This implied that majority of manufacturing SMEs recruit experienced staff internally but only to a moderate extent. While the manufacturing SMEs recognised the role of human resource development from within the firm, they also appreciated the relevance of external recruitment so as to bring in new ideas into the firm.

The findings showed that deviations based on standard deviation were the highest in terms of providing employee training programs each year as evidenced by a standard deviation of 1.236. This implied that most respondents did not witness any employee training programs in their company each year. The study finally noted that all the statements had a p-value less than 0.05 depicting their significance in measuring human resources construct. Similar findings were obtained by Nyberg, Moliterno, Halo & Lepak (2014). He concluded that human capital is generating superior performance. Lazear (2009) also concluded that a firm must invest in its employees through education, training and development if its human capital was unique and ultimately generate greater performance than competitors. However, the results contradict the findings of Kimani (2010) that there was a low negative correlation between strategic human resource management practice and performance

The third variable in this study was physical resources which was adopted in the study due to the relevance of physical resources in the manufacturing business. The variable was operationalized using production facility, ICT infrastructure, natural resources and marketing infrastructure. The descriptive analysis results were as evidenced in Table 4.

Table 4: Descriptive Statistics for Physical Resources

	N	Mean	Std. Deviation	Coefficient of Variation	t-statistic	Sig. (2-tailed)
This organization is connected to the internet	131	3.85	1.106	0.287	39.824	.000
The layout of our factory is designed to improve performance.	131	3.76	1.006	0.268	42.801	.000
Use of ICT in our organization has improved our performance	131	3.75	1.166	0.311	36.797	.000
All departments in this organization are connected through an internal network	131	3.64	1.222	0.336	34.104	.000
The production facility available is adequate to meet our customers' demands.	131	3.60	.943	0.262	43.647	.000
The company has adequate distribution channel for our products	131	3.59	.927	0.258	44.292	.000
Our marketing team is adequately empowered to carry on their functions	131	3.57	.985	0.276	42.907	.000
The organization has invested in adequate production facility.	131	3.57	.953	0.267	41.523	.000
There is adequate space in the production section.	131	3.56	1.054	0.296	38.642	.000
There is free flow of raw materials and finished goods on the production floor.	131	3.48	1.105	0.318	36.059	.000
This company has a strong marketing infrastructure	131	3.45	1.104	0.320	35.773	.000
Processes in this organization have been automated	131	3.44	1.124	0.327	34.984	.000

	N	Mean	Std. Deviation	Coefficient of Variation	t-statistic	Sig. (2-tailed)
This firm has adequately invested in information communication technology.	131	3.41	1.129	0.331	34.588	.000
This firm encourage sharing of databases with our customers to monitor their stock levels	131	3.31	1.164	0.352	32.573	.000
We have adequate access to natural resources	131	3.23	1.092	0.338	33.832	.000
Most of our raw materials are natural resources	131	3.11	1.125	0.362	31.611	.000
Aggregate Score	**131**	**3.52**	**1.08**			

The mean score for physical resources was 3.52 which indicated that most manufacturing SMEs in Kenya used physical resources to a large extent to influence their organisation performance. However, as evidenced by a standard deviation of 1.08, there was also a large disparity in the use of physical resources. Furthermore, most of Kenya's manufacturing SMEs were linked to the internet as evidenced by a mean score of 3.85. This implied that the participants agreed to a large extent that they linked their firms to the internet. The results signified the relevance of connectivity to the internet on firm performance. Pitt, et al. (2016) showed that connectivity to the internet may boost firm performance by improving access to market information, facilitating more effective coordination of firms' production and delivery chains and by creating new business opportunities. Accordingly, manufacturing SMEs in Kenya tap in to the internet so as to increase performance levels. It was also observed that the statement with the least mean score was that most of raw materials used by manufacturing SMEs were natural resources as evidenced by a mean score of 3.11. It is thus concluded that majority of manufacturing SMEs only relied on natural resources to a moderate extent.

It was evidenced by Paunov and Rollo (2016) that internet and intranet adoption positively affects a firms' labour productivity and also improves firms' performance in Africa. The results were also consistent with the conclusion reached by Myeda and Pitt (2014) that selecting a proper distribution channel strategy positively affects firm performance. Moreover, all the statements measuring physical resources had P-values less than 0.05 significance level meaning that they were all significant. These findings were compatible with the outcomes of Benjamin and Orodho (2014), who found that physical facilities boost manufacturing and superior performance, Myeda and Pitt (2014), demonstrated that facility management encourages organisational performance and provides competitive advantage. Mong'are (2012) also established that physical resource availability effects school performance, particularly in resource-intensive, practical-oriented subjects.

The fourth independent objective of the study was intellectual capital and was adopted in this study due to its importance in managing and efficient utilization of strategic resources and influencing firm performance. The variable was operationalized through, innovations, number of patents, knowledge level and number of new products as advised by Chu, et al (2011), Vafaei, et al (2011) and Dumay and Garanina (2013). Table 5 shows the results.

Table 5: Descriptive Statistics for Intellectual Capital

	N	Mean	Std. Deviation	Coefficient of Variation	t-statistic	Sig. (2-tailed)
We encourage all our staff to be innovative.	131	3.63	1.131	0.312	36.758	.000
Our company encourage our staff to study widely	131	3.51	1.211	0.345	33.180	.000
We encourage our employees to suggest	131	3.47	1.185	0.341	33.537	.000

new products that may increase customer utility						
The management of this firm has adopted a number of innovative initiatives.	131	3.31	1.082	0.327	35.048	.000
Our production processes are knowledge based	131	3.31	1.171	0.354	32.390	.000
We design new production processes frequently	131	3.24	1.108	0.342	33.427	.000
This company has patented all its production formulae	131	3.13	1.303	0.416	27.487	.000
This firm develop new products regularly	131	3.13	1.041	0.333	34.421	.000
This firm has a library to encourage our staff to improve their knowledge level	131	2.91	1.406	0.483	23.680	.000
Our enterprise design and produce new products every year	131	2.90	1.129	0.389	29.407	.000
This firm boast of having the greatest number of patents	131	2.88	1.259	0.437	26.163	.000
Aggregate Score	**131**	**3.221**	**1.184**			

Source: Survey Data (2018)

The overall mean score for intellectual capital was 3.221 implying that majority of manufacturing SMEs employed intellectual capital only to a moderate extent. This could be because majority of the manufacturing enterprises developed and produced a certain line of products which are patented already hence, only a few developed new products and innovated new once. As noted earlier by Vafaei, Taylor and Ahmed (2011) intellectual capital can be converted into future profits and comprises resources such as ideas, inventions, technologies, designs, processes and informatics programs. Consequently, as noted by Bowen, Morara and Mureithi (2019) due to the failure to exploit the intellectual capital at their disposal, most manufacturing SMEs may have had bad performance and eventually shut down their activities.

The highest mean score was observed on the statement that majority of manufacturing SMEs in Kenya encourage their staff to be innovative with mean score of 3.64 implying innovation was enthralled some manufacturing enterprises. The results tallied with the statement with the least mean score which showed that most firm boasted of having majority number of patents with a mean score of 2.88 meaning that manufacturing enterprises hardly innovated new products and process as evidenced by few patents granted. The study thus established that although some manufacturing enterprises endeavoured to be innovative, this did not translate into new products or process. In view of Ngugi (2014) intellectual capital positively influence the growth of Manufacturing SMEs in Kenya while Njuguna (2014) showed that intellectual capital improves financial performance of Kenyan state corporations. In the light of these findings, the study finds that manufacturing SMEs in Kenya would greatly profit from capitalizing on the intellectual capital available by being innovative, developing fresh products and procedures and sharing this understanding across the company. The observed high standard deviation of 1.184 indicate that there was a high variation amongst the respondents on the role of intellectual capital in their firms. Therefore, while some manufacturing SMEs tapped into their intellectual capital through knowledge sharing, innovation and growth of new products some remained dormant which may have adversely affected their performance level.

Performance was the dependent variable of the study operationalized through profitability in form of profit margin, sales volume, market share and number of customers. The results of descriptive analysis on the variable were as evidenced are presented in Table 6.

Table 6: Descriptive Statistics for Performance

	N	Mean	Std. Deviation	Coefficient of Variation	t-statistic	Sig. (2-tailed)
The quality of our products has helped us increase the number of customers	131	3.95	1.152	0.292	39.199	.000
The number of customers in this firm has been gradually increasing	131	3.89	1.010	0.260	44.136	.000
Our firm has been experiencing growing sales volume	131	3.85	1.016	0.264	43.419	.000
Gross profit margin has been on the rise	131	3.79	.950	0.251	45.687	.000
We have observed a steady increase in profit before tax	131	3.66	1.058	0.289	39.553	.000
This company has over the years experienced gradual growth in profit after tax	131	3.63	1.083	0.298	38.409	.000
Our main products occupy the bigger portion of market share	131	3.63	1.018	0.280	40.775	.000
Our customers have been gradually increasing their order volumes	130	3.62	1.109	0.306	37.157	.000
We pride as the manufacturing firm with the highest market share	131	3.52	1.126	0.320	35.784	.000
Aggregate Score	**131**	**3.727**	**1.058**			

Source: Survey Data (2018)

Organisation performance had an overall mean score of 3.727 implying that most participants agreed that their company's performance had significantly risen. In addition, the general standard deviation was 1.058, which demonstrates that Kenya's manufacturing SMEs had a strong dispersion in performance. Based on the magnitude, the majority of manufacturing SMEs in Kenya were established to rely on the quality of their products to boost the number of clients as evidenced by a mean score of 3.95 and a standard deviation of 1.152. The elevated value of the standard deviation shows that among the small and medium-sized manufacturing companies there was high variability in the pursuit of quality goods.

The respondents also believed to a great extent that their manufacturing firm had the highest market share with a mean score of 3.52 and a standard deviation of 1.126. Although, this is the statement that received the least mean score, the results showed that majority of the respondents believed that their firm held a significant proportion of the market in the regions that they operate. Hatch and Howland (2015) had earlier concluded that for firms to effectively compete in the complex and highly competitive environment, companies must constantly improve the quality of their products, reducing costs, and differentiating their products and services. The results therefore show that

manufacturing SMEs in Kenya had adopted this strategy to a great extent though with a significant level of variability as evidenced by a high standard deviation.

According to Gitau, (2014), measuring organizational performance often involve financial measurements indicators such as sales growth, profit rate, return on investment, return on sales, return on equity, and earnings per share. By this definition, it was established that most of the selected manufacturing SMEs in Kenya experienced steady performance in the past ten years. In this view, the study found that manufacturing SMEs in Kenya had high performance.

4.3 Regression Analysis Results

In order to determine the extent to which strategic resources effected the performance of manufacturing SMEs in Kenya, multiple regression analysis was initially conducted on all independent variables. The multiple regression model tested was as follows;

$$FP = \beta_0 + \beta_1 FR + \beta_2 HR + \beta_3 PHR + \beta_4 INC + \varepsilon \ (1)$$

Where: -
FP = Firm Performance
β_0 = Constant
$\beta_1, \beta_2, \beta_3 \& \beta_4$ = Beta Coefficients
FR = Financial Resources
HR = Human Resource
PHR = Physical Resources
INC = Intellectual Capital
ε = Error Term

The results of the linear regression analysis were as shown in Table 7.

Table 7: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.8657[a]	.7495	.7366	.5840

a. Predictors: (Constant), Financial Resources, Intellectual Capital, Human Resources, Physical Resources
b. Dependent Variable: Performance
Source: Survey Data (2018)

The results in Table 7 above indicates that model was 0.7495 implying that 74.95 percent of the variation in performance of manufacturing SMEs in Kenya is explained by financial resources, human resources, physical resources and intellectual capital. It also implies that 25.05 percent of variation in performance of manufacturing SMEs in Kenya is explained by other variables other than those in the model.
The analysis of variance (ANOVA) results are as evidenced in Table 8.

Table 8: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.23	4	15.3075	94.269	0.0000
	Residual	20.46	125	0.1624		
	Total	81.69	130			

a. Dependent Variable: Performance
b. Predictors: (Constant), Financial Resources, Intellectual Capital, Human Resources, Physical Resources
Source: Survey Data (2018)

The results in Table 8 above show the analysis of variance results for strategic resources and performance and show a p value of 0.000< 0.05 which indicates that the regression relationship was significant in predicting how financial resources, human resources, physical resources and intellectual capital influences performance of manufacturing SMEs in Kenya. Similar conclusion were reached using the F statistic for $F_{(4, 130)} = 94.269 > 2.4436$ F) critical, implying that the model was significant and adequate in predicting performance.

Further the study calculated the coefficients of the variables and obtained the results shown in Table 9.

Table 9: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.309	0.712		4.647	0.0000
Financial Resources	0.346	0.148	0.216	2.338	0.0229

Human Resources	0.205	0.068	0.178	3.015	0.0038
Physical Resources	0.562	0.213	0.132	2.638	0.0107
Intellectual Capital	0.127	0.027	0.194	4.704	0.0000

a. Dependent Variable: Performance

Source: Survey Data (2018)

From Table 9, the constant had a coefficient of 3.309 which means that if all the variables in the study were kept constant at zero (0) performance of manufacturing SMEs in Kenya would be 3.309. Furthermore, the findings indicate that the financial resource coefficient was 0.346, meaning that keeping all other factors constant a unit increase in financial resources would result in a 0.346 increase in manufacturing SMEs performance in Kenya. The findings also indicate that a unit increase in human resources would result in a 0.205 increase in the performance of production SMEs in Kenya if all other factors were kept constant.

Furthermore, the findings showed that keeping all other factors constant, increasing one unit of physical resources would result to a 0.562 increase in manufacturing SMEs performance in Kenya. Finally, the results showed that if all other variables were held constant and intellectual capital increased by one-unit, the performance of manufacturing SMEs in Kenya would increase by 0.127. Furthermore, the findings showed that all variables had a p-value less than 0.05 which meant that all variables were significant in anticipating performance of manufacturing SMEs in Kenya.

