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THE IMPACT OF FOREIGN DIRECT INVESTMENT ON DOMESTIC INVESTMENT IN SELECTED COUNTRIES OF CENTRAL AND EASTERN EUROPE FROM 2008-2019

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1.Introduction

Economists have been exploring the key factors that affect a country's economic growth, and through their continuous efforts, there are currently many successful economic theoretical research results. According to the research of neoclassical growth theory (Solow, 1956), labor force, capital stock and technological progress are the key factors affecting economic growth, but long-term economic growth depends on the technological progress of exogenous variables. Because, with time, the level of capital per capita and the level of output per capita will converge to the equilibrium level. However, labor and capital will bring temporary growth to the economy. In addition, according to the investment multiplier effect in macroeconomics, an increase in a country's investment will cause the national income to increase by a multiple of investments, thereby producing a macroeconomic expansion effect.

Moreover, unlike the neoclassical growth theory, through the endogenous growth model, the economist Romer (1986) concluded that the long-term economic growth is not the result of exogenous variables, but the endogenous variables of the economic system (population growth and Technological progress), which means that the driving force of economic growth is human capital and the investment in innovation and knowledge. Moreover, the economist Romer also pointed out that technological progress can maintain the increasing marginal return of capital, and also investment in innovation and knowledge can improve technological progress.

Generally speaking, these two crucial economic growth theories emphasize the critical impact of investment on the economy. Furthermore, as an essential international investment, the inflow of FDI will significantly increase the society's capital stock, thereby increasing the host country's investment in plants and equipment. Significantly, according to the theory of endogenous growth, we can say that FDI can not only bring about technological spillovers but also increase investment in innovation and knowledge in the host country, which could improve social production efficiency and

increase other intangible assets of the country (Mohapatra & Gopalaswamy, 2016). Additionally, foreign investment brought by multinational companies brings not only direct capital but also many intangible assets worth learning and imitating for the host country, such as advanced technology, corporate management technology, international marketing approach, and brand management. Therefore, FDI plays a significant role in maintaining a country's long-term economic growth.

Moreover, the flow of international investment is generally divided into an investment portfolio and FDI. The investment portfolio can be regarded as an investment in foreign securities markets, such as the purchase of stocks and bonds. In addition, the purpose of the investment portfolio is to obtain short-term or long-term income, not to require a controlling stake in the host country, and investors will not participate in the company's daily operations. However, as a long-term international investment, FDI's purpose is to gain control of the host country's enterprises or pursue further development in specific industries by investing substantial capital in establishing new companies. FDI enters the host country mainly in two forms which are M&A (merge and acquisition) and green-filed investment. Furthermore, international companies with the way of M&A participate in the economic activities of the host country through the financial market. In comparison, green-filed investments invest capital in the plant, equipment, and personnel training to the local industry. Therefore, FDI with the form of Green-filed investment will participate in economic activities through market competition mechanisms.

According to Jude (2019) research on FDI in Central and Eastern Europe, Green-filed investment has a much more substantial impact on the host country's economy and industry than M&A. Because Green-filed investment may be complementary to local companies for a long time and will break the previous market balance since this form of FDI will employ human resources and capital resources to establish new entities in the host country or expand the scale of existing enterprises. However, both forms of FDI will have a significant impact on the financial industry of the host country, especially the development of domestic enterprises. For instance, if the host country has a relatively mature and developed financial market, then financial institutions

dominated by banks can reasonably guide international capital to conduct M&A in an organized manner, which will be more conducive to the financing of domestic enterprises and finally will have a positive impact on the domestic economy. However, green-filed investment is rarely restricted by the financial market, but the local government's policy of attracting foreign capital will affect the entry of such investment. According to Jude's (2019) research, for CEE countries, FDI based on Green-filed investment is more likely to be welcomed by the host country. Because this kind of investment will directly drive the development of the industrial entities, and under the influence of the market mechanism, it will be more conducive to driving the investment and development of domestic enterprises.

However, according to previous research, we can find that FDI could not always positively impact the economy of the host country. This is because FDI may crowd out investment opportunities for domestic companies or form a monopoly in various economic industries in the host country, resulting in crowding out domestic companies from a certain industry or market through market competition. Therefore, when we evaluate the impact of FDI on the host country's economic development, we mainly examine whether the inflow of FDI crowd out or crowd in domestic investment.

In addition, the crowding-in effect of FDI is relatively evident in economic activities. For example, FDI could drive the investment of upstream and downstream affiliated companies, or FDI could bring advanced management experience or technology transfer to the host country to promote the successful industrial transformation of domestic enterprises. However, the entry of FDI will also bring about a crowding-out effect. Generally speaking, the crowding-out effect of FDI is mainly produced in two ways. First, in the product market, FDI crow out local enterprises and investment by influencing the products and services, learning process, and growth experience of local enterprises.

Second, in the production factor market, FDI crowd out local enterprises and investment by affecting the funds, labor, and other factors that local enterprises could obtain or affecting the cost of these crucial factors. Specifically, if the inflow of FDI increases by 1 unit resulting in the increase in the total domestic investment of the host

country by less than one unit, then we can believe that FDI has a crowding-out effect on domestic investment. However, if an increase of 1 unit of FDI can lead to an increase of more than 1 unit of total domestic investment, then FDI can be considered to have a crowding-in effect, which is beneficial to domestic investment. We will introduce a detailed discussion of this theory in the following chapter.

For CEE countries, the inflow of FDI has always played an essential role in the local economic development. After the Eastern European Revolution, CEE countries have embarked on the road of economic transformation, and significant changes have taken place in their social and economic systems. In addition, the privatization of state-owned assets has become a key step in economic transformation. Furthermore, in the process of privatization, a large number of foreign capital has poured into these post-socialist countries, and many domestic enterprises have been acquired by foreign capital. According to scholar Uhlenbruck's (2000) research on 170 foreign acquisition projects, reinvestment after acquisitions by foreign firms has dramatically improved the production efficiency of the acquired company, and these acquisitions and investments have promoted the integration of the company into the international market.

Nonetheless, from the beginning of the economic transition in CEE countries to 2008, most countries in this region experienced substantial economic growth, and the growth rate of per capita GDP of more than 90% of the original communist countries far exceeded the growth rate of the world average per capita GDP. In addition, some CEE countries have received a large amount of direct investment from developed economies in Western Europe after joining the European Union and have wholly entered the European trade market. Therefore, before 2008, the economic development of CEE countries was relatively successful. Nevertheless, in terms of the impact of FDI on domestic investment, we have not come to a unified conclusion, which means that we have not found from previous research that the inflow of FDI into CEE countries has a significant crowding-out effect on domestic investment. However, many studies have shown that FDI has a long-term positive crowding-in effect on domestic investment in several Central and Eastern European countries (Titarenko, 2005; Kosová, 2010; Jude, 2019).

However, the 2008 global financial crisis brought about a negative impact on the economic development of CEE countries and the attraction of international investment. According to scholars Dorneana, Vasile & Oanea (2012) on the research of the impact of the financial crisis on FDI flows, the 2008 financial crisis had a direct impact on the level of FDI in 10 CEE countries (all EU member states) and also this crisis resulted in a tremendous negative impact on the economies of the whole region. Moreover, the financial crisis has dramatically reduced the influx of foreign capital into these countries, and even a certain amount of foreign capital outflow from the host countries during the crisis. Therefore, after the financial crisis, various countries have strengthened their inspection of foreign capital and tried to establish a more reasonable regulatory mechanism, which also led to the slow growth of foreign capital flowing into these countries after the crisis, and even the level of FDI flows in some countries has been lower than before the financial crisis.

However, as the financial crisis subsided, CEE countries began to attract substantial foreign investment, especially the huge direct investment from China. Since the establishment of the '16+1' economic and trade cooperation mechanism between China and 16 Central and Eastern European countries in 2012 and the start of China's promotion of the 'Belt and Road' economic initiative in 2013, economic and trade cooperation between China and CEE countries has been continuously strengthened (Brînză, 2019), especially the cooperation between the two parties in the field of investment. This is because, after the financial crisis, there is a lack of liquid investment in CEE countries. At the same time, China needs to increase exports and overseas investment. In addition, China regards the Central and Eastern European markets as a springboard to enter the EU market (Matura, 2019). Therefore, since 2013, Central and Eastern Europe and China have launched formal cooperation in various fields. According to the latest statistics from the Ministry of Commerce of China, as of the end of 2020, 17 CEE countries have invested a total of US$1.72 billion in China, involving automobiles, medicine, finance, logistics, and other fields. Meanwhile, China has accumulated a total of US$3.14 billion in direct investment in the entire industry in 17 CEE countries, which has expanded to many fields such as energy, minerals,

infrastructure, logistics, automobile production, and other fields. Moreover, China has become Hungary's largest investment source country in 2020.

Therefore, it is necessary to examine the impact and significance of these foreign investment inflows on domestic investment. However, many scholars are also concerned about the cooperation between China and CEE countries because China-US relations continue to be tense, and the European Union and other institutions believe that China is engaged in economic cooperation with CEE countries in order to gain political influence (Matura, 2019). However, we have not found strong evidence in relevant literature studies to show that China's investment in Central and Eastern Europe is for solid political purposes. In summary, after strengthening cooperation with China, countries in the CEE region have attracted much more funds to promote economic development. Nevertheless, few scholars have examined the impact of FDI inflow on domestic investment in CEE countries after Chinese investment has entered the Central and Eastern European markets. Consequently, this article will analyze the impact of FDI on domestic investment with the inflow of Chinese investment into CEE regions as the research background in the following research.

In general, the main research purpose of this article is to test whether FDI has crowding-in or crowding-out domestic investment in selected Central and Eastern European countries. Additionally, for this article's structure, we will first conduct a detailed literature review on this research topic. Secondly, this article will introduce the models, variables, and data selected in this empirical study. Thirdly, the essay will conduct a provisionary analysis of sample data and the amount of FDI inflows. Fourthly, this article is going to perform regression analysis on sample data. Furthermore, in the sixth section, we are going to conduct a qualitative analysis of empirical research results. In the seventh part, this article will conclude and put forward constructive suggestions. Finally, we are going to discuss the limitation of our research.

2. Literature review

When analyzing the relationship between FDI and domestic investment, it is generally believed that if the increase in total domestic investment in the host country caused by FDI inflow is more significant than the increase in FDI itself, then FDI has a positive crowd-in effect on FDI domestic investment. Specifically, the entry of FDI will not only bring financial assistance to the economic industries of the host country but also provide advanced management experience and technological innovation. Moreover, the business activities of multinational companies will also drive the development of relevant domestic enterprises in the host country.

However, FDI will also have a negative crowding-out effect on domestic investment, especially when the annual increase in FDI is greater than total domestic investment. Compared with domestic enterprises, multinational companies have significant advantages in capital, production technology, and management experience. In addition, to attract more foreign investment from the international capital market, multinational companies will get many preferential policies in the host country. Therefore, compared with domestic firms, multinational companies have substantial competitive advantages in specific industries so that they will squeeze out domestic companies' investment opportunities and consumer markets (2006, Bo).

Scholars have done many academic studies on the crowd-in or crowd-out effect of FDI on domestic investment according to different research objects and periods. Firstly, let us review the research on FDI and domestic investment in global markets. Scholars Agosin and Mayer (2000) established an investment model based on neoclassical theory. Their model is mainly used to test the crowd-in or crowding-out relationship between FDI and domestic investment. Moreover, they applied this investment model to test and analyze 26-year (1970-1996) panel data in three developing regions worldwide. More importantly, their research results show that FDI has a significant crowding-in effect on the domestic investment of Asian countries, which means that the inflow of FDI into Asian developing countries has a positive effect on the domestic

investment of the host country. However, for Latin America, the crowding-out effect of FDI on domestic investment is quite obvious. Additionally, their empirical research results also indicate no obvious correlation between FDI and domestic investment in Africa. Therefore, these two scholars concluded that FDI's domestic investment is not always favorable. The significant crowding-out effect of FDI on domestic investment may be caused by the host country's oversimplified investment policy and the difficulty of domestic companies to participate in the industries invested by multinational companies, and the inability to accept the technology spillover brought by FDI quickly.

Furthermore, Agosin and Mayer's research on the relationship between FDI and domestic investment has become a classic case for many scholars to study this issue. Many scholars directly apply their investment models in subsequent studies to study their cases in different regions and countries. For example, Chinese scholar Bo (2006) applied the research methods and theoretical models of Agosin and Mayer to study the crowd-in and crowd-out relationship between FDI and domestic investment in 29 provinces and cities of China from 1985 to 2003. Moreover, his empirical research found that before 1992, FDI obviously had a positive driving effect (crowd in) on domestic investment, but after 1992, the effect of FDI on domestic investment was the opposite. In addition, in his research, he divided 29 provinces and cities into three large economic regions and studied the specific relationship between FDI and domestic investment in each large sample. He found that FDI has different effects on domestic investment in different economic regions. For example, in economic areas with more export trade and labor-intensive industries, the crowding-out effect of FDI on domestic investment is more obvious.

Moreover, scholars Ndikumana and Verick (2008) obtained different results from Agosin and Mayer's case when studying the relationship between FDI and domestic investment in Africa. Specifically, scholars Ndikumana and Verick studied the panel data of 38 sub-Saharan African countries from 1970 to 2005 through a dissimilar theoretical model, and their research results indicated that FDI and domestic investment had a positive effect in this research sample. interdependent. FDI has a crowd-in effect

on domestic investment, and FDI also has a positive effect on the economic development of the African region.

In addition, a certain proportion of private investment in domestic investment also has a certain positive effect on FDI. Therefore, the scholar believes that national governments in these regions should actively exploit the complementarity between FDI and domestic private investment to attract more foreign investment to promote resource-intensive industries. Although the conclusions of these two studies on the relationship between FDI and domestic investment in Africa are various, this is due to the different focus of their research and the difference in the number and period of the sample studied. In this way, this article believes that the analysis behind the two research results is worthy of our reference and learning.

In addition, many scholars have studied the relationship between FDI and domestic investment in developed and underdeveloped markets at the same period. Because the production factors and economic environment of developed countries are different, FDI may have different effects on countries with different levels of economic development. For example, scholar Wang (2010) applied an econometric model to analyze the impact of foreign investment on domestic investment in 50 countries from 1970 to 2004. From his research, we can find that the impact of FDI on developed countries is negative, which means that there is not enough evidence that FDI would promote domestic investment. However, for developing countries, FDI would bring obvious and positive cumulative effects to these countries.

