

The impact of foreign direct investment, bank credit and current account balance on economic growth on the basis of income level

Abstract

According to the literature, it appears that foreign direct investment (FDI), bank credit (CRDT) and current account balance (CAB) are key factors that determine economic growth as they influence funds needed in order for a country to keep its growth. In other words, FDI, CRDT and CAB set the ground for sustainable development. In this study covering 44 countries and the period of 1977-2017, the impact of FDI, CRDT and CAB on economic growth is investigated on the basis of income level. In this regard, 44 countries are divided into 4 groups: high income level (HIL), upper middle income level (UMIL), lower middle income level (LMIL) and low income level (LIL). In the study, the panel data approach is used. As per the results, FDI is a key factor for growth and especially, it is important for LMIL and LIL countries. As the income level increases, its positive effect on economic growth decreases. Current account deficit has a positive effect for UMIL countries, while it has a negative effect for HIL and LMIL countries. As for CRDT, it affects the growth of HIL countries only and its impact is negative.

Keywords: Foreign direct investment, bank credit, current account balance, economic growth, panel data analysis, income level

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1. INTRODUCTION AND LITERATURE

Development is one of the main concerns of governments. Therefore, investigating factors to promote growth, which will lead to social welfare and development, is important to both policy makers and researchers (Behname, 2012).

In the literature, there are various researches on economic growth and factors triggering it. To sustain future economic growth, countries need domestic or foreign financial resources. Foreign direct investment (FDI), bank credit (CRDT) and current account balance (CAB) have therefore become key factors in determining the growth rate of economies, drawing the attention of both policy makers and academic researchers. As these variables define the level of funds required to ensure economic stability and growth, there are many researches in the literature, aiming at explaining their impact on economic growth. As mentioned by Bhowmik (2018), FDI inflows may have a causal relation bi-directionally with growth rate and might be a requirement for sustainable development. The declining FDI, CRDT and economic growth as well as deterioration in CAB in all financial/economic crises have been the general phenomenon (Bhowmik, 2018; Adem and Vuran, 2018, Magaji et al., 2023).

One of the economic factors whose relation with economic growth has been investigated in the literature is foreign direct investment. FDI directly or indirectly reduces unemployment and increases revenue for government (Al-Masbhi and Du, 2020). As mentioned by Alfaro (2003) and Alzaidy et al. (2017), it is suggested that FDI has positive effect on economic growth as it provides countries or local firms with know-how, technology, new skill, techniques in firms' production process in addition to capital inflow. The African Capacity Building Foundation (2017) investigated the sources of economic growth in Africa, showing that FDI had a strong positive effect on real GDP growth (Mudenda et al., 2021). However, the effect of FDI might vary across countries based on different conditions such as human capital, macroeconomic stability etc. (Makki and Somwaru, 2004). FDI is also beneficial in terms of increasing host coun-

try's productivity, capital formation and export (Moudatsou, 2003).

Using data on FDI to 69 countries for a period of 20 years, Borensztein et al. (1998) stated that foreign direct investment contributed more to growth compared to domestic investment. In addition, they concluded that FDI was important for technology transfer and the study results were consistent with that of De Gregorio (1992) implying FDI was approximately three times more efficient than domestic investment in 12 Latin American countries. For the period 1997-2020 in emerging European countries, the research by Vintila and Mocanu (2023) resulted in FDI positively affecting economic growth. In accordance with the results of Vintila and Mocanu (2023), Begum et al. (2023) found out that FDI had positive effect on GDP, export and industry value. Suliman and Elian (2014) studied FDI, financial development and economic growth through a cointegration model and the results showed that a developed financial market is a must for the positive impact of FDI on growth. Similarly, as expressed by Carkovic and Levine (2005), there are studies in the literature which find that FDI positively affects growth if the host country is wealthy enough. Another study which supports Carkovic and Levine (2005) belongs to Dort et al. (2014). As per this study which examined 85 developing and developed countries between 1984-2009, investment has a more positive impact on growth in countries with high institutional quality. On the other hand, according to the study by Iamsiraroj and Doucouliagos (2015), it was implied that growth is more correlated with FDI in developing countries. Koojaroenprasit (2012) investigated the effect of FDI on economic growth in South Korea for a period from 1980 to 2009, indicating that FDI had a strong effect on the economic growth of South Korea, while domestic investment did not. Choe (2003) investigated 80 countries over the period 1971-1995 through a panel VAR model, indicating that FDI was Granger cause of growth. Herzer (2010) examined the relation between FDI and economic growth for developing countries, finding that FDI had, on average, a negative effect on growth for the period between 1970-2005 but there were cross-country differences in terms of the effect of FDI. In addition, it was found that freedom from govern-

ment intervention and freedom from business regulation was important in FDI positively affecting growth. According to the literature survey by Bruno and Campos (2013), it is revealed that 50% of empirical studies indicate FDI has a significantly positive effect on growth, 11% report a negative effect, while 39% report there is no relation between growth and FDI (Jude and Leveuge, 2014).

Another factor assumed to have a positive relation with growth is bank credit. As expressed by Olowofeso et al. (2015), a low level of financial development and inefficient private sector credit system adversely affect growth, while a strong credit system and access to funds promote the productive capacity of companies and enhance development and economic growth. As a result, in developing countries, studies might indicate negative correlation regarding credit and growth (Ayadi et al., 2013). Recently, studies on the relation between economic growth and private sector credit has increased all around the world. For instance, Anyanwu et al. (2017) examined the impact of commercial bank lending on RGDP. Using annual data for the period 1970 to 2019, Mudenda et al. (2021) showed that FDI and credit to the private sector supported overall economic growth in Zambia. Applying Auto Regressive Distributed Lagged model, Magaji et al. (2023) explained bank credits had positive effect on GDP in both long and short run. As seen in the literature review of Magaji et al. (2023); Zaqiraj et al. (2020) also had similar findings. Emecheta and Ibe (2014) used the reduced VAR technique for the period of 1960-2011 in Nigeria and concluded that bank credit to the private sector play vital role in the economic growth of Nigeria. Korkmaz (2015) investigated the impact of bank credit on growth and inflation through panel data analysis, reaching that domestic credit by banks affected growth but not inflation for 10 European countries between 2006-2012. Using domestic credit to the private sector to as a share of GDP, Khan and Senhadji (2000) examined financial development and economic growth for 159 countries and stated that there was a positive relation whose effect varied with different conditions. As said before, in the literature there are also researches in which bank credit to the private sector has negative relation with growth, one of which is