These results were consistent with the findings of Zarutskie (2010) who suggested that financial resources are critical in achieving superior performance. At the same time, Phillips (2012) concluded that without financial resources, organisations may not run smoothly as well as take adequate investments. Similarly, Salazar, Soto and Mosqueda (2012) concluded that absence of financial resources has led to poor performance in most organisations. At the same time Wernerfelt (2011) human capital is among the most important attributes in generating superior performance. Similar results were posted by Nyberg et al (2014) human capital generates superior performance for the organisation.

Additionally, Benjamin and Orodho (2014), physical facilities represent one of the most important components of organizational resources that stimulate production and superior performance. Moreover, Pitt, et al (2016) concluded that there is a strong relationship between facility management and organisation performance. Finally, Dumay and Garanina (2013) concluded that possession of intellectual knowledge, applied experience, organizational technology, customer relationships and professional skills catapults the firm to better performance.

4.4 Correlation Analysis

The objective of correlation analysis was to establish the nature and strength of the relationship that exist among the study variables. To achieve this objective, Pearson's product moment correlation was used. The results were as shown in table 10.

Table 10: Correlation Analysis Results

		Performance	Financial Resources	Human Resources	Physical Resources	Intellectual Capital
Performance	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	131				
Financial Resources	Pearson Correlation	.550	1			
	Sig. (2-tailed)	.001				
	N	131	131			
Human Resources	Pearson Correlation	.406	.336	1		
	Sig. (2-tailed)	.005	.000			
	N	131	131	131		
Physical Resources	Pearson Correlation	.668	.333	.781	1	
	Sig. (2-tailed)	.002	.000	.000		
	N	131	131	131	131	
Intellectual Capital	Pearson Correlation	.158	.383	.682	.753	1
	Sig. (2-tailed)	.001	.000	.000	.000	
	N	131	131	131	131	131

Source: Survey Data (2018

Table 10 shows that the correlation coefficient between performance and financial resources was 0.550 with a significance level of 0.001. The correlation coefficient between performance and human resources was found to be 0.406 with a significance level of 0.005. The correlation coefficient between performance and physical resources was

0.668 with a significance level of 0.002, performance while intellectual capital had a correlation coefficient of 0.158 and a significance level of 0.01.

From the analysis, it was found that there was a strong positive correlation between performance of manufacturing SMEs and financial resources and physical resources. The findings also showed a positive and moderate positive correlation between performance of manufacturing SMEs and human resources and a weak positive correlation between performance of manufacturing SMEs and intellectual capital. In general, the results showed that there was a positive correlation between performance of manufacturing SMEs and all the study variables implying that an increase in strategic resources lead to an increase in performance of manufacturing SMEs in Kenya.

These results coincided with the conclusions of Zarutskie (2010) that financial resources are positively correlated with organisation performance. Phillips (2012) also showed that a positive correlation exists between financial resources and organisations performance. At the same time Benjamin and Orodho (2014) showed a positive relationship between physical resources and organisational performance. According to Wernerfelt (2011) human capital and performance are positively correlated. Finally, organisation performance is positively correlated with intellectual capital (Ngugi, 2014).

5. Conclusion

Based on the findings of the study, it was also noted that financial resources were significant in predicting performance of manufacturing SMEs firms. The study thus concluded that financial resources have a positive and significant influence on performance of manufacturing SMEs in Kenya. Further, financial resources significantly predicted profitability, sales volume and market share but failed to significantly predict the number of customers. In addition, the study found that human resource which was measured using personnel expertise, level of commitment, loyalty of employees and decision-making skills was significant in predicting performance.

In addition, physical resources affected performance to a great extent. It was also established that physical resources were significant in predicting profitability and market share but insignificant in predicting sales volume and number of customers. The study therefore concluded that physical resources have a significant influence on performance of manufacturing SMEs in Kenya. On the other hand, the study found that performance of small and medium manufacturing enterprises was moderately influenced by intellectual capital although the influence was not significant. The study thus concluded that intellectual capital has no significant influence on performance of manufacturing SMEs in Kenya.

6. Recommendation of the Study

Based on the conclusions of the study. The following recommendations for policy implications were suggested. The study concluded that financial resources have a positive and significant influence on performance of manufacturing SMEs in Kenya. Management of manufacturing SMEs should therefore ensure that there are enough financial resources to meet their daily transactions and ensure that they are able to acquire the relevant strategic resources for efficient running of their firms. In addition, the study concluded that human resources have a positive and significant influence on performance of manufacturing SMEs in Kenya and thus the management of small and medium manufacturing enterprises should always ensure that they have adequate committed and well-skilled personnel with the required expertise.

The study also concluded that physical resources have a significant influence on performance of manufacturing SMEs in Kenya. The study recommends that the management of small and medium manufacturing enterprises in Kenya should invest significantly in physical resources in order to maximise the performance of these firms. In addition, the study concluded that intellectual capital has no significant influence on performance of manufacturing SMEs in Kenya. Thus, the study recommends that the management of small and medium manufacturing enterprises should carry our cost benefit analysis before committing their resources to protect their intellectual capital in form of patents.

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Index of the cycle of money - The case of Greece

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ARTICLE INFO	ABSTRACT
	Purpose: The purpose of this paper is to apply the theory of cycle of money in the case of Greece. Prior works have determined the economic characteristics of the case of Latvia, Serbia, and Bulgaria, according to the concept of the theory of cycle of money. The index of the cycle of money suggests how an economic system should counteract a monetary and fiscal crisis and studies how well-structured is Greece's economy. The estimations of the index of the cycle of money of Greece are compared with the global average index of the cycle of money. The results reveal that Greece is above the average global value. Then, Greece's results reveal that it is a well-structured economy and can face an economic crisis. The current work is important as represents the strength of Greece's economy with emphasis to the period of 2012 - 2017, of financial and economic crisis. The theory of the cycle of money covers the gap that exists for the structure and functionality of the economy, which formed on the derivative of GDP, giving the cycle of money. Moreover, it is the only theory that enhances the economy, without any negative effect of the fiscal or the monetary policy, as uses the same amount of money of an economy appropriately.
	Design/methodology/approach: The applied methodology stands on the analysis of the theory, mathematical, statistical, and econometrical results.
	Findings:
	The study found that the general index of the cycle of money for the case of Greece is 0.72, showing that the distribution of money is at the upper level, revealing the very good strength of the Greek economy, with a very well-based economic structure and high economic functionality, meaning high distribution and reuse of money.
	Research limitations/implications: This work is from a project for multiple countries. Concluding, the recent decision of 15% minimum tax to the international companies complies with the Fixed Length Principle of the theory of cycle of money that developed the last years.
	Originality/value: This study contributes to the theory of the cycle of money and shows that Greece belongs to the countries which have top rates to the distribution of money, explaining why Greece against to huge financial crisis of the prior decade, achieved to recovered.

1. Introduction

The paper's argument and novelty are that Greece belongs to the countries with a very good index of the cycle of money, meaning high economic functionality, interpreting appropriate performance to the distribution and the reuse of money. This high economic functionality according to these terms, shows that the structure of the economy is appropriately formed. The highest index of the cycle of money is that of Luxemburg; as has a value of 0.98 for the general index of the cycle of money. Then, Luxemburg's economy would not be affected by any type of economic crisis or depression.

The theory of the cycle of money doesn't have negative effects that monetary and fiscal policy occur, as it is no external influence on the magnitudes of economies happen, but by an appropriate tax policy the same amount of money an economy is used more effectively, reflecting and the structure of the economy. This doesn't mean that a fiscal or monetary policy should not be applied pending the case. The theory of the cycle of money studies the economic

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functionality of an economy, through the distribution and reuse of money, permitting to conclude the appropriate structure of the economy.

This work studies the dynamic of the economy, of Greece, using the concept of the cycle of money. The prior results of Latvia's, Serbia's, and Bulgaria's conclusions revealed the behavior of these countries to a potential crisis. Following a similar concept, it is examined the case of Greece. The theoretical background of the cycle of money supports that the dynamic of an economy is formed on the idea of the number of times that money is used in an economy. An economy should be considered not as a closed system, but as a system with fragments. An economy with fragments means that the economy interacts with other economies but simultaneously protects its money (Constantinos Challoumis, 2021a, 2021c, 2021b). An amount of money in many cases is getting out from an economy to external banks, or other economies. The main idea is that the bigger companies and the international companies in most cases are saving their money to external banks and economic heavens. Then, using this theory, the tax authorities should put an additional tax on these kinds of companies to decline the losses to the economy. Additionally, the smaller companies and the freelancers should be taxed with lower tax rates. Then, it would be plausible to increase the dynamic of the economy. Moreover, the factories, the know-how services of big companies, the health care system, and the educational system comprise a special case for the economy, as belong to those cases where the taxes improve the quality of the economy (Stern, 2015; Ud Din, Mangla and Jamil, 2016; Castaño, Méndez and Galindo, 2016; Miailhe, 2017; Challoumis, 2018; Tvaronavičienė, Tarkhanova and Durglishvili, 2018; Campos, Braga and Correia, 2019; Lajas and Macário, 2020; Forson, 2020; Jia et al., 2020; Constantinos Challoumis, 2020). The factories and the big know-how companies increase the cycle of money, as they do not substitute the activities of the small-medium companies and the freelancers. The educational and health care systems improve the quality of the economy, making the whole economy better.

Thus, the applied methodology is hinged on the concept of the index of the cycle of money. The cause to define the general index of the cycle of Greece permits to conclude country's strength to a crisis. The results comply with the economic condition of Greece, as its high distribution and reuse of money, allowed to counteract the economic crisis.

Therefore, this paper sought to make clear how the concept of the cycle of money, works in an actual case scenario like this of the economic system of Greece. The index of the cycle of money suggests how an economic system ought to counteract a monetary crisis and examines how well-structured is a country's economy. The estimations of the index of the cycle of money of Greece are used for a comparison with the global average index of the cycle of money (Erickson, 2016; Arai, Naito and Ono, 2018; Bakaki and Bernauer, 2018; Korenik and Wegrzyn, 2020; Montmarquette, 2020; Pircher, 2020; Rumayya et al., 2020; Haskel and Westlake, 2021). The results reveal that Greece is above the average global value and therefore could face an economic crisis, as it is a well-structured economy. The concept of the cycle of money reveals that the taxes return to the economy, in the case of the education and the health care system (these are exclusions from the mainstream where taxes support the economy). But, the mainstream is that the tax authorities should maintain the taxes to the lowest level. For small and medium companies, the government should protect them with very low taxes and contemporaneously should put greater taxes on the larger companies. But, there is a type of big and international companies that should have low tax rates, as these types of companies are not substituting the activities of smaller companies ('The East Asian miracle: economic growth and public policy', 1994; 'Income taxes, public fiscal policy and economic growth', 2014; Acs and Szerb, 2007; Oueslati, 2015; Acs et al., 2016; Arabyan, 2016; GVELESIANI, 2019; Ladvocat and Lucas, 2019; Wu et al., 2019; Rashid, Warsame and Khan, 2020).

The cases of Latvia, Serbia, and Bulgaria revealed that are above the limit of 0.2 (this is the minimum allowed limit to be able an economy to face a crisis) and in general above the average rate of 0.5, concluding that these countries can counteract a potential crisis. The fixed-length principle can enforce the cycle of money (Challoumis, 2019a). The case of Latvia presented the condition of the country's economy and how to react to an economic crisis, according to the index of the cycle of money. These results are formed on the theoretical approach of the theory of the cycle of money, where this theory presents that to an economy the taxes return to the society, basically to the case of the education and the health system. But, the main rule is that the authorities should keep the taxes as low as is plausible, for the medium or small economic units (meaning any kind of economic unit e.g. freelancers), and companies. The arm's length principle is the principle where the authorities use to apply the taxes to international and to groups of companies.

The arm's length principle is the method that the tax authorities estimate the tax obligations of the companies, which participate in international transactions. The authorities using the arm's length principle are tough to obtain the controlled transactions, as the international companies offer similar data with that of the uncontrolled transactions and they are hiding with a purpose to avoid paying taxes. Therefore, the government needs to apply the fixed-length principle. The fixed-length principle indicates that the companies of controlled transactions manage transactions and achieve to avoid tax-paying (Cai, 2017; Abdelkafi, 2018; Challoumis, 2019a; Constantinos Challoumis, 2019; Bernasconi and Espinosa-Cristia, 2020; C. Challoumis, 2020; Jeon, Kim and Kwon, 2020). Then, according to the fixed-length principle, international companies should pay plus a fixed amount of tax or at least a minimum fixed tax. In that way, the cycle of money is enhanced, because the larger companies generally receive the money out the society and the economy and save them to international banks. Therefore, that money is lost from society, diminishing consumption. According to the fixed-length principle, the local companies which save their money to local banks should have lower tax rates.

The fixed-length principle serves the theory of the cycle of money, where the small and medium companies are paying lower taxes than the larger companies, which substitute their commercial activities. On the contrary, the arm's length principle estimates the taxes standing on methodologies provided by the companies that make international transactions (Porter, 2007; Kalambokidis, 2014; Bowling, Boyland and Kirkeby, 2019; Lajas and Macário, 2020; Mueller, 2020). In that way, the large companies cover the activities of the smaller companies. Finally, the mainstream is that small and medium companies robust the distribution of money to a country's economy as usually they don't save their

money out of the country's economic system, and reuse the money inside the economy (Stern, 2015; AICPA, 2017; Cascajo *et al.*, 2018; Le Bodo *et al.*, 2019). Therefore, the money distributed inside the economy many times increases the cycle of money. The reason why money increases the cycle of money is obvious according to eq. (4) of the general index of the cycle of money. The last decision of G7 for 15 % minimum tax for the international companies complies with the Fixed Length Principle of the cycle of money; where last years suggested an additional standard tax to these companies as they don't reuse the money to country's economy, but they save them to tax heaves and to international banks (Challoumis, 2019b).

