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Contents

	Title	Page
1	An empirical study of the relationship between Foreign Direct Investments, Remittances, Political Stability and Economic Growth in Greece Paraskevi Bantimaroudi ¹ , Petros Golitsis ² , Mila Mitreva ³	1-19
2	EMPIRICAL ANALYSIS OF COVID-19 CRISIS EFFECTS ON THE WB6 REGION Darko Lazarov ¹ , Emilija Miteva-Kacarski ² , Misho Nikolov ³	20-28
3	Methods and policies for inventory management Kamelija Trajanova ¹ , Janka Dimitrova ²	29-44
4	Supply chain mapping as advanced business model Riste Temjanovski ¹ Janka Dimitrova ²	45-54
5	Logistics costs and their impact on performance Monika Arsova ¹ , Riste Temjanovski ²	55-67
6	Mass media usage from emerging adults in times of crisis: evidence from the COVID-19 pandemic Tamara Jovanov Apasieva ¹ , Katerina Fotova Čiković ² , Mila Mitreva ³ , Monika Arsova ⁴	68-82

An empirical study of the relationship between Foreign Direct Investments, Remittances, Political Stability and Economic Growth in Greece

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This study attempts to shed light on the relationship between FDI, remittances, Gross Fixed Capital Formation, political stability, inflation and economic growth for the case of Greece, using time-series data of annual frequency, covering the period from 1980 to 2018; the end date is the last year before the COVID-19 and the 2022 Russian Invasion of Ukraine which caused a structural break on the data set. After establishing that the investigated variables are stationary in level or in their differences, and once the Johansen test and the residuals based approach to cointegration are employed in capturing the cointegrating relations between them, we proceed with a robust VEC model and an ARDL with cointegration bounds, depending on the level of integration of the time series, to capture both the short-run and the long-run dynamics. The overall findings of both models are jointly analyzed, revealing that according to the ARDL model, FDI and economic growth are positively related in the short-run, but negatively related in the long-run. Moreover, the model indicates a negative short- and long-run relationship between remittances and economic growth, as well as a positive link between political stability and economic growth in Greece, as expected. The negative short-run relationship between remittances and economic growth is further supported by the VECM. Finally, both the VECM and ARDL indicate that GFCF and economic growth are positively related in the short-run, while the ARDL model reveals that this relationship exists in the long-run too.

Keywords

FDI; remittances; political stability; Gross Fixed Capital Formation (GFCF); inflation; economic growth (GDP); Johansen test; bounds testing approach; VECM; ARDL; Granger-causality

1. Introduction and brief literature review

It is generally supported that Foreign Direct Investment (FDI), which is a type of an investment made by a company or an individual from one country in business interests located in a host country, play a considerable role in the second country's economy. FDI increases the stock of physical capital, which in turn leads to the development of human capital, and therefore, upgrades the economic stability and boosts the economic growth of the recipient country [1]; [2]; [3]; [4]; [5]; [6]; [7]; [8]. On this context, it has been pointed out that highly productive sources are entered into the recipient country due to FDI, which entails an increase in employment opportunities [9]; [10]; [11]. Furthermore, FDI promotes the host country's growth by facilitating the transfer of technology and know-how, as well as by enhancing its entrance to foreign markets [12]; [11]; [8]. Finally, it has been argued that FDI enables transition economies to be integrated into the global economy [13]; [14]; [15].

On the other hand, the acquisition of the assets in another country with the aim of establishing a lasting interest in the management of a business enterprise in the host country could be having an offsetting or even a negative economic result [16]; [17]; [18]; [19]; [20], including its negative effect on green technology innovation [21], which combined with the overdevelopment of the financial sector could even de-stabilize an economy [22]; [23]. Furthermore, FDI, which aims to gain control over the company's operations and profits, is sensitive to foreign interests and can be overresponsive especially in periods of turbulence; for example, [24] has provided strong evidence that FDI is related with lower equity returns and low-cashflow rather than high-cashflow growth, questioning the long established views which consider market capitalization as a growth enhancer for an economy.

Still, the majority of the developing countries, and countries in transition, attempt to attract external funds in order to finance their development projects and achieve their financial goals [25]; [15]. In this respect, many countries have reduced their restrictive policies on the FDI inflows, have improved the foreign investors' protection, and have loosened the limitations on investors' operations [12]; [26]; at least until the shuttering of commercial activity that occurred in the face and during the Covid-19 pandemic, that had a dramatic effect on the global economy [27]. Besides the FDI regulatory framework, that should be stable, secure and transparent [12]; [28], and in line with the national security interest [29], the factors that can also determine FDI inflows are the host country's market size, its trade openness, competitiveness and political stability [30]; [25]; [31], even though corrupted regimes could also add on the attraction of FDI [16], along with a loose environmental regulatory framework [32]; [33]; [34].