Petkovski and Kjosevski (2014) examining the transition economies. Investigating 16 countries in Central and South Eastern Europe over the period 1991–2011, Petkovski and Kjosevski (2014) used the Generalised Method of Moments (GMM). In another study where credit has negative impact on growth, Ayadi et al. (2013) explored northern and southern Mediterranean countries between 1985-2009 and implied that the reason for that might be weak financial regulation and supervision or deficiencies in credit allocation. This can also be related to the quality of financial system, as proposed by Koetter and Wedow (2010), since growth may require better but not necessarily more credit (Ayadi et al., 2013). More credit is even risky for a country as higher credit growth may cause bank fragility, as shown in the study by Ghosh (2010). In addition, Ho and Saadaoui (2021) stated that the beneficiary of the credit (firms versus households), the structural features (export-led growth), and the regional heterogeneity were also important to formulate sound policy recommendations on the relation between economic growth and bank credit. Kale and Eken (2022) reached a limited positive relationship between bank efficiency and economic growth for the OECD countries for the period 2011-2019 as well. Similarly, Aryestya and Marta (2021) mentioned that, after the domestic credit value exceeding an optimal threshold, the correlation between domestic credit and economic growth became negative.

Studies suggest trade-based globalisation contributes to economic growth through enlarging the market size and the diffusion of technology and external demand has impact on economic growth (Mishra, 2020; Grech and Rapa, 2019; Ho and Iyke, 2020; Mudenda et al., 2021). Therefore, another economic variable, the relation with economic growth of which has been investigated in the literature is current account balance (CAB). CAB might be an important indicator in terms of reflecting what the economic growth will be, especially for developing countries, which have low saving rate and need foreign capital for economic growth. Aydin and Esen (2016) states that developing countries which do not have adequate internal resource, depend on external resource and economic growth leads to current account deficit (CAD)

which also increases the fragility of the country against external shocks. Therefore, it can be said that investors' perception on whether CAD is sustainable or not is important. If there is perception that CAD will lead to a sharp policy shift such as tightening of monetary and fiscal policy or cause a crisis, then CAD will not be sustainable (Milesi-Ferretti and Razin, 1996) and this will negatively affect growth. In this frame, current account deficit may be both good and bad for a country which depends on foreign capital. Even high income level countries may need to address their current account deficit and reduce it to sustain their growth rates, as seen from the example of UK (Blakeley, 2018). In the study by Aydın and Esen (2016), for instance, the threshold value for CAD was found as %3,99 for Turkey between 1999: Q2 and 2014: Q2 through the Threshold Autoregressive Model (TAR), implying that a CAD below the threshold value had a positive impact on the growth, while a CAD above the threshold value had a negative impact on the growth. On the other hand, Milesi-Ferretti and Razin (1996) conducted a study on Australia, Chile, Ireland, Israel, Malaysia, Mexico and South Korea, expressing that a specific threshold could not be a good indicator of sustainability and this could be related to exchange rate policy and structural factors such as the health of the financial system. In addition to CAD, current account surplus (CAS) might also be a problem for countries. The reason for that is that CAS may negatively affect consumption and domestic investment, leading to reduction of demand and potential output which will have negative impact on economic growth. Besides, during a financial crisis, countries which have huge foreign asset accumulation due to persistent CAS may face a problem if foreigners are not in a position to pay their debts (Wajda-Lichy, 2015). As explained by Devadas and Loayza (2018), even good deficits or surpluses do not mean that a country will be on safe side and will not be affected from financial stress since the characteristics of gross financial stocks and the balance sheet of sectors may be important for a country's vulnerability to stress. In this regard, although it can be said that there is a relation between CAB and economic growth according to the literature, there is no consensus on how CAB affects economic growth.

The aim of this study is to compare the macro-economic effect of FDI, CRDT and CAB on economic growth between the income level groups. In the literature, there are researches which investigate the effect of these variables on economic growth. However, many researches examine the relation individually and use one of the variables due to endogeneity problem. The main contribution here will be to see all these variables' effect on economic growth. In addition, as seen from the literature, since the economic development of countries may be important, income levels are also taken into consideration. One of the hypotheses in this study is that "as the income level decreases, the positive effect of FDI on economic growth increases". The main assumption here is that countries with low income level need more capital inflow, compared with developed economies. It should also be stressed that CAB is expected to further affect developing countries, considering that the balance between import and export is quite important for these countries' growth. As known, some countries' economic growth is driven by import, while some countries grow based on export. CRDT, which is another key factor investigated in this study, is expected to support economic growth, as it is considered one of the main drivers behind economic development, providing necessary funds.

