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Article

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Is Taxation Important for the Allocation of FDI in EU Countries?[1]

*Jan PAVEL – Jana TEPPEROVÁ – Hana ZÍDKOVÁ**

Abstract

The foreign direct investment (FDI) amount suggests the country's attractiveness to foreign investors. However, it can also reflect the tax benefits provided by the recipient country or achievable in a combination of tax rules of the investor-state and the recipient country. If these benefits represent an opportunity for aggressive tax planning, it leads to profit shifting, which the international organizations and their members try to combat. We used the economic data and specific tax indicators of the European Member states in the period of 2013 to 2019. We estimated panel regression models to determine that three indicators of the tax system of the investor's state attract FDI allocation. They include the non-residency of the company having management in another state, the absence of withholding tax on interest paid, and the patent box or other preferential tax regime on income from intellectual property rights. In the recipient country, two indicators proved to be statistically significant and positively impacted the FDI stock: the possibility of group taxation with the holding company and the accessibility of unilateral ruling on, e.g., interest spread or royalty spread. The absence of CFC rules, no taxation of deemed income from interest-free loans, and tax deductions of intra-group interest costs in the investor's country positively affect the level of managerial services and the amount of interest paid to the investor's country from the recipient country.

Keywords: *Foreign Direct Investments, Aggressive Tax Planning indicators, Profit Shifting, Panel Regression*

JEL Classification: H26, E62, F23

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Introduction

Foreign direct investments (FDI) are primarily associated with the health of the given economy. Increasing inbound FDI testify to investors' trust in the economy and assist economic development. Although negative impacts of extended FDI may occur – for example, in the form of a dual economy or undesirable effects on the labor market – inbound FDI are primarily associated with positive aspects (UNCTAD, 2015; Beugelsdijk et al., 2008; CSO, 2008). These are mainly financing investments that increase economic development, assist job creation, improve labor productivity, boost export potential, and more.

Decisions about the allocation of FDI are complex and involve numerous factors. The main factors are skilled and productive labor, labor cost, business climate, site characteristics, material inputs, governmental influences, and tax regulation (Laulajainen and Stafford, 1995). Effective taxation in the country of investment's destination usually represents only the secondary criterion. Nevertheless, individual countries still acknowledge and adopt it within their tax competition. Therefore, governments use different tax incentives to encourage investors and increase FDI, which can take the form of preferential tax regimes or specific parameters of the tax systems.

Over the past decade, much attention has been paid to multinational companies' so-called aggressive tax planning ("MNEs"). Aggressive tax planning is a set of strategies combining different tax systems and international taxation rules to minimize the corporate income tax of a group of companies. In a broad sense, these practices can be described as base erosion and profit shifting (BEPS) between tax jurisdictions. Such strategies impact cross-border flows and, on a global scale, may be observed within the volume of FDI (OECD, 2015). Although it is difficult to distinguish between actual and BEPS-related activities, tax-motivated investments can be observed in FDI values.

This article is based on the assumption mentioned above that decisions on FDI allocation can be influenced not only by the economic characteristics of individual countries but also by specific parameters of their tax systems. Some investors consider not only the value of the statutory tax rates but also the extent to which the tax system setup allows them to apply aggressive tax planning. The primary research question of our paper is what parameters of the tax system in the sending and receiving countries affect the allocation of FDI. Our analysis assumes that countries with tax systems facilitating profit shifting attract more FDI.

We adopt the macroeconomic approach using data from EU countries to answer the research question. As the method, we use regression analysis, focusing on the years 2013 – 2019, which should not be affected by the 2008 financial crisis or the 2020 COVID crisis. Besides effective and statutory corporate tax rates and

other economic and geographic variables, we adopt parameters the European Commission previously identified as aggressive tax planning (ATP) indicators to describe the tax systems. The novelty of our research lies in our effort to determine whether the parameters of the tax systems of both states (investor and recipient) play a role in the investor's decisions on the allocation of FDI. Therefore, we will examine how much FDI allocation is affected by aggressive tax planning. This aspect has not been pursued by researchers in the literature so far. Therefore, our conclusions can be particularly beneficial for tax policymaking. The result can be a coordinated action leading to equalizing tax conditions in individual states, which should lead to a more economically efficient allocation of FDI with a positive impact on their productivity.