2. Review of Literature

The facets of Latvia, Serbia, and Bulgaria revealed that are above the limit of 0.2 and in general above the average rate of 0.5, concluding that these countries can counteract a potential crisis. The fix length principle can enforce the cycle of money. The case of Latvia presented the condition of the country's economy and how to react to an economic crisis, according to the index of the cycle of money. These results are formed on the theoretical approach of the theory of the cycle of money, where this theory presents that to an economy the taxes return to the society, basically to the case of the education and the health system. But, the main rule is that the authorities should keep the taxes as low as is plausible, for the medium or small economic units (meaning any kind of economic unit e.g. freelancers), and companies. The arm's length principle is the principle where the authorities use to apply the taxes to international and to groups of companies. The arm's length principle is the method that the tax authorities calculate the tax obligations of the companies, which participate in international transactions. The authorities using the arm's length principle are tough to obtain the controlled transactions, as the international companies offer similar data with that of the uncontrolled transactions and they are hiding with a purpose to avoid paying taxes (Feinschreiber, 2004). Therefore, the government needs to apply the fixed-length principle. The fixed-length principle indicates that the companies of controlled transactions manage transactions and achieve to avoid tax paying. Then, according to the fixed-length principle, international companies should pay plus a fixed amount of tax. The cycle of money is enhanced because the larger companies generally receive the money out of the society and the economy and save them to international banks. Thus, that money is lost from society, diminishing consumption. Then, according to the fixed-length principle, the local companies which save their money to local banks should have lower tax rates (Jomo and Wee, 2003; Bakaki and Bernauer, 2018; Cornelsen and Smith, 2018; Bhuiyan and Farazmand, 2020; Kroth, Geremia and Mussio, 2020; Rumayya *et al.*, 2020).

Concluding, the fixed-length principle serves the theory of the cycle of money, where the small and medium companies are paying lower taxes than the larger companies, which substitute their commercial activities. On the other hand, the arm's length principle estimates the taxes standing on methodologies provided by the companies that make international transactions (Marume, 2016; Constantinos Challoumis, 2020; Maxwell, 2020). In that way, the large companies cover the activities of the smaller companies. The mainstream is that small and medium companies robust the distribution of money to a country's economy as usually they don't save their money out of the country's economic system, and reuse the money inside the economy. The money distributed inside the economy many times increases the cycle of money. The reason where the money increases the cycle of money is obvious according to eq. (4) of the general index of the cycle of money.

The last decision of 15 % minimum tax for the international companies complies with the Fixed Length Principle of the cycle of money; where last years suggested an additional standard tax to these companies as they don't reuse the money to country's economy, but they save them to tax heaves and to international banks.

3. Methodology

The methodology applied for the current study is presented below, being in the same line with the presented theory. The calculations of the cycle of money are clarified by the following mathematical types of the work "Mathematical background of the theory of cycle of money":

$$c_y = c_m - c_\alpha \tag{1}$$

$$c_y = \frac{dx_m}{dm} - \frac{dx_m}{da} \tag{2}$$

$$i_{cy} = Y * b_d \tag{3}$$

$$g_{cyCountry} = \frac{c_{ycoyntry\prime s}}{c_{yAverage} + c_{ycoyntry\prime s}} \text{ or } \frac{i_{cycoyntry\prime s}}{i_{cyAverage} + i_{cycoyntry\prime s}} \tag{4}$$

$$g_{cyAverage} = \frac{c_{yAverage}}{c_{yAverage} + c_{yAverage}} \lor \frac{i_{cyAverage}}{i_{cyAverage} + i_{cyAverage}} = 0.5 \tag{5}$$

The c_m is the velocity of financial liquidity, c_α is the velocity of escaped savings and c_y is the cycle of money. The i_{cy} is the index of the cycle of money, Y is the national income or GDP, and b_d is the bank deposits of the country. In addition, $g_{cyCountry}$ symbolizes the general index of c_y of the country, $i_{cycoyntry\prime s} \lor c_{ycoyntry\prime s}$ is the index of c_y of the

country, and $i_{cyAverage} \lor c_{yAverage}$ is the global index of i_{cy}. Finally, $g_{cyAverage}$ is the general global index of c_y, and is obtained as a global constant (Constantinos Challoumis, 2021d).

The proper hypothesis is to establish the connection between the index of global average c_y, the bank deposits and the GDP per capita, with an econometric approach. Then is confirmed the initial hypothesis that the cycle of money of Greece is above the global average index of the cycle of money. The eq. (4) and (5) mean that an economy close to the value of 0.5 can face immediately an economic crisis. Results close to this value represent an appropriate index of the cycle of money, revealing an adequate economic structure of the society and then the fine distribution of money between the citizens - consumers. Eq. (1) is the term of the cycle of money which used to define the $c_{ycoyntry's}$ and $c_{yAverage}$ of eq. (2). The cycle of money to a quantity value is expressed by GDP, basically is an expression of $\frac{\partial(GDP)}{\partial(S+I+X)}$, according to $\frac{dx_m}{dm}$ and - $\frac{\partial(GDP)}{\partial(S'+I'+M)}$ hinged on $\frac{dx_m}{da}$. Then, $c_y = d(GDP) = \frac{\partial(GDP)}{\partial(S+I+X)} d(S+I+X) - \frac{\partial(GDP)}{\partial(S'+I'+M)} d(S'+I'+M)$, formed on $c_y = \frac{dx_m}{dm} - \frac{dx_m}{da}$, of eq, (2). Then, S is the savings, I is the investments and X is the exports. Then, S', is about the savings which are oriented to banks out of the country's economy, I', is about the investments which oriented to banks out of the country's economy, and M are the imports. Therefore, the cycle of money expresses the GDP as the following one: $Y = S_T + I_T + (X - M), \lor Y = (S - S') + (I - I') + (X - M) \lor Y = \Delta S + \Delta I + (X - M)$. According to the theoretical background, for the lost money from the economies, the problem of controlled transactions could be administrated, if an organization could identify the money transitions between the economies, by a comparison of the global economies, by ΔS, ΔI, and (X-M). Then, $c_{ytotal} = \sum_{i=1}^{n} \sum_{t=1}^{m} c_{yi,t} = \sum_{i=1}^{n} \sum_{t=1}^{m}$. But, because data from an organization for these activities don't exist follows the application of the index of the cycle of money. The cycle of money is an expression of the minus between the differential equations of the volume of money that is used in an economy and the volume of money that are lost from the economy. This is the reason why the theory of the cycle of money supports the higher tax of companies that make controlled transactions and the bigger companies because with that way the smaller companies are using an amount of money multiple times. An exemption is for the high technology companies and the factories, where their activities cannot substitute by smaller companies.

The cycle of money expresses the money which is in an economy, and this is reflected in money that has the commercial banks, and extensively the central bank. Therefore, the relation of the country's GDP with the bank deposits allows determining the current amount of money in an economy. In pursuance of prior mathematical background, it is made an econometric analysis of Greece's index of the cycle of money, using Greece's bank deposits per GDP, Greece's GDP per capita, and the global index of the cycle of money. Hence, using eq. (3) - (5), concluded the index of the cycle of money and the general index of the cycle of money, from the country's and global bank deposits, in combination with their GDP's per capita.

4. Results

Using the prior methodology extracted the following results. This table has the parameters of bank deposits per GDP, GDPs, and the indexes of the cycle of money. This section reveals the dependence of Greece's index of the cycle of money using the bank deposits of Greece's economy and the GDP per capita of Greece's economy. The bank deposits of the global average case and the global GDP per capita are used for the comparison of Greece's economy, its GDP, and the country's bank deposits.

To the following table is described the variables:

Variable	Description
Country's bank deposits per GDP	Greece's bank deposits per GDP, of Greece for the period of 2012 - 2017.
Country's GDP per capita	Greece's GDP per capita, of Greece for the period of 2012 - 2017.
Country's index of the cycle of money	Greece's indicator of its strength to a crisis, presenting its distribution and reuse of money reflecting its economic structure - expressed as a rate value.
Global index of the cycle of money	Global indicator of its strength to a crisis, presenting its distribution and reuse of money reflecting its economic structure - **expressed as a rate value.**
Country's general index of the cycle of money	Greece's general indicator of its strength to a crisis, presenting its distribution and reuse of money reflecting its economic structure - **expressed as a rate value.**

Global general index of the cycle of money	Global general indicator of its strength to a crisis, presenting its distribution and reuse of money reflecting its economic structure - **expressed as a rate value. It' value is estimated to be 0.5. But, the minimum rate to recover from a crisis is 0.2.**

Proportional conclusions come up and from an econometric point of view, with the dependent variable to be the index of the cycle of money:

Table 1: Greece's OLS regression analysis (Source: author's compilation)

Variable	Coefficient	std. error	p-value
Constant	−2.32145e+06	202146	0.0075 ***
Greece's bank deposits per GDP	28692.6	120.182	1.75e-05 ***
Greece's GDP per capita	81.7602	6.36967	0.0060 ***
Global index of the cycle of money	−0.0286666	0.0222880	0.3272

To the prior table, the values with three asterisks are below the 0.01 significant level. The result of the Global average index of the cycle of money has a higher value as it is not directly connected to the country's economy, as there are different estimations for the global case. The Durbin Watson result is 2.263453. The indexes reveal Greece's distribution of money and the form of its economic structure (see Table 2). The first three rows of the table reveal that the p-value is important, therefore the initial hypothesis was rejected and the model is accurate. Pursue to those estimations and the theoretical background is determined the condition of the economic structure of the country and if Greece belongs to the very good economies. Should be mentioned that is used the period of 2012 - 2017. It is selected that period as was critical for E.U. as many economic formations happened, especially for countries with high debts; affecting and other economies. According to these results, it's plausible to clarify the condition of the cycle of money in Greece:

Table 2: Greece's index of the cycle of money (Source: Globaleconomy.com and author's compilation)

Year	Bank Deposits Global Average per GDP (%)	Bank Deposits Greece per GDP (%)	Global GDP per Capita ($)	Greece's GDP per Capita ($)	Index of Global Average Cy ($)	Index of Greece's Cy ($)
2012	52.48	88.92	16,653.01	28,800.00	873,949.96	2,560,896.00
2013	53.96	91.42	17,266.62	28,127.00	931,706.82	2,571,370.34
2014	55.81	93.35	17,159.02	28,525.00	957,644.91	2,662,808.75
2015	59.38	82.35	15,295.71	28,588.00	908,259.26	2,354,221.80
2016	60.77	71	15,330.03	28,652.00	931,605.92	2,034,292.00
2017	60.07	70.82	15,082.49	29,141.00	906,005.17	2,063,765.62
RESULTS					5,509,172.04	14,247,354.51

Should be noticed that Bank deposits are used as a percentage of GDP because in that way it is plausible to extract conclusions, about the whole economy per GDP and to make comparisons easier with other countries. Greece's bank deposits:
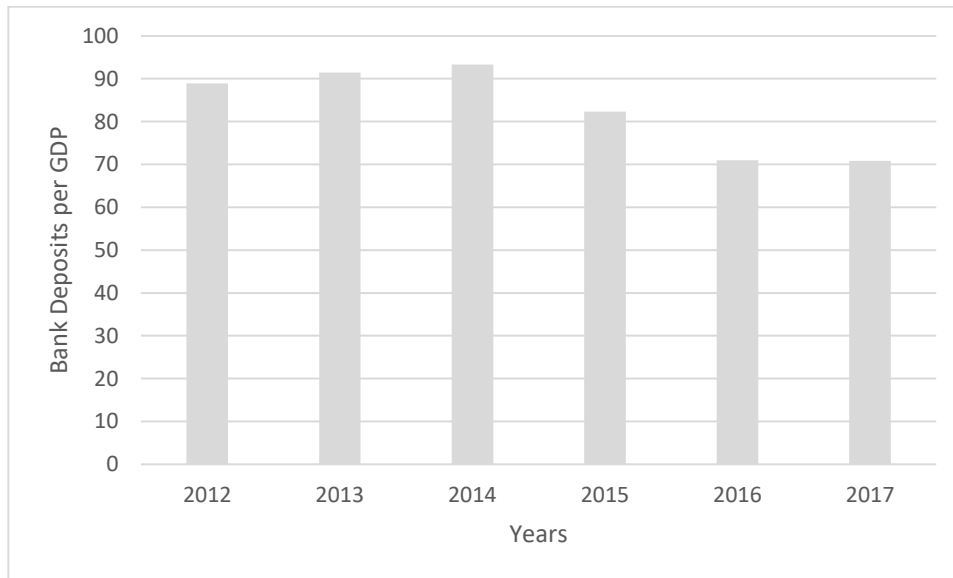
Figure 1. Greece's bank deposits (Source: Globaleconomy.com)

To figure 1 presents the situation of bank deposits of Greece's financial system, as a percent of GDP, for the period from 2012 to 2017. In addition, the next scheme presented the GDPs of Greece:
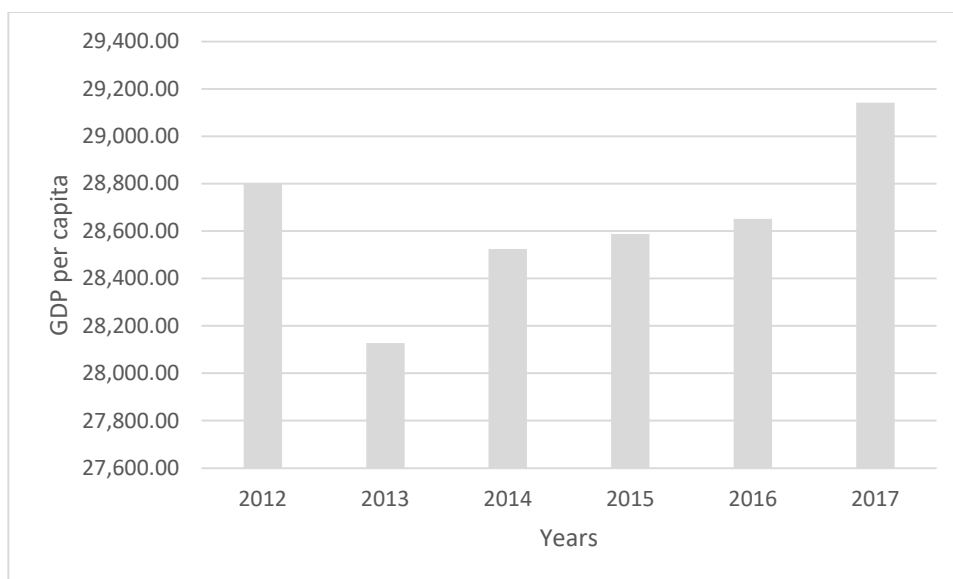

Figure 2. Greece's GDPs per capita (Source: Globaleconomy.com)

Figure 2 presents the condition of the GDPs of Greece's economy for the period from 2012 to 2017. Also, the next scheme presents the GDPs of Greece, for the same period.