Consequently, the political environment is a key factor that determines foreign inflows, and it has been pointed out that the global investors are primarily concerned about the host country's political stability [25], since political instability can impact the return on their investments [35] and affect the feasibility and sustainability of the economic opportunities [36]. Hence, political instability may

have a negative effect on FDI inflows, as enhancing the uncertainty regarding the economic environment and reducing the foreign investors' incentives [25].

On a global basis, focusing on the pre-COVID-19 period, it is noteworthy that FDI decreased by 16% from 2016 to 2017. Specifically, it declined by 27% in developed countries in 2017 [37], whereas it increased by 2% in developing economies [37]. Furthermore, in 2018 the global FDI fell by 19%. This decrease is mainly due to the fact that FDI flows fell by 40% in developed countries, because of the "large repatriations of accumulated foreign earnings by United States multinational enterprises, following tax reforms" [28], leading to a decrease of 73% in FDI flows to Europe [28]. However, FDI increased by 3% in developing countries [28].

In the case of Greece, nonetheless, the rather recent relative results could be perceived either as mixed or encouraging, indicating a considerable recovery after the Greek public debt crisis, during which the FDI inflows were significantly decreased, supporting a partially restored confidence of foreign investors in Greece. Specifically, net FDI inflows were about €3,606 million during 2018 and about €3,204 million during 2017, revealing a rise of 12.5%, which followed the increase of 28.3% and of 118.5% from 2017 to 2016 and from 2015 to 2016, respectively [38]. The FDI activity during the last decade in Greece originates from companies, coming mainly from EU, with Germany and France being on the top (due to Deutsche Telecom's investment in OTE, the major Telecommunication company of Greece) and the acquisition of Greek banks by French banks, etc., and followed by Cyprus and non-EU countries, such as Switzerland, Canada and the USA (Enterprise Greece, 2019).

To wrap up, Greece is of special interest, not only because FDI has been a crucial factor in the country's economic growth and development, and over the years the country has attracted significant amounts of foreign investment (particularly in sectors such as tourism, shipping, and energy), but due to the country's membership in the European Union (EU), Greece gained access to a large and prosperous market, that eventually drove the country to an unprecedented public debt, financial and economic crisis. Subsequently, the country has faced significant economic challenges, including high levels of debt and unemployment, that could be attributed to structural failures [39], a low level of competitiveness, an adverse business environment [40]; [41]. As a result, FDI has declined in certain sectors, including the banking and real estate. Nonetheless, the country continues to attract foreign investment in areas such as tourism and renewable energy, and the government is actively working to promote FDI and improve the investment climate. Within this context, and given that FDI has played a significant role in the economic development of the country and remains an important factor in the country's efforts to overcome its current economic challenges [42]; [43], it is essential to investigate the relationship between FDI, remittances (as another source of a foreign net flow), Gross Fixed Capital Formation, inflation and economic growth by focusing on the political stability too.

In addition to FDI, as stated, foreign inflows can also take the form of remittances, as funds transferred from one country (immigration country) to another (emigration country), including not only migrants', but also short-term employees' income transfers. From a macro-economic perspective, and especially in the light of temporary emigration, there are two main kinds of remittances, i.e. remittances for consumption purposes and for saving and investment purposes [44]; [17]. There are many studies that have pointed out the key role of remittances in the recipient country's development process, since they compose an important portion of GDP in many

instances. According to Barajas et al. (2009), remittances improve the capital accumulation's rate not only by enhancing the rate of both physical and human capital, but also by reducing the cost of capital in the recipient country. Hence, the economy can be stabilized and the volatility may be lowered. However, it has been supported that remittances influence the labor force participation negatively, since they may be substituted for labor income [45].

Overall, the present study is particularly focused on Greece because of the special economic and political conditions that this country has faced throughout the years. From 2000 Greece achieved high levels of GDP growth that were above the Eurozone mean, reaching the high point of 5.8% and 5.7% in 2003 and 2006, respectively. However, the financial crisis led the Greek economy to an intense downturn, with real GDP of -0.3% in 2008, -4.3% in 2009, -5.5% in 2010, -9.1% in 2011, -7.3% in 2012 and -3.2% in 2013. Greece had a real GDP growth of 0.7% in 2014, which declined in 2015 and 2016 by 0.4% and 0.2%, respectively. Nonetheless, the country finally achieved a growth of 1.5% in 2017 and 1.9% in 2018 [46].