2. METHODOLOGY

In this study, FDI, CRDT and CAB are used to see their effects on economic growth. In this regard, the economic growth of 44 countries is investigated with respect to FDI, CRDT and CAB through panel data analysis. The countries to be investigated are divided into 4 groups based on their income levels (high income level, upper middle income level, lower middle income level and low income level) and the groups are individually examined through the panel data analysis. However, FDI, CRDT and CAB are individually quite big factors to affect economic growth and they can not be used together in a formula as they also have endogeneity problem and affect each other. For instance, FDI may affect host countries' balance of payments and development process (Bhowmik, 2018, Ali et al., 2019). Similarly, FDI might have a booming effect on

Table 1. Countries and Income Level

Country	Income Level	Country	Income Level
Chile	High income	Turkey	Upper middle income
Denmark	High income	Bangladesh	Lower middle income
United Kingdom	High income	Bolivia	Lower middle income
Israel	High income	Ghana	Lower middle income
Norway	High income	Honduras	Lower middle income
Oman	High income	India	Lower middle income
Saudi Arabia	High income	Kenya	Lower middle income
Singapore	High income	Nigeria	Lower middle income
Sweden	High income	Nicaragua	Lower middle income
Seychelles	High income	Pakistan	Lower middle income
Trinidad and Tobago	High income	Philippines	Lower middle income
United States	High income	Papua New Guinea	Lower middle income
Argentina	Upper middle income	Sudan	Lower middle income
Brazil	Upper middle income	Senegal	Lower middle income
Botswana	Upper middle income	Eswatini	Lower middle income
Dominican Republic	Upper middle income	Benin	Low income
Jordan	Upper middle income	Haiti	Low income
Sri Lanka	Upper middle income	Madagascar	Low income
Malaysia	Upper middle income	Mali	Low income
Peru	Upper middle income	Niger	Low income
Paraguay	Upper middle income	Sierra Leone	Low income
Thailand	Upper middle income	Togo	Low income

Source: Income levels are obtained from The World Bank

the domestic credit in developing economies (Nguyen et al., 2018). Thus, it is crucial to get rid of endogeneity problem. To achieve this, in the analysis, the endogeneity of FDI, CRDT and CAB is eliminated through the formula below, in which the variables serve as both independent variable and control variable:

$$EG_t = \alpha + A IV_t + B_1 CV_{1t} + B_2 CV_{2t} + \varepsilon_t$$

where;

CV₁ = FDI and CV₂ = Bank Credit; if IV = CAB

CV₁ = CAB and CV₂ = Bank Credit; if IV = FDI

CV₁ = FDI and CV₂ = CAB; if IV = Bank Credit

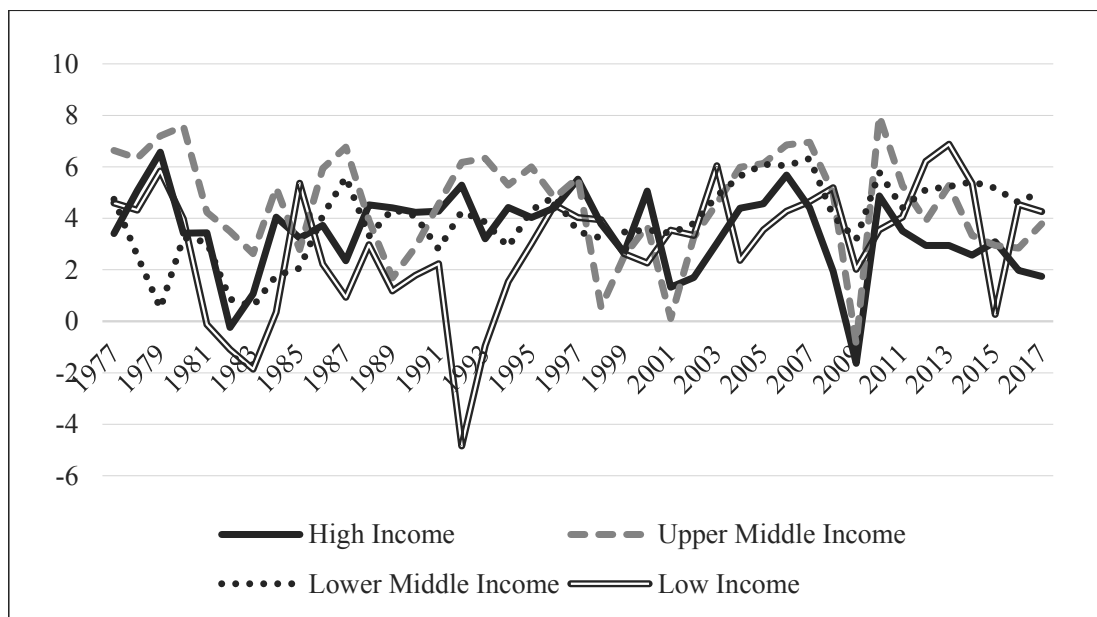
EG is economic growth

IV is independent variable

CV is control variable

Table 2. The Variables Used

Variable	Explanation
GDP	Real GDP growth
FDI	The ratio of foreign direct investment, net inflows to GDP
CRDT	The ratio of domestic credit to private sector by banks to GDP
CAB	The ratio of current account balance to GDP

Figure 1. Real GDP growth (annual %)

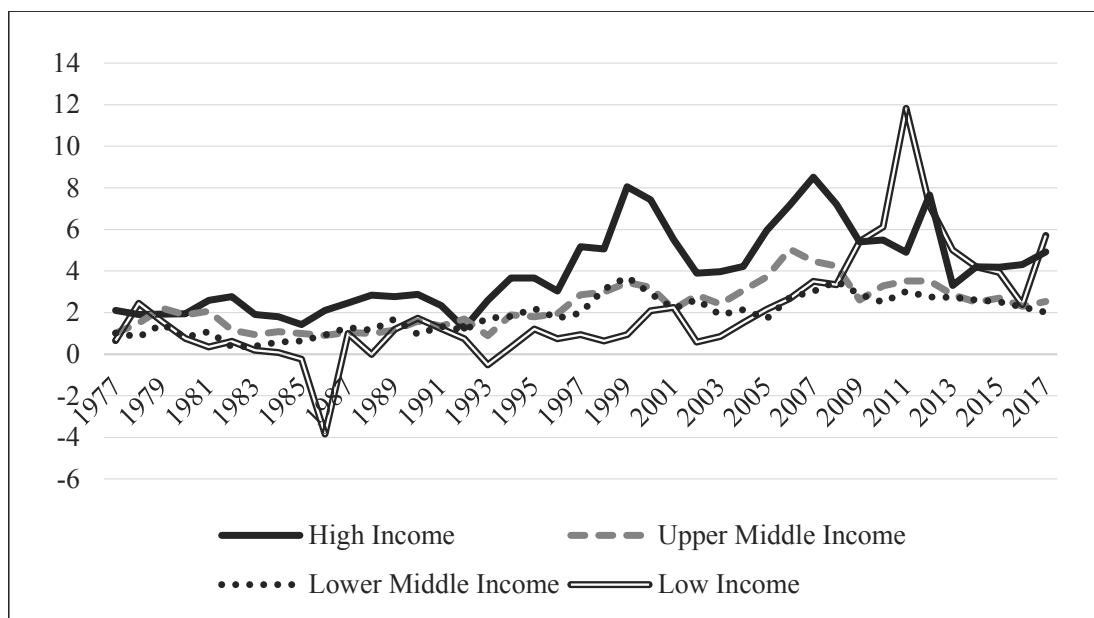
Source: The values obtained from The World Bank are calculated on the basis of groups. Each group of income level reflects the average values of countries in the group.