According to prior results, the index of Greece's c_y is 14,247,354.51 $

We obtain from the prior results that:

The index of global average c_y is 5,509,172.04 $

Calculating the general index of the cycle of money for the case of Greece and of global view we have that:

- The general index of c_y for Greece is $g_{cyCountry} = 0.72$
- The general index of c_y of global view is $g_{cyAverage} = 0.5$

Therefore, it is concluded that Greece's index cycle of money is above the global average cycle of money. Then, the dynamic of Greece's economy complies with the global average and its structure is near to the initial hypothesis. Then we receive the next scheme:
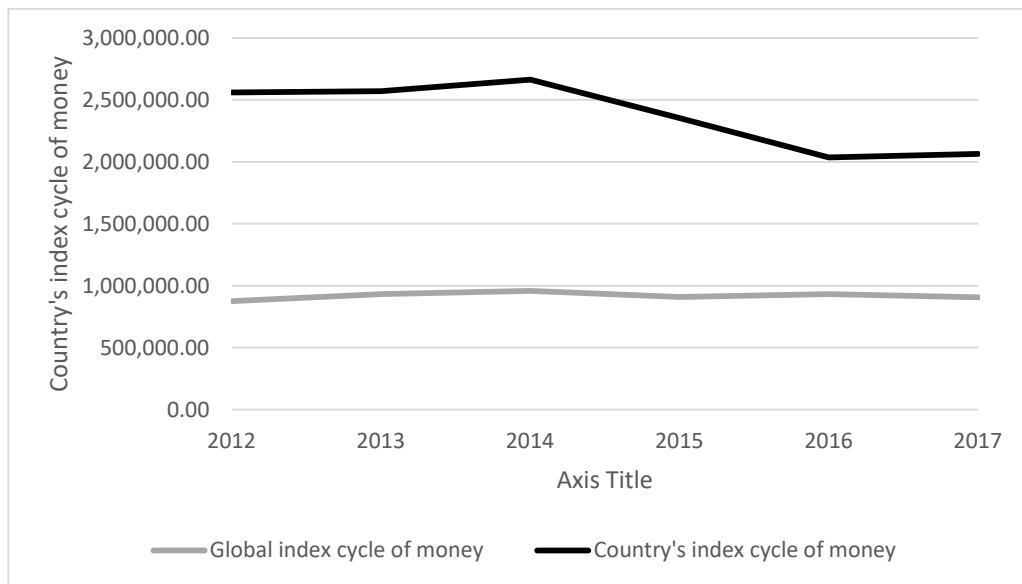
Figure 3. Graph of the index of the cycle of money (Source: author's compilation)

Formed on the prior scheme, it is concluded that the index of the cycle of money of Greece's economy is above the global average of the index of the cycle of money, which is 0.5 (considered as a global constant). Greece's index of the cycle of money is 0.72. Countries over 0.2 can face an economic crisis. As higher is their index, then faster can return to their prior condition. The countries that are near 0.5 have a well-structured economy - standing on eq. (5), according to the theoretical background of the cycle of money. This conclusion means that the economic structure of Greece has an upper distribution of money to its economy. Besides, Greece could proceed to more reforms, as the international and the bigger companies still substitute the local medium and small enterprises. The authorities should apply the fixed-length principle, then higher taxes should be put on the bigger companies. In that way, the distribution of money inside the economy will be increased, and social welfare will be boosted. The government should protect more the small and medium enterprises to avoid losing money from transactions of bigger companies.

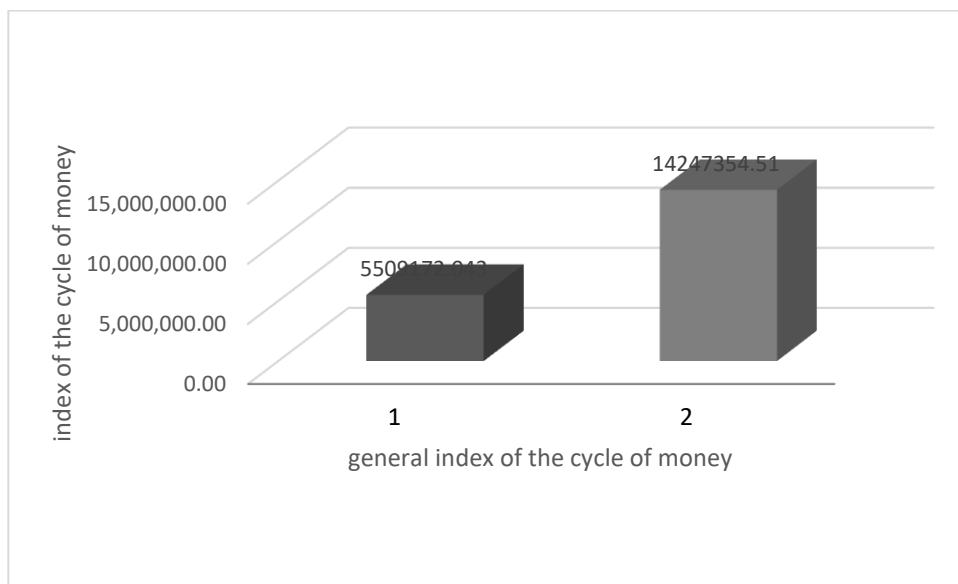The general index of the cycle of money appears to the following figure:

Figure 4. The cycle of money indexes (Source: author's compilation)

The prior scheme has presented the combination of the index of the cycle of money with the case of the general index of the cycle of money. It is represented the affiliation between the global average indexes and Greece's index. Greece is part of the countries which are above the global average index of the cycle of money, both for the simple index and general index.

5. Discussion

The current results reveal that Greece's economic system belongs to the upper level of the cycle of money, then there has an upper dynamic. But, Greece's economy could be improved more. The structure of the economy may be improved, with decrease taxes to the small and medium companies, and an increase of taxes to the bigger companies. The bigger

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companies have to provide economic activities that smaller businesses can't support, then the authorities ought to imply low taxes to know-how companies and factories. Consequently, big companies must no longer replace smaller businesses' activities. The investments of a country are boosted by the increase in the distribution of money. A country with a well-based economic system is a country with a good cycle of money and therefore it can face an economic crisis. Greece's economic system is above the index of common GDP per capita (meaning the value of 0.5), from 2012 to 2017 using the index of average GDP per capita. The branches of international banks if are included in the system of the economy are considered as part of this economy, then as international banks are considered the banks which keep the money outside the economic system of each economy (meaning especially banks of tax heavens or international banks which keep money out of the economies as part of black money and huge amounts of money that will not return to the countries' economies). Moreover, if a country has a low rate of bank deposits per GDP, but comply with the theory of the cycle of money, then it is obvious that there is a problem with black money. The black money increases the cycle of money as in some way is reused to the economy but decreases the cycle of money if is deposited outside the economy. So, black money belongs to the grey area, for the economy. But, in any case, the index of the cycle of money reveals if the economy has black money. In addition, the tax policy if it is not able to identify the bigger companies from the smaller companies, means that has a bureaucratic problem, as these identifications should be directly visible for government's data.

The cycle of money supports the free competition and the tax policy of Fixed Length Principle between the economies, and according to them shows the directions that should be followed to the economy is that companies with big capital should be invested in factories and companies of high technological products, not to substitute products and services that can offer smaller companies. Small and medium enterprises are the most accurate and quick way to develop the private sector to a country, making wider the tax bureau minimizing with that way the taxes.

6. Conclusion

According to the outcomes of the table, Greece is above the worldwide average index of the cycle of money. From figure 2 and figure 3 the index of the cycle of money is revealed Greece's distribution of money is to the most upper rate. The cycle of money of the country permits a very good distribution of money. The losses of the local banks are to a low degree. But, the country's economy could be better due to the fact an amount of money is excluded from the local financial system by worldwide transactions (see table 2). The current model complies with the initial assumption, showing the distribution of money to Greece's economy. Greece's economic system tends in the last years to have the same reuse of money inside the financial system as in the past, as tends to have the same characteristics as a financial system that complies with the idea of the cycle of money. Greece's financial dynamic is above the worldwide average cycle of money, as the value is 0.72 reveals that Greece's economy tends to have a good distribution of money. Other countries' recent results, as the case of Latvia, Serbia, and Bulgaria, revealed that are close to the global general average index of the cycle of money, meaning that their economic structures and economic functionality are well-based and can face a potential crisis of their economies.

At least, the shadow market is not a problem according to the theory of the cycle of money, as critical is to keep the money to a country's economy and not move them outside it. If money stays in an economy, then it is a matter of time to be taxed or by direct or indirect tax. Then, for this reason, international and big companies should be taxed higher than smaller companies, as they substitute their activities and save their money outside the economy. On the contrary, smaller companies use and reuse their money to the economy and save them to local banks, increasing the cycle of money. The finding of 0.72 is a little bit lower than the 0.79, which is about the period of 1980 - 2020. This means that Greece to the crisis period of 2012 - 2017 became a little bit weaker as their rate of the cycle of money declined by 0.07. The finding of 0.72 indicates that Greece has a very good value of the general index of the cycle of money, meaning that the structure of the economy is very well-based. The distribution and reuse of money permitted it to face its strong economic crisis.

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Optimizing university acceleration programs. The case of NKUA's multistage model

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ARTICLE INFO	ABSTRACT
	Purpose: Business accelerators have rapidly emerged as prominent players in the entrepreneurial ecosystem. A key strategic decision in designing acceleration programs is whether to customize or standardize the new venture development program (Cohen et al., 2019). Recognizing a trade-off between customization and standardization, the paper presents a multistage acceleration model aiming to harvest benefits of standardization while keeping several advantages found in tailor-made acceleration programs. **Design/methodology/approach:** The here-proposed 3-stage acceleration model was developed to serve the needs of the recently established business accelerator of the National and Kapodistrian University of Athens (NKUA). As the authors have developed and are currently implementing the 'Archimedes Multistage Acceleration Model' they act as change agents aiming to solve practical problems. This enabled the adoption of an action research approach where the aim is to produce knowledge to change social reality rather than vice versa (Allard-Poesi and Perret, 2003). To that end, the Action Innovation Management Research framework (Guertler et al., 2020) constitutes the basis of this research. **Findings:** The 'Archimedes Multistage Acceleration Model' proposes a 3-stage acceleration program where each stage matches a different level of maturity. For those statups positioned in the first two stages the aim is to progressively (and selectively) assist them through to the next stages. This model may be regarded as a funnel where startups are initially supported in the framework of a highly standardized acceleration program, ending gradually to receive highly tailored-made services. This design serves the needs of university accelerators that target a subset of the local startup ecosystem and aim to foster an entrepreneurship culture.
	Research limitations/implications: 'Archimedes Multistage Acceleration Model' was developed for, and up to this point applied at NKUA for almost a year. It is widely accepted that effectively supporting startups is a long-term process and as such a model serving this purpose requires more time to demonstrate its full potential. Furthermore, the application of the model at other universities will provide further evidence on both its value for other business accelerators and its transferability. **Originality/value:** Despite the growing interest in business accelerators, university accelerators remain an overlooked topic in the literature. The paper proposes a new acceleration model and presents how this is applied in the case of the Archimedes Center of NKUA. The model that harvests benefits of standardization while keeping several advantages found in tailor-made acceleration programs, is especially designed to serve the needs and the objectives of university accelerators.

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1. Introduction

Since the first accelerator program offered by Y Combinator in 2005, accelerators have become popular during the last decade (Cohen et al. 2019a; Hathaway, 2016). They have rapidly emerged as prominent players in the entrepreneurial ecosystem (Hallen, et al., 2019) gradually replacing the up until recently dominant concept of incubator (Pauwells et al., 2016) both in developed as well as emerging markets (Roberts and Kempner, 2017). As a number of studies find a positive impact of acceleration on startups (Winston et al., 2013; Hallen et al., 2019; Dams et al., 2016), accelerators may also regarded as public intervention tools (Sheng et al., 2020) increasing, thus, the 'demand' for designing new accelerator programs (Cohen et al., 2019b). Despite having common elements such as education, coaching, mentorship, networking and financing (Hathaway, 2016), there is significant variation in accelerators along multiple design features (Cohen et al., 2019a).

A key strategic decision in designing accelerator programs is whether to customize or standardize the new venture development program. Cohen et al. (2019b) call this decision 'the extent of customization'. Accordingly, some accelerators encourage ventures to follow individualized programs around their unique knowledge and needs while others standardize the set of activities and sequence the venture development process (Cohen et al., 2019b). We identify this as an important trade-off with serious implications.