The article is divided into four main parts. The first part deals with the analysis of the current state of knowledge. The following chapter introduces the data used and the chosen methodological approach. The third chapter presents and discusses the results of the regression models. In the end, we summarize our results and discuss the possible limits of our research.

1. Current State of Knowledge

Several studies with various focuses that are relevant to our research have been published. The first set of related studies focuses on tax factors influencing the allocation of FDI. The second set researches the specific tax factors of profit shifting. Finally, the range of studies estimates the volume of profit shifting.

1.1. Tax Factors Influencing the Allocation of FDI

Different methodologies exist to assess the scope and variety of BEPS, one of which is the possibility of observing the aggressive tax planning behavior in FDI. It is assumed that MNEs often structure their cross-border activities in the most tax-efficient way, and therefore, FDI are, in this manner, also influenced by tax planning (Bolwijn et al., 2018). However, the influence of ATP behavior is not straightforward, as both actual economic activity and BEPS affect FDI, and separating the two is challenging (Bradbury et al., 2018).

An overview of the variables influencing inward FDI is provided, e.g., by De Mooij and Enderveen (2003) and Abbas (2023), who found tax factors among the other relevant variables. Despite the clear assumption of the negative effect of taxation on inward FDI, empirical studies provide ambiguous results. It is essential to point out that tax factors can be included in various forms. Table 1 provides an overview of the tax variables used in the research regarding FDI.

T a b l e 1

Tax Variables as Factors of FDI

Variable	Empirical findings	Literature
Corporate tax rate Statutory tax rate Effective tax rate Marginal tax rate	+/0/–	Crivelli et al. (2016), Clausing (2016), De Mooij and Enderveen (2003)
Double tax treaties	+	Murthy and Bhasin (2015), Weyzig (2013), Weyzig (2013)
Specific parameters of the tax system IP box regime withholding tax on interest thin-capitalization rules (tax rate effect) transfer pricing rules ATP indicators specified by the European Commission (2015; 2017)	 + – + 0 n/a	 Falk and Peng (2018) Bialek-Jaworska and Klapkiv (2021) Buettner et al. (2014) Pavel and Tepperová (2020), Pavel et al. (2020)

Source: As mentioned in the table.

In empirical studies on BEPS, mostly corporate tax rates are considered within the tax factors influencing FDI flows. These can be used in different variants, such as statutory, effective, or marginal tax rates (Crivelli et al., 2016; e.g., Clausing, 2016; De Mooij and Enderveen, 2003). The sole use of statutory tax rates can be problematic, as statutory tax rates do not capture other parameters of tax systems, such as the tax base formation, possible tax allowances, etc. Although it is impossible to include all the specifics of tax systems, most studies use effective tax rates to overcome the simplicity of statutory tax rates (De Mooij and Enderveen, 2003).

Double-tax treaties play an essential role in international taxation. Some studies research the influence of the number of double tax treaties concluded by the countries or parameters stated within such treaties on the FDI flows. Weyzig (2013) proved that the network of double tax treaties is the critical determinant of FDI flows through the Netherlands. With both inflow and outflow FDI, the country is assumed to be used within the so-called treaty shopping strategies, meaning the use of an entity within the country to secure benefits offered by the double tax treaties concluded by that country. This was also concluded by Lejour et al. (2021) using the data on Dutch SPEs. Their conclusion was based on bilateral income flows instead of FDI data. The impact of the double-tax treaties on FDI was also researched by Murthy and Bhasin (2015). They concluded that not only is the existence of the double-tax treaty important, but the age of the treaty is as well. They found a positive effect of the new treaty on FDI inflows in India and a positive effect of the age of the treaty on the FDI in Japan, Switzerland, and Germany.