Meanwhile, As the year progressed, the cumulative effects of FDI would continue to increase domestic investment in the least developed countries. Therefore, his research believes that the governments of underdeveloped countries should pay more attention to improving the operating efficiency of domestic enterprises and allow them to participate in economic activities with multinational companies actively. However, this article believes that it is impossible that FDI could actively drive domestic investment in every underdeveloped region or country to promote economic development. This is because FDI needs certain economic conditions and relatively completed supporting policies to promote domestic investment.

Although there is plenty of literature discussing the impact of FDI and domestic investment, some scholars have studied several key factors that affect FDI. Furthermore, this article believes that it is necessary to understand the relevant research on this issue. For example, Goswami and Haider (2014) discussed the main factors affecting FDI in their research. They tested 12 political risk indicators using an econometric model with FDI as the dependent variable. Then their research found that the failure of government governance is not an important reason for preventing FDI inflows. On the contrary, cultural conflicts and the attitude of the investing country towards the host country are the key factors that hinder the inflow of international capital. Furthermore, their research results may differ from other scholars' arguments, but their research involves 146 countries, and their research methods are relatively reasonable and complete. Therefore, this article believes that we cannot ignore the key factors they mentioned when examining the key elements that affect FDI inflows.

The above research summary is mainly based on the global market. Next, this article will focus on academic research on the relationship between FDI and domestic investment in Central and Eastern Europe. First of all, let us review the earlier related research. For instance, the scholar Konings (2000) used a fixed-effects model to test the efficiency and influence of early multinational on domestic companies in three Central and Eastern European countries (Bulgaria, Poland, and Romania). Moreover, he found that there was no evidence to show that multinational companies have a positive spillover effect on domestic companies in these three countries. In addition, multinational companies in Bulgaria and Romania indeed have a negative spillover effect on domestic investment. Therefore, in the example he studied, we can also say that FDI brought by multinational companies did not promote domestic investment. However, many studies have focused on the crowding-in or crowding-out effect of FDI on domestic investment.

For example, scholars Mišun and Tomšík (2002) analyzed the crowding-in effect of FDI in the process of national privatization by FD in the Czech, Poland, and Hungary from 1990 to 2000 through empirical research. Their research applied the investment model of Agosin and Mayer, but they modified the model according to the specific

situation. Moreover, their research shows that Hungary and the Czech Republic have a positive crowd-in effect during the privatization of state-owned assets, which means that since they introduced foreign capital, FDI has promoted domestic investment. However, their research finds that the crowding-out effect of FDI in Poland is obvious and has always existed. Based on their quantitative research and policy analysis, scholars believe that during the period from 1990 to 2000, the Czech Republic and Hungary were quite successful in attracting foreign investment to increase the domestic economy. Because of the inflow of foreign capital, many domestic industries have received financial and technical support. However, compared with the Czech Republic, Hungary's policy is more effective in introducing foreign capital. In contrast to the Polish research results, although the amount of FDI flowing into Poland is relatively large, FDI did not bring about an additional increase in domestic investment, and foreign investment has a crowding-out effect on domestic investment. Whereas their research estimates that in the future economic development, the crowding-out effect of FDI on domestic investment is likely to become a positive crowding-in effect in Poland.

Surprisingly, their prediction on the future crowding-in effect of FDI is consistent with Jude (2019) 's recent study of 10 countries in Central and Eastern Europe (including Poland). This article will introduce Jude's research in detail in the following part. In addition, some scholars have concentrated on studying the impact of FDI in a certain Central and Eastern European country on domestic investment. In addition, some scholars have concentrated on studying the impact of FDI in a certain Central and Eastern European country on domestic investment. We know that if the purpose of a study is to investigate the crowding-in and crowding-out phenomenon in a specific country, then such research may have a guiding effect on the actual problems of a certain country. For example, Titarenko (2005) used a total investment model to study the impact of FDI on domestic investment in Latvia from 1995 to 2004. Specifically, his research is based on the theoretical and empirical research results of scholars Agosin and Mayer (2000). Titarenko applied the total investment model to test the crowding-in or crowding-out effects of FDI. His research results indicate that FDI in Latvia has a long-term crowing-out effect on domestic investment, which means that foreign investment flows into Latvia have replaced domestic enterprise's investment to a certain

extent. According to the scholar's research and analysis, the reason for the long-term crowding-out may be that the inflow of FDI in the host country is relatively low. Because the inflow of investment funds is too low, it will be difficult to promote the domestic economy. Another reason is that FDI flowing into Latvia generally enters relatively active economic industries, and these industries are basically oligopoly industries. Therefore, capital from abroad rarely flows into underdeveloped economic sectors that lack capital and technology.

As a consequence, FDI does not have a positive impact on Latvia's domestic investment. This article believes that Titarenko's analysis of the reasons for the crowding-out effect in Latvia is quite reasonable because the analysis of the reasons combines the historical background of Latvia's state-owned assets and the characteristics of economic development. Furthermore, this case study in Latvia let us realize the influence of government policies on maximizing the benefits of foreign investment. Meanwhile, this article believes that the positive or negative impact of FDI inflow on the host country is inseparable from the government's policy on foreign investment. In other words, to achieve the positive crowding-in effect of international capital on investment, the government needs to develop detailed policies to attract foreign investment and allocate foreign investment to under-developed economic sectors as much as possible, thereby generating technological spillovers to the specific industry.

Our research will also analyze the reasons for the crowding-in or crowding-out effect and put forward more reasonable policy recommendations. Besides, one scholar also achieved an in-depth study of a country's foreign investment. Kosová (2010) analyzed the crowding-in effects of FDI in the Czech Republic from 1994 to 2001 through empirical research. His research results show that FDI would crowd out domestic investment in the short term, but the crowding-out effect of FDI is dynamic in the long run, which means that FDI would have a positive crowding-in effect on domestic investment in the later period. This is because, in the early stage of privatization, many foreign investments flowed in rapidly, but later due to factors such as technological spillovers. Therefore, FDI has a positive driving effect on domestic investment by creating investment demand and market for domestic enterprises, but from the case of

the Czech Republic, FDI does not have the benefits of competition to domestic enterprises. Meanwhile, from the research of scholar Kosová(2010), we can see that the crowding-out or crowding-in effect of FDI on domestic investment may be a long-term dynamic. Therefore, to better study the impact of FDI on domestic investment, we need to choose a longer research period.

The above research on the influence of FDI on domestic investment in CEE countries focuses on the period of privatization (around 1990-2001), and the crowding-in and crowding-out effects of FDI in these studies vary from country to country. Next, this article mainly analyzes scholars' research on this topic in recent years, which is the relationship between FDI and domestic investment after the privatization in CEE countries. For example, scholar Zuzana (2015) also used the investment model of Agosin and Mayer, like many other scholars, and tested the impact of foreign investment on domestic investment in four Central and Eastern European countries (Czech, Hungary, Slovakia and Estonia).

In addition, Zuzana's research period included the privatization period and the period of the 2008 financial crisis (1992-2010) and used a specific coefficient to test the crowding-in or crowding-out effect. Finally, her research shows that the whole data sample shows that FDI has a negative crowding-out effect on domestic investment in these four countries in a specific research period. In addition, she added that the reason for the crowding-out effect might be that a large amount of foreign capital acquired essential domestic energy and strategic industries during the privatization of state-owned assets, and the government excessively attracted foreign investment and also domestic enterprises were challenging to form a supply of multinational companies. Therefore, the investment of domestic enterprises in these countries has been crowded out.

However, this article believes that although her research uses a very mature classic investment model, she has not independently studied the development period after privatization. Because, in the later stage of privatization, other studies have proved that to a certain extent, FDI has had a positive impact on domestic investment. Moreover, the investment model of Agosin and Mayer is suitable for the study of a single country

or multiple countries. Therefore, this article believes that selecting four countries as the research object to verify the crowding-in and crowding-out effect of FDI for whole CEE countries may not be convincing. So, this article will select more countries as research samples in the research on this topic.

Unlike scholar Zuzana's research, scholar Jude (2019) selected 10 Central and Eastern European countries as a sample to study the relationship between FDI and domestic investment. Moreover, Jude believes that previous related studies have ignored some decisive factors that affect investment, such as capital costs or economic uncertainty. Hence, some control variables that affect investment are added to Jude's empirical research model. Nevertheless, in his research, he did not consider the impact of the lag effect of FDI and domestic investment on total investment. More important, it is commendable that Jude's research explores the impact of different types of FDI on domestic investment, such as green-field investment and merger & acquisition. Because many previous studies did not examine the crowding in or out of domestic investment by different types of FDI effect, and his research results point out that the inflow of FDI in the short term will have a negative impact on Central and Eastern European countries, but in the long run, FDI will have a positive effect.

In addition, He believes that mergers and acquisitions through multinational companies will not have a significant impact on domestic investment. However, the green-filed investment will actively establish industrial links with domestic companies to promote the development of domestic companies in a specific industry chain. Therefore, this type of FDI will have a positive mutual influence on domestic investment. This article believes that compared to previous studies, Jude's research considers more influencing factors and discusses the impact of different types of FDI on domestic investors in more detail. However, from the scholar Jude's point of view, she believes that Agosin and Mayer's investment model does not consider other factors. However, this article believes that although Jude's research considers other influencing factors, his research does not consider the lagging effect of these variables on total investment. Because, for a country's total investment, FDI and domestic enterprise investment will have a lag effect, which has a more significant impact on total investment than other control

variables. In addition, it is difficult to choose an objective standard to measure the overall effect of a particular influencing factor on multiple countries.

On the whole, previous studies on the crowding-in or crowding-out effect of FDI in CEE countries did not reach a unified conclusion. This is because the selected research objects, research time period, and research methods are different for each article. However, from previous studies, FDI has different effects on domestic investment in developed and underdeveloped regions. Because, in developed countries, their financial market is relatively strong and stable, so FDI exists more in the form of equity transfer or acquisition, while in developing countries, much more FDI exists in the form of green-filed investment. However, in the research on CEE countries, scholars have not compared and studied countries with inconsistent economic development levels in this region. In addition, at present, we could hardly find the latest research on the crowding-in or crowding-out effect of FDI in Central and Eastern Europe. Besides, after 2012, many Chinese investments continued to flow into CEE countries under the promotion of China's international cooperation project 'One Belt One Road'.

Meanwhile, the advantages of CEE countries regarding consumer market and labor resources have also attracted many investments from Western European countries. However, the inflow of foreign investment in recent years may crowd out domestic investment and have a negative impact on domestic industries. Therefore, it is necessary to explore the impact of FDI on domestic investment in this region in the past ten years. Moreover, studying the impact of FDI on domestic investment can also provide constructive suggestions to the local government to better implement reasonable policies to correctly guide foreign investment and ultimately promote economic stability and positive development in Central and Eastern Europe.

3.Brief introduction of model, variables and data

3.1 Selection of Model and Variables

In this article, we select the model of Manuel R. Agosin and Ricardo Mayer (2000) to analyze the impact of FDI on Domestic investment:

$$\mathrm{I}_{i,t} = \alpha_i + \beta_1 F_{i,t} + \beta_2 F_{i,t-1} + \beta_3 F_{i,t-2} + \beta_4 I_{i,t-1} + \beta_5 I_{i,t-2} + \beta_6 G_{i,t-1} + \beta_7 G_{i,t-2} + \varepsilon_{i,t}$$

Where I represents the ratio of investment to GDP, F represents the ratio of FDI to GDP, and G represents the GDP growth rate. $F_{i,t-n}$ is the n-order lag of the ratio of FDI to GDP, $I_{i,t-n}$ is the n-order lag of the ratio of investment to GDP, and $G_{i,t-n}$ is the n-order lag of GDP growth rate. item. α is the coefficient of fixed effect, that is, the ratio of investment to GDP when all variables (except α) in the model are 0. And ε is the residual of the model.

Some important theorems and calculation methods used in this model will be explained further. However, before explaining this model, we need to understand an important assumption about the investment. This hypothesis suggests that foreign direct investment brought by multinational companies directly affects the total domestic investment of the country, and foreign investment is an important part of the total domestic investment. FDI and investment from domestic enterprises constitute the total domestic investment of the country (Agosin & Mayer, 2000). This assumption helps us assess the impact of FDI on total domestic investment. In addition, we can express this hypothesis with the following equation:

$$I_t = I_{d,t} + I_{f,t}$$

In many cases, the amount of FDI flowing into a country is considered to be a new investment made by multinational companies in the country. However, this is an oversimplification of the concept of FDI. Agosin and Mayer (2000) believe that the amount of FDI cannot be simply regarded as equivalent to new investments made by foreign multinational companies. Because FDI can be regarded as the inflow of capital into the capital account in the balance of international payments, and the actual investment is a table variable in the national income and expenditure account. Therefore, FDI does not represent the actual investment of multinational companies in the country, because many mobile FDI enters the host country through mergers and acquisitions, which means that the gap between FDI and actual investment will be relatively large.

So the situation mentioned above is borrowing from the domestic capital market for investment. Agosin and Maye said that this situation occurs mostly in developed countries while developing countries have relatively few cases. Specifically, for developing countries, domestic borrowing costs are much higher than the international market, or average, this factor will cause multinational companies to borrow less from the domestic market. In this article, we study the Central and Eastern European countries, which have both advanced economies and non-advanced economies, so we still have to consider the difference between FDI and actual investment. This also shows that investment can be measured by FDI, and there is a lag effect, so there will be first-order and second-order lags in the ratio of FDI to GDP in the formula.

Next, Agosin and Mayer assume that the investment formed by domestic enterprises is a variable that adjusts the difference between the expected capital stock and the actual capital stock. That is:

$$\mathrm{I}_{d,t} = \lambda(K^*_{d,t} - K_{d,t})$$

Where $K_{d,t}^{*}$ represents the expected capital stock of domestic enterprises, $K_{d,t}$ represents the actual capital stock of domestic companies, and λ represents the relationship between FDI and domestic investment, that is, $\frac{\mathrm{I}_{d,t}}{\mathrm{I}_t}$. So $\mathrm{I}_t = K_{d,t}^{*} - K_{d,t}$, which is the difference between the expected capital stock and the actual capital stock.