Thus, apart from the aforementioned structural failures of Greece, it is noteworthy that the sovereign debt crisis that the country faced became harsher due to a series of reforms and austerity measures which resulted in impoverishment, loss of property and income, an upended political system and a new migration wave. On the whole, the Greek economy suffered the longest period of decline of any other advanced economy up to now, exceeding the US Great Depression. The crisis started in late 2009 and it was provoked by the global financial crisis of 2008, the structural faults in the Greek economy, the deficiency of flexibility in monetary policy and the disclosures about the underreported previous data on government debt levels and shortfalls [47]. Within this context, the present research paper attempts to shed light on how political stability in Greece contributes to investors' confidence, and consequently, how the political environment affects FDI flows and economic growth, and whether FDI enhances the Greek economy. In addition to the FDI flows, the linkages between remittances and economic growth in Greece are investigated, especially given that the country switched from having negative remittance flows (an outflow) to positive ones (an inflow), due to the change on the immigration flows.

Therefore, after focusing on the importance of inward and outward FDI, and the inflows and outflows of remittances, as sources of foreign funds, along with the significance of political stability, our main research objective is to investigate further the relationship and the interaction between these variables and economic growth, during several years prior to the beginning of the latest public debt crisis, throughout the crisis and after it. Specifically, the present study covers the time-period from 1980 to 2018; the end date is chosen as such, because it is the last year before the COVID-19 and the 2022 Russian Invasion of Ukraine, which caused a structural break on the data set. This period calls for further research that it could be delivered once this crisis, along with the broader geopolitical changes, is unfolded or once it is evident that it has reached its peak.

Thus, to conclude, although the relationship between FDI, remittances and GDP has been extensively investigated by the academic literature and a positive relationship has been supported by a big proportion of the empirical studies, conflicting views still exist.¹ Furthermore, although there is a large body of empirical studies on this topic, it has been found that there is a limited

¹ An extensive literature is available upon request.

research with regards to the link between FDI, remittances and GDP for the developed countries in general, and for Greece in particular, especially if one is further interested in the importance of the political factor. Finally, given that Greece is a developed country that experienced the longest period of decline compared to any other advanced market economy up to now, this study becomes even more intriguing, especially given that the country, after 15 years, has not yet reached the 2008 level of GDP. The GDP of the country was 355.91 Billion US\$ at the 2008 peak, and it still hovers, in 2021-2022, around 215 Billion US\$ (according to the official data from World Bank, 2023).

In this context, an empirical assessment of the relationship between FDI, remittances, GFCF, inflation, political stability and GDP growth for the case of Greece is provided, based on two advanced econometric models (a VECM and an ARDL with co-integration bounds), to contribute to the existent academic literature on these relationships in a developed but unsettled country, which to the best of our knowledge is not applied yet for this time period under this exact econometric set up. Therefore, FDI, remittances and political stability are used as explanatory variables (focus variables), while gross fixed capital formation and inflation are used as control variables, so as more extended and robust models to be constructed.

The paper is structured as follows: Section 2 is referred to the data and presents the empirical methodology, Section 3 presents and explains the empirical results, while section 4 extends the analysis of the findings in the context of the existing literature. Finally Section 5 concludes.

2. Data and Empirical Methodology

2.1 Description of Data

Data for all variables are obtained from the World Bank Development Indicators Database (WDI), published by the World Bank (2019). The whole dataset covers the period from 1980 to 2018. Within this time-span, two sample periods are constructed, with the first one including time-series data from 1980 to 2018 and the second one covering the time-period from 1996 to 2018.²

Within this framework, two separate econometric models are constructed and jointly analyzed. The first model includes four variables, i.e. foreign direct investments (FDI), remittances (REM), gross fixed capital formation (GFCF), inflation (CPI) and economic growth (GDP per capita) for the period 1980-2018, while the second one includes political stability (PS) in addition to FDI, REM, GFCF and GDP, for the time-period between 1996 and 2018.³ Logarithmic transformation of the variables is done (natural logarithms are used).⁴ A summary of the data collection is provided in Table 1.⁵

² Both samples are of annual frequency, while 39 observations are provided by the first one and 23 observations by the second one. The whole dataset is divided into two sample periods, because, unlike the variables for which data were available from 1980 to 2018, in case of the political stability index, only data covering the period between 1996 and 2018 were available.

³ Descriptive Statistics are available upon request.