Specific parameters of the tax systems promote or allow for the creation of aggressive tax planning structures. These parameters allow for no taxation of

the income in the country, for example, in the form of no withholding taxes on passive incomes or allow for special deductions of the income paid such as interest. Such rules make it challenging to counter ATP behavior. The European Commission (2015; 2017) identified seven essential strategies for ATP behavior and 33 indicators enabling aggressive tax planning structures. Comparing all the indicators for the EU countries provided a further possibility to research the impact of tax systems' parameters with a particular focus on BEPS. The effects of ATP indicators and their impact on FDI were analyzed by Pavel and Tepperová (2020), or Pavel et al. (2020). Białek-Jaworska and Klapkiv (2021) researched withholding tax on interests and concluded that it reduces international profit-shifting through FDI debt instruments. Besides the tax rate, Buettner et al. (2014) focused on the thin capitalization and transfer pricing rules. The existence of the thin capitalization rule led to higher sensitivity of the FDI to the tax rate. Results for the transfer pricing regulations were mixed, and no significant effect on FDI was found.

Tax treatment of intellectual property rights can also be among the tax determinants of investment decisions. The effect of the intellectual property tax regime on FDI was researched by Falk and Peng (2018). They found that introducing the IP box regime in the Netherlands increased FDI inflows in research and development.

1.2. Factors of Profit Shifting

The first research on tax base erosion and profit shifting from the 1990s looked at the relationship between tax variables, such as the difference in statutory corporate tax rates and the shift in profits. The authors used data on labor and capital factors to determine investment returns (Hines and Rice, 1994).

Since then, much research has been done on the factors and methods of profit shifts, especially on the company data for individual countries or regions. For example, Keightley and Stupak (2015) and Flaaen (2017) worked with data from the United States. Clausing (2006), who also worked with microdata from US companies, concluded that the tax rate plays a significant role in shifting profits. Schwarz (2009) examined the ratio between capital and debt and thus traced the use of debt financing to shift profits.

Other authors have worked with microdata from European multinational companies; Dischinger (2008) found that profits shift mainly through transfer pricing in trade in goods. Barion et al. (2010) focused on the level of indebtedness of branches and found that debt is growing in countries with a higher statutory rate. Huizinga and Laeven (2008) and Heckemeyer and Overesch (2017) examined the dependence of the declared profits of branches of multinational companies on the difference in tax rates. Nerudová et al. (2020) analyzed the companies' data

in Visegrad countries. They concluded that a change in the tax differential by 1 pp results in less than a 1 pp change in the revenue loss for public budgets. Similar results were achieved by Dharmapala and Riedel (2013), who found that debt financing is the primary way to shift profits.

Beer and Loeprick (2015) found a relationship between ownership of intangible assets and reporting taxable profits. Janský and Kokeš (2015) worked with data for the Czech Republic. They found a higher ratio between debt and equity in the branches of companies from the so-called European tax havens (Netherlands, Switzerland, and Luxembourg). Overesch and Wamser (2010) also examined the effect of debt and, in particular, the tax deductibility of interest in thin capitalization rules on transfers of profits from Germany between 1996 and 2004. Pavel and Tepperová (2020) reached similar conclusions, identifying Cyprus as a conduit country, besides the countries mentioned above. They used an indicator for conduit countries calculated from foreign direct investment inflows and outflows.

Dischinger et al. (2014) worked with worldwide data and established the dependence of profit shifting on the corporate tax burden in the country of the branch. Fuest et al. (2013) found a link between the placement of intangible assets in a group of companies and the transfer of profits.

Also, several authors have investigated the dependence between the level of taxation in individual countries and regions and the level of foreign direct investment. For example, Hájková et al. (2006) and Heckemeyer and Overesch (2013) examined the elasticities of foreign investment to selected tax variables. Pavel et al. (2020) found that the elasticity of foreign direct investment stock to the tax rate is higher for the effective tax rate than for the statutory tax rate in post-communist countries.

1.3. Estimates of Tax Evasion due to Shifting Profits

Apart from the knowledge of factors influencing tax base erosion, tax policymakers must know the volume of these transferred profits. Table 2 summarizes the estimated volume of the profit shifting.