Furthermore, Agosin and Mayer believe that the expected capital stock of domestic enterprises depends on the expected domestic production growth and the difference between the potential output of the economy and the actual output. The expected domestic production growth is expressed by G^{e}, and the potential product of the economy is expressed by Y_p ,the actual output is represented by Y, then the difference between the potential output of the economy and the actual output is represented by Y_t. Agosin and Mayer did not include this variable in the model because there is no significant relationship between changes in interest rates and investment rates in developing countries. So based on this, we can get:

$$K_{d,t}^{*} = \delta_0 + \delta_1 G_t^{e} + \delta_2 Y_t$$

Then, according to the law of capital stock, investment is the change in capital stock between period t and period $t-1$. If k is used to represent the annual depreciation rate of capital stock, then:

$$K_{d,t} = (1-k)K_{d,t-1} + I_{d,t-1}$$

On the basis of this model, we add another $G_{i,t-3}$. Because if domestic enterprises are rational, then the expected domestic production growth will not systematically deviate from the actual economic growth. In this case, there is: $G_t^{e} = G_t$. In this article, we adopt the assumption of adaptive expectations rather than rational expectations because the adaptive expectations of individual economic behavior have greater universality. So to build the model more accurately, we added one more item and the model becomes:

$$\mathrm{I}_{i,t} = \alpha_i + \beta_1 F_{i,t} + \beta_2 F_{i,t-1} + \beta_3 F_{i,t-2} + \beta_4 I_{i,t-1} + \beta_5 I_{i,t-2} + \beta_6 G_{i,t-1} + \beta_7 G_{i,t-2} + \beta_8 G_{i,t-3} + \varepsilon_{i,t}$$

Next, in order to be able to judge the 'crowding in' and 'crowding out' effects more conveniently, we introduce a new variable M :

$$\mathrm{M} = \frac{\sum_{i=1}^{3} \beta_1}{1 - \sum_{i=4}^{5} \beta_i}$$

According to the above model and our newly introduced variable, we need to perform Wald test on each M value to judge its significance:

H_0: $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$ （$\mathrm{M} = 1$）

H_0: $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 \neq 1$ （$\mathrm{M} \neq 1$）

If H_0 cannot be rejected at a certain level of significance, it means that M is equal to 1 at a certain level of significance. In other words, there is no significant "crowding in" or "crowding out" effect. However, if H_0 is rejected at a certain level of significance, it means that M is not equal to 1 at a certain level of significance, then a specific discussion will come at this time. If $\mathrm{M} < 1$, it means that there is a 'crowding in' effect, and if $\mathrm{M} > 1$, it means that there is a " crowding out " effect.

Specifically, the results are divided into the following three cases:

(1) Failure to pass the Wald test means that there is no obvious 'crowding in' or 'crowding out' effect.

(2) Pass the Wald test, and if M<1, it shows that there is a 'crowding out' effect, that is, an increase in the ratio of 1% of FDI to GDP will result in an increase of less than 1% in the ratio of investment to GDP.

(3) Pass Wald test, and if M>1, it shows that there is a ‘crowding in’ effect, that is, an increase in the ratio of 1% of FDI to GDP will result in an increase of more than 1% in the ratio of investment to GDP.

3.2 Data selection

To better research the impact of FDI on the domestic investment of Central and Eastern European countries, this paper selects 11 countries that have joined the European Union as the main objects of research. These countries are Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. We chose these 11 countries because they all joined the European Union, and due to the management and support of the European Parliament, these countries have relatively low financial market risks, and their domestic economies and politics are relatively stable. In addition, they have a certain degree of unity in terms of foreign trade policy and foreign investment. Moreover, after joining the European Union, these 11 countries have gained more opportunities to attract foreign capital and EU assistance, especially investment from developed countries in Western Europe. As a member of the EU, the products and services in these countries can smooth entry into the vast consumer market of the European Union. Thus they will have substantial economic advantages.

Therefore, taking these 11 Central and Eastern European countries that have joined the European Union as the research object, not only considering their similar economic system backgrounds but also these countries can provide the reference opportunity in terms of economic growth to other Central and Eastern European countries that have not joined the European Union. For example, we can examine whether the large amounts of foreign capital received by these countries that have joined the European Union positively affect their domestic investment or crowd out the investment of domestic enterprises.

In addition, according to the research (Agosin and Mayer, 2000; Wang, 2010), we can find that FDI has different effects on economies with different levels of economic development. For example, in a certain period, FDI flowing into emerging economies such as China and India may have a long-term crowding-in effect on domestic investment, but the effect of FDI on other developed economies is negative. Therefore, to better study the impact of FDI in different economies in Central and Eastern Europe, this article divides these 11 countries into two different groups based on the

International Monetary Fund(IMF) statistics. One group is advanced economies (Czech Republic, Estonia, Latvia, Lithuania, Slovakia, Slovenia), and the other group is non-advanced economies (Bulgaria, Croatia, Hungary, Poland, Romania).

Next, this article selects the data of these 11 countries from 2008 to 2019 as the panel data sample. Because since 2008, due to the global financial crisis, the global capital market has experienced a significant blow, and the capital market has gradually recovered in the following years. In addition, after 2008, except for Croatia (which joined the European Union in 2013), the other 10 Central and Eastern European countries have joined the European Union. So the 12-year period (2008-2019) selected in this article has great practical reference value.

In the following analysis, we will divide 2008 to 2019 into two periods to analyze: 2008-2012 and 2013-2019. The reason is that by the end of 2012, the financial crisis will The influence of the world capital market has mainly ended, and the global capital market has gradually recovered. Furthermore, since 2013, the economic cooperation between China and 16 Central and Eastern European countries has started, the investment from China's 'Belt and Road' project (2013) and investment capital from developed countries in Western Europe have begun to increase. Meanwhile, the period from 2008 to 2019 is more than ten years. If this period is used as the overall research, the short-term impact may be ignored. Therefore, in order to study the impact of FDI in Central and Eastern European countries on domestic investment in different periods in detail, we decided to divide the whole period into two short periods.

Additionally, according to the model we used, we selected the GDP growth rate, the ratio of FDI to GDP, and domestic investment ratio to GDP statistics from the World Bank database from 2008 to 2019. Moreover, the data we selected has no missing value, and each variable has 132 observations, and they are strongly balanced. While for the provisional analysis part, we also select the FDI net flow

Table 1. Statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpr	132	1.857229	3.864606	-14.83861	9.307467
fgdp	132	3.502238	7.932087	-40.41425	54.23906
fcgdp	132	22.43957	3.587162	16.85927	37.28651

4. Provisional Analysis

4.1 Provisional analysis for FDI inflow

In order to more analyse the impact of FDI on domestic investment in 11 countries, we have listed the annual net FDI inflows (in billions of U.S. dollars) in these countries and the trend of FDI inflows from 2008 to 2019. According to figure 2 below, we can find that due to the impact of the global financial turmoil in 2008, the inflows of FDI into these 11 Eastern European countries have decreased to varying degrees. In addition, many countries have experienced long-term declines in the amount of FDI. Even during the worst of the financial crisis, the net inflow of FDI in some countries became negative, such as Hungary, Latvia, Lithuania, and Slovenia.

Moreover, for the amount of FDI inflows before the financial crisis, the annual inflows of FDI in the five non-advanced economies were relatively large, and the net inflows of FDI in most non-advanced economies far exceeded the net inflows of FDI in advanced economies. Among the advanced economies, the Czech Republic's annual net FDI inflow is the largest and far exceeds the annual net FDI inflow of the rest five advanced economies. However, in the long run, the amount of FDI attracted by the other five advanced economies is relatively stable each year, especially after the financial crisis, the amount of FDI inflows from these economies has been slowly and continuously rising.

Meanwhile, although these five non-advanced economies attract relatively large amounts of FDI each year, especially Hungary and Poland, the overall amount of FDI inflow fluctuates wildly. Specifically, we can see from the line chart that the fluctuations in the amount of FDI of Hungary from 2008 to 2019 are the largest.

Moreover, the net inflow of FDI is around 90 billion. U.S. dollars in 2019, while the net FDI inflow in 2018 was around negative 65 billion U.S. dollars. In addition, except for Hungary, the Czech Republic, and Poland, the net FDI inflows of the other eight countries have been relatively stable during the 12 years.

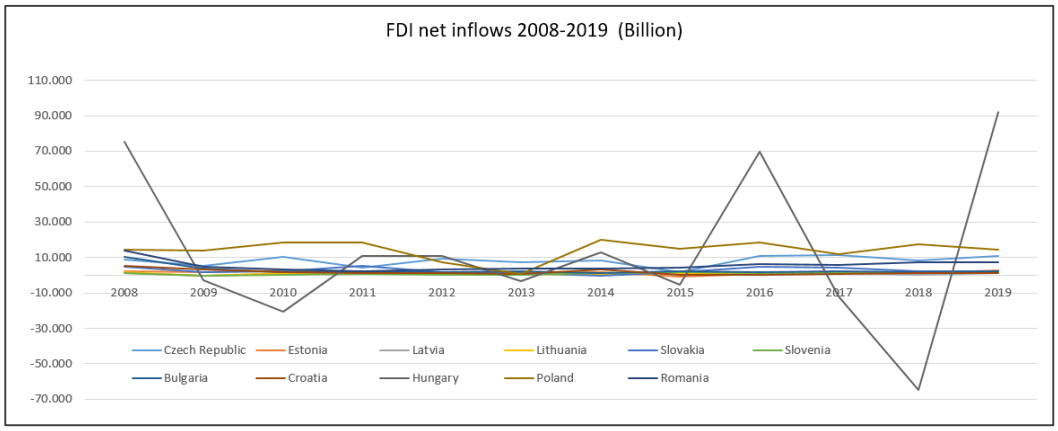


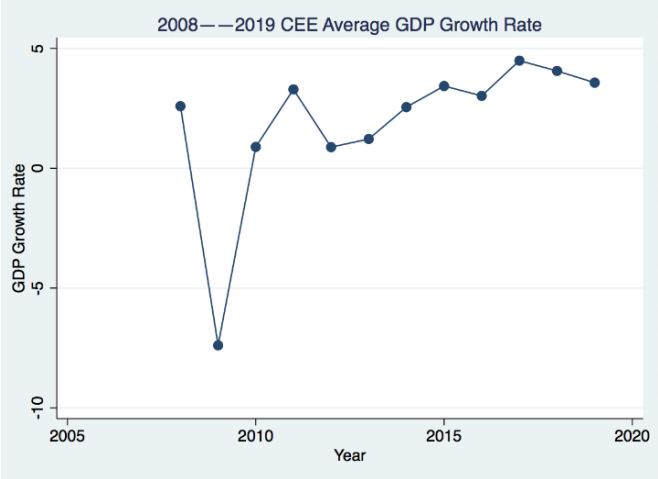
Figure 2: FDI net inflows 2008-2019

4.2 Provisional analysis for GDP Growth Rate

From the table3 and graph4 below, we can see that the year with the lowest economic performance of the 11 Central and Eastern European countries from 2008 to 2019 was 2009, and the average GDP growth rate of the Central and Eastern European countries in 2009 was only- 7.39%, while the rest years are positive. The reason is that the financial crisis that has swept across the world since 2008, the economic development of Central and Eastern Europe suffered a severe blow in 2009. After the financial crisis, the average GDP growth rate of Central and Eastern European countries has been on a steady upward trend since 2012. The average economic growth reached a peak of 4.49% in 2017 and then showed a slow downward trend.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP Growth Rate (%)	2.59	-7.39	0.89	3.29	0.88	1.22	2.55	3.43	3.02	4.49	4.06	3.57

Table 3. 2008——2019 CEE Average GDP Growth Rate



Graph 4. 2008——2019 CEE Average GDP Growth Rate

Next, we compare and analyze the changes in the GDP growth rate of two different economies (Advanced Economies and Non-Advanced Economies) between 2008 and 2019. According to Table 5, we can see that there is a significant difference in the GDP growth rate between the advanced Economies and Non-Advanced Economies in Central and Eastern Europe. Among them, the average GDP growth rate of the Non-Advanced Economies in Central and Eastern Europe is 2.20%, while the average GDP growth rate of the Advanced Economies of Eastern Europe was 1.62%, and the average GDP growth rate of all countries was 1.88%.

In addition, as shown in Table6 and Graph7, 2009 is the year that most affected by the financial crisis, the GDP growth rate of Non-Advanced Economies in Central and Eastern Europe was about 2.5 times that of Advanced Economies, but both economies experienced negative economic growth. However, after the advanced economies experienced a severe economic downturn, their economic development experienced a rapid rebound. In addition, after 2012, the GDP growth rate of Advanced Economies and Non-Advanced Economies in Central and Eastern Europe both showing an upward trend. And It needs to be pointed out that in 2017, the average GDP growth rate of Non-

Advanced Economies in Central and Eastern Europe was 4.68%, the highest economic growth rate in 12 years.

In general, compared with advanced economies, we can find that non-advanced economies have performed better in terms of GDP growth rate. That is to say, non-advanced economies have relatively stable economic development from 2008 to 2019, especially during the financial crisis. The average GDP growth rate of advanced economies showed a low negative growth rate during the financial crisis. This is because the three Baltic countries (Latvia, Lithuania, Estonia) had the lowest GDP growth rate in 2009, which was about minus 14%. Therefore, these three countries' low negative growth rates have led to the low overall economic growth rate of the advanced economies.

In addition, the advanced economies experienced a relatively severe economic downturn during the financial crisis, which may be related to the development characteristics of the financial markets of advanced economies. Moreover, although the financial sectors of advanced economies have a high proportion of the whole economic development, they also have higher risks before the financial crisis. In addition, the real economy accounts for the most proportion of the non-advanced economies. Therefore, the advanced economies will be affected first when the global financial market is turbulent. So, in general, the economic performance of advanced economies was worse than the economic performance of non-advanced economies.

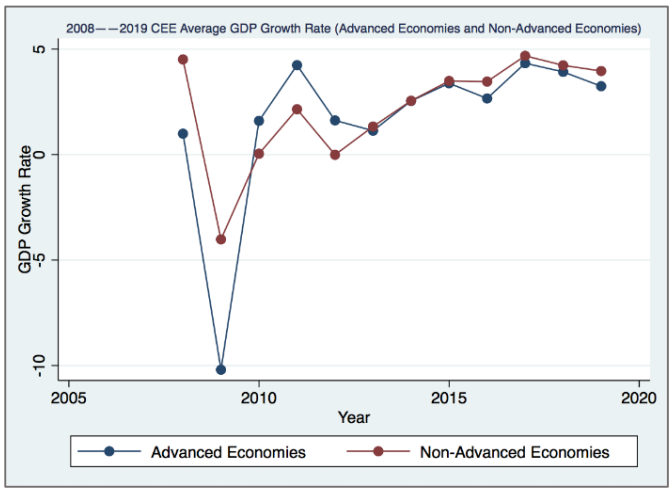
However, we cannot deny that advanced economies have better economic vitality and a more stable economic structure because after experiencing severe economic decline, advanced economies have obtained faster economic recovery. Furthermore, the GDP growth rate of advanced economies exceeds the GDP growth rate of the non-advanced economies in 2010.