⁴ Also, it should be noticed that the political stability index ranges between -2.5 (weak) and 2.5 (strong)⁴, and since this range does not correspond to the other variables' value range, its range is changed from -2.5 - 2.5 into 0 – 100. ⁵

Table 1. Brief Summary of Variables

Variable	Description	Ticker	Frequency	Data Range	Source
Foreign Direct Investment	Foreign Direct Investment received in current USD	FDI	Annually	1980-2018	WDI
Remittances	Remittances received in current USD	REM	Annually	1980-2018	WDI
Economic Growth	Gross Domestic Product per capita in USD	GDP	Annually	1980-2018	WDI
Gross Fixed Capital Formation	Gross Fixed Capital Formation in USD	GFCF	Annually	1980-2018	WDI
Inflation	Consumer Price Index	CPI	Annually	1980-2018	WDI
Political Stability	Political Stability Index (-2.5 weak; 2.5 strong)	PS	Annually	1996-2018	WDI (via Land Portal)

2.2 Empirical Methodology

Given that cointegrating relations between the variables are expected, a VEC model could be applied for the study of FDI, remittances and political stability, as well as inflation and gross fixed capital formation, involving time-series data [48]; [49]; [17]; [50]; [31]. Next, an ARDL model is performed, for the given level of integration, to shed more light on the linkages between the variables [51]; [31]; [52]; [53] which is a model to use especially when samples are rather short.

2.2.1 VEC Model

A VEC model is an appropriate model for the cointegrated series regarding the evaluation of their short-run properties [54]; [55], and in attempting to tie the short-run behavior of each variable to its long-run values [56]. The regression equations are as follows:

$$\Delta Y_t = a_1 + p_1 e_1 + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-1} + \sum_{i=0}^n \gamma_i Z_{t-1}$$

$$\Delta X_t = a_2 + p_2 e_{i-1} + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-1} + \sum_{i=0}^n \gamma_i Z_{t-1}$$

If the coefficient of the error correction term (ECT) is significant and negative, it indicates that the variables adjust, so as to restore the long-run equilibrium [54]; [17]; [31].

The descriptive statistics of them are available upon request, indicating that the series shows no significant deviation from normality.

2.2.2 Bounds Testing Approach – ARDL Model

If there is a group of time-series of $I(0)$ or $I(1)$, the Autoregressive Distributed Lag (ARDL) approach to cointegration can be used, so as the short- and long-run relationships between the variables to be determined [57]; [58]; [59]; [55]. In addition, the ARDL method is chosen because the estimates obtained from it are unbiased and efficient given that (i) it provides the long-run and short-run components at the same time, removing problems related to autocorrelation and omitted variables, and (ii) it distinguishes between dependent and independent variables. Also, it is a simple technique, since the cointegrating equations can be estimated by the OLS procedure after the lag length is identified [60]. Furthermore, no pre-testing is needed for the ARDL approach, in the sense that it is applicable regardless of whether the regressors are $I(0)$ or $I(1)$ or mutually cointegrated.⁵

The ARDL model, introduced by [57], takes the following form:

$$\Delta y_t = \beta_0 + \sum_{i=1}^n \beta_i \Delta y_{t-i} + \sum_{i=0}^n \delta_i \Delta x_{t-i} + \varphi_1 y_{t-1} + \varphi_2 x_{t-1} + \varepsilon_t$$
, where, β_i, δ_i : the short-run coefficients; φ_1, φ_2 : the ARDL long-run coefficients; ε_t : a white noise error term.

In order to show that a long-run cointegration relation between the variables exists, it should be ensured that the F-test indicates the rejection of the null hypothesis in favor of the alternative hypothesis, as follows:

$$H_0: \varphi_1 = \varphi_2 = 0$$

$$H_a: \varphi_1 \neq \varphi_2 \neq 0$$

When the estimated F-statistics is greater than the upper critical bound value, the null hypothesis of no cointegration is rejected, while if it is lower than the lower critical bound value, the null hypothesis is failed to be rejected. However, if the calculated F-statistics falls between the lower and upper bounds, no decision can be made on whether to reject or not the null hypothesis.

3. Empirical Results

3.1 ADF Unit Root Test

Following the unit root testing, when the variables are examined at their first difference, the proper model for non-stationarity is mainly a Pure Random Walk.⁶ Furthermore, the ADF tests, indicate that all variables are stationary in their first difference, i.e. $LFDI \sim I(1)$, $LREM \sim I(1)$, $LGFCF \sim I(1)$, $LCPI \sim I(1)$, $LGDP \sim I(1)$, $LPS \sim I(1)$ which gives ground to proceed with a Vector Autoregressive

⁵ However, the procedure cannot be applied in the presence of $I(2)$ time-series (Pesaran et al, 2001; Golitsis et al, 2022).