In order to work with as much data as possible, when selecting the countries, the availability of data is taken into consideration. Covering the period of 1977-2017, the data is obtained from The World Bank indicators and it is annual. The countries used within the scope of this study are

shown in Table 1, while the description of the variables/data used are shown in Table 2.

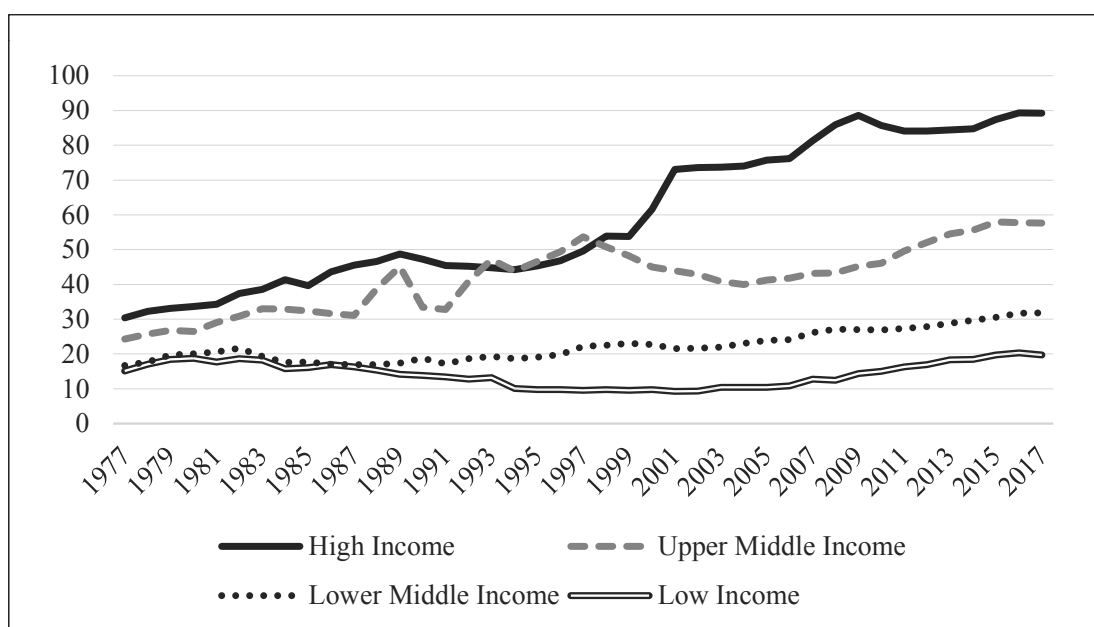
To see the motion of variables over time, the values of GDP, FDI, CRDT and CAB are illustrated on the basis of groups through Figure 1,2,3 and 4.

Figure 2. Foreign direct investment, net inflows (% of GDP)

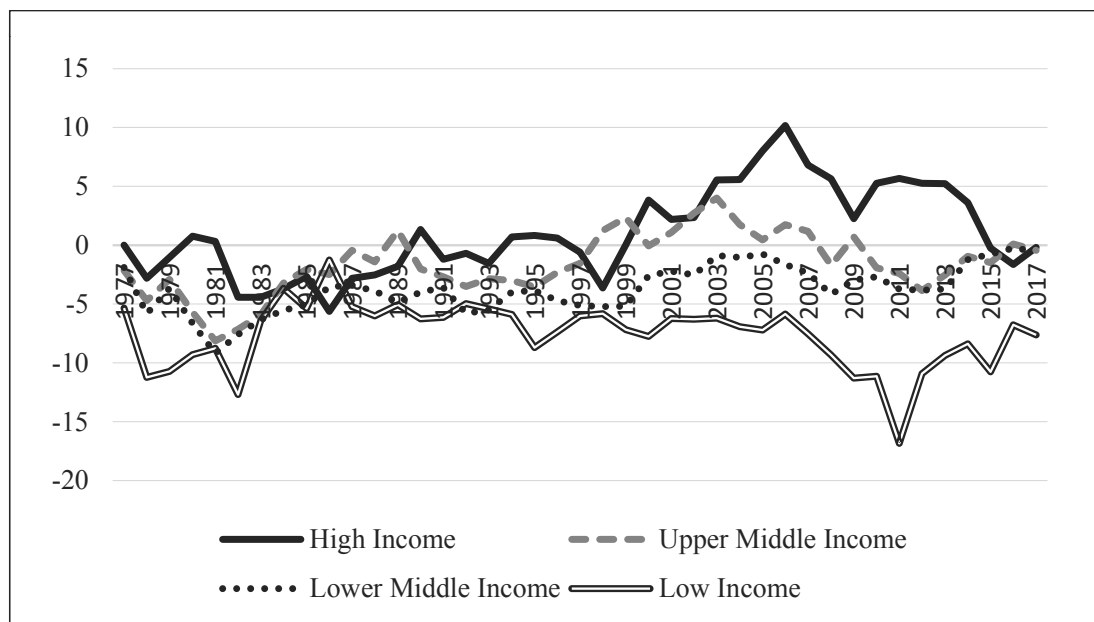


Source: The values obtained from The World Bank are calculated on the basis of groups. Each group of income level reflects the average values of countries in the group.