Variable	Obs	Mean	Std. Dev.	Min	Max
Gdpr（all)	132	1.88319	3.877706	-14.83861	9.307467
Gdpr（Non-Advanced Economies)	60	2.197851	3.118333	-7.323537	9.307467
Gdpr（Advanced Economies)	72	1.620974	4.416978	-14.83861	7.443936

Table 5. 2008-2019 Descriptive statistics of GDP growth rates for all countries

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Non-Advanced Economies	4.51	-4.02	0.04	2.15	-0.01	1.33	2.55	3.49	3.46	4.68	4.23	3.96
Advanced Economies	0.99	-10.20	1.80	4.24	1.62	1.13	2.54	3.38	2.66	4.33	3.92	3.24

Table 6. 2008——2019 CEE Average GDP Growth Rate (Advanced Economies and Non-Advanced Economies)



Graph 7. 2008——2019 CEE Average GDP Growth Rate (Advanced Economies and Non-Advanced Economies)

Specifically, the lowest GDP growth rates in Central and Eastern Europe in 2009 were Lithuania, Estonia, and Latvia, which were -14.8%, 14.4%, and -14.3%. Surprisingly, these three countries all belong to Advanced Economies. According to scholar Mezhevich's (2015) research on the economic development of the three Baltic countries, the reason for the rapid decline in the economic development of these three countries

during the financial crisis is the over-developed financial industry, real estate, international import and export trade. This is because those factors have become the main driving force of domestic economic development rather than the real economy. In addition, there are some speculative economic activities in the economies of these three countries, and some financial institutions from Northern Europe have a dominant position in their domestic financial markets. Therefore, such an unstable economic structure has caused severe problems under the impact of the global financial crisis.

The severe economic downturn during the financial crisis has also brought opportunities for self-correction to the financial development of these countries. Therefore, governments of various countries have strengthened the supervision and management of the financial market and actively boosted their industrial entity. Moreover, as shown in Table 8 and Graph 9, only Lithuania's GDP growth rate was positive, and both Estonia and Latvia's GDP growth rates were negative in 2007. However, in 2019, Lithuania's GDP growth rate was the lowest among the 10 Central and Eastern European countries, and Latvia's GDP growth rate was still negative until 2010. In 2011, the GDP growth rates of these three countries reached their peaks in the past 12 years, but the growth rates have declined after 2011, and their GDP growth rates have been in a stable and fluctuating state.2017, the average GDP growth rate of Non-Advanced Economies in Central and Eastern Europe was 4.68%, the highest economic growth rate in 12 years.

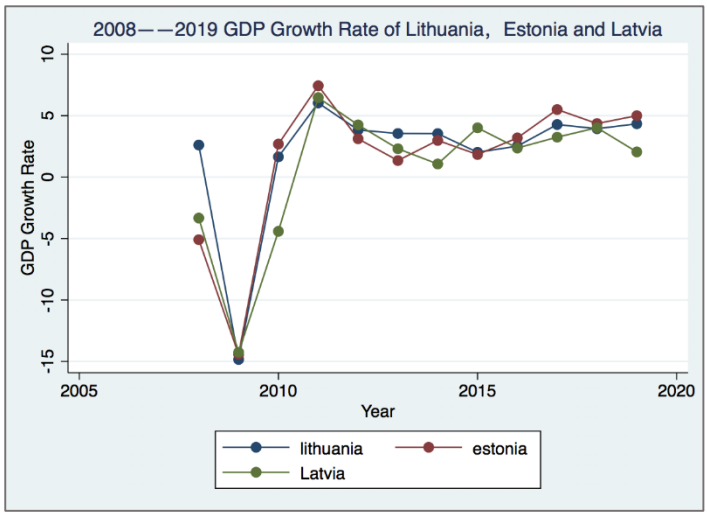
In general, compared with advanced economies, we can find that non-advanced economies have performed better in terms of GDP growth rate. That is to say, non-advanced economies have relatively stable economic development from 2008 to 2019, especially during the financial crisis. The average GDP growth rate of advanced economies showed a low negative growth rate during the financial crisis. This is because the three Baltic countries (Latvia, Lithuania, Estonia) had the lowest GDP growth rate in 2009, which was about minus 14%. Therefore, these three countries' low negative growth rates have led to the advanced economies' low overall economic growth rate.

In addition, the advanced economies experienced a relatively severe economic downturn during the financial crisis, which may be related to the development characteristics of the financial markets of advanced economies. Moreover, although the financial sectors of advanced economies have a high proportion of the whole economic development, they also have higher risks before the financial crisis. In addition, the real economy accounts for the most proportion of the non-advanced economies. Therefore, the advanced economies will be affected first when the global financial market is turbulent. So, in general, the economic performance of advanced economies was worse than the economic performance of non-advanced economies.

However, we cannot deny that advanced economies have better economic vitality and a more stable economic structure because after experiencing severe economic decline, advanced economies have obtained faster economic recovery. Furthermore, the GDP growth rate of advanced economies exceeds the GDP growth rate of the non-advanced economies in 2010.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Lithuania	2.61	-14.84	1.65	6.04	3.84	3.55	3.54	2.02	2.52	4.28	3.94	4.34
Estonia	-5.09	-14.43	2.69	7.44	3.12	1.35	2.99	1.84	3.19	5.50	4.36	5.00
Latvia	-3.33	-14.26	-4.41	6.47	4.25	2.31	1.07	4.01	2.37	3.25	4.02	2.05

Table 8. 2008——2019 GDP Growth Rate of Lithuania，Estonia and Latvia



Graph 9. 2008——2019 GDP Growth Rate of Lithuania，Estonia and Latvia

On the contrary, although the Central and Eastern Europe region has been severely impacted by the financial crisis in general, especially in 2009, we found that Poland still maintained a relatively high growth rate. Poland is non-advanced economies, and Poland's GDP growth rate in 2009 is 2.83%. Furthermore, compared with the other ten countries, Poland is the only country whose GDP growth rate has been positive during the 12 years. Although the economic growth rate of the Slovak Republic is better when compared with the other five advanced economies, its average GDP growth rate (2.5%) is much lower than Poland (3.6%).

In addition, we can see the GDP growth rate of Slovakia and Poland from 2008 to 2019 in Table10 and Figure 11. Although Slovakia has the highest GDP growth rate among the six advanced economies in 2008, its growth rate was negative 5.5% in 2009. Slovakia's economic growth quickly recovered after experiencing a severe decline and maintained a relatively high growth rate, while the GDP growth rate of Slovakia has fluctuated dramatically during the period 2010-2019.

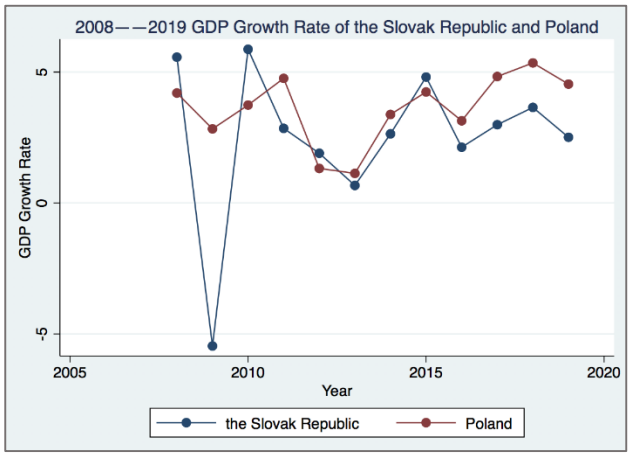
When it comes to Poland's economic development, apart from its economic growth rate of around 1.2% in 2012 and 2013, it has maintained a relatively good GDP growth rate in other periods, and its GDP growth rate peaked at 5.35% in 2018. As non-advanced economies, it is worth studying the reason for Poland's stable high economic growth rate. Poland is considered to be a former socialist country that has successfully completed its economic transformation, and Poland has maintained good economic growth in subsequent developments (Golotag, 2019). The better performance of Poland's economic development is related to the effect of the European Union because since Poland joined the European Union in 2004, Poland has received billions of euros in funding to develop relatively weak domestic infrastructure.

In addition, Poland has successfully used its status as a member of the European Union to vigorously develop its own banking industry instead of relying on Western European financial institutions like other countries in Central and Eastern Europe. In order to maintain the stable development of the financial market, Poland has not joined the Eurozone. This has enabled Poland to reduce external financial risks (Škare, Sinković & Porada-Rochoń, 2019). More importantly, Poland has taken advantage of its

advantageous geographical location and lower labor costs to attract many international companies to establish bases in Poland in recent years. Furthermore, Poland is the country with the largest economic volume in Central and Eastern Europe, as Poland's current domestic consumer market accounts for about 60% of the national GDP. However, Poland will also face some problems affecting economic development in the future, such as an aging population and declining funding from the European Union.

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
the Slovak Republic	5.57	-5.46	5.87	2.85	1.90	0.67	2.64	4.81	2.13	2.99	3.65	2.51
Poland	4.20	2.83	3.74	4.76	1.32	1.13	3.38	4.24	3.14	4.83	5.35	4.54

Table10. 2008——2019 GDP Growth Rate of the Slovak Republic and Poland



Graph11. 2008——2019 GDP Growth Rate of the Slovak Republic and Poland

4.3 Provisional analysis for FDI/GDP and DI/GDP

In Table 12, gdpr represents the growth rate of GDP and fgdp represents the ratio of FDI to GDP and fcgdp represents the ratio of total fixed capital formation to GDP. Since the latter two variables are ratios, we need to look at the overall GDP growth rate to do the analysis.

For the non-advanced economies in Central and Eastern Europe, the variance of the ratio of FDI to GDP is relatively large, while the variance of GDP growth rate is relatively small, which shows that the difference of non-advanced economies of FDI in Central and Eastern Europe is obvious. For advanced economies in Central and Eastern Europe, the variance of its ratio to GDP is small, and the variance of GDP growth rate is also small, which shows that the difference in FDI among developed countries in Central and Eastern Europe is relatively small.

In addition, for the average ratio of FDI to GDP in different economies, we find that the average ratio of FDI to DGP in non-advanced economies is higher than that of advanced economies. We know that GDP can measure the size of a country's economy. Furthermore, the ratio of net FDI inflows to GDP can indicate the ability of a country's economy to attract foreign funds. Therefore, the higher the ratio of FDI to GDP, the better the economic vitality and the better the country can attract foreign investment and advanced technology. For example, when we observe China's economic performance during the period of rapid economic development, we find that the ratio of FDI to GDP is much higher than that of other developing countries and advanced economies. In 1993 (a period of rapid economic development), the ratio of China's FDI to GDP reached a record high of 6.19%, but the world average for the same period was 1.08%. Therefore, we believe that in Central and Eastern Europe, non-advanced economies are more attractive to foreign investment. In other words, these non-advanced economies have better advantages in-market resources, labor costs, and government investment policies.

Moreover, the infrastructure construction in these countries is relatively backward, which also shows more investment opportunities in the market. In addition, the investment cost is relatively low, and the process of foreign capital entry is relatively simple. Therefore, we can find from the data that the annual FDI inflow in these countries accounts for a relatively high ratio of GDP. However, this article believes that the higher the ratio of FDI to GDP does not mean that the country's economic development has more potential or is worth investing in by multinational companies. If a country's annual inflow of FDI accounts for too high a proportion of GDP, then the

uncontrollable risks in the country's economic development will be very high. Because too much FDI may bring some adverse effects to the country. For example, the economic strength of the subsidiaries of multinational companies is too strong, and monopolizing the domestic market and crowding out the national industries. In addition, the adverse effects of FDI will have negative effects on the balance of payments. Secondly, excessive reliance on foreign investment is not conducive to the decision-making and implementation of the country's significant economic development, and it may also cause the host country to lose part of its economic independence.

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpr	132	1.88319	3.877706	-14.83861	9.307467
fgdp	132	3.502238	7.932087	-40.4143	54.23906
fcgdp	132	22.43957	3.587162	16.85927	37.28651

Table12. 2008——2019 Descriptive statistics of variables for all countries

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpr	60	2.197851	3.118333	-7.323537	9.307467
fgdp	60	3.820633	11.47846	-40.4143	54.23906
fcgdp	60	22.08831	3.677254	17.52583	37.28651

Table13. 2008——2019 Descriptive statistics of variables for non-advanced economies

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpr	72	1.620974	4.416978	-14.83861	7.443936
fgdp	72	3.236908	2.538606	-3.10412	13.16293
fcgdp	72	22.73229	3.509126	16.85927	31.94834

Table14. 2008——2019 Descriptive statistics of variables for advanced economies

According to Graph15, we can see that the ratio of Hungary's FDI to GDP in Non-Advanced Economies is the most unstable, with its peaks in 2008 and 2016 and then reaching the lowest value in 2018. For the rest of the year, Hungary's FDI ratio to GDP has been fluctuating between positive 20 and negative 20. For the rest of the Non-Advanced Economies countries, which are Bulgaria, Croatia, Poland, and Romania, the

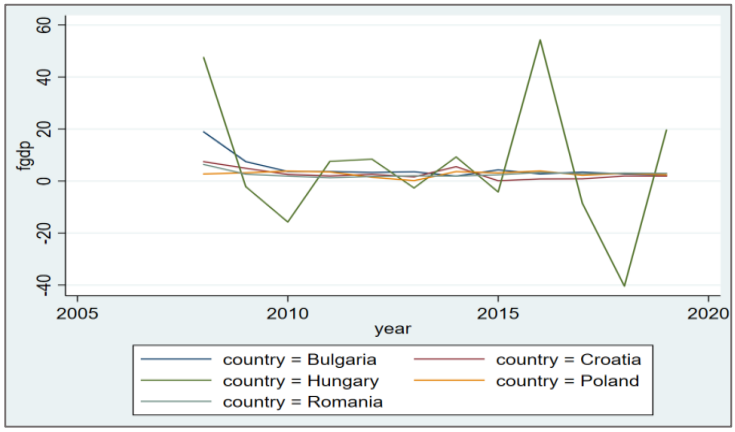
ratio of FDI to GDP is relatively stable. It is worth mentioning that the upward and downward trends of FDI to GDP ratios of all the non-advanced economies except Hungary are not that obvious in 2019. In addition, Hungary's FDI to GDP ratio is also the most unstable compared with the other six advanced economies.