Standardization has two interrelated problems. Firstly, startups of different maturity levels essentially end up following a one-size-fits-all program. This could be avoided by choosing startups of a similar maturity level. However, where the 'supply' of quality startups is limited this may hinder the creation of high-quality cohorts. This is especially the case in less developed startup ecosystems (Startup Genome, 2021). Secondly, where tailored programs exist it is ultimately up to the founders to determine which events to attend. But this too has downsides with fewer common activities and, thus, loss of 'peer effect' in mutual learning benefits, as well as in networking (Smith et al., 2016; Miller and Bound, 2011).

Recognizing the trade-off between standardization and customization, the paper aims to present a new multistage accelerator model and how this is applied in practical terms. The here-proposed 'Archimedes Multistage Acceleration Model' aims to harvest benefits of standardization, while keeping several advantages found in tailor-made acceleration programs. This model is highly relevant in less-developed entrepreneurial ecosystems where the supply of startups is limited.

The here-proposed 'Archimedes Multistage Acceleration Model' was developed to address the needs and challenges of the newly established Archimedes accelerator of the National and Kapodistrian University of Athens that is operating in a startup ecosystem under development. As the authors have developed and are currently implementing the 'Archimedes Multistage Acceleration Model' they act as change agents aiming to solve practical problems. To that end, the Action Innovation Management Research framework (Guertler et al., 2020) constitutes the basis of this research.

The rest of the paper is organized as follows. In the next section we review acceleration programs and acceleration programs design. The following part presents the research methodology and in turn the 'Multistage Acceleration Model' along with how it is applied in in the case of the Archimedes accelerator. Finally, findings of the research are discussed. We conclude our study with a brief discussion of the limitations of our study and present directions for future research.

2. Acceleration Programs and Acceleration Programs Design

Entrepreneurship support structures appeared initially at the end of the 1950s in the form of business incubators in the US (Kilcrease, 2012). However, the concept did not receive great attention till the 1980s when gradually a great number of incubators emerged mainly in the US and in Europe (Bruneel et al., 2012). This 1st generation of incubators offered affordable office space and shared resources (Barrow, 2001). As governments in the US and Europe were confronting increased unemployment rates (Reich, 1991) and in parallel new technology-based firms were considered as job creators and economic growth generators (Tether & Storey, 1998), incubators have adapted by enriching their services. They started offering proactive business support, networking, and coaching (Bruneel et al., 2012). However the demand for startup support has further shifted as in the early 2000s the internet had already shortened the product life cycle (Cao & Folan, 2012) and the burst of the 'dot com' bubble decreased considerably funding opportunities for startups (Goldfarb et al., 2007). Responding to this new era, a new concept under the name 'Business Accelerator' was introduced by Y Combinator in 2005 (Hallen et al., 2019). This new concept has shortened the support cycle and provided seed funding to early stage startups. In parallel, the rise of the lean startup approach (see Blank, 2013; Ries 2011; Mayrya, 2012), boosted further the widespread of the concept. The result was a radical shift from incubation to acceleration as the prevailing startup support structure of the 2010s (Pauwels et al., 2016). The main differences between the previous mainstream model of startup support (incubation) and the new one (acceleration) concern the duration of the supporting period, the organizing in cohorts, the business model and the mentorship (see table 1).

Table 1 Difference between incubators and accelerators

	Incubator	Accelerator
Duration	1 to 5 years	3 to 12 months
Cohorts	No	Yes
Business model	Rent; Non-profit	Investment, can also be non-profit

Selection	Non-competitive	Competitive
Stage	Early or late	Early
Education	Ad hoc, human resources, legal	Seminars (mostly mandatory)
Mentorship	Minimal, tactical	Intense, by self and externals

Source: Adapted by Hathaway (2016)

While several initiatives call themselves acceleration programs, not all necessarily meet a set of minimum criteria that would distinguish them from other initiatives, such as incubators, venture studios, startup competitions or angel investors (Cohen et al., 2019a). Accelerators are limited-duration programs that help cohorts of founders to build and launch their ventures (Cohen et al., 2019a). They support early stage startups through education, coaching, mentorship, networking and financing (Hathaway, 2016). Accelerators directly provide capital or alternatively support startups via fund raising (Busulwa et al., 2020) and function as fixed term, cohort-based, and mentorship-driven program with a concluding graduation event (Cohen et al., 2019a). This event takes in most of the times the form of a startup demo-day giving participants the chance to pitch their venture to a large audience including investors (Hathaway, 2016; Cohen, 2013).

Two definition elements distinguish accelerators from other initiatives: the fixed-term and the cohort nature of the programs (Cohen et al., 2019a). During the acceleration period, startups can leverage resources such as education, coaching, mentoring and office space. The fixed-term nature of these ensures that startups are forced to contend with market forces, rather than being sheltered (or incubated) from them (Cohen et al., 2019a). The cohort nature of the acceleration programs aims, on the one hand, to enable basic agglomeration and support across startups (Cohen et al., 2018) and, on the other hand, to enable 'peer effects' in learning and networking (Smith et al., 2016; Miller and Bound, 2011).

Accelerators may be non-profit or for-profit by providing equity and expecting return their investment. Accelerators may vary in the amount of the equity stake taken, in the length of the program, in the availability of co-working space and in industry vertical focus. Accelerators may be affiliated with investor groups or business angels, venture capitals, corporations (corporate accelerators), universities (university accelerators), local governments (e.g. municipality accelerators) or non-governmental organizations (Cohen and Hochberg, 2014). In cases where accelerators are affiliated with a larger organization it is the later that formulates their strategy and, in turn, the design of their program by complementing or even advancing the strategy of the parent organization (Brigl et al., 2017). One such case are also university accelerators. Accelerators operating within a university context aim either to create a valuable experience (Adomdza, 2016), to foster innovation (Wise & Valliere, 2014) or to support technology transfer (Crisan et al., 2021). Despite sporadic effort (see Breznitz & Zhang, 2019; Drori & Wright, 2018; Metcalf et al., 2020; Thomson, 2019; Wright et al., 2017) to explore the phenomenon, little research has been conducted on the operation of university accelerators and how they design their acceleration process as part of the organization's broader strategy (Breznitz &Zhang, 2019).Cohen et al. (2019a) recognize three main design choices in the development of an acceleration program: a) consultation intensity, b) disclosure level and c) extent of customization. The extent of customization, which is the main focus of this research, is about the degree accelerators allow ventures to decide what activities to attend based on their perceived needs. Cohen et al. (2019a) assesses the extend of customization by examining whether accelerator designs require ventures to (1) choose their own mentors or meet with assigned mentors, (2) interact with their cohorts on an ad-hoc basis or attend regularly scheduled peer gatherings, (3) choose which workshops to attend or attend a prescribed set of workshops, and (4) follow a standardized sequence of activities. These four elements related to the extent of customization will be later used to assess the degree of customization of each of the stages of the here-proposed 'Archimedes Multistage Acceleration Model'.

3. Methodology

3.1 An action Research Approach

Action research is a problem-oriented approach to conduct research (Guertler et al., 2020) which provides rigor and relevance (Levin, 2012) and, as such, it responds to recent calls for more problem-based research (Benner and Tushman, 2015). The term 'action research' entails a family of methodologies that pursue action and research simultaneously (Dick, 1997). Just like in the present research, these methodologies implicate researchers who are actors of change that actively participate in the resolution of a specific matter of genuine concern producing results for both academic and practitioner communities (Swann, 2002; Livieratos, 2009).

In the study reported in this paper, all authors are directly implicated in the establishment and management of the business accelerator of the National and Kapodistrian University of Athens and are thus acting as change agents. Aiming to respond to a number of challenges related to the establishment and operation of an accelerator in a large multidisciplinary university, the authors developed the here-proposed 'Archimedes Multistage Acceleration Model'. This enabled the adoption of an action research approach where the aim is to produce knowledge to change social reality rather than vice versa (Allard-Poesi and Perret, 2003). The aim of this paper is to develop and present a model for business acceleration. It is therefore within the scope of this study to deduct knowledge and best practice from addressing a problem. As such, action research is an appropriate approach to use for addressing the research question.

Being part of the broader field of innovation management, business acceleration entails high level of novelty and uncertainty that requires pivots (Hidalgo and Albors, 2008), the problems and the context present a sociotechnical nature of (D'Alvano and Hidalgo, 2012) and it implicates a broad range of stakeholders and relationships (Carayannis et al., 2012). Recognizing the importance of these characteristics for the present research, the Action Innovation Management Research (AIM-R) framework is adopted (Guertler et al., 2020). Based on this framework research is conducted in five phases: 1) Analysis and framing, 2) Project planning, 3) Executing on action, 4) Reflecting and learning, 5) Communicating and pivoting.
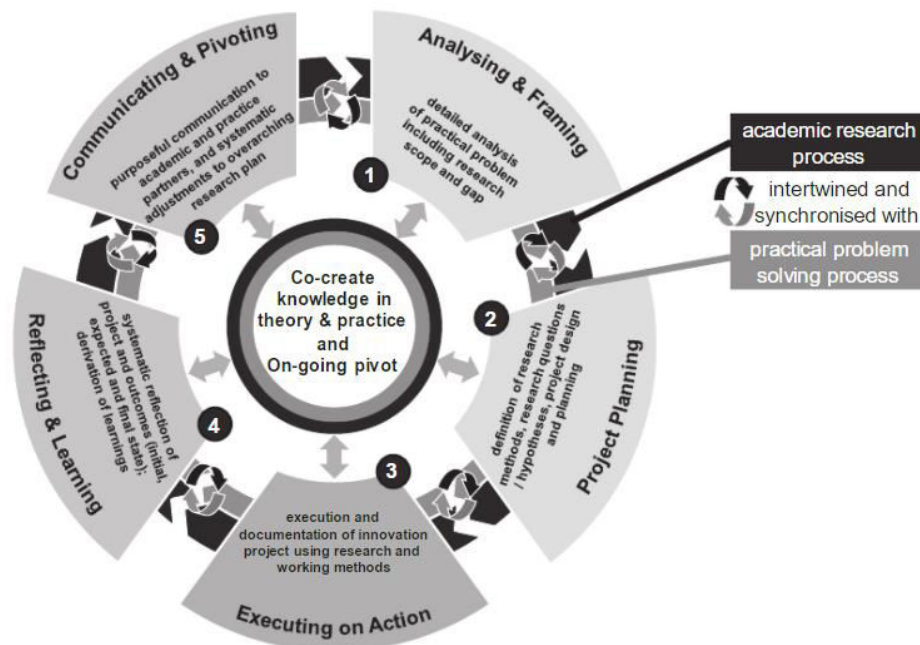

Figure 1: The Action Innovation Management Research framework, Source: Guertler et al., 2020

3.2 The Action Research Process Implemented in this Study

Research setting. NKUA was founded in 1837 and is the oldest university of the Eastern Mediterranean region. Today NKUA has more than 2,200 professors and researchers, 45,000 undergraduates and 24,000 postgraduate students. It offers 41 undergraduate programs and 205 postgraduate programs in a broad range of fields such as biology, medicine, informatics, business administration and literature. In September 2019 NKUA started the operation of the Archimedes Center of Research, Innovation and Entrepreneurship. The Archimedes center offers business acceleration and TT services to all departments and laboratories. As these two activities were considered complementary, they are hosted under the same organization. Following the five-phase AIM-R model proposed by Guertler et al. (2020) the action research was organized and executed as follows.

Phase 1 - *Analysis and Framing.* Prior to the establishment of a business accelerator, startup support was conducted in the framework of an 'executive training' course addressed to startup founders. The "Entrepreneurship in Action" program operating from 2014 till 2018 was a yearly program offering 100 hours of teaching. In parallel, it was offering coaching for developing a business plan and its final event was an open demo day in the form of a startup contest. Operating this program was a valuable experience for the design and development of a university acceleration program. On that basis, the senior management of the University commissioned the head of the "Entrepreneurship in Action" program to set up the Archimedes Center. Interestingly, the provision of technology transfer services was considered as complementary to the support of startups (Livieratos & Dimitrakopoulos, 2020) and to that end both activities were included into the Archimedes Center that started its operation in 2019.

Phase 2 - *Project planning.* The authors undertook the mandate to develop a business accelerator at NKUA. At that point, both authors were already experienced in supporting startups and one of them was actively implicated as instructor and coach at the "Entrepreneurship in Action" program. Project planning included the diagnosis of the current situation. The internal and external environment was analysed as well as national and international best practices. In relation to the internal environment several meetings were organized at all levels (undergraduate and postgraduate students, alumni, professors and administration staff) aiming to recognize 'entrepreneurial intent' in the framework of the university's ecosystem. In relation to the external environment a great number of meetings were organized at national and international level aiming to build a network of stakeholders and/or exchange experiences. A structured literature analysis was initiated from an early stage of this phase. Interestingly, it came out that cooperation among business and the university was a main concern of the Greek entrepreneurship community. A recent study indicated that a great number of firms asked for support in this domain (Katimertzopoulos & Vlados, 2017). Given the limited resources, priorities were set, and in turn, it was decided how acceleration would be offered.

Phase 3 - Executing on action. The diagnostic phase revealed mainly two reasons prohibiting the copy of one of the existing acceleration models in the case of NKUA. The first is that a university accelerator aims besides building startups also to foster an entrepreneurship culture within the university and the second was related to the fact that the Greek startup ecosystem is under development and severely affected by the Greek crisis (GEM, 2019). Adopting a lean startup viewpoint (Blank, 2013; Ries 2011; Mayrya, 2012) on how to initiate actions during the first year of its operation, the accelerator experimented with several models. Initially it started offering mostly tailored-made services, supporting in total 28 startups. On that basis a new multistage acceleration program was designed in mid-summer 2020 and became operational since September 2020.