Figure 3. Domestic credit to private sector by banks (% of GDP)



Source: The values obtained from The World Bank are calculated on the basis of groups. Each group of income level reflects the average values of countries in the group.

Figure 4. Current account balance (% of GDP)

Source: The values obtained from The World Bank are calculated on the basis of groups. Each group of income level reflects the average values of countries in the group.

The outline of the empirical analyses applied in this study can be illustrated as follows:

- o Im-Pesaran-Shin and Levin-Lin-Chu unit root tests are applied to see whether the panel data are stationary or not.
- o The models to be used for panel data analysis (the pooled least squares model, the fixed effect model and the random effect model) are selected to determine which model is appropriate for panel data analysis. To achieve this; the F test, the Breusch-Pagan test and the Hausman test are used.
- o Panel data analyses are performed and the results thereof are shared.

3. EMPIRICAL STUDY

3.1. Unit Root Test

In order to analyze panel data, since it is a requirement for data not to have unit root, Im-Pesaran-Shin (2003) and Levin-Lin-Chu (2002)

unit root tests are applied within the scope of this study.

Allowing for residual serial correlation and heterogeneity of the dynamics and error variances across groups, Im-Pesaran-Shin test, instead of pooling the data, takes into consideration the mean of (A)DF statistics computed for each cross-section unit when the error term of the model (1.1) is serially correlated (Barbieri, 2006), while Levin-Lin-Chu test uses a pooling approach and follows three steps: First of all, ADF regressions are estimated on each cross-section and residuals computed. Secondly, for each cross section, the ratio of long-run to short-run standard deviations is estimated. In the final step, the ratios are used to adjust the mean of the t -bar statistic found (Barreira and Rodrigues, 2005).

Im-Pesaran-Shin test results are shown in Table 3, while Levin-Lin-Chu analysis results are summarized through Table 4.

Table 3. Im-Pesaran-Shin Unit Root Analysis

Variable	I(0) / I(1)	Intercept		Intercept and Trend	
		Im-Pesaran-Shin t-bar	Significance Level	Im-Pesaran-Shin t-bar	Significance Level
All Countries (44 Countries)					
GDP	I(0)	-4,8045	***	-5,18382	***
	I(1)	-	-	-	-
FDI	I(0)	-2,84795	***	-3,61344	***
	I(1)	-	-	-	-
CAB	I(0)	-2,83207	***	-3,25511	***
	I(1)	-	-	-	-
CRDT	I(0)	-1,08274	-	-1,88523	-
	I(1)	-5,60381	***	-5,67318	***
Note: For the model with intercept, the critical values are -1,70 -1,75 and -1,84 for %10, %5 and %1 respectively. For the model with intercept and trend, the critical values are -2,33 -2,38 and -2,47 for %10, %5 and %1 respectively.					
High Income Level Countries (12 Countries)					
GDP	I(0)	-4,44881	***	-4,56062	***
	I(1)	-	-	-	-
FDI	I(0)	-3,25804	***	-3,88352	***
	I(1)	-	-	-	-
CAB	I(0)	-2,14471	***	-2,65694	**
	I(1)	-	-	-	-
CRDT	I(0)	-1,06425	-	-2,01768	-
	I(1)	-5,16351	***	-5,27069	***
Note: For the model with intercept, the critical values are -1,85 -1,95 and -2,11 for %10, %5 and %1 respectively. For the model with intercept and trend, the critical values are -2,48 -2,57 and -2,74 for %10, %5 and %1 respectively.					
Upper Middle Income Level Countries (11 Countries)					
GDP	I(0)	-4,65474	***	-4,87661	***
	I(1)	-	-	-	-
FDI	I(0)	-2,93253	***	-3,5208	***
	I(1)	-	-	-	-
CAB	I(0)	-2,96715	***	-3,40971	***
	I(1)	-	-	-	-

Variable	I(0) / I(1)	Intercept		Intercept and Trend	
		Im-Pesaran-Shin t-bar	Significance Level	Im-Pesaran-Shin t-bar	Significance Level
CRDT	I(0)	-1,22707	-	-2,12144	-
	I(1)	-5,08257	***	-5,09576	***
Note: For the model with intercept, the critical values are -1,87 -1,96 and -2,14 for %10, %5 and %1 respectively. For the model with intercept and trend, the critical values are -2,49 -2,58 and -2,76 for %10, %5 and %1 respectively.					
Lower Middle Income Level Countries (14 Countries)					
GDP	I(0)	-4,50076	***	-5,33469	***
	I(1)	-	-	-	-
FDI	I(0)	-2,4244	***	-3,47295	***
	I(1)	-	-	-	-
CAB	I(0)	-2,96245	***	-3,33628	***
	I(1)	-	-	-	-
CRDT	I(0)	-0,965387	-	-1,88332	-
	I(1)	-6,09172	***	-6,13414	***
Note: For the model with intercept, the critical values are -1,82 -1,92 and -2,06 for %10, %5 and %1 respectively. For the model with intercept and trend, the critical values are -2,45 -2,54 and -2,69 for %10, %5 and %1 respectively.					
Low Income Level Countries (7 Countries)					
GDP	I(0)	-6,25707	***	-6,43318	***
	I(1)	-	-	-	-
FDI	I(0)	-2,85911	***	-3,57699	***
	I(1)	-	-	-	-
CAB	I(0)	-3,53737	***	-3,87525	***
	I(1)	-	-	-	-
CRDT	I(0)	-1,12237	-	-1,2908	-
	I(1)	-6,20186	***	-6,34864	***
Note: For the model with intercept, the critical values are -1,95 -2,07 and -2,29 for %10, %5 and %1 respectively. For the model with intercept and trend, the critical values are -2,57 -2,68 and -2,90 for %10, %5 and %1 respectively.					