Hungary's FDI to GDP ratio and FDI net inflows. When Eastern European countries carried out political and economic reforms, neoliberal economic policies favored transition and non-advanced economies. In addition, multinational companies from advanced economies have started large-scale investments in non-advanced economies to expand consumer markets. Therefore, the Central and Eastern European markets, which are overly market-oriented, have become an essential component of the global emerging markets. When global capital was transferred to the Central and Eastern European markets, Hungary has actively implemented economic opening policies since 1990. For example, Hungary has formulated many preferential policies to attract foreign investment and has become the country that attracts the most foreign investment per capita among Central and Eastern European countries.

By 2008, foreign banks accounted for 68% of the Hungarian banking sector. By 2009, foreign capital controlled two-thirds of Hungary's manufacturing industry, 90% of the telecommunications industry, and 60% of the energy sector, making Hungary one of the countries with the highest degree of globalization. However, the 2008 financial crisis and the European debt crisis that erupted afterward severely affected the inflow of foreign capital into Hungary and Hungary's economic development (Miguel & Komuves, 2014). We know that when turbulence occurs in the global capital market, some countries with a high degree of globalization are hit harder. Therefore, Hungary, which accounts for a large proportion of foreign capital in the domestic economy, has experienced significant fluctuations in the ratio of FDI to GDP and its GDP growth rate since 2008. In particular, the ratio of FDI to GDP of Hungary became negative in 2010.

Since the European debt crisis, investment from developed markets has reduced investment in Hungary, especially for those investments from other EU member states. Therefore, Hungary formulated the Eastern Opening policy in 2012 to continue to attract foreign capital in emerging Asian markets, especially China and India (Völgyi

& Lukács, 2021). According to the latest statistics from the Ministry of Commerce of China, as of the end of 2020, China has invested more than 5.5 billion U.S. dollars in Hungary, accounting for half of the total investment in Central and Eastern Europe. Hungary has become China's largest investment country in Central and Eastern Europe. In addition, China and India's important investment methods in Hungary are mainly acquisitions and greenfield investments. In summary, Hungary uses its advantages to attract a large amount of foreign capital to promote economic development, while at the same time, it also adds external risks to the country's economy.



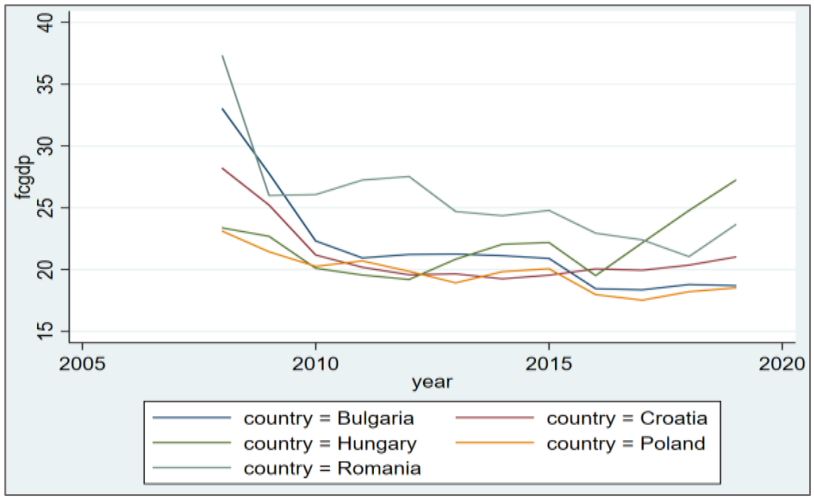
Graph15. The ratio of foreign direct investment to GDP in non-advanced economies

Next, we are going to analyse the ratio of gross fixed capital formation to GDP in non-advanced economies. We generally think that total fixed capital formation represents the net investment in an accounting period, and it is also used to calculate GDP expenditure. According to the phenomenon of macroeconomics, non-advanced economies, especially countries with high-speed development, such as India and China, obviously have a large proportion of their total fixed capital formation in GDP. Because these countries aim to achieve rapid economic growth by investing in large amounts of fixed assets, when a large amount of domestic investment invests in the country, these investments will stimulate the total demand of society and increase the production capacity of more industries in the future. Nevertheless, when the economic crisis breaks out, domestic and foreign consumer markets will greatly reduce the demand, and companies expect future profits to decline. Therefore, domestic and foreign companies tend to reduce their investment in fixed capital to reduce output. This is why we see the

ratio of total fixed capital formation to GDP in many countries, especially fast-developing non-advanced economies, will experience a sharp decline during economic crises or debt crises.

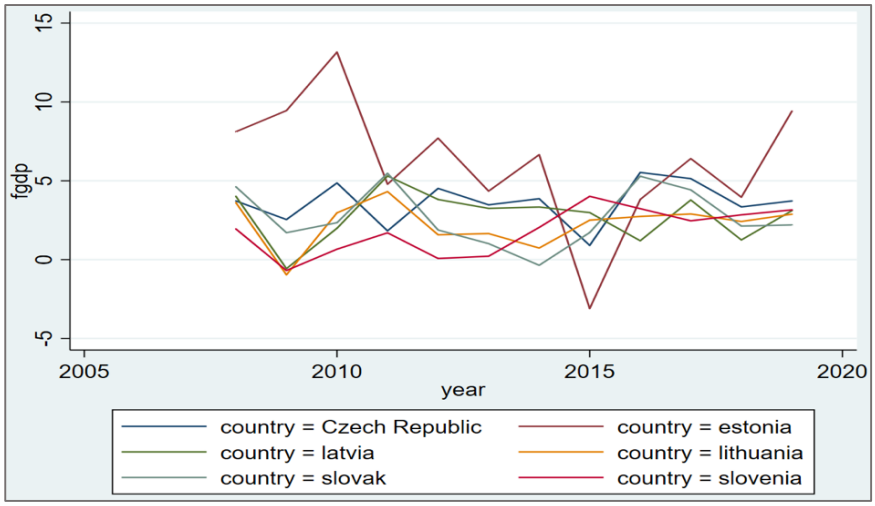
However, when we compared the average ratio of Gross fixed capital formation to GDP of these two different economies, we were surprised to find that the average ratio of the five non-advanced economies did not exceed that of the advanced economies, which the average ratio of five non-advanced economies are around 22%. Furthermore, the average ratio of advanced economies is slightly higher than that of non-advanced economies, which means that the overall investment in fixed assets of the two economies is about the same. The average ratio of Gross fixed capital formation to GDP of the economy is higher than that of advanced economies in Western Europe. This is closely related to the economic structure of Central and Eastern European countries. This is because compared with the advanced economies in Western Europe, many Central and Eastern European countries have more economic industries dominated by heavy assets.

Subsequently, we are going to analyze the trend of changes in the ratio of domestic investment (total fixed capital formation) to GDP in these 5 Non-Advanced Economies in Central and Eastern Europe in a specific period. As shown in Figure 6, the trends in the ratio of these countries are relatively consistent. In 2008, Romania's domestic investment to GDP ratio was the highest, but in 2009 it was slightly lower than Bulgaria. Since 2009, Romania's domestic investment to GDP ratio has been at the highest position in Non-Advanced Economies until 2018, and then it was overtaken by Hungary. In other words, Hungary's FDI to GDP ratio and domestic investment to GDP ratio is both the highest among Non-Advanced Economies in 2019. In Poland, where the GDP growth rate has been relatively stable and high, the ratio of FDI to GDP and domestic investment ratio to GDP is not outstanding. On the contrary, the ratio of domestic investment to GDP in 2019 is the lowest among non-advanced economies.



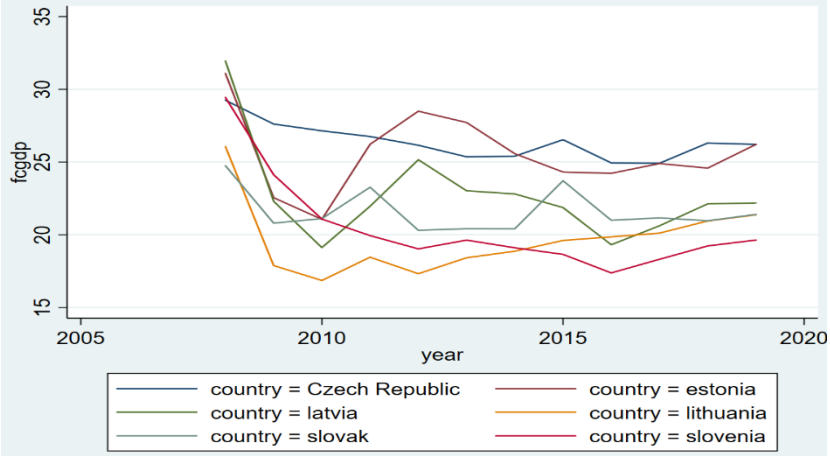
Graph16. The ratio of domestic investment to GDP in non-advanced economies

According to Graph17, we can see that in advanced economies, Estonia's FDI to GDP ratio fluctuates the most. In 2008, Estonia's FDI to GDP ratio was the highest in advanced economies. Before 2014, Estonia's FDI to GDP ratio was always in a leading position, while its FDI to GDP ratio fell to the lowest among Advanced Economies in 2015. Then it returned to the leading position until 2018. For the other advanced economies, which are the Czech Republic, Latvia, Lithuania, Slovak and Slovenia, the trend of change is relatively similar, while the ratio of FDI to GDP has a clear downward trend in 2009. In 2019, the ratios of FDI to GDP in these countries were relatively similar.



Graph17. The ratio of foreign direct investment to GDP in advanced economies

As for the ratio of domestic investment to GDP of Advanced Economies, as shown in Figure 18, the trend is relatively consistent. The six Advanced Economies experienced a decline from 2008 to 2010. After 2010, with the exception of Estonia, the ratio of domestic investment to GDP in other countries has been in relatively slight fluctuations. The ratio of FDI to GDP and the ratio of domestic investment to GDP of Estonia have changed greatly. Estonia's ratio of domestic investment to GDP was in the leading position in advanced economies in 2012 and 2013, and the volatility is relatively small after 2013. The ratio of domestic investment to GDP of the Czech Republic remains the same in 2019.



Graph18. The ratio of gross fixed capital formation to GDP in advanced economies

5. Empirical analysis

5.1 Stationary test

In order to assess the stability of the regression results, it is necessary to have a panel unit root test on the variables, and the LLC test is being used on those variables. This is because this article needs to avoid false regression or spurious regression. The non-stationary time series data often show a common trend of change, while these series may not have a significant relationship between themselves. So if we do the regression analysis under this circumstance, even we get a higher R-squared, the result still does not have any practical significance.

Table 19. Unit root test for all different country groups

	All Countries	Non-advanced economies	Advanced economies
Variable Names	Levin-lin-chu	Levin-lin-chu	Levin-lin-chu
gdpr	-22.17 ***	-3.17 ***	-24.49 ***
fgdp	-4.16 ***	-1.77 **	-4.43 ***
fcgdp	-3.94 ***	-3.35 ***	-2.34 ***

Note：*, **and *** respect the significance level of the unit root test of 10%, 5%, and 1% respectively.

According to the results shown in Table 19, the three variables of GDP growth rate, foreign direct investment to GDP ratio, and domestic investment to GDP ratio of all countries and Advanced economies are stable at the 99% confidence level. While the original series of GDP growth rate and the ratio of domestic investment to GDP in Non-advanced economies are stable at the 99% confidence level. While the original series of the ratio of foreign direct investment to GDP in Non-advanced economies is at the 95% confidence level. So in summary, all variables of all different country groups are stable in the original sequence at the 95% confidence level, which means all the original variables of all different country groups are passing the unit root test.

5.2 Co-integration test

Based on the unit panel root test, since the results of the unit root test find that the variables are of the same order and are single-integrated, then we perform the co-integration test on the variables. For the co-integration test, we choose to use the KAO test method. The co-integration test results are shown in Table 10 below.

Table 20. KAO Co-integration Test Results

	All Countries		Non-advanced economies		Advanced economies	
	Statistic	p-value	Statistic	p-value	Statistic	p-value
Modified Dickey-Fuller t	-1.29	0.0979 *	-0.36	0.36	-0.77	0.22
Dickey-Fuller t	-10.72	0.000 ***	-2.27	0.0115 **	-9.57	0.000 ***
Augmented Dickey-Fuller t	-2.94	0.0016 ***	-0.6883	0.2456	-2.15	0.0157 **
Unadjusted modified Dickey Fuller t	-5.10	0.000 ***	-1.49	0.0675 *	-4.43	0.000 ***
Unadjusted Dickey-Fuller t	-12.73	0.000 ***	-2.91	0.0018 ***	-11.85	0.000 ***

Note：*, **and *** respect the significance level of the unit root test of 10%, 5%, and 1% respectively.

For the results of the co-integration test shown in Table 20, For those co-integration tests of the three variables in all countries, we found that among the five indicators of the KAO test, four indicators are significantly co-integrated at the 90% confidence level. For the co-integration test of three variables of the Non-advanced economies, we found that among the five indicators of the KAO test, three indicators are significant at the 90% confidence level which including the Unadjusted Modified Dickey-Fuller test and Unadjusted Dickey-Fuller test. For the co-integration test of three variables of non-advanced economies, we found that among the five indicators of the KAO test, four indicators are significantly co-integrated at the 95% confidence level which including the Unadjusted Modified Dickey-Fuller test and Unadjusted Dickey-Fuller test. So we can conclude that all the original variables of all different country groups are co-integration.

5.3 Regression analysis

On this step, we will perform regression analysis on the variable data we selected according to the model mentioned above. In addition to the regression analysis for all countries, we will also perform regression analysis on Non-Advanced Economies and Advanced Economies respectively. For all countries, we will also perform regression analysis on the period of 2008-2012 and 2013-2019 respectively. For Non-Advanced Economies and Advanced Economies, we will perform regression analysis on the period of 2008-2012 and 2013-2019 respectively as well.