At the global level, the OECD (2015) calculated that public revenue losses due to the erosion of tax bases could amount to USD 100 – 240 billion. Some authors have examined the correct methodology for estimating corporate tax evasion. Bradbury et al. (2018) pointed out the necessity of distinguishing the data between actual economic activity and activity that allows for the transfer of profits. The optimal type of corporate tax rate to estimate tax evasion has also been examined in the literature (Crivelli et al., 2016). Volumes of tax evasion are often calculated for individual countries or regions. For example, Vicard (2015) calculated the potential tax loss due to the transfer of USD 8 billion in profits for France in 2008.

Álvarez-Martínez et al. (2021) estimated tax revenue losses from multinational companies at USD 36 billion for the EU, USD 24 billion for Japan, and USD 100 billion for the United States.

T a b l e 2

Volume of the Profit Shifting as Presented in Selected Studies[2]

Region	Estimated volume of profit shifting	Literature
Global	USD 100 – 240 billion (tax loss)	OECD (2015)
Global	USD 665 billion	Janský and Palanský (2019)
Developing countries	USD 450 billion	UNCTAD (2015)
Developing countries	USD 35 billion	Oxfam (2000)
France	USD 8 billion, France	Vicard (2015)
European Union	USD 36 billion (tax loss)	
Japan	USD 24 billion (tax loss)	Alvarez and Martinez (2018)
USA	USD 100 billion (tax loss)	
Global	USD 280 billion (tax loss)	Clausing (2016)
Global	USD 500 billion (tax loss, long run)	Cobham and Jansky (2018)
Global	USD 90 billion (tax loss, short run)	Cobham and Jansky (2018)
Global	USD 188 – 247 billion (tax loss)	Wier and Zucman (2022)

Source: As mentioned in the table.

An important direction in the methodology of estimating tax evasion's extent due to the transfer of profits is the research focused on the question of how the rate of return on foreign investment depends on the share of the so-called tax havens in the volume of foreign investment. This approach, together with the use of an extensive database of foreign direct investment data, was employed by the UNCTAD (2015) study. In addition to tax havens, the study identifies countries with favorable tax regimes. It allows multinational companies to register so-called special purpose entities (SPE) through which profits or other payments (royalties or interest) are paid to countries with low corporate tax rates. They call them SPE countries, although these are called conduit countries in other literature. The authors of the UNCTAD (2015) study estimated the degree of dependence of the rate of return on foreign direct investment on the share of investments from tax havens and SPE (conduit) countries on the total volume of foreign direct investment. They concluded that if the share of investments from these "problematic" countries in the total volume of foreign investment increased by 10 pp, the rate of return on foreign investment would decrease by 1 pp.

Their calculation of tax evasion is based on the idea that the lower rate of return on foreign direct investment from tax havens or SPE countries is caused by shifting profits. A comparison with the natural rate of return on investment reveals the

[2] Other studies calculated the volume of profit shifting and corresponding tax revenue losses on corporate income tax as well, for another overview of the estimates see Lejour (2021) or Bradbury et al. (2018).

difference in the reported profits of multinational companies and, using the effective tax rate identifies potential tax evasion on corporate tax. UNCTAD (2015) concluded that USD 450 billion is being transferred globally from developing countries, equivalent to USD 90 billion in tax revenue losses of these countries in 2012. This study was inspired by an older study by Oxfam (2000), which also took advantage of the difference in the usual rate of return on investment and the rate of return found for foreign investment from tax havens. However, the estimate by Oxfam (2000) was much lower, at about USD 35 billion in developing countries. This can be explained by the enormous boom in tax base erosion and profit shifting since the 1990s.

Bolwijn et al. (2018) found that 30 to 50% of bilateral foreign direct investment flows through conduit states (or SPE countries). Based on the UNCTAD (2015) data, they summarized that tax avoidance in developed countries amounts to approx. USD 110 billion. So, relative to the size of these economies, it is much lower than in developing countries, which suffer USD 90 billion of revenue loss due to profit shifting.