***, **, * reflect significance level of %1, %5 and %10 respectively.

Table 4. Levin-Lin-Chu Unit Root Analysis

Variable	I(0) / I(1)	Intercept			Intercept and Trend		
		Coefficient	t ratio	z-score [p value]	Coefficient	t ratio	z-score [p value]
All Countries (44 Countries)							
GDP	I(0)	-0,69619	-30,994	-24,782 [0,0000]	-0,78089	-34,105	-24,9512 [0,0000]
	I(1)	-	-	-	-	-	-
FDI	I(0)	-0,35083	-19,162	-11,974 [0,0000]	-0,47465	-23,055	-12,7482 [0,0000]
	I(1)	-	-	-	-	-	-
CAB	I(0)	-0,30391	-18,069	-10,026 [0,0000]	-0,43214	-22,173	-10,179 [0,0000]
	I(1)	-	-	-	-	-	-
CRDT	I(0)	-0,047648	-6,868	-1,02247 [0,1533]	-0,1634	-12,777	-0,842372 [0,1998]
	I(1)	-0,86924	-37,577	-31,7666 [0,0000]	-0,90032	-38,738	-30,0917 [0,0000]
High Income Level Countries (12 Countries)							
GDP	I(0)	-0,61223	-14,775	-10,7976 [0,0000]	-0,63041	-15,051	-9,57255 [0,0000]
	I(1)	-	-	-	-	-	-
FDI	I(0)	-0,57242	-13,709	-10,2182 [0,0000]	-0,69696	-15,659	-10,6861 [0,0000]
	I(1)	-	-	-	-	-	-
CAB	I(0)	-0,26222	-8,970	-4,65122 [0,0000]	-0,36945	-10,564	-3,96503 [0,0000]
	I(1)	-	-	-	-	-	-
CRDT	I(0)	-0,040863	-3,482	-0,63384 [0,2631]	-0,15686	-6,271	0,921004 [0,8215]
	I(1)	-0,83919	-18,618	-15,7058 [0,0000]	-0,87355	-19,322	-14,9507 [0,0000]
Upper Middle Income Level Countries (11 Countries)							
GDP	I(0)	-0,67144	-15,012	-11,9571 [0,0000]	-0,7483	-16,222	-11,7158 [0,0000]
	I(1)	-	-	-	-	-	-
FDI	I(0)	-0,36909	-9,944	-6,0026 [0,0000]	-0,45658	-11,372	-5,84937 [0,0000]
	I(1)	-	-	-	-	-	-
CAB	I(0)	-0,37902	-10,163	-6,08306 [0,0000]	-0,47844	-11,981	-6,3659 [0,0000]
	I(1)	-	-	-	-	-	-
CRDT	I(0)	-0,1185	-5,750	-1,58495 [0,0565]	-0,16057	-6,493	-1,69711 [0,0448]
	I(1)	-	-	-	-	-	-
Lower Middle Income Level Countries (14 Countries)							
GDP	I(0)	-0,70704	-17,828	-14,103 [0,0000]	-0,80311	-19,923	-14,3929 [0,0000]
	I(1)	-	-	-	-	-	-
FDI	I(0)	-0,26893	-9,191	-5,13639 [0,0000]	-0,40728	-11,837	-6,11014 [0,0000]
	I(1)	-	-	-	-	-	-
CAB	I(0)	-0,31976	-10,108	-4,75399 [0,0000]	-0,44249	-12,576	-5,36374 [0,0000]
	I(1)	-	-	-	-	-	-
CRDT	I(0)	-0,045188	-3,116	1,2666 [0,8974]	-0,148	-6,828	0,344308 [0,6347]
	I(1)	-0,94409	-23,551	-20,015 [0,0000]	-0,96309	-24,049	-18,854 [0,0000]

Variable	I(0) / I(1)	Intercept			Intercept and Trend		
		Coefficient	t ratio	z-score [p value]	Coefficient	t ratio	z-score [p value]
Low Income Level Countries (7 Countries)							
GDP	I(0)	-1,0999	-18,533	-17,2009 [0,0000]	-1,1203	-18,930	-16,3659 [0,0000]
	I(1)	-	-	-	-	-	-
FDI	I(0)	-0,47581	-9,139	-6,03489 [0,0000]	-0,59997	-10,722	-6,39117 [0,0000]
	I(1)	-	-	-	-	-	-
CAB	I(0)	-0,46354	-9,145	-6,06067 [0,0000]	-0,55703	-10,534	-6,58608 [0,0000]
	I(1)	-	-	-	-	-	-
CRDT	I(0)	-0,099943	-3,491	0,93674 [0,8256]	-0,14359	-4,509	0,672218 [0,7493]
	I(1)	-1,0739	-17,817	-16,2523 [0,0000]	-1,0827	-17,973	-15,195 [0,0000]

According to Table 3 and Table 4, it is possible to say that GDP, FDI and CAB are stationary at I(0), while CRDT is generally stationary at I(1). Therefore, regarding CRDT, it is deemed fit to use the first difference of log of the variable, when applying the panel data analyses.

3.2. Model Selection for Panel Data Analysis

After overcoming the unit root issue, the next step is to decide which model to select for panel data analysis. As per the literature, it is seen that there are three main models for panel data approach: the pooled least squares model, the fixed effect model and the random effect model.