Given the fact that the accelerator's aim besides supporting NKUA founders is also to foster an entrepreneurship culture in the university's community, awareness raising activities were very important at this stage. The Archimedes team started contacting all professors and especially those that are somehow implicated in business and economics courses (including a handful of entrepreneurship courses). Students from these courses coming from faculties other than business and economics were more interested in starting a company and in turn seek for acceleration services. In parallel, activities beyond the university started taking place. The Archimedes accelerator started taking an active role in the startup ecosystem's events and appeared regularly in the relevant media. As NKUA is quite a big university, it has proven that more than half of the startups have a member that is somehow related to the university. As a result, awareness raising activities generally towards the Athens startup ecosystem were also proven effective.

Phase 4 – Reflecting and learning. The 'Archimedes Multistage Acceleration Model' is operating for more than one year. During this period, the internal and external network that was developed during the previous phases contributed by providing feedback and ameliorating the model. In parallel, the users of the model, namely startup founders have also contributed by providing feedback. In parallel, the model was presented at the ISPIM Conference (December 2020, Livieratos & Siemos, 2020) during which academia and practitioners from the field of innovation management and entrepreneurship provided feedback. Moreover, the here-proposed model was presented in various occasions at national and international level (CIVIS Alliance, GAZELLE EU project) so as to exchange experiences with other similar structures and get feedback.

Phase 5 – Communicating and pivoting. The aim of the present paper is to communicate the 'Archimedes Multistage Acceleration Model' to a wider audience. Moreover, the model will be part of an online toolbox for startup support schemes developed in the framework of the Gazelle project. More feedback is expected by these communication actions that will enable further amelioration of the model and its practical application.

4. The Archimedes Multistage Acceleration Model

The 'Archimedes Multistage Acceleration Model' is developed to address the needs and challenges of the newly established accelerator of the National and Kapodistrian University of Athens (NKUA). The prerequisite for supporting an entrepreneurial team is that at least one of the founders must have some connection to NKUA (student, researcher, faculty member, employee or alumni). Given the nature of the university and the development of the ecosystem, the mandate was to support ventures from all industries with a wide variety in terms of maturity. Moreover, recognizing that the stereotypical role of women in seeking sole careers is preventing future growth in female entrepreneurship (Dimitriadis et al., 2018), special consideration was also given to this type of entrepreneurship as well as to youth entrepreneurship (Karadzic et al., 2015). To that end, the Archimedes accelerator is supporting startups from an early stage prior to incorporation, up to startups that operate up to three years. The following case material offers three key insights into the startup variety:

- Pave Studios is a startup established by a team of three "Escape Room" entrepreneurs and a developer/'escape room enthusiast'. When they entered the Archimedes accelerator, they had nothing else than a vision: "*to digitalize the Escape Room experience and transfer it outdoors*". Approximately ten months later Pave Studios launched their first mobile game entitled "The Timeless".
- Adwork offers artificial intelligence processing for semantic description and object recognition from all kinds of video and embedded marketing techniques to AI-assisted scene recognition supporting Virtual Product Placement. Adworks' founders have long experience in the TV market. When Adwork entered the Archimedes accelerator they had 'verified the problem' and were about to finalize their Alpha version.
- Give Engineering is a startup created by a team of F1 engineers aiming to develop electric scooters. When Give Engineering entered the Archimedes accelerator, they had finalized a working prototype, submitted several patents, raised seed funding, obtained client letters of intent and had prepared a well-written business plan. Their aim was to raise round A to support production and sales.

In support of this diverse audience of startups and in response to the trade-off described earlier, a 3-stage acceleration program was designed. Each stage matches a different level of maturity and has a duration of 4 months. At the end of the 1st stage the output is a validated business model, at the end of the 2nd stage the output is a business plan and at the end of the 3rd stage the aim is funding and/or sales. Startup selection going forward incorporates a maturity assessment to position applicants into one of the three stages. In reference to the above cases, Pave Studios would be positioned into the 1st stage, Adwork into the 2nd stage and Give Engineering into the 3rd stage (see Figure 2).

For those startups positioned in the first two stages the aim is to progressively (and selectively) assist them through to the next stages. Startups entering at any stage are offered mentoring by a pool of mentors, coaching by the accelerator managers, education in the form of workshops and a co-working space to work and meet in their day-to-day activities in the city center of Athens. It is still possible for startups to follow activities from other stages if there are specific gaps identified.
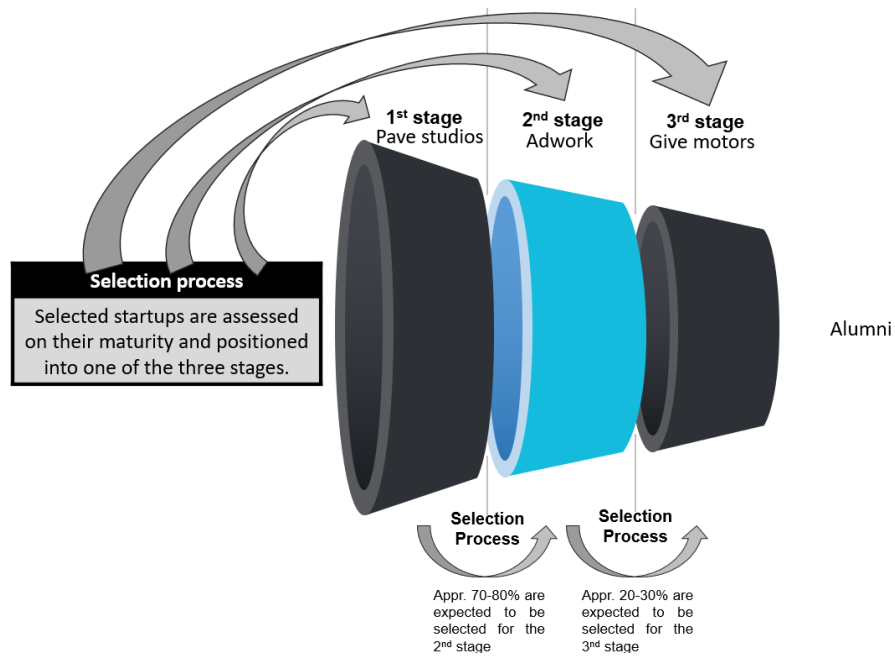
Figure 2: The selection process of the Archimedes multistage model

The modus operandi of the acceleration program for each stage is the following:

1st stage. During the 1st stage startups have to attend ten workshops and have to give-in a deliverable almost every week. At the end of the 2nd month startups get a mentor under the condition that they have handed-in their deliverables. At the end of the 1st stage startups present their venture at an internal demo-day in order to get feedback by the Archimedes team, one or two mentors and the peers of the cohort. Overall, during this stage special consideration is given to enhance creativity of startups that is believed to have a positive impact on innovation activity (Botrić, 2015).**2nd stage**. Approximately 70-80% of the startups coming from the 1st stage will make it to the 2nd stage. The cohort is enriched by those startups that have been selected to directly enter the 2nd stage. During the 2st stage startups have to attend four workshops and have to give-in one single deliverable at the end of the fourth month. In parallel, they are advancing their ventures based on coaching by the acceleration managers and the advice of their mentor(s). Smaller milestones are agreed on a regular basis. The 2nd stage ends with an open demo day attended by investors, venture capitals, corporates and academics.

3rd stage. Approximately 20-30% of the startups coming from the 2nd stage will make it to the 3rd stage. The cohort is enriched by those startups that have been selected to directly enter the 3rd stage. Activities at this stage are fully customized based on coaching by the acceleration managers and the advice of their mentor(s). The main aim for startups entering this stage is sales and/or funding. Figure 3 presents the structure and the timeframe of the multistage acceleration model as well as the objectives, the workshops and the deliverables for each stage.
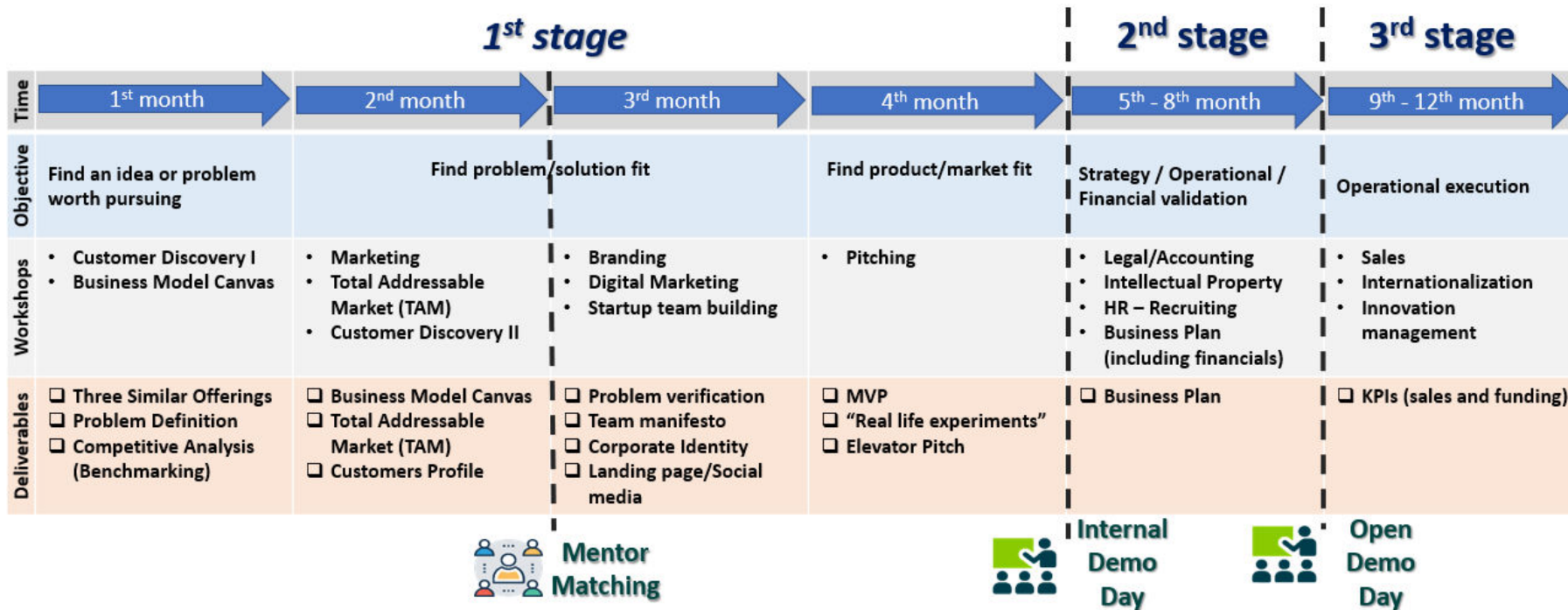
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Figure 3: NKUA's Archimedes multistage acceleration program

Under this model, there are three call-outs per year for potential startup participants. Having three call-outs per year results that the Archimedes accelerator works simultaneously with all stages all around the year. Following Cohen et al. (2019b) we assess the extent of customization of the multistage acceleration model by examining for each one of the stages whether startups:
(1) choose which workshops to attend or attend a prescribed set of workshops,
(2) choose their own mentors or meet with assigned mentors,
(3) interact with the startups of their cohorts on an ad-hoc basis or attend regularly scheduled peer gatherings, and
(4) follow a standardized sequence of activities.
Table 2 presents the design choices of the multistage acceleration model in relation to these four design elements.

Table 2 The extend of customization per stage

	1st stage (4 months)	2nd stage (4 months)	3rd stage (4 months)
(1) Workshops	Teams have to attend 20 hours of workshops. Teams may also attend workshops of the other stages if necessary. Workshops take place on Tuesdays.	Teams have to attend 12 hours of workshops. Teams may also attend workshops of the other stages if necessary. Workshops take place on Wednesdays.	Teams may attend 9 hours of workshops. Workshops are not mandatory at this stage. Teams may also attend workshops of the other stages if necessary. Workshops take place on Thursdays.
(2) Mentors	Mentors are assigned at the end of the 2nd month to the teams that have successfully completed their deliverables up to that point. Acceleration managers discuss the needs with startups and propose mentor-startup pairs. Both parties have to agree on the matching. As the network of the university is extensive, in some cases acceleration managers are looking for help beyond the existing pool of mentors.	Teams coming from the 1st stage keep their mentor. In some cases, as the venture progresses, additional mentors with different expertise might be assigned, if needed. Mentors are assigned directly for those entering directly the 2nd stage and the process is the same as in the 1st stage.	Teams coming from the 2nd stage keep their mentor. Just like in the 2nd stage, in some cases, as the venture progresses, additional mentors with different expertise might be assigned, if needed. Mentors are assigned directly for those entering directly the 3rd stage and the process is the same as in the 1st stage.
(3) Interaction with cohort	Teams interact with other members of the cohort during workshops, during other events and at the co-working space. Accelerator managers initiate interaction in case of complementary knowledge.	Same as in the 1st stage.	Same as in the 1st stage. Unlike the 1st stage attending workshops is not mandatory.
(4) Sequence of activities	Standardized sequencing. Startups have strict deadlines to gradually hand-in 12 deliverables. Activities are organized around these deliverables.	Partial standardization, in the sense that startups have to hand-in one deliverable at the end of the 2nd stage (fully structured and sufficiently documented business plan). Besides the activities that are related to the deliverable, all other activities are customized.	Activities are fully customized according to the needs of the startup, based on management consulting experience from the acceleration managers.

5. Discussion

The Archimedes accelerator of the National and Kapodistrian University of Athens has a relatively small pool of startups that it can choose from for two reasons. The first is that it operates in an entrepreneurial ecosystem under development that is coming out of almost a decade of economic crisis (GEM, 2020; Karafolas and Woźniak, 2020). The second is related to its nature as a university accelerator. In order to be eligible to apply for the Archimedes accelerator, startups need to have at least one member that is somehow connected to the university (alumni, student, faculty, researcher or employee). Targeting a subset of an entrepreneurial ecosystem under development and aiming

to formulate high-quality cohorts, it was decided to open-up to startups that have a great variety in terms of maturity and derive from all sectors.