Janský and Palanský (2019) also used the rate of return on investments differentials methodology. They focused on estimating the amount of tax evasion and how profit shifts affect groups of countries according to their economic development, measured by GDP per capita. They estimated that USD 420 billion was transferred from 79 investigated countries, equating to USD 125 billion of public revenue loss. Their global model estimates that USD 665 billion of profits shifted to low-tax jurisdictions, corresponding to USD 194 billion of global public revenue loss in 2016.

Tørsløv et al. (2023) considered the mismatch between the recognized profits of multinational companies and their actual economic activity based on employee remuneration. He concludes that 36% of the profits of multinational companies are redirected to tax havens.

Cobham and Jansky (2018) monitored the impact of investments from low or favorable-tax countries on the overall profitability of companies. After adjusting for this impact, they estimated the size of tax evasion in 102 countries. They worked with data for all companies and not just multinational companies. These authors found that approximately USD 500 billion of corporate tax revenue is being lost globally in the long run, whereas this amount is USD 90 billion in the short run. Clausing (2016) derived its estimates of tax evasion from the sensitivity of corporate taxation to the tax rate level. Her study extrapolates the results of US multinationals to 24 countries, covering 95% of global profit share, according to Forbes Global 2000. This paper presented an annual loss of U.S. tax revenue of USD 111 billion in 2016 and USD 280 billion globally.

In their updated research working paper, Wier and Zucman (2022) provide profit-shifting estimates for the years 2015 – 2019, suggesting a gradual increase from USD 188 billion (2015) to USD 247 billion (2019) of global tax loss due to profit-shifting.

2. Methodology, Models and Data

2.1. Research Questions

Based on the analysis of the current state of knowledge, it can be concluded that economic and geographical factors and the parameters of tax systems play a role in deciding on the allocation of FDI. Many investors are trying to minimize tax liability. Therefore, it is very likely that they consider not only the statutory tax rates but also other parameters of tax systems that allow the application of certain types of aggressive tax planning. The result is lower effective taxation and, in many cases, the increased value of selected types of cross-border payments, especially payments for services for which it is simply impossible to set a comparable price (typically management services) and royalties and interest payments. These payments increase the entity's costs in the FDI' recipient country (i.e., the country from which these payments are made), which reduces the tax base.

The following analysis focuses on these research questions:

1. Do tax system parameters in investor states play a role in FDI allocation decisions?
2. Do tax system parameters in recipient states play a role in FDI allocation decisions?
3. Is the application of ATP reflected in the size of cross-border flows of selected payments?

2.2. Models

We use a macroeconomic approach to find answers to the above research questions. We focus on the macroeconomic volume of FDI (or cross-border flows of selected types of payments) and look for factors that influence them. The basic concept of the presented models is based on the assumptions (confirmed by several studies prepared so far) that the allocation of FDI is determined by economic maturity, the size of the economy, geographical distance, and the business environment, including the parameters of the tax system. Therefore, the tested factors can be divided into economic, geographical, and tax variables. From the point of view of the focus of our analysis, tax factors are essential; variables from the other two groups thus serve only as controls.

We used the data from 2013 – 2019 because European economies were in a standard economic situation then. Before 2013, it was still possible to see the effects of the Great Recession, and in 2020, the COVID-19 crisis came. We work with data from all EU states that were EU members in the monitored period. Our models use average values for the observed period to eliminate the short-term fluctuations of the variables in the economic cycle. As the values of the parameters of the tax systems did not change in most countries during the period analyzed, it is impossible to work with time series. Average values are also more appropriate because decisions on the allocation of FDI are influenced more by long-term factors than short-term fluctuations.

In the analysis, we only work with EU member states since the European Commission only publishes the indicators of aggressive tax planning for them. At the same time, these are also countries operating in the European Single Market, for which some parameters of the tax systems are unified (for example, the taxation of dividends between related companies). To answer our research questions, we estimated three groups of regression models.