The pooled least squares model does not consider time and individual dimensions, thus can use the least squares technique, while the assumption of the fixed effect model is that there is a different constant intercept for each cross section and time is considered less realistic. On the other hand, eliminating heteroscedasticity, the random effect model allows the difference between intercepts to be accommodated by error terms (Zulfikar, 2018).

These models are stated below, being customized to the variables of GDP, FDI, CAB and CRDT.

The Pooled Least Squares Model (PLS)

$$GDP_{it} = a + \beta_1 FDI_{it} + \beta_2 CRDT_{it} + \beta_3 CAB_{it} + \varepsilon_{it}$$

for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$

where;

N = the number of countries

T = the number of time periods

The Fixed Effect Model (FE)

$$GDP_{it} = a_i + \beta_1 FDI_{it} + \beta_2 CRDT_{it} + \beta_3 CAB_{it} + \varepsilon_{it}$$

for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$

where;

N = the number of countries

T = the number of time periods

The Random Effect Model (RE)

$$GDP_{it} = a + \beta_1 FDI_{it} + \beta_2 CRDT_{it} + \beta_3 CAB_{it} + u_i + \varepsilon_{it}$$

for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$

where;

N = the number of countries

T = the number of time periods

ε_{it} = the residual as a combination of cross section and time series.

u_i = the individual residual specific to cross section

In order to select appropriate model; the F test, the Breusch-Pagan test and the Hausman test are used. The F test is used for selecting between PLS (as null hypothesis) and FE (as alternative hypothesis), while the Breusch-Pagan

Table 5. Panel Data Analysis Model Selection

Panel Data Analysis Models for Comparison	Tests Used for Comparison			Selected Model
	F Test	Breusch-Pagan Test	Hausman Test	
All Countries (44 Countries)				
H ₀ = PLS H _A = FE	3,59232 [1,03114e-013]***			FE
H ₀ = PLS H _A = RE		116,559 [3,58597e-027]***		RE
H ₀ = RE H _A = FE			1,88263 [0,597121]	RE
High Income Level Countries (12 Countries)				
H ₀ = PLS H _A = FE	3,31105 [0,000212662]***			FE
H ₀ = PLS H _A = RE		14,279 [0,000157616]***		RE
H ₀ = RE H _A = FE			4,91935 [0,177799]	RE
Upper Middle Income Level Countries (11 Countries)				
H ₀ = PLS H _A = FE	4,40341 [6,64927e-006]***			FE
H ₀ = PLS H _A = RE		34,0636 [5,33407e-009]***		RE
H ₀ = RE H _A = FE			4,89079 [0,179971]	RE
Lower Middle Income Level Countries (14 Countries)				
H ₀ = PLS H _A = FE	3,73095 [9,95489e-006]***			FE
H ₀ = PLS H _A = RE		26,9638 [2,07306e-007]***		RE
H ₀ = RE H _A = FE			9,42676 [0,0241234]**	FE
Low Income Level Countries (7 Countries)				
H ₀ = PLS H _A = FE	1,99797 [0,0662089]*			FE
H ₀ = PLS H _A = RE		1,52269 [0,217212]		PLS
H ₀ = RE H _A = FE			9,86755 [0,0197262]**	FE

Note: ***, **, * reflect significance level of %1, %5 and %10 respectively.

Table 6. Panel Data Analysis Results for Dependent Variable GDP

Variable	Coefficient	Std. Error	t-ratio	p-value	
All Countries (44 Countries)					
Constant	0,0331305	0,00214827	15,42	2,02e-050	***
FDI	0,186014	0,0300838	6,183	7,79e-010	***
CAB	0,0158368	0,0148910	1,064	0,2877	
CRDT	0,000205992	0,00629549	0,03272	0,9739	
High Income Level Countries (12 Countries)					
Constant	0,0315262	0,00378124	8,338	8,22e-016	***
FDI	0,0828185	0,0410988	2,015	0,0445	**
CAB	0,0392665	0,0233333	1,683	0,0931	*
CRDT	-0,0322035	0,0156329	-2,060	0,0399	**
Upper Middle Income Level Countries (11 Countries)					
Constant	0,0366570	0,00449848	8,149	3,93e-015	***
FDI	0,280374	0,0866522	3,236	0,0013	***
CAB	-0,0953653	0,0354855	-2,687	0,0075	***
CRDT	0,00820401	0,0104429	0,7856	0,4325	
Lower Middle Income Level Countries (14 Countries)					
Constant	0,0339232	0,00232626	14,58	6,93e-041	***
FDI	0,405278	0,0745463	5,437	8,22e-08	***
CAB	0,0645346	0,0272749	2,366	0,0183	**
CRDT	-0,00195960	0,00972162	-0,2016	0,8403	
Low Income Level Countries (7 Countries)					
Constant	0,0267990	0,00527537	5,080	7,05e-07	***
FDI	0,352195	0,105871	3,327	0,0010	***
CAB	0,0731972	0,0710189	1,031	0,3036	
CRDT	0,0155121	0,0189694	0,8177	0,4142	

Note: ***, **, * reflect significance level of %1, %5 and %10 respectively.

test is used for deciding between PLS (as null hypothesis) and RE (as alternative hypothesis). As for the Hausman test, it is applied when selecting between RE (as null hypothesis) and FE (as alternative hypothesis). In the light of this infor-

mation, for the all countries and the groups of countries, the related tests are applied and the results thereof are summarized in Table 5 along with the selected model.

As per Table 5 results, the F test indicates the FE model for both all of the countries and the income level groups. On the other hand, the Breusch-Pagan test implies that the RE model will be appropriate for all the panel data analyses except the one for the group of low income level countries. Consequently, the Hausman test is applied and decided that the RE model should be used for the groups of all countries, high income level and upper middle income level, while the FE model should be used for the groups of lower middle income level and low income level.

3.3. Panel Data Analysis and Results

In the study, panel data analyses are performed upon the selection of models suitable and the results are shown in Table 6, covering the groups of all countries, high income level, upper middle income level, lower middle income level and low income level.