Accepting startups with different levels of maturity makes it difficult to design a highly standardized acceleration program. A customized acceleration program is equally not serving the needs of NKUA's accelerator mainly because of the loss of the 'peer effect'. The 'peer effect' was evaluated as too important to neglect, especially in the framework of a university that seeks, among other things, to enhance the community effect and support the creation of entrepreneurial spirit among its members. As a result, it was decided to design an acceleration program that aims to harvest benefits from both design types.

The Archimedes multistage acceleration may be regarded as a funnel where startups are initially supported in the framework of a highly standardized acceleration program offered in Stage 1, ending gradually to receive highly tailored-made services in Stage 3. Choosing to start with a standardized acceleration program is mainly related to the fact that the vast majority of NKUA's founders have neither prior entrepreneurial, nor a business background. Their ideas are unique, but the process they follow is recognized as being very similar. To this end, having a standardized acceleration program during the 1st Stage aims at helping startups establish their own learning curve, becoming thus able to gradually find their own way. Moreover, it is worth adding that every cohort has a number of drop-outs. Previous experience shows that the standardization of activities leads drops-outs to leave earlier. *"Failing fast and cheap"* serves both the startups and the accelerator.

6. Limitations and further research

'Archimedes Multistage Acceleration Model' was developed for, and up to this point applied at NKUA for almost a year. This poses both limitations and directions for future work. It is widely accepted that effectively supporting startups is a long-term process and as such a model serving this purpose requires more time to demonstrate its full potential. Furthermore, the application of the model at other universities will provide further evidence on both its value for other business accelerators and its transferability. Despite these limitations, we firmly believe that the current experience constitutes a solid base that enables the communication of 'Archimedes Multistage Acceleration Model' in various ways, among others with this publication, supporting thus not only its dissemination but also its enhancement, its application and its transferability.

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The Role Of Institutional Conditions In The Impact Of Economic Growth On Poverty

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ARTICLE INFO	ABSTRACT
	Purpose: According to the New Institutional View, the main reason for the great difference between countries in terms of growth, development and economic welfare is their institutional structures and foundations. Creating a stable structure in human relationships, institutions reduce insecurity, transaction costs and increase people's motivation. In this regard, the present study examined the role of institutional conditions in the impact of economic growth on poverty in middle and high per capita income countries from 2004 to 2017. **Design/methodology/approach:** This study was conducted by the panel threshold approach and the general index of good governance was used to measure the institutional quality, calculated using the weighted average of the six governance indices of the World Bank. **Findings:** The threshold value in this model is -1.0583, indicating that when the good governance index crosses this threshold and the institutional quality improves, economic growth will reduce poverty to a greater extent. **Research limitations/implications:** In this study, we faced data limitations on poverty, and many countries did not have continuous annual data. **Originality/value:** To my knowledge, no study has been conducted yet on the role of institutional quality in the impact of economic growth on poverty. Therefore, this study enhances our understanding of the importance of institutions and their effect on the relationship between economic growth and poverty.

1. Introduction

Recession, high rate of unemployment, corruption, and other social and economic factors have left low-income households in poverty in most countries and they do not enjoy the benefits of economic growth, so in recent years the issue of poverty eradication has been considered and the support of the United Nations and its affiliates has put this issue on the agenda of governments in most countries. Hence, various studies have been conducted in different countries on how to reduce poverty, most of which have mentioned economic growth as the main solution to reduce poverty (Lyubimov, 2017).

However, there is intense debate over the extent to which the poor benefit from this growth. some economists believe that liberal economic policies should be supported to provide an opportunity to increase the income of the poor. But another group believes that the benefit of economic growth for the poor are undermined or even offset by sharp increase in inequality (Dollar and Kraay, 2002).

with the rising differences between countries in terms of economic growth and poverty, economists sought to find the reason for these differences.

In 1973, North and Thomas suggested that countries' institutional structures and foundations are one of the most important reasons for the great differences between them in terms of growth, development and economic welfare (Acemoglu et al., 2005).

Therefore, a new approach known as New Institutional Economics was introduced to the economics literature.

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According to North (1990), "institutions are the rules of the game in society; or more formally, they are humanly devised constraints that shape human interaction. Hence, they structure in human exchange, whether political, social or economic."

Institutions and the type of governance of a country are among the primary and main factors determining the incentives of individuals to invest in and acquire the skills that all these factors lead to economic success in more production, higher income, and better economic well-being in the long run. In other words, good governance means good public service, marketization, and rule of law, et al., which encourage the "helping hand" of power or inhibit the "grabbing hand" of power, resulting in good economic performance (Liu et al., 2018). North (1990) believed that Institutional quality limits corruption and inefficiency in government bureaucracy since good and stable institutions encourage more private investment (Assadzadeh & Pourqoly, 2013). Keefer and Knack (1997) argued that poor institutional quality undermines the security of property rights (Perera and Lee, 2013). Moreover, poor institutions allow and encourage unproductive activities which can slow down economic growth as resources are driven away from the most productive activities (Dhrifi, 2013). Dellepiane-Avellaneda (2010) maintained that more strictly follow certain rules of good governance, can develop faster, and use available resources more efficiently to help the most vulnerable in the society (Jindra & Vaz, 2019).

In this regard, the present study aimed to determine the effect of the institutional condition on the relationship between economic growth and poverty. Also, as part of this research, we have tried to contribute to solving the fundamental question: a better institutional condition will improve the effect of economic growth on poverty reduction?

It is important to note that one of the limitations we face in this research, is the lack of poverty data which makes our sample and time period smaller. According to data limitation, 53 middle and high per capita income countries were studied from 2004 to 2017 using econometric models. The names of these countries are given in Table 1.

Table 1: List of countries

High- income economies	Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Panama, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Uruguay
Upper- middle-income economies	Argentina, Armenia, Belarus, Brazil, Bulgaria, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, Indonesia, Iran, Kazakhstan, Paraguay, Peru, Russia, Thailand, Turkey
lower-middle-income economies	Bolivia, El Salvador, Honduras, Kyrgyzstan, Moldova, Ukraine

This section reviews the research design and the second section explains the research background. Then, in the third section, the research method and the proposed model are presented. The fourth and fifth sections also include model estimation and the analysis of results, summary, and research suggestions, respectively.

2. Review of Literature

2.1 Theoretical Review
In recent decades, many economists have come to believe that low economic growth rates are the reason for the spread of poverty, stating that higher growth could solve the problem of unemployment and poverty. During these years, no attention was paid to how the benefits of growth were distributed, and development was considered equivalent to increasing national production. Hence, much research has been conducted on the relationship between growth and poverty, in which economists have sought to answer the question of whether the main effect of growth and its benefits go to the poor or the most of its benefits are absorbed by the rich and low-income people benefit to a lesser extent? Based on these studies, in analyzing the relationship between economic growth and poverty, three concepts have been developed, including Trickle-Down Growth, Immiserizing Growth, and Pro-Poor Growth.
In Trickle-Down Growth, the benefits of economic growth are gradually and indirectly transferred from the rich to the poor, so that, first, the rich enjoy the benefits of growth and then by spending money, the poor also benefit. In this case, although economic growth reduces poverty, the benefits of the poor are less than those of the rich, and economic growth will lead to increased inequality (Kakwani and Pernia, 2000).

Immiserizing Growth was suggested by Bhagwati (1988) in the context of the Green Revolution and states that economic growth increases poverty. In this case, income inequality increases so much that it offsets the effect of poverty reduction (ibid.).
In Pro-Poor Growth, definitions are divided into two categories. One group pays attention to changes in inequality along with economic growth, but the other group considers economic growth only to refer to the term pro-poor (Kraay, 2006).

Thus, as growth theories could not explain the low and unsustainable economic growth of poor countries and there are different and sometimes contradictory theories about the impact of economic growth on poverty,

institutional and political approach to growth and development was raised after the second half of the twentieth century. According to this theory, capital accumulation, innovation, education, etc. are among the superficial reasons for growth and institutions are the main or fundamental factors in the growth and development of countries (Acemoglu et al., 2005). New institutional economists believed that improving indicators of good governance is a necessary condition for creating the institutional conditions of lowering transaction costs and thus a competitive market is conducive to increasing the efficiency in the allocation of resources and the pace of economic growth (Mira & Hammadache, 2017).

Institutions not only affect economic performance but also play a significant role in determining the consequences of growth and poverty. According to Tebaldi and Mohan (2010), institutional quality affects the level of poverty through market inefficiency and misallocation of resources. Efficient governments are more successful at providing basic services and access to public goods, thereby improving well-being and increasing social equity (Jindra & Vaz, 2019). Conversely, inefficient institutions and poor governance cause public resources to be spent in the interests of the rich, ignoring the needs of lower-income deciles such as health, education, skills, and, consequently, finding a suitable job. Hence, unemployment increases in this group and leads to the aggravation of poverty. In summary, the relationship between institutions, economic growth, and poverty can be shown as follows:

Figure 1: Relationship between institutions, economic growth and poverty
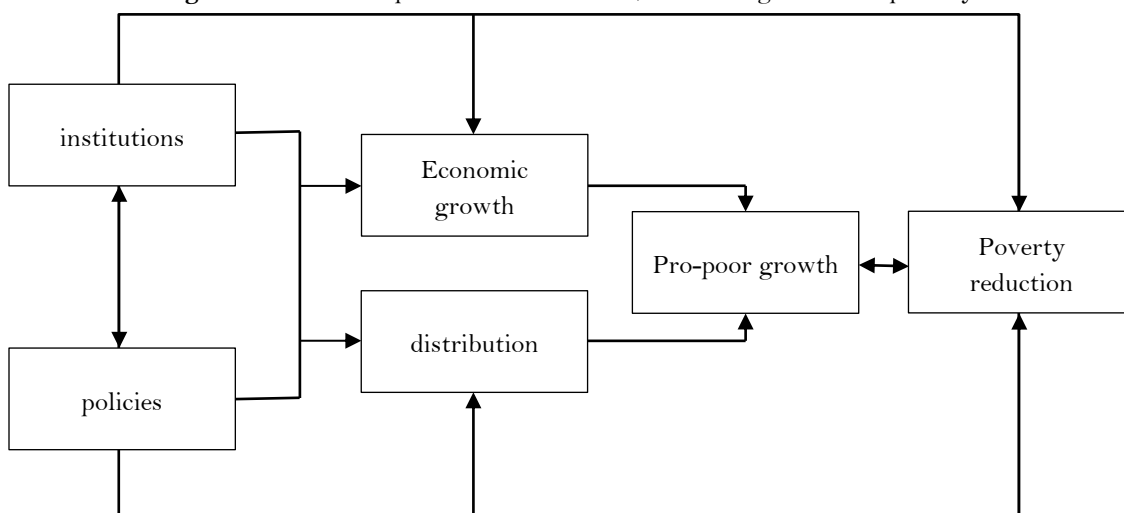
Adapted from Asian Development Bank (2002)

As shown, institutions affect poverty both directly and indirectly through economic growth and income distribution (Asian Development Bank, 2002).

In general, to achieve the benefits of economic growth and meet the challenges of development, countries need institutional structures that support the market economy, and this requires two types of institutions: (1) Institutions that foster exchanges through building trust and reducing transaction costs. (2) Institutions that influence the state to protect private property rights (Shirley, 2008).

2.2 Previous studies
Numerous empirical studies on institutions and their impact on economic growth have been conducted using various institutional indicators and in all of them, it has been stated that the reason for the difference in capital accumulation, productivity, and as a result, production per capita among countries fundamentally depends on differences in country's economic and institutional infrastructure. Institutions and government policies determine the economic environment within which individuals accumulate skill, and firms accumulate capital and produce output (Barro, 1991; Knack and Keefer, 1995; Hall and Jones, 1999; Kaufmann and Kraay, 2002; Easterly and Levine,2003; Assane and Grammy, 2003; Acemoglu et al., 2005; Nsiah and Fayissa (2010), Tariq et al., 2016; Huang and Ho, 2017; Almeida, 2020).

On the other hand, some studies have attempted to find the relationship between institutional quality and poverty. In 2010, Tebaldi and Mohan using eight institutional variables and the instrumental variable method examined the impact of institutions on poverty, they showed that the economy, with a robust system to control corruption, an effective government, and a stable political system improves economic growth and reduces poverty. Corruption, ineffective government, and political instability not only damage income distribution through market inefficiency but also increase poverty by increasing income inequality. Later, Perera and Lee (2013) showed that although improvements in government stability and law and order are found to reduce poverty, improvements in the level of corruption, democratic accountability, and bureaucratic quality appear to increase income inequality and poverty levels. Cuestas and Intartaglia (2016) asserted that better institutional quality reduces poverty in cross-section

analysis. In another paper, Siddique et al. (2016) examined the relationship between governance and poverty alleviation. They claimed that institutions, directly and indirectly, affect poverty and education. Jindra and Vaz (2019) had also stated that although good governance can reduce multidimensional poverty, institutional reform alone may not have the desired results for all countries.

In summary, most studies emphasize the positive role of institutional quality in economic performance and state that better institutional conditions improve economic growth and reduce poverty by providing a conducive environment for economic activities. It should be noted, however, no study has been conducted yet on the role of institutions in the relationship between economic growth and poverty.

3. Methodology

Since threshold models are used to investigate the nonlinear and asymmetric behaviour of independent variables on the dependent variable, in this study, the panel threshold econometric model was used.

The threshold regression method was developed by Hansen (1999) for non-dynamic panels with individual fixed effects.

The structure of this model is such that each observation can be divided according to the value of an observed variable called the threshold variable. The structural form of this model is as follows:

$$Y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \qquad (1)$$

In this equation, i represents the individual and the subscript t represents time, y is the dependent variable, x is the column vector of explanatory variables. Here q_{it} is the threshold variable, γ is the threshold value and $I(.)$ is the indicator function and the observations are divided into two regimes based on whether the threshold variable (q_{it}) is less or more than the threshold value (γ). These regimes are characterized by differences in regression slopes β_1 and β_2. It should be noted that the elements x_{it} should not be time-invariant to identify β_1 and β_2. It is also assumed that the threshold variable is also not time-invariant. For error term e_{it}, it is also assumed that it is independent and identically distributed (iid) with mean zero and finite variance σ^2.