⁶ Detailed results are available upon request.

modeling, and an ARDL model, given that DLCPI is stationary at 0.05 and not at 0.01 significance level.

Table 2. ADF Statistics for Unit Root (at first difference)

Variables	Coefficient	Test critical value at $\alpha=1\%$	Test critical value at $\alpha=5\%$	Probability
DLFDI	-1.438562	-2.630762	-1.950394	0.0000
DLREM	-0.643118	-2.628961	-1.950117	0.0002
DLGFCF	-0.599606	-2.628961	-1.950117	0.0002
DLCPI	-0.075632	-2.628961	-1.950117	0.0140
DLGDP	-0.486828	-2.628961	-1.950117	0.0012
DLPS		-2.679735	-1.958088	0.0004
	-0.883890			

3.2 On Cointegration

3.2.1 The Johansen Cointegration Test

The [61] is performed to investigate the existence of any linear combinations between the variables. Since the Johansen test is sensitive to the lag length selected, a lag selection test is applied in advance. A lag length of 2 is selected, as supported by the majority of the criteria.⁷ For the sample period 1980-2018, the Johansen cointegration test supports three cointegrating equations between the variables at 5% level of significance using the Trace test, and two cointegrating equations at 5% level of significance using the max-Eigenvalue test.⁸

3.2.2 VEC Model

To proceed, a VECM(2) is performed, which according to the inverse root of AR characteristic polynomial indicates satisfies the stability condition.

⁷ The Akaike Information Criterion (AIC) and the Final Prediction Error (FPE) also suggest a length of 2, and this is important for the lag specification, since the AIC and the FPE have been proven to be superior to any other criteria in case of small samples -60 observations and below- (Liew, 2004), such as in our case. This is because they minimize the possibility of the underestimation, while they maximize the chance of obtaining the true lag length (Liew, 2004). Based on this argument, a lag length of 2 is also selected for the case of the dataset covering the period 1996-2018. See Appendix (results are available upon request).

⁸ Further, the Trace test indicates 5 cointegrating equations at 5% level of significance for the sample period 1996-2018. These cointegrating relations are based on the data trend assumption of linear cointegrating equations with intercept (and no trend). Further, we summarize the number of the suggested cointegrating relations based on various data trend setups; and since the cointegration between the variables is verified, it can be finally concluded that they move together in the long-run. Detailed results are available upon request.

Table 3. VECM(2) Results (1980-2018)

	DLFDI	DLREM	DLPS	DLGFCF	DLGDP
DLGFCF(-1)					0.436761*** [1.97835]
ECT	-1.005784**	[-2.70659]			

Table 4. VECM(2) Results (1996-2018)

	DLFDI	DLREM	DLPS	DLGFCF	DLGDP
DLREM(-2)					-0.348407** [-2.99840]
DLGFCF(-1)				1.641124** [2.41381]	1.068923** [3.09106]
ECT					-0.081492** [-2.41346]

T-statistics are in []. The rest of the results are the relevant coefficients. T-critical is approximately 2 [: $t(a/2; t-m) = t(0.025; 20) \approx 2$] or close to 2.4 (based on the sample). Note that the Tables summarize only the statistically significant results. **denotes 0.05 significance level, while *** denotes 0.10 significance level.

In the case of the VECM(2) for the first sample-period, the variables are not significantly related over the short-run,⁹ since for every coefficient the t-critical is greater than the t-statistic. However, the error correction term (ECT) is statistically significant and negative when DLFDI is treated as the dependent variable. This finding indicates that there is a long-run equilibrium. Moreover, the coefficient of the ECT is high, supporting a rather quick adjustment towards the long-run equilibrium. Furthermore, in the case of the VECM(2) for the second sample-period, when DLGDP is considered as the dependent variable, some statistically significant relationships appear too. Specifically, for the lagged values of DLREM and DLGFCF, t-statistic is greater than t-critical, indicating that remittances and gross fixed capital formation have an impact on economic growth. These findings are consistent with studies supporting that remittances can slowdown economic growth of the recipient country [62]; [63]; [64]; [65]. Also, it has been found that there is a positive relationship between DLGDP and DLGFCF, which is in line with economic theory.

Additionally, a positive and statistically significant relationship between $DLGDP_t$ and $DLGDP_{t-1}$ is revealed. The coefficient of the ECT is negative and -0.081492, showing that about 8% of the disequilibrium will be restored each year by the changes in economic growth (DLGDP).