The first group of models contains four models analyzing the parameters of tax systems of the investor's states (research question number 1). The general form of regression models is as follows.

$$\ln FDIstock_{ij} = \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln OPN_i + \beta_3 \ln ULCdif_{ij} + \beta_4 NEI_{ij} + \\ + \beta_5 \ln STRdif_{ij} + \beta_6 X_i + \varepsilon_i \quad (1)$$

$$\ln FDIstock_{ij} = \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln OPN_i + \beta_3 \ln ULCdif_{ij} + \beta_4 NEI_{ij} + \\ + \beta_5 \ln ETRdif_{ij} + \varepsilon_i \quad (2)$$

$$\ln FDIchange_{ij} = \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln OPN_i + \beta_3 \ln ULCdif_{ij} + \beta_4 NEI_{ij} + \\ + \beta_5 \ln STRdif_{ij} + \beta_6 X_i + \varepsilon_i \quad (3)$$

$$\ln FDIchange_{ij} = \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln OPN_i + \beta_3 \ln ULCdif_{ij} + \beta_4 NEI_{ij} + \\ + \beta_5 \ln ETRdif_{ij} + \varepsilon_i \quad (4)$$

where $FDIstock_{ij}$ is the value of FDI in the state j invested by entities which are residents of the state i, GDP_i is GDP in the state i, OPN_i is the openness of the economy of the state i, $ULCdif_{ij}$ is the difference in labor costs between the states i and j, NEI_{ij} is a dummy variable with the value of 1 if the states i and j are neighbors, $STRdif_{ij}$ is the difference in statutory corporate tax rates between the states i and j, X_i is a vector of dummy variables characterizing the presence of elements in the state tax system i enabling the application of ATP procedures, $FDIchange_{ij}$ is a change in the value of FDI in the state j invested by entities which are residents of the state i and $ETRdif_{ij}$ is the difference in the effective tax rate between the state i and j.

The explained variable is either the FDI level or the change of this level over the observed period. The inclusion of the *FDIchange* was motivated by an effort to verify whether the level of FDI is different from the result of events that occurred before the period under review. On the side of explanatory variables, we find both the control variables and the characteristics of the tax system of the investor's state. In the first case, it is the size of the economy (*GDP*), its openness (*OPN*), the difference in labor costs (*ULCdif*), and geographical proximity (*NEI*). Positive regression coefficients can be expected in all cases, as larger economies have a higher capacity to invest abroad.

Likewise, the openness of the investor economy has a positive effect on the interaction of economic entities with foreign countries, often leading to establishing branches to facilitate trade. Also, the lower wage level in the recipient country will support the transfer of production capacity from higher-wage countries, allowing cost savings and, consequently, higher profits. Finally, in the case of geographical proximity, we can once again expect a higher economic exchange between the two countries combined with a higher degree of knowledge of the other state and a higher willingness to invest there. (Alamá-Sabater et al., 2016; Campos and Kinoshita, 2003).[3]

We take tax factors into account in two ways. In the first case (equations 1 and 3), the models work with the difference in the statutory corporate tax rate and with indicators of ATP, expressed as dummy variables. The second option (equations 2 and 4) is to use the difference in effective taxation, which assumes both the effect of different statutory rates and other tax system parameters, including the already mentioned possibilities to use ATP (and therefore, we do not adopt dummy variables in those models).

The second group of models explores the role of tax parameters of the recipient's state (research question number 2). Two regression models with the following structure were estimated using the same method as in the previous case.

$$\ln FDIstock_{ij} = \beta_0 + \beta_1 \ln GDP_j + \beta_2 \ln OPN_j + \beta_3 NEI_{ij} + \beta_4 \ln STR_j + \beta_5 \ln WTT_j + \\ + \beta_6 X_j + \varepsilon_j \quad (5)$$

$$\ln FDIchangeij = \beta_0 + \beta_1 \ln GDP_j + \beta_2 \ln OPN_j + \beta_3 NEI_{ij} + \beta_4 \ln STR_j + \beta_5 \ln WTT_j + \\ + \beta_6 X_j + \varepsilon_j \quad (6)$$

where $FDIstock_{ij}$ is an explanatory variable, which indicates the value of FDI in the state j invested by entities resident in the state i, GDP_j is the value of GDP in the state j, OPN_j is the openness of the economy of the state j, NEI_{ij} is a dummy variable acquiring the value