An alternative intuitive way of writing (1) is

$$y_{it} = \begin{cases} \mu_{it} + \beta_1' x_{it} + e_{it}, & q_{it} \leq \gamma \\ \mu_{it} + \beta_1' x_{it} + e_{it}, & q_{it} > \gamma \end{cases}$$

Another compact representation of (1) is to set

$$x_{it}(\gamma) = \begin{pmatrix} x_{it} I(q_{it} \leq \gamma) \\ x_{it} I(q_{it} > \gamma) \end{pmatrix}$$

And $\beta = (\beta_1' \ \beta_2')'$ so that (1) equals

$$y_{it} = \mu_i + \beta' x_{it}(\gamma) + e_{it} \qquad (2)$$

What is important in this model is to estimate the value of γ, so that observations can be divided accordingly. For this purpose, Chan (1993) and Hansen (1999) proposed the least- squares method. This method is possible by minimizing the sum of squared errors. Hence, the estimation of γ will be as follows:

$$\hat{\gamma} = \arg_\gamma \min S_1(\gamma) \qquad (3)$$

It is undesirable for a threshold $\hat{\gamma}$ to be selected which sorts too few observations into one or the other regime. This possibility can be excluded by restricting the search in (3) to values of γ such that a minimum percentage of the observation (say, 1% or 5%) lie in each regime.

Once $\hat{\gamma}$ is obtained, the slope coefficient estimate is $\hat{\beta} = \hat{\beta}(\hat{\gamma})$. The residual vector is $\hat{e}^* = \hat{e}^*(\hat{\gamma})$ and residual variance

$$\hat{\sigma}^2 = \frac{1}{n(T-1)} \hat{e}^{*'} \hat{e}^* = \frac{1}{n(T-1)} S_1(\hat{\gamma}). \qquad (4)$$

When the threshold value is determined, the significance of the threshold should be statistically examined. At this stage, it should be tested whether the coefficients β_1 and β_2 are significantly different from each other or not. The statistic used in this case is F statistic:

$$F_1 = \frac{S_0 - S_1(\gamma)}{\hat{\sigma}^2} \qquad (5)$$

Where $S_0 = \tilde{e}^{*'} \tilde{e}^*$ is the sum of squared errors. The distribution of F_1 is nonstandard and depends on the moments of the sample (Hansen,1996). As a result, it is not possible to calculate its critical values in a general form. Hansen (1999) suggests using the below bootstrap procedure for examining the significance of F_1: (1) by minimizing the sum of squared residuals, the threshold value, and the corresponding coefficients are estimated; (2) a new sample, with the residuals of the first stage, is generated under the supposition of the null hypothesis (the explanatory variables are supposed to be nonstochastic, so they do not change). With this sample, the coefficients and residuals are estimated under the null and alternative hypotheses. Then, the simulated F_1 statistic is calculated, and (3) the above calculations are repeated many times. Using the simulated F_1 critical values of F and bootstrap p-value will be calculated. Finally, a p-value is a percentage that the simulated F_1 exceeds the actual value. This will be the estimation of asymptotic p-value under H_0. Now, if this percentage is lower than the considered significance level (i.e. 5%), the null hypothesis will be rejected (Hajamini, 2014).

While there is a threshold, rejecting the null hypothesis $H_0: \beta_1 = \beta_2$, Hansen (1999) indicated That $\hat{\gamma}$ would be a consistent estimation of the true threshold (γ), but its asymptotic distribution will be nonstandard. He suggested using the likelihood ratio for constructing the confidence interval. The null hypothesis for the true threshold test will be $H_0: \gamma_1 = \gamma_2$, so the likelihood ratio would be in the form below

$$LR_1(\gamma) = \frac{(S_1(\gamma) - S_1(\hat{\gamma}))}{\hat{\sigma}^2} \qquad (6)$$

The probability of rejecting the null hypothesis increases with the value of this statistic. Hansen (1999) showed that under some assumptions, this statistic converges in distribution to the random variable ξ which have the probability distribution of $P(\xi \leq x) = (1 - \exp(-x/2))^2$ and its reverse distribution is $c(\alpha) = -2\log(1 - \sqrt{1 - \alpha})$. This function can be used to estimate the critical values. Provided that $LR_1 \leq c(\alpha)$, the confidence interval $(1 - \alpha)\%$ will be made for the sum of squared residuals and consequently the threshold.

It should be noted that the hypothesis $H_0: \beta_1 = \beta_2$ is different from the hypothesis $H_0: \gamma_1 = \gamma_2$. The F_1 statistic is used to test the presence of the threshold, while the LR_1 statistic is used for constructing the confidence interval of the present threshold (Hajamini, 2014).

If the existence of the first threshold is statistically confirmed, the model should be estimated by two and/or three thresholds and the significance of the thresholds should also be tested (Hansen, 1999).

3.1 Analytical model and data

It seems that the large differences in the nature and performance of institutions in different countries are one of the most important reasons for the difference in the rate of economic growth and its impact on poverty. Therefore, the main issue of this research is how economic growth affects poverty in different institutional conditions. Since threshold models are used to investigate the nonlinear and asymmetric behavior of independent variables on the dependent variable, in this study, the threshold panel econometric model was used to show different institutional conditions (Hansen, 1999). According to the theoretical foundations, the following equation was developed to answer the question.

$$PH_{it} = \mu_i + \alpha_1 INF_{it} + \alpha_2 POP_{it} + \alpha_3 HC_{it} + \alpha_4 FDI_{it} + \alpha_5 LOGGDPpercapita_{i,t} * I\left(INS_{i,t} \leq \gamma\right) +$$
$$\alpha_6 LOGGDPpercapita_{i,t} * I\left(INS_{i,t} > \gamma\right) + \varepsilon_{it} \qquad (7)$$

In this study, the poverty headcount index was used to measure poverty. According to the World Bank's definition, poverty headcount is "the percentage of the population whose income is below the poverty line". Poverty index data were collected from the World Bank's database from 2004 to 2017 and the poverty index was considered $ 3.20 per day according to the poverty line. Institutional quality, which is considered as a threshold variable, was obtained based on the principal component analysis method to calculate the weighted mean of six indicators of good governance (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption) provided by the World Bank. It should be noted that each of the six governance indicators is in the range of -2.5 to +2.5, which a higher value means a more desirable result for that country. To measure economic growth, which is considered a regime-dependent variable, the logarithm of gross domestic product per capita (at constant 2010 prices in US dollar) was employed. Control variables, including inflation rate, population growth rate, and foreign direct investment were obtained from the World Bank's website and human capital variables were obtained from the University of Pennsylvania's website.

4. Results

Before estimating the model, Hausman (1987) test was used to determine the fixed and random effects. The null hypothesis in this model states that there is no correlation between the individual effects and the explanatory variables. According to the results in Table 2, the null hypothesis of orthogonality is rejected, and thus the existence of fixed effects is confirmed.

Table 2: Hausman test

Chi-Square Statistic	P-Value
307.31	0.00

Source: Research Data

For model estimation, we use *xthreg* command in Stata.

In this model, first, the threshold value is estimated by the ordinary least squares method, then the result of the threshold significance test is presented to ensure the validity of the econometric method of panel threshold. The results of these tests are presented in the following tables:

Table 3: Threshold significance test results

Hypothesis testing	F-stat	P-value	Critical values at 10%	Critical values at 5%
H_0: No threshold H_1: One threshold	62.11	0.01	42.84	53.66

H_0: One threshold H_1: Two threshold	37.37	0.11	41.01	51.07

According to the results of this test, the existence of the first threshold is statistically confirmed (it is significant at the level of 5%), but according to the bootstrap P-Value in the second case (0.11), the existence of the second threshold cannot be accepted. The threshold value and the confidence interval are shown in the following table.

Table 4: Threshold values and confidence interval

Model	Threshold Value	95% Confidence Interval
Model with one threshold	-1.0583	[-1.0734, -1.0571]

The threshold value in this model is -1.0583, meaning that when the good governance reaches this point, the function breaks and the coefficient of economic growth will change. According to the table above, the 95% confidence interval for the first threshold is [-1.0734, -1.0571]. To construct this confidence interval, the likelihood ratio is estimated for different threshold values under the null hypothesis $H_0: INS = INS_0$, then the threshold values with a likelihood ratio of less than or equal to $C(\alpha)$ $(LR1(\gamma) \leq C(\alpha))$ are then considered as confidence intervals (Hansen, 1999).

After confirming the existence of threshold and determining the number of thresholds, the results of model estimation were obtained, which are presented in the table below. In this model, the weighted mean of six indicators of good governance was used as the threshold variable to investigate the role of institutional conditions in the impact of economic growth on poverty.

Table 5: Model estimation results

	Coefficient	P-Value	Std. error	t statistic
LOGGDP(INS≤-1.0583)	-50.41	0.00	8.11	-6.21
LOGGDP(INS>-1.0583)	-51.89	0.00	8.13	-6.38
INF	0.004	0.88	0.03	0.15
POP	1.003	0.01	0.38	2.58
HC	-3.63	0.32	3.67	-0.99
FDI	-0.005	0.00	0.002	-2.74
Constant	228.91	0.00	29.69	7.71

As seen, the economic growth coefficient before and after the threshold is different and significant. The estimation results indicate that there is a significant negative relationship (at the level of 5%) between economic growth and poverty in the two regimes. In the first regime, the effect of economic growth on the poverty headcount is estimated to be -50.41. But with the improvement of the good governance index and cross the threshold (-1.0583), the coefficient increases. In fact, in this case, the impact of economic growth on the poverty headcount is -51.89. Regarding the negative coefficient of economic growth, this variable reduces poverty by creating opportunities to meet basic needs and earn more money for the poor, which also confirms the theory of pro-poor growth. According to this definition, pro-poor growth occurs when economic growth reduces poverty. In this definition, no attention is paid to changes in income inequality. On the other hand, institutions are said to be the fundamental determinants of economic growth and development of societies, which not only determine integrated economic growth but also determine the outputs of the economy, such as distribution of resources in the future (such as the distribution of wealth, physical or human capital) (Acemoglu et al., 2005). In other words, institutions not only determine the size of the aggregate pie but also determine how this pie is divided among different groups and individuals in society (ibid). Low institutional quality affects economic growth and poverty through market inefficiency and misallocation of resources (Tebaldi and Mohan, 2010). Governments can also help increase production and investment, employment, and reduce unemployment, and thus reduce poverty by improving governance indicators. As a result, good governance is essential to reducing poverty. As seen in this model with the improvement of institutional quality and regime change, the impact of economic growth on poverty also increases, meaning that if the institutional quality exceeds the threshold of -1.0583, through increasing participation of people in economic activities, reducing corruption, political stability, government efficiency, and effectiveness, and optimized resource allocation prepare the condition for improving economic growth and its outcomes, such as poverty reduction.

Reducing the purchasing power of the poor, inflation increases income inequality and poverty (Law and Soon, 2020), but in this model, inflation has no significant effect on poverty.

In the estimated regression, the population growth coefficient is 1.003. Assuming the stability of other variables, a one percent increase in population growth increases poverty by 1.003 percent. Some believe that one of the reasons for structural unemployment is population growth, so population growth and consequent unemployment will worsen the situation of the poor. On the other hand, population growth has been recognized as one of the major and most

effective factors in reducing per capita income and consequently reducing the standard of living and public welfare (Ahlburg, 1996).

Although it is expected that by increasing human capital and increasing the capabilities of individuals, they will have the opportunity to find better jobs with higher incomes and poverty will reduce, the insignificant coefficient of this variable is not far from expected, as governments pay more attention to providing conditions for increasing education and have neglected to create jobs for educated people. Therefore, these countries have not been successful in using the benefits of increased education to reduce poverty.

Many economists believe that foreign direct investment with a positive impact on growth and development and through job creation leads to increased income of people and reduced poverty, but in this model the coefficient of this variable is very small. Assuming other conditions are stable, a one percent increase in foreign direct investment will reduce poverty by 0.005 percent.

5. Conclusion

Good governance is very important for economic performance, it will enable the economy to grow more and reduce poverty. In this paper, the role of institutional quality in the impact of economic growth on poverty was studied in the form of a panel threshold econometric model from 2004 to 2017. The results indicate the positive role of institutional quality in the impact of economic growth on poverty. In this model, the threshold value is set at -1.0583. The results show that when the good governance index crosses this threshold and the institutional quality improves, the impact of economic growth on poverty also increases, meaning that at a better quality of institutions, economic growth reduces poverty to a greater extent.

These results confirm theories about the fundamental role of institutions in economic growth and development

and their consequences. Also, these results are in line with the ideas of Tebaldi and Mohan (2010) and Acemoglu et al., (2005). According to these studies, institutions pave the way for economic growth and its consequences, such as poverty reduction by creating a suitable environment for people to participate more in economic, social, and political activities, reducing corruption, political stability, government efficiency, and effectiveness and optimal resource allocation. In addition, when there are effective economic, social and political institutions, it can be expected that the development of technology, introduced in endogenous growth theories as to the engine of economic growth, will improve economic growth. Furthermore, governments can increase investment and production, as well as increase employment and reduce unemployment by improving governance indicators, thereby helping to reduce poverty.

The results and lessons above lead to some policy implications: Firstly, governance quality should be improved continuously to promote economic performance and poverty reduction programs. On the other hand, more attention should be paid to the weak aspects of governance and try to do governance reforms.

In the present study, due to the existing limitations, the focus is on cross-country analysis, but it seems that future research should study every country separately and consider the effect of every component of good governance on the relationship between economic growth and poverty.

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