⁹ The coefficients are tested at 0.05 significance level. However, if they were tested at 0.1 level of significance, then it could be concluded that economic growth (measured by GDP per capita) is affected by the previous year's gross fixed capital formation. More specifically, when DLGDP is considered as dependent variable, the coefficient of the lagged value of DLGFCF is highly significant and positive, indicating that, if the previous year's gross fixed capital is increased by 1 unit, the current year's GDP will be increased by almost 0.436 units. This result is plausible and aligned with the economic theory.

3.2.3 Granger-Causality

The Pairwise Granger-Causality results are reported in the tables below (5 and 6). It can be generally concluded that the majority of the variables in the system are not significantly related over the short-run. However, it is shown that, at 0.05 significance level, DLFDI Granger-causes DLREM, but not vice-versa. Also, it is found that a unidirectional lead-lag relationship exists between DLGFCF and DLFDI, running from the first variable to the second one and implying that an increase in gross fixed capital formation leads to a rise in foreign direct investments in the short-run, but not the opposite. Moreover, the findings support a Granger-causal link between DLGDP and DLPS, i.e. economic growth affects political stability in the short-run, but not the other way around.

Table 5. Pairwise Granger Causality Tests (1980-2018)

Null Hypothesis	F-Statistic	Probability
DLFDI does not Granger Cause DLREM	292.802	0.0456**
DLGFCF does not Granger Cause DLFDI	67.3474	0.0950*

Table 6. Pairwise Granger Causality Tests (1996-2018)

Null Hypothesis	F-Statistic	Probability
DLREM does not Granger Cause DLGFCF	5.30990	0.0994*
DLGFCF does not Granger Cause DLPS	5.66552	0.0915*
DLGDP does not Granger Cause DLPS	18.4639	0.0181**

Note that only the statistically significant findings are reported in the Tables. ** implies rejection of the null hypothesis at the 0.05 level and * at 0.10 level of significance.

3.2.4 Bounds Testing Approach – ARDL Model

Following the ADF results, the ARDL bounds testing approach to cointegration is applied. The appropriate number of lags should be determined before proceeding to the ARDL bounds testing [66], since the appropriateness of the lag length limits the spuriousness of the relative results [59]. We use the SBC criterion. Pesaran and Shin (1999) suggest a maximum of two lags to be chosen for annual data. Based on this, the lag order that minimizes SBC is selected. The results are presented on Table 7.

Table 7. Appropriate Lag Order

Dataset 1980-2018		Dataset 1996-2018	
Endogenous Variable	Lag Order	Endogenous Variable	Lag Order
DLGDP	1	DLGDP	1
DLFDI	0	DLFDI	0
DLREM	0	DLREM	0
DLGFCF	0	DLPS	0
DLCPI	1	DLGFCF	0

Furthermore, in order to show that there exists a cointegration relation between the variables in the long-run, it should be ensured that the F-test implies the rejection of the null hypothesis of no cointegration (H_0), which can be expressed as $\varphi_0 = \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0$, while the alternative

hypothesis of cointegration (H_a) is $\varphi_0 \neq \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0$. The Table 8 summarizes the ARDL bounds test results, which are followed by the relative equations (only for the models that can support cointegration and based on the previous lag length selection).

Table 8. ARDL Bounds Test for Cointegration

Dataset 1980-2018				Dataset 1996-2018			
Model No	Endogenous Variable	F-statistic	Coint.	Model No	Endogenous Variable	F-statistic	Coint.
1	DLGDP	3.180921*	Yes	6	DLGDP	3.728055**	Yes
2	DLFDI	3.435529*	Yes	7	DLFDI	2.288578	Inconclusive*
3	DLREM	1.599371	No	8	DLREM	3.188129*	Yes
4	DLGFCF	3.858839**	Yes	9	DLPS	3.779875**	Yes
5	DLCPI	1.473193	No	10	DLGFCF	2.456732	Inconclusive*

Critical Values	Lower Bound	Upper Bound
1%	3.07	4.44
5%	2.26	3.48
10%	1.90	3.01

*** denotes stat. significance at 1% level, ** at 5% level and * at 10% level. Critical values are obtained from Pesaran et al. (2001) critical values tables (case I). The number of explanatory variables (k) is 4.

The models have been tested for serial autocorrelation using the Breusch-Godfrey test, which indicated that the null hypothesis of no autocorrelation is failed to be rejected at both 1% and 5% significance level.¹⁰ Also, the models give evidence of stability using the CUSUM test; the blue line lies within the boundary lines in all cases.¹² The estimated ARDL coefficients are reported in the Table 9 below.