According to Table 6 results, only FDI is statically significant at the level of %1 for the all countries, implying that any increase of FDI positively affect GDP. Similarly, FDI is also significant for the all income level groups, having a positive coefficient and this result is in accordance with many studies in the literature. On the other hand, it is seen that CAB has no effect on GDP for both all of the countries and the low income level group. Any increase in CAB has a positive effect on GDP for the groups of high income level and lower middle income level, while its impact is negative for the upper middle income level countries. CRDT's effect is limited to the high income level countries and it is negative. For the other groups, it seems that CRDT is not significant at the level of %10.

4. DISCUSSION

One of the most important results in this study is that FDI positively affects economic growth. This is valid for all the income level groups and countries need FDI to sustain their growth rates. In addition to the countries with low level income, which require much more know-how and technology, even the economies with higher level income have need of FDI. As per the re-

sults, although developing countries need more FDI, compared to developed countries, FDI is a key factor all countries should put emphasis on and the hypothesis that "as the income level decreases, the positive effect of FDI on economic growth increases" is acceptable. What Iamsiraroj and Doucouliagos (2015) implied, "growth is more correlated with FDI in developing countries" is therefore in accordance with the result obtained in this study. The positive impact of FDI on economic growth is also in accordance with what were stated by Vintila and Mocanu (2023) and Begum et al. (2023).

Another interesting result of this study is that bank credits tend to impede economic growth for high income level countries and bank credits are not associated with economic growth of the other income level groups (statically not significant at the level of %10), which is against the hypothesis constructed here that bank credits stimulate economic growth. One of the reasons might be that each country has its own specific characteristics. As Armeanu et al. (2015) mentioned, the countries are not homogenous and economic conditions under which crediting processes developed are different, even if they have same income levels. As the combinations of countries and the panel data are used in this article, a significant result may not have been obtained due to absence of specific characteristics of countries and economy may have been disturbed by external shocks and factors. Therefore, losing the characteristics of countries can be the biggest limitation of this study. Besides, the result of this study can be seen as complementary to those of Ho and Saadaoui (2021), stating the beneficiary of the credit, the structural features and the regional heterogeneity were important and supports the researches by Ayadi et al. (2013) and Ghosh (2010).

As expected, CAB is found to influence middle income level groups more than high income level countries. Current account deficit positively affects the growth of upper middle income level countries, while it has a negative impact on the growth of lower middle income level countries. Its negative impact on the growth of lower middle income level countries is also valid for high income level countries. As mentioned by Blakeley (2018), even high income level countries may

need to address their current account deficit in order not to remain vulnerable to any changes in the global macroeconomic and provoke capital flight. Therefore, restructuring of economy, including the strengthening of domestic supply chains and a diversification of exporting sectors may be required for both middle income and high income level countries in generating economic growth, considering the status of optimal current account balance and threshold values for current account deficit, as explained by Aydın and Esen (2016). In this frame, as Devadas and Loayza (2018) indicated, it should be taken into consideration that even good deficits or surpluses do not mean that a country will be on safe side due to the characteristics of gross financial stocks and the balance sheet of sectors.

5. CONCLUSION

In this study, the impact of foreign direct investment, bank credit and current account balance on economic growth is examined on the basis of income level. In this regard, 44 countries are divided into 4 groups: high income level, upper middle income level, lower middle income level and low income level.

As per the results, foreign direct investment is a key factor for growth and especially, it is important for lower middle and low income level countries. As the income level increases, its positive effect on economic growth decreases. This result implies that developing countries need more foreign capital than developed countries in order to grow and the result is against what Dort et al. (2014) concluded.

Another point is that current account deficit has positive effect on the growth of upper middle income level countries, meaning production in these countries most probably depends on import as in the case of Turkey. On the other hand, it seems that current account surpluses are good for high and lower middle income level countries.

As for bank credit, it affects the growth of high income level countries only and its impact is negative. Hence, it can be said that the quality of bank credit is more important than the quantity.

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This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

B. Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

C. Availability of data and material

The data that support the findings of this study are openly available in the website of World Bank (www.worldbank.org).

D. Code Availability

The computer program results are shared through the tables in the manuscript.

E. Authors' Contributions

Not applicable

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Utjecaj izravnih stranih ulaganja, bankovnih kredita i salda tekućeg računa bilanca plaćanja na gospodarski rast prema razini dohotka

Sažetak

Literatura sugerira da su izravna strana ulaganja (FDI), bankovni krediti (CRDT) i saldo tekućeg računa bilance plaćanja (CAB) ključni faktori koji određuju gospodarski rast jer utječu na sredstva potrebna da bi zemlja održala svoj rast. Drugim riječima, FDI, CRDT i CAB postavljaju temelj za održivi razvoj. U ovom istraživanju, koje obuhvaća 44 zemlje i razdoblje od 1977. do 2017. godine, analizira se utjecaj FDI, CRDT i CAB na gospodarski rast prema razini dohotka. U tom smislu, 44 zemlje su podijeljene u 4 skupine: zemlje s visokim dohotkom (HIL), zemlje s višim srednjim dohotkom (UMIL), zemlje s nižim srednjim dohotkom (LMIL) i zemlje s niskim dohotkom (LIL). U radu je korištena analiza panel podataka. Prema rezultatima, FDI je ključni faktor za rast i osobito je važan za zemlje LMIL i LIL. Kako se razina dohotka povećava, njegov pozitivan učinak na gospodarski rast opada. Deficit tekućeg računa ima pozitivan učinak za zemlje UMIL, dok ima negativan učinak za zemlje HIL i LMIL. Što se tiče CRDT-a, on utječe samo na rast zemalja HIL i njegov je učinak negativan.

Ključne riječi: izravna strana ulaganja, bankovni krediti, saldo tekućeg računa bilance plaćanja, gospodarski rast, analiza panel podataka, razina dohotka