Before performing all regression analysis, we must test the model for heteroscedasticity first, otherwise, the estimation results will not have any practical significance. Because under the assumption of the classical regression model, the ordinary least squares estimator is a linear, unbiased, and effective estimator. In other words, for all unbiased estimates, the least-squares estimator has the least variance and it is an effective estimator.

If other assumptions remain unchanged, the random disturbance term is allowed to have heteroscedasticity. Then the variance of the random disturbance term changes with the change of the observation value. That means under this circumstance, the Gauss-Markov assumption of least squares estimation is violated. At this time, if the least-squares method is used to estimate the parameters, there will be some negative consequences. These consequences include: 1. The parameter estimator is still linear and unbiased, but it is not effective; 2. The variance in the heteroscedastic model no longer has the smallest variance; 3. The t test loses its effectiveness; 4. The predictive effect of the model is impaired.

5.3.1 Regression analysis for all countries

We perform the regression analysis of all countries ‘datasets first, and then we perform the between-group heteroscedasticity test of the variance. The chi-square value is 132,

which is significant at the 99% statistical level, indicating that there is serious between-group heteroscedasticity.

Based on this, we choose the PCSE estimation method to solve the problem of heteroscedasticity. The PCSE estimation method is introduced by Beck and Katz (1995), and this is an innovation of the method of panel data model estimation. This method can effectively solve the problem of heteroscedasticity, synchronous correlation, and sequence correlation. PCSE estimation method can be really precise when the sample size is not large enough.

We use the PCSE estimation method to control heteroscedasticity and do the regression again, the results are shown in the table11:

Table 21. Regression Results for all countries

	Coef.	Std. Err.	z	P>z
fgdp	-0.0245	0.0254	-0.96	0.335
fgdp (-1)	0.0144	0.0217	0.66	0.507
fgdp (-2)	0.0184	0.0285	0.65	0.518
fcgdp(-1)	1.0324	0.1354	7.63	0.000
fcgdp(-2)	-0.1506	0.1318	-1.14	0.253
gdpr(-1)	0.1002	0.0824	1.22	0.224
gdpr(-2)	-0.1411	0.0479	-2.94	0.003
gdpr(-3)	-0.0395	0.0432	0.91	0.360
C	2.5448	1.97	2.34	0.049

Next, we have to perform Wald test to test the significance of $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$, that is, the significance of $M = 1$. The Wald test value is 2.06, so the null hypothesis cannot be rejected at the 5% statistical level. This also means that at a significant level of 95%, $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$, that is, $M = 1$.

5.3.2 Regression analysis for Non-Advanced Economies

At this stage, we perform the regression analysis of non-advanced Economies' datasets, and then we perform the between-group heteroscedasticity test of the variance. The chi-square value is 94.28, which is significant at the 99% statistical level, indicating that there is serious between-group heteroscedasticity.

Based on this, similarly, we choose the PCSE estimation method to solve the problem of heteroscedasticity. We use the PCSE estimation method to control heteroscedasticity and do the regression again, the results are shown in the table 22.

Table 22. Regression Results for Non-Advanced Economies

fcgdp	Coef.	Std. Err.	z	P>z
fgdp	-0.0540	0.0214	-2.53	0.012
fgdp (-1)	-0.0087	0.0219	-0.4	0.69
fgdp (-2)	-0.0251	0.0263	-0.96	0.339
fcgdp(-1)	1.1588	0.1313	8.82	0
fcgdp(-2)	-0.2450	0.1108	-2.21	0.027
gdpr(-1)	-0.1101	0.1041	-1.06	0.29
gdpr(-2)	0.0340	0.0880	0.39	0.699
gdpr(-3)	0.1163	0.0598	1.94	0.052
C	2.2107	1.5385	1.44	0.151

Next, we have to perform Wald test to test the significance of $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$, that is, the significance of $M = 1$. The Wald test value is 3.22, so the null hypothesis can be rejected at the 10% significance level. This also means that at a significant level of 90%, $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 \neq 1$, that is, $M \neq 1$.

5.3.3 Regression analysis for Advanced Economies

At this stage, we perform the regression analysis of advanced Economies' datasets, and then we perform the between-group heteroscedasticity test of the variance. The chi-square value is 75.8, which is significant at the 99% statistical level, indicating that there is serious between-group heteroscedasticity.

Based on this, similarly, we choose the PCSE estimation method to solve the problem of heteroscedasticity. We use the PCSE estimation method to control heteroscedasticity and do the regression again, the results are shown in the table 23:

Table 23. Regression Results for Advanced Economies

	Coef.	Std. Err.	z	P>z
fgdp	0.167	0.085	1.97	0.049
fgdp (-1)	0.063	0.082	0.77	0.443
fgdp (-2)	0.170	0.075	2.28	0.022
fcgdp(-1)	0.778	0.168	4.63	0
fcgdp(-2)	0.004	0.160	0.02	0.982
gdpr(-1)	0.063	0.109	0.58	0.564
gdpr(-2)	-0.138	0.047	-2.96	0.003
gdpr(-3)	-0.021	0.042	0.50	0.614
C	3.753	1.179	3.18	0.001

Next, we have to perform Wald test to test the significance of $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$, that is, the significance of $M = 1$. The Wald test value is 2.57, so the null hypothesis can be rejected at the 10% statistical level. This also means that at a significant level of 90%, $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 \neq 1$, that is, $M \neq 1$.

5.3.4 Regression Results for different time periods (2008-2012, 2013-2019 and 2008-2019)

Similarly, we need to divide the period of 2008-2019 into two groups (2008-2012 and 2013-2019) for regression analysis. The regression results have shown that the model does not pass the heteroscedasticity test, and there is statistically significant heteroscedasticity. As a solution, we adopt the PCSE estimation method to control the heteroscedasticity and do the regression again.

Then we performed regression analysis on Advanced Economies and Non-Advanced Economies for these two time periods of 2008-2012 and 2013-2019. And both of the models does not pass the heteroscedasticity test, and there is statistically significant heteroscedasticity. Similarly, we use the PCSE estimation method to solve the problem of heteroscedasticity and do the regression again.

5.3.5 Regression Results Summary

Table 24. Regression Results Summary

	All Countries			Non-Advanced Economies			Advanced Economies		
	2008-2019	2008-2012	2013-2019	2008-2019	2008-2012	2013-2019	2008-2019	2008-2012	2013-2019
fgdp	-0.0245	0.2932	-0.0512	-0.054	1.9	-0.053	0.1668	0.6265	0.0266
	0.0254	0.0849	-0.0262	-0.0214	-0.019	-0.023	0.0848	0.2595	0.0868
fgdp (-1)	0.0144	0.1031	-0.0206	-0.0087	0.45	-0.011	0.0629	0.1693	-0.0665
	0.0217	0.017	0.0249	-0.0219	-0.005	-0.0275	0.082	0.1491	0.098
fgdp (-2)	0.0184	0.0882	-0.0142	-0.0251	0.706	-0.028	0.1705	-0.1093	-0.0392
	0.0285	0.0241	0.03265	-0.0263	-0.007	-0.03	0.0747	0.12	0.0967
fcgdp(-1)	1.0324	1.3041	0.8932	1.1588	2.55	1.184	0.7776	0.7275	0.7311
	0.1354	0.1475	0.1552	-0.1313	-0.013	-0.267	0.1678	0.2836	0.1722
fcgdp(-2)	-0.1506	0.3684	-0.0272	-0.245	-2.04	-0.26	0.0036	0.379	0.1405
	0.1318	-0.1715	0.1457	-0.11	-0.02	-0.234	0.1598	0.2937	0.1716
gdpr(-1)	0.1002	-0.0344	-0.0342	-0.1101	0.053	-0.162	0.0631	0.2715	0.788
	0.0824	-0.1096	0.0974	-0.104	-0.0036	-0.12	0.1094	0.0984	0.1233
gdpr(-2)	-0.1411	-0.2185	0.0278	0.034	-0.756	0.02	-0.1384	-0.202	0.0214
	0.0479	0.041	0.102	-0.088	-0.01	-0.156	0.0468	0.0826	0.1141
gdpr(-3)	-0.0395	0.0109	0.1439	0.1163	0.12	0.299	0.0213	-0.1476	0.0896
	0.0432	0.0474	0.0708	-0.0598	-0.0013	-0.115	0.0432	0.045	0.0829
C	2.5448	-0.2882	2.8794	2.2107	3.71	1.857	3.7532	-6.3892	2.5764

	1.97	1.2696	0.901	-1.5385	-0.113	-2.13	1.1792	1.2081	1.0872
M-value	-0.8735	2.157	-0.952	-1.02	6.11	-1.31	-0.381	-0.42	-0.9507
Wald test	2.06	19.14***	8.71***	3.22***	10635.39***	1.75	2.75*	7.77***	2.66
R^2	0.8032	0.9347	0.8267	0.8255	1	0.786	0.8484	0.9614	0.858

As we mentioned above, when the null hypothesis（$M = 1$）is accepted, then there is no crowding in or crowding out effect. While when the null hypothesis（$M = 1$）is rejected, when $M > 1$, then there is crowding in effect, when $M < 1$, then there is crowding out effect,

According to the table 24, we can conclude that:

(1) For the regression results for all countries, the Wald test of all countries is not significant, indicating that there is no crowding-in and crowding-out effect.

From 2008 to 2012, the Wald test of all countries is significant at the 99% confidence level. And M>1 indicates that FDI has a crowding-in effect. Specifically, for every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP increased by 2.16%.

From 2013 to 2019, the Wald test of all countries is significant at the 99% confidence level, and M<1 indicating that FDI has a crowding-out effect. Specifically: For every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP decreased by 0.95%.

(2) For the regression results for non-advanced Economies, the Wald test of 2008-2019 is significant at the 99% confidence level, and M<1 indicating that FDI has a crowding-out effect. Specifically: For every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP decreased by 1.02%.

From 2008 to 2012, the Wald test is significant at the 99% confidence level. And M>1 indicates that FDI has a crowding-in effect. Specifically, for every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP increased by 6.11%.

From 2013 to 2019， the Wald test is not significant, indicating that there is no crowding-in and crowding-out effect.

(3) For the regression results for advanced Economies, the Wald test of 2008-2019 is significant at the 90% confidence level, and M<1 indicating that FDI has a crowding-out effect. Specifically: For every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP decreased by 0.38%.

From 2008 to 2012, the Wald test is significant at the 99% confidence level, and M<1 indicating that FDI has a crowding-out effect. Specifically: For every 1% increase in the ratio of FDI to GDP, the ratio of total investment to GDP decreased by 0.42%.

From 2013 to 2019， the Wald test is not significant, indicating that there is no crowding-in and crowding-out effect.

6. Qualitative analysis of empirical results

6.1 Analysis of the whole samples' empirical results

From the above empirical analysis, there is no evidence to show that the inflow of FDI in the whole sample during the entire study period (2008-2019) significantly crowd in or crowd out domestic investment. In other words, on the whole, the FDI flowing into these 11 Central and Eastern European countries does not have a positive or negative multiplier effect on the formation of domestic investment. However, by studying different periods, we are surprised to find that the FDI of the entire sample has a positive crowding-in effect on domestic investment in the previous period (2008-2012). However, in the later study period, FDI has not evident crowding-in impact on domestic investment. In addition, in different periods, the intensity of the crowding-in and crowding-out effect of FDI on domestic investment is disparate. Between 2008 and 2012, the degree of crowding-in of domestic investment by FDI is greater than the crowding-out effect of FDI in the later period. This difference may be because the domestic economy was severely influenced by the financial crisis and the European debt crisis before 2013.

Therefore, the governments of CEE countries were more prudent in the policy of attracting foreign investment. For instance, the government has strengthened foreign capital control in the domestic financial market and has strictly supervised financial institutions. Hence, the amount of FDI flowing into the host country through the financial market is greatly decreased. Additionally, in order to quickly recover the economy and solve employment problems, governments of various countries favorably receive foreign capital, mainly in the form of greenfield investment, to enter the domestic market. Because it is believed that when greenfield investment enters the domestic market, it could significantly increase domestic field investment, such as building factories and purchasing equipment, moreover, this kind of foreign investment

in the real economy will encourage underdeveloped local industries and more effective form business links with local domestic enterprises. Therefore, this form of investment will improve the real domestic industry and drive the development of the local economy to a certain extent.

In the same way, scholar Jude (2019), when studying the impact of FDI in 10 Central and Eastern European countries on domestic investment, also reaches a conclusion that is consistent with the views of this article, and he believes that greenfield investment in Central and Eastern Europe is more conducive to the development of the real economy. Hence, it has a significantly positive effect on the investment of domestic enterprises. On the other side, this article believes that the unique economic development advantages of Central and Eastern Europe can also explain why FDI shows a crowding-in effect on Central and Eastern Europe in the early stage. Compared with the developed economies of Western Europe, in the early stage (2008-2012), although the Central and Eastern European countries are relatively backward in cutting-edge technology and international management experience, they have a relatively complete industrial foundation and a large amount of cheap labor force. These advantageous conditions could create positive and effective complementary effects with foreign-funded enterprises. Meanwhile, these potential conditions also could promote the rise of upstream and downstream domestic enterprises in specific industries in the region.

Consequently, FDI has a positive crowding-in effect in the early stage. However, the research in this article finds that in the later stages (2013-2019), FDI leads to a lower degree of crowding-out effect. Although the average GDP growth rate of CEE countries has continued to rise since 2013 and the inflow of FDI has also increased slowly, we noticed a negative crowding-out effect of FDI in our empirical research. There may be various reasons for this crowding-out effect. First of all, as the financial crisis subsided and the European debt crisis eased, most CEE countries gradually deregulated their inspection of foreign capital. They formulated many preferential policies to attract foreign investment in order to promote economic development and industrial structure adjustment.

Meanwhile, in the Central and Eastern European markets, many highly skilled labor have migrated to developed markets such as Western Europe, and labor costs have also increased to a certain degree. Therefore, compared with other developing countries globally, the attractiveness of the labor force of CEE countries has declined. Hence, many inflows of FDI did not directly enter the real economy but became strategic mergers and acquisitions. For example, since 2012, many multinational companies from Asia have increased their investment in the CEE markets, especially China. Nevertheless, these investments are mainly for technological exchange, occupying the consumer market, and promoting trade volume. Because the CEE's producing and consuming market provides a platform for many multinational companies to enter the developed consumer market in Western Europe. That is the main reason why developing economies represented by China and India continue to make strategic investments in Central and Eastern European countries (Ramasamy & Yeung, 2020). Specifically, these investments are primarily concentrated in companies with more technological advantages so that the investing country could better use the technological advantages of the acquired company to make up for the disadvantages of the parent company.