Table 9. Estimated ARDL Coefficients

	Regressor	Coefficient	Standard Error	T-Ratio	Probability
Model 1	LGDP(-1)	-0.418711	0.207871	-2.014287*	0.0544
	LREM(-1)	-0.110610	0.046307	-2.388651**	0.0245
	LGFCF(-1)	0.267879	0.136438	1.963370*	0.0604
Model 2	DLREM	-2.164210	1.180683	-1.833016*	0.0775

¹⁰ The BG test's results can be found in the Appendix (available upon request). ¹² Detailed results are available upon request.

	DLGDP	8.292325	3.643970	2.275629**	0.0307
	LFDI	0.669536	0.186163	3.596496***	0.0012
Model 4					
	DLGDP	1.060948	0.198485	5.345235***	0.0000
	LFDI	0.0322931	0.014751	2.232535**	0.0338
	LGFCF	0.353034	0.106410	3.317661***	0.0025
	LCPI	0.175988	0.69846	2.519650**	0.0177
Model 6					
	DLFDI(-1)	0.033690	0.015845	2.126151*	0.0594
	LFDI(-1)	-0.042470	0.018003	-2.359074**	0.0400
	LREM(-1)	-0.200123	0.070314	-2.846124**	0.0174
Model 8					
	DLGFCF	0.839396	0.460017	1.824706*	0.0930
	LPS	2.288799	1.017982	2.248369**	0.0441
	LGDP	1.808485	0.651142	2.777406**	0.0167
Model 9					
	LPS	0.866731	0.276470	3.134997***	0.0086
	LGDP	0.499895	0.211965	2.358381**	0.0362

*** denotes statistical significance at 1% level, ** at 5% level and * at 10% level. Note that only the statistically significant results are presented.

As it is evident on Table 9, there is a long-run relationship in six of the models. First, when GDP is treated as an endogenous variable (model 1), economic growth, remittances, GFCF and inflation are related in the long-run. Specifically, the estimated coefficients are statistically significant and indicate that a long-run relationship running from lagged remittances to current economic growth holds. This result is confirmed by model 6 too. A finding which is consistent with the VECM results, supporting that economic growth and remittances are negatively related.

Furthermore, in line with the VECM results and economic theory, model 1 reveals that a rise in lagged GFCF increases DLGDP in the long-run. Additionally, it is shown that a positive short-run relationship between GFCF and economic growth exists too. Specifically, based on the model 4, an increase in LGDP increases DLGFCF. Accordingly, it can be stated that the positive relationship between GFCF and GDP exists both over the long- and short-run.

Model 6 gives some more evidence about the long-run relationships between the variables, when DLGDP is treated as dependent variable. The results not only confirm that a negative long-run relationship between economic growth and past remittances exists, but also show that current economic growth and past foreign direct investments are negatively related over the long-run too. However, as the short-run results are concerned, a positive relationship is revealed between economic growth and past foreign direct investments, since a rise in lagged LFDI increases DLGDP (model 6). This positive short-run relationship between economic growth and foreign direct investments is confirmed by the model 2, in which DLFDI is the endogenous variable. Hence, it can be concluded that FDI and GDP are positively related in the short-run, but negatively related in the long-run.

Once the political stability is included in the models, the findings are worth commenting as well. When it is treated as dependent variable (model 9), a positive long-run relationship between

political stability and economic growth holds, as it was anticipated according to economic theory. Lastly, the model 8 reveals the nature of the long-run relationship when remittances are the dependent variable. It is shown that remittances, political stability and economic growth move together in the long-run. In particular, political stability and remittances are positively related in the long-run, since an increase in current political stability leads to an increase in remittances.

4. Discussion of the Empirical Findings

At this part the results of VEC and the ARDL models are jointly discussed in the context of the findings of the previous studies. Firstly, the VECM(2) model reveals a statistically significant and negative short-run relationship between current economic growth and past remittances in Greece. This finding, which is confirmed by the ARDL model too, is aligned with the part of economic theory supporting that remittances can slowdown growth. This negative relationship could be explained by the fact that remittances may reduce the labor supply in the recipient country [67] and lead to the appreciation of the domestic currency, which subsequently may force entrepreneurial competition to fall [68]; [69]. Relatively, it can be also argued that shocks in remittances can lead to a decline in the traded sector [70], while it is possible that they can be spent on conspicuous consumption (such as houses and cars) forcing the prices of basic commodities to rise and inflation to move upwards, which, in turn, can affect economy in a negative way [71]; [17].