Furthermore, through the acquisition of local companies could have a better opportunity to enter the EU market. Because these countries are all EU member states, and the products and services provided by these acquired companies can conveniently enter the Western European market with huge consumption potential. Moreover, such an investment model could also promote trade cooperation between the investing and host countries. However, this acquisition-based investment model could not well facilitate the host country to develop the real economy, and the acquired companies will also intensify industry competition. Therefore, this investment model will continue to crowd out the development opportunities of domestic enterprises and produce a crowding-out effect. However, although FDI is not conducive to the formation of domestic investment in the later period, the crowding-out effect of FDI is not greatly strong.

6.2 Analysis of underdeveloped economies' empirical results

According to our empirical research, FDI has a crowding-out effect on domestic investment in developed economies during the entire study period (2008-2019), and the intensity of the crowding-out effect of FDI is not quite strong. Whereas, when we examine the results in various periods, we were surprised to find that FDI has a strong crowing-in effect on domestic investment in underdeveloped economies. Meanwhile, the intensity of FDI's crowding-in effect is very strong. In other words, FDI plays a significant role in promoting the formation of domestic investment in the period of 2008-2012.

Consequently, it is necessary for us to conduct an in-depth analysis of this solid crowding-in effect in the short term. Although the underdeveloped economies lag behind the developed economies in terms of economic development, these underdeveloped economies have huge economic volumes in Central and Eastern Europe, and also the real economy is relatively large in scale. In addition, in 2008-2012, because the financial markets of these underdeveloped economies were relatively less affected by external financial institutions, and they were not members of the Eurozone, which led to that they were less affected by the financial crisis and the European debt crisis.

Consequently, in a certain period, foreign capital is more inclined to enter the underdeveloped economies dominated by the real economy. Additionally, compared with developed economies, underdeveloped economies, especially Hungary, Poland, and Croatia, have significant advantages in labor resources. Moreover, the technical level, corporate management experience, and influence in the international market of domestic enterprises lag behind multinational enterprises. Hence, it is quite difficult to compete with foreign enterprises effectively. More importantly, many multinational companies in underdeveloped economies could make full use of the advantages of labour resources and could also efficiently form industrial connections with other

domestic companies. These domestic companies could also continue to learn from these multinational companies in order to obtain the technological spill-over effect, which would be quite conducive to the further development and growth of domestic companies.

Moreover, these conditions and advantages formed by foreign capital are all conducive to domestic enterprises to increase investment. On the other hand, compared with developed economies, the governments of these countries are more inclined to introduce active preferential policies to attract a large amount of foreign investment, especially in Hungary and Poland (Götz et al., 2018; Miguel & Komuves, 2014). As the two largest economies among the underdeveloped economies, Poland and Hungary have also been exploring models of promoting economic development by attracting foreign investment. Their governments are also constantly adjusting the country's internal industrial structure while attracting foreign investment. Therefore, after entering these two countries, foreign investment could also positively guide domestic enterprises.

However, in the latter stage of the research period, we do not find a significant crowd-in or crowd-out effect, which means that FDI has no significant impact on domestic investment. According to the above analysis, FDI from Western Europe, the United States, and other developed markets continued to decrease in the later period.

However, foreign investment from developing countries represented by China and India increasingly flowed into the underdeveloped regions of Central and Eastern Europe, especially Poland and Hungary, and other countries. However, these foreign capitals participate in the economic activities of the host country through market competition mechanisms and financial markets. Compared with the previous research period, the amount of greenfield investment flowing into the real economy is relatively smaller, but more foreign investment is mainly for acquisition and trade cooperation. Therefore, we did not notice any obvious crowding-in or crowding-out effect in the later stage.

6.3 Analysis of developed economies' empirical results

In the empirical analysis of our research, during the entire period (2008-2019), we find that FDI inflow shows a crowding-out effect on domestic investment in developed economies, which is similar to less developed economies. However, in the early period of the research period (2008-2012), FDI has a crowding-out effect on domestic investment, which is contrary to the results of research in underdeveloped economies. In addition, in the later stage, like underdeveloped economies, our research study does not indicate any obvious crowding-in or crowding-out effect of FDI.

Hence, in general, FDI shows a slight crowding-out effect on domestic investment in developed economies. Next, we are going to analyze the causes of the crowding-out effect in detail. First of all, compared with the underdeveloped economies, the economic structure in these six developed CEE countries is more stable and developed. Specifically, the Czech Republic and Slovakia have a high degree of industrialization. In addition, their industrial structure is similar to that of developed countries in Western and Southern Europe. Therefore, foreign-funded enterprises entering these developed economies have a relatively similar industrial structure to domestic enterprises.

In consequence, it is difficult for domestic and foreign enterprises to form complementary effects in the industry. Alternatively, it brings unhealthier industrial competition. Furthermore, the financial markets of these developed economies are relatively developed and closely linked with international circulating capital. At the same time, Slovenia, Slovakia, Estonia, Latvia, and Lithuania have joined the Eurozone. Therefore, During the financial crisis and the European debt crisis, these countries' financial markets and import and export trade have been significantly impacted. Therefore, the FDI flowing into these countries lacks long-term stability due to fluctuations in the international financial market, so their FDI has a certain degree of crowding out effect to domestic firms, especially in the 2008-2012 period.

Additionally, although these countries can obtain lower-cost loan funds after joining the Eurozone, they lost their autonomy in monetary policy. Therefore, it is pretty

challenging to depreciate the domestic currency to increase export trade when the economy is down. Meanwhile, it is difficult for multinational companies from other countries to export products in these developed countries so that they can only compete with domestic companies in the domestic market. Consequently, to a certain extent, foreign capital has intensified domestic industrial competition rather than forming a positive complementary role with domestic enterprises during the early stage. In addition, compared with underdeveloped economies such as Hungary and Poland, these developed economies lack incentives for foreign companies in their policies to attract foreign investment. However, these developed countries' economic development and political system are relatively stable, and the level of labor quality is relatively high, which is also a potential advantage for attracting foreign-funded enterprises. In general, the above reasons have caused a slight crowding out of FDI in developed economies.

However, in the later stages, our research results do not indicate the crowding-in or crowding-out effect of FDI. This may be due to the fact that after experiencing the influence of external financial markets, these advanced economies have strengthened the management and supervision of their own financial institutions, and have strengthened the inspection of inflows of FDI so that we do not find a significant crowding-out effect in the later stages. Moreover, after 2012, a part of the FDI entering these developed economies came from developed countries in Western Europe (such as Germany, France, and the United Kingdom), and other parts of the investment came from developing countries in other regions (such as India and China). This article believes that it is possible that FDI from different sources has various effects on domestic investment. For example, investment from Western Europe and other countries may result in crowding out due to intensifying destructive competition in the industry.

However, multinational companies from developing countries may quickly form industrial complements with local companies, and meanwhile, local companies could expand their sales channels to developing countries through these multinational companies, which is conducive to the further expansion and investment of domestic companies. In summary, it is possible that the two opposite effects of FDI have a

neutralizing effect on domestic investment so that we have not found that FDI has a particularly obvious positive or negative effect.

7. Conclusions and policy recommendations

7.1 Conclusions

In the empirical research of this article, we examine the relationship between inflows of FDI and domestic investment by applying panel data from 11 Central and Eastern European countries from 2008 to 2019. Our empirical results show that from the entire sample, FDI has no obvious crowding-in or crowding-out effect on domestic investment during the entire study period. However, FDI shows different effects on domestic investment in different research stages. For instance, during 2008-2012, FDI crowd in the domestic investment of the entire sample. In addition, throughout the research period, FDI has a negative crowding-out effect on domestic investment in developed economies and underdeveloped economies.

However, in the early stage, we find that FDI positively influences domestic capital in underdeveloped economies, which is the crowding-in effect. This may be because underdeveloped economies have attracted more international investment into the real economy through more favorable policies; meanwhile, multinational enterprises have formed positive complementary effects with host domestic enterprises. In brief, FDI has different effects on domestic investment in these two economies, and FDI has various effects on domestic capital at different stages.

7.2 Policy recommendations

7.21 Policy recommendations for the CEE region

Therefore, when formulating policies to attract foreign investment, the government should fully understand the impact of FDI on domestic investment in order to formulate investment policies suitable for the development of domestic industries. Next, we need to discuss how the government should formulate reasonable policies for foreign investors. First, we believe that the two essential factors which significantly affect

foreign capital's entry into the domestic market are the market and the government. The market economy mainly determines the market factors in Central and Eastern Europe, and it is difficult for the government to replace the market economy.

However, government-related factors that can be directly linked to FDI could be changed or controlled by the government. This article believes that the country's infrastructure, political system, labor market, and taxation policies could directly influence FDI in the CEE region, and also these four factors are closely related to the government's participation in the public administration field (Paul et al., 2014). Therefore, we emphasize that the government should improve the country's infrastructure and establish an effective political system when attracting foreign companies to invest in the country and cultivate high-quality labour resources and introduce preferential tax policies.

First of all, as far as infrastructure is concerned, it is a significant investment condition that most multinational companies attach great importance to. Because a relatively complete and developed infrastructure is a prerequisite for commercial operations, for example, public transportation could largely determine the transportation costs of multinational companies' raw materials and products. Import and export trade, manufacturing, and energy industries in Central and Eastern Europe all rely heavily on infrastructure.

Additionally, what we could not ignore is the construction of telecommunication network infrastructure. Because, with the growing influence of the Internet in the global economy, telecommunications network infrastructure is extraordinarily essential for the network operations of many multinational companies. Moreover, better telecommunications facilities could provide local consumers and commercial companies with interconnected platforms and hardware support. Consequently, the government should help enterprises upgrade their industries and create more entrepreneurial opportunities by improving telecommunications infrastructure.

In addition, compared with developed regions in Western Europe, various infrastructures in Central and Eastern Europe are relatively backward, indicating

potential investment opportunities in infrastructure. Therefore, the governments of Central and Eastern European countries attracting foreign capital to increase investment in their own infrastructure can not only create investment opportunities for multinational companies but also improve their own infrastructure conditions.

In terms of improving the political system, this article believes that improving the administrative efficiency of the public sector and eliminating corruption could create a fair and transparent operating environment for multinational companies. Furthermore, this article finds that in Central and Eastern Europe, corruption in government functional departments has greatly reduced the economy's efficiency. whic is because corruption may lead to rent-seeking and higher investment costs.

At the same time, some scholars believe that corruption can reduce society's total factor productivity and investment rate (Claire & Garcia, 2018). On top of that, more and more multinational companies and foreign governments attach great importance to the fairness and transparency of the political system of the investment recipient countries. In particular, the European Union has increased the protection of the property of multinational corporations in host countries in recent years.

Therefore, in order to encourage more multinational companies to invest in Central and Eastern Europe, the governments of CEE countries should try to improve the government's administrative capacity and eliminate the adverse effects of corruption on the economy.

In addition, the government's cultivation and management of the labor market can also increase foreign companies' preference for the domestic market. Specifically, according to the research on the labor market conditions of Central and Eastern European countries from 2004 to 2019 by the scholar Sadowaka & Jarocka (2021), we find that after more than ten years of development, the labor market of Central and Eastern European countries has undergone tremendous changes.

At present, compared with other CEE countries, the conditions of the labor market in the Czech Republic, Poland, and Estonia are the best. This is attributed to the favorable

influence of the strong neighboring country's economy and the better development of the domestic economy. For example, because the Czech Republic and Poland are close to Germany, which has a relatively developed economy, and the two countries have close economic cooperation with Germany, which led to that the technology and quality of the labor force have been improved.

However, although many Central and Eastern European countries have joined the European Union, the labor market development is still not stable, such as Slovakia. Therefore, it is necessary for Central and Eastern European countries, especially those with the less-developed labor market, to adopt a series of measures to improve their own labor resources. This is because the government's adjustment and improvement of the labor market can significantly reduce the country's unemployment rate and attract more multinational companies.

Meanwhile, for any company, the superior labor force is the source of the company's innovation and development. In general, the government should work harder to provide more cheap and skilled labor to the market in accordance with the conditions of the domestic labor market.

In addition, a key factor that determines the investment of foreign companies is the tax policy. Moreover, scholar Paun (2019) conducted a systematic study on the relationship between taxation policies and FDI in 11 Central and Eastern European countries and found that taxation systems could increase the attraction of foreign investment.

Therefore, this article believes that although the CEE countries that have joined the EU and they could operate the business in this vast single market and quickly receive huge funds brought by the EU, these countries must develop an effective tax system to increase government revenue and minimize corporate costs. Moreover, some Central and Eastern European countries with relatively weak economic foundations and relatively backward infrastructure need to increase tax incentives to attract more foreign-funded enterprises.

7.22 Policy recommendations for the undeveloped economies

In the following part, we will analyze how different economies in Central and Eastern Europe adopt appropriate policies to attract investment from multinational companies based on the specific empirical results of this research. For the underdeveloped economies, FDI shows a negative crowding-out effect during the entire research phase. Hence, this article believes that the governments of these countries should make more adjustments in their policies to attract foreign investment.

Specifically, underdeveloped economies have relatively weak industrial bases and lack financial support for economic development, so the government should encourage FDI inflow. However, the government could not blindly introduce investment from various foreign-funded enterprises, and they should combine the actual conditions of the country's economy and industry. For example, the government should encourage potential foreign companies to enter underdeveloped industries in these economies and focus on attracting foreign capital, leading to industrial links with domestic companies because domestic firms in underdeveloped economies lack high-tech technology and advanced international management experience.

Therefore, the government should promote cooperation between internationally renowned high-tech companies and local companies to improve their country's technological innovation. In addition, underdeveloped economies should also pay attention to improving their own infrastructure construction to provide convenient operating conditions for multinational companies. More importantly, the government should improve the efficiency of government departments and the transparency of policies because corruption is more severe in underdeveloped economies, especially in Bulgaria, Romania, Poland, and Hungary (Claire & Garcia, 2018).

Therefore, in order to provide more investors with a relatively fair political environment, the government should improve relevant laws and regulations and increase anti-corruption efforts to protect the rights and interests of foreign investors from being infringed. In summary, when attracting foreign capital into the domestic market, the government should improve the country's investment conditions and

carefully select the suitable source of capital for the healthy development of the country's economy.