Secondly, both models indicate a statistically significant and positive short-run relationship between current economic growth and past gross fixed capital formation in Greece. This result is in line with the findings of a vast number of studies focused on this relationship and suggesting a positive link between the variables (e.g., [72]; [73];[74]. Our findings also confirm the results of [48] for the case of Greece. These researchers used a VAR model and supported that an increase in GFCF results in a rise in per capita GDP.¹¹ Furthermore, as to the long-run relationships between the aforementioned variables, the ARDL model indicates that economic growth and remittances are negatively related, whereas economic growth and gross fixed capital formation are positively related. These long-run relationships could be explained following the same reasoning as above.

Mixed results are obtained from the ARDL model regarding the FDI variable, leading to some interesting insights. Current economic growth and past foreign direct investments appear to be negatively related in the long-run, but positively related in the short-run. Within this framework, two main inferences can be drawn. On the one hand, the negative long-run relationship between FDI and economic growth is a finding, which can be explained by the fact that FDI includes greenfield FDI and cross-border M&A; cross-border M&As are likely to be negatively related to economic growth. Relatively, it has been argued that M&As do not lead the host country's physical

¹¹ As such, the general rule that GFCF exerts a significant influence on economic growth applies for the case of Greece, since the GFCF influences the economic growth in a positive way, either directly by increasing the physical capital stock, or indirectly by enhancing the technology (Levine and Renelt, 1992).

capital to rise, since they are related to a transfer of assets from the local to the foreign market, and hence, they generally discourage economic growth [75].

On the other hand, the positive relationship over the short-run was excepted, based on several empirical studies emphasizing the beneficial effect of FDI flows on host countries' GDP growth, which is mainly attributable to the fact that FDI provides not only new capital, but also facilitates the access to new technology and know-how and enhances employment [76]; [77]; [78]. The ARDL model captures a positive relationship between political stability and economic growth in Greece over the long-run. As to the short-run link between the variables, neither model, reveals any significant results. However, the Granger-causality test supports that a unidirectional lead-lag relationship exists between economic growth and political stability, running from the first variable to the second one, but not vice versa¹². It is noteworthy that the this positive link between political stability and economic growth is consistent to the findings of several studies which support that domestic political stability boosts economic growth and leads GDP growth to rise [79]; [80]; [81]; [82].

Furthermore, no significant results are generated regarding the relationship between political stability and FDI. However, in the case of remittances, it is shown that an increase in political stability will lead remittances to rise, meaning that they respond positively to domestic political stability. This can be explained by the fact that remittances destined for savings purposes are determined by several factors, such as the security of the savings in host countries [44], which is closely related to economic and political stability.

The last important finding shows that when the economic growth is treated as dependent variable (in the VECM), while FDI, remittances, political stability and GFCF act as the independent ones, the error correction term is statistically significant, negative and rather high. Therefore, it indicates that the model can adjust rather quickly to its long-run equilibrium path, following the short-run distortions.

5. Conclusion

This study has attempted to shed light on the existing inter-linkages amongst foreign direct investments, remittances, political stability, gross fixed capital formation, inflation and economic growth in the case of Greece. We have applied mainly two robust econometric models, a VECM and an ARDL with co-integration bounds, and we have generated, according to the robustness related testing of the models, and according to our understanding, reliable and considerable results, indicatively for policy making purposes. Finally, our findings of both models were jointly discussed in the context of the previous studies in the area.

In consolidating the overall results, it can be concluded that: there is a statistically significant and positive short-run relationship between FDI and GDP variables, whereas there exists a negative long-run relationship between them (based on ARDL model); a statistically significant negative

¹² Also, the Granger-causality test's results reveal two complementary short-run relationships, i.e., between FDI and REM, as well as between GFCF and FDI, running from the first variable to the second one in both cases, but not the other way around.

relationship between remittances and economic growth was revealed both in short- and long-run (based on VECM and ARDL model); a statistically significant and positive short-run as well as long-run relationship between gross fixed capital formation and economic growth (based on VECM and ARDL model); a statistically significant and positive relationship between political stability and economic growth exists in Greece over the long-run (based on the ARDL model); a uni-directional Granger-causal link exists between economic growth and political stability, running from the first variable to the second one; no sufficient evidence was revealed regarding the presence of short- or long-run relationships between political stability and FDI, as well as between economic growth and inflation. Finally, under the VEC model, the Error Correction Term was statistically significant, negative and high, suggesting that the model can adjust quickly to its longrun equilibrium path, after a short-run distortion. Hence, a long-run equilibrium solution can be finally supported within the modeling.

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