7.23 Policy recommendations for the developed economies

For developed economies, we have discovered the long-term crowding-out effect of FDI in our research. Although the intensity of the crowding-out effect is not quite strong, this article believes that the government should also adjust related policies so that government could promote FDI to bring positive crowding-in effects in the future. Specifically, advanced economies have a relatively high degree of economic development and have a better industrial foundation.

Therefore, the government should strictly examine when introducing new investment because the current crowding-out effect is caused by excessive competition between multinational companies and domestic companies. Therefore, the domestic government should reasonably guide FDI into other industries with less competition.

Moreover, advanced economies should lay out long-term strategic plans to improve their competitiveness when attracting foreign investment, which means that the government should attract investment from foreign high-tech enterprises to enter the domestic market to achieve technology spill-over, such as chips, artificial intelligence, and other industries. Meanwhile, targeted investment policies could help these developed economies quickly maintain their competitiveness in the high-end technology sector.

Additionally, with the development of the economy, the cost of production factors such as raw materials and labor resources in developed economies is constantly increasing, leading to a decline in the return on investment of multinational companies. Therefore, in order to make the domestic market more attractive in the international capital market, these governments need to adopt appropriate policies to curb the excessive growth of the prices of production factors.

Additionally, according to the research of other scholars, the crowding-out effect of FDI on domestic investment in developed economies is often lower than that of underdeveloped economies. In other words, attracting more FDI into developed countries does not always have a positive effect. Therefore, developed economies could guide their own enterprises to invest in foreign markets, especially countries and markets where the cost of production factors is lower. Because investing in foreign markets can not only make full use of the surplus funds of domestic enterprises but also find a larger consumer market for domestic products and technologies. In summary, developed economies still have strong competitiveness in attracting foreign investment, but governmental policies are still needed to rationally guide the inflow of FDI in order to generate greater benefits for domestic enterprises.

7.24 Policy recommendations for the European Union

The above policy recommendations are mainly applicable to the governments of each country in Central and Eastern Europe. The 11 Central and Eastern European countries studied in this article have all joined the European Union, and these countries have received a large amount of investment and financial aid from within the European Union. In addition, the European Union is the most powerful political and economic organization in the European market, and each member country has close cooperation and relations.

Therefore, it is necessary for us to discuss how the EU should implement policy adjustments in the face of the negative crowding out of domestic investment in 11 EU member states (the total sample) in the later period of FDI (2013-2019). The European Union represents a single but dynamic economic market, and it has constantly been reforming and making great efforts for the European integration process. Especially in the economic field, various EU institutions have continuously coordinated economic cooperation within the EU and provided solid financial assistance to member states with serious economic issues.

At the same time, the European Union is constantly improving its competitiveness to face the fierce competition in the global resource and consumer markets from the

United States and China, and India of emerging markets. In consequence, when EU member states receive investment from other markets around the world, the EU also needs to pay attention to the potential impact of FDI flowing into the European market. Since the global capital market recovered from the financial crisis, many multinational companies and financial institutions have begun to accelerate their expansion in the global market. The CEE market has become a strategic choice for many foreign capitals before entering the developed markets of Western Europe.

Therefore, after 2012, companies from China, India, and sovereign wealth funds in the Middle East have continuously increased their investment in the Central and Eastern European markets. However, previous studies have shown that a large number of investments are mainly entered CEE markets in the form of acquisitions, and many investment projects are strategic acquisitions (Bickenbach & Liu, 2018).

Furthermore, the EU needs to pay attention to the fact that many strategic mergers and acquisitions often occur when EU member states are in difficult economic periods or when many domestic companies are under tremendous pressure from bankruptcy. In particular, many Central and Eastern Europe companies that have advanced industrial technology would be forced to sell their shares and assets when they encounter cash flow interruptions and low market values in their operations. Hence, foreign investment institutions or commercial companies often acquire EU companies that are conducive to the investment country's strategic plans at a quite low market value.

More importantly, affected by the global epidemic since 2020, the consumer market has been severely frustrated. There have been many companies that have declared bankruptcy in the EU market because of the broken capital chain. If the EU can not speed up the process of vaccine development and vaccination, the epidemic will continue to lead to more significant negative influence on the consumer market and enterprises. This will provide other global investment institutions and commercial companies potential opportunities for 'predatory strategic acquisitions'.

More importantly, our research results did not show the positive crowding-in effect on domestic investment after introducing FDI in CEE in the later stages. Additionally, a

certain number of multinational companies that have acquired or invested in Central and Eastern Europe have their own risks. For example, many companies in emerging markets have serious problems such as loan defaults or fraudulent accounts, which will bring instability to the industrial development of the investment-receiving country. Therefore, if multinational companies' investment funds and investment plans change, this will lead to bankruptcy of investment projects in the host country. From the perspective of the EU, this is not conducive to the stable operation of the EU's internal economy.

Accordingly, it is necessary for the EU to take corresponding measures to avoid this undesirable phenomenon caused by attracting investment. First of all, the EU should increase the inspection of large-scale investment projects in the European market by multinational companies from China and other countries， which will greatly help prevent the EU's strategically important industries from being acquired by multinational companies, such as healthcare, biotechnology, and other critical infrastructure. In addition, increasing the review of investment companies will stop multinational companies with bad assets from entering the EU market, thereby reducing investment risks.

Meanwhile, the EU should actively coordinate with the governments of various countries and formulate relatively uniform investment regulations and rules because some EU member states will excessively attract investment from multinational companies outside the EU in order to promote their own rapid economic growth. However, the EU is a relatively complete community of interests, and changes in the economic structure of a single country will have an unstable impact on the entire European market, for instance, Greek debt crisis after the 2008 financial crisis.

More importantly, the EU should provide member states, especially countries with poor economic development, with the endorsement of policy and financial assistance as fairly as possible, which could offer vital support to large enterprises to maintain operations during the economic downturn. This is because the EU's relatively unified monetary policy and independent fiscal policies of each country have increased the

difficulty and challenges of financial assistance within the EU. In summary, the EU must attach great importance to the issue of foreign investment.

8. Limitation of this research

Due to the excessive number of countries in our study, it is not easy to obtain specific data. Therefore, this article does not separately study the impact of different types of FDI (M&A and Greenfield investment) on domestic investment. Because compared to M&A, greenfield investment may have a more significant impact on the real economy. If data on greenfield investment in these countries could be obtained conveniently, empirical research on this topic may provide more detailed results. In addition, this article does not make more argumentation on the secondary effects of crowding-out or crowding-in effects because FDI may bring negative crowding-out effects to the investment of the host country in the short term. As a result, a number of low-efficiency domestic enterprises lose their competitiveness and withdraw from the market. However, from another perspective, this crowding-out effect will increase the level of domestic industrial production and optimize the industrial structure. Therefore, if there is sufficient time for research, this article should further discuss the secondary impact of FDI crowing in or crowding out the impact on domestic enterprises.

Furthermore, when we perform regression analysis, the first thing we perform is the regression analysis of the fixed-effects model. Nevertheless, after the test, this article finds that there is heteroscedasticity, and when there is heteroscedasticity, the fixed-effects model cannot be used for analysis. Therefore, we chose the panel corrected standard error (PCSE) method for mixed-effects regression analysis. This panel calibration standard error (PCSE) method, strictly speaking, is more accurate when the time span is approaching infinity. However, our time span is 12 years, and there is still a certain gap with infinity, hence it may cause the problem of low accuracy of our regression. According to the panel data we selected, our time span and country data are still not large enough so that it will lead to the problem of low accuracy of the regression.

In addition, for the problem of controlling heteroscedasticity, Driscoll & Kraay (1998) also proposed that when the number of countries in the selected data approaches infinity, another non-parametric covariance matrix estimation method can be used. However, from a comprehensive point of view, our time span and the number of countries are far from infinity, so we still chose the panel corrected standard error (PCSE) method for regression analysis.

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Appendix：

Appendix 1. GDP growth, FDI/GDP and GCF/GDP 2008-2019 of 11 selected CEE countries

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bulgaria												
GDP Growth	6.086	-3.375	0.559	2.355	0.357	0.326	1.885	3.990	3.820	3.503	3.092	3.694
FDI/GDP	18.914	7.490	3.658	3.666	3.309	3.576	1.922	4.303	2.744	3.426	2.726	2.398
GFCF/GDP	33.005	27.781	22.317	20.946	21.226	21.260	21.127	20.909	18.453	18.364	18.793	18.705
Croatia												
GDP Growth	1.893	-7.324	-1.317	-0.198	-2.392	-0.447	-0.341	2.432	3.498	3.439	2.808	2.859
FDI/GDP	7.474	4.904	2.579	1.997	2.589	1.611	5.524	0.106	0.811	0.859	1.976	1.926
GFCF/GDP	28.190	25.223	21.183	20.189	19.582	19.656	19.255	19.549	20.057	19.952	20.363	21.022
Czech Republic												
GDP Growth	2.686	-4.657	2.435	1.760	-0.785	-0.046	2.262	5.388	2.537	5.169	3.181	2.335
FDI/GDP	3.722	2.541	4.863	1.825	4.517	3.476	3.864	0.904	5.528	5.139	3.344	3.723
GFCF/GDP	29.248	27.615	27.149	26.755	26.155	25.360	25.404	26.538	24.943	24.916	26.310	26.213
Hungary												
GDP Growth	1.058	-6.700	1.122	1.937	-1.381	1.861	4.229	3.819	2.140	4.317	5.405	4.578
FDI/GDP	47.496	-2.135	#####	7.577	8.419	-2.649	9.278	-4.211	54.239	-8.487	######	19.606
GFCF/GDP	23.372	22.693	20.109	19.562	19.200	20.838	22.052	22.190	19.516	22.171	24.782	27.227
Poland												
GDP Growth	4.200	2.832	3.741	4.758	1.325	1.126	3.379	4.236	3.142	4.831	5.354	4.541
FDI/GDP	2.731	3.189	3.834	3.508	1.476	0.153	3.645	3.153	3.876	2.234	3.000	2.417
GFCF/GDP	23.106	21.443	20.263	20.704	19.862	18.928	19.833	20.070	17.978	17.526	18.215	18.518
Romania												
GDP Growth	9.307	-5.517	-3.901	1.906	2.041	3.771	3.609	2.954	4.703	7.319	4.475	4.153
FDI/GDP	6.377	2.664	1.932	1.293	1.786	2.020	1.935	2.429	3.323	2.812	3.041	2.945
GFCF/GDP	37.287	25.998	26.073	27.244	27.535	24.701	24.362	24.792	22.947	22.408	21.052	23.633
Slovak Republic												
GDP Growth	5.575	-5.456	5.871	2.847	1.897	0.667	2.642	4.815	2.133	2.990	3.650	2.512
FDI/GDP	4.619	1.708	2.343	5.480	1.879	1.016	-0.359	1.719	5.290	4.425	2.129	2.201

GFCF/GDP	24.751	20.801	21.112	23.270	20.309	20.420	20.415	23.717	20.998	21.162	20.965	21.403
Slovenia												
GDP Growth	3.510	-7.548	1.344	0.861	-2.639	-1.029	2.768	2.210	3.192	4.794	4.385	3.184
FDI/GDP	1.945	-0.689	0.663	1.700	0.072	0.215	2.042	4.015	3.233	2.462	2.840	3.156
GFCF/GDP	29.443	24.131	21.082	19.944	19.032	19.634	19.108	18.655	17.379	18.316	19.235	19.637
Estonia												
GDP Growth	-5.089	-14.434	2.690	7.444	3.125	1.346	2.987	1.845	3.188	5.499	4.355	4.996
FDI/GDP	8.113	9.452	13.163	4.784	7.706	4.345	6.655	-3.104	3.816	6.408	3.958	9.414
GFCF/GDP	31.093	22.551	21.063	26.223	28.497	27.721	25.576	24.316	24.226	24.898	24.585	26.213
Latvia												
GDP Growth	-3.327	-14.260	-4.407	6.469	4.252	2.310	1.074	4.007	2.373	3.251	4.024	2.054
FDI/GDP	4.011	-0.570	1.989	5.309	3.815	3.251	3.336	2.984	1.196	3.784	1.246	3.106
GFCF/GDP	31.948	22.304	19.121	21.962	25.159	23.026	22.808	21.873	19.316	20.618	22.127	22.185
Lithuania												
GDP Growth	2.614	-14.839	1.651	6.039	3.844	3.550	3.537	2.025	2.519	4.283	3.937	4.339
FDI/GDP	3.614	-0.963	2.969	4.316	1.577	1.653	0.736	2.504	2.737	2.897	2.420	2.881
GFCF/GDP	26.066	17.885	16.859	18.460	17.324	18.422	18.870	19.611	19.858	20.115	20.951	21.373

Appendix 2. FDI net inflow 2008-2019 of 11 selected CEE countries (billion).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
IMF advanced economies:												
Czech Republic	8.815	5.272	10.168	4.189	9.433	7.358	8.089	1.700	10.851	11.235	8.325	10.752
Estonia	1.977	1.866	2.592	1.119	1.787	1.098	1.782	-0.715	0.926	1.727	1.213	2.963
Latvia	1.434	-0.150	0.475	1.520	1.081	0.989	1.045	0.813	0.335	1.153	0.429	1.059
Lithuania	1.727	-0.360	1.103	1.881	0.677	0.769	0.357	1.037	1.178	1.384	1.300	1.574
Slovakia	4.641	1.521	2.116	5.432	1.777	1.004	-0.363	1.520	4.743	4.226	2.251	2.313
Slovenia	1.081	-0.347	0.319	0.876	0.034	0.104	1.019	1.730	1.446	1.196	1.538	1.710
IMF non-advanced economies:												
Bulgaria	10.297	3.897	1.843	2.104	1.788	1.989	1.094	2.221	1.488	2.007	1.810	2.076
Croatia	5.250	3.070	1.545	1.249	1.465	0.937	3.184	0.052	0.419	0.477	1.213	1.170
Hungary	75.108	-2.792	-20.770	10.741	10.816	-3.587	13.060	-5.266	69.681	-12.133	-64.702	92.165
Poland	14.574	14.025	18.395	18.534	7.358	0.795	19.776	15.065	18.321	11.762	17.624	14.399
Romania	13.668	4.638	3.214	2.370	3.048	3.855	3.869	4.318	6.252	5.953	7.344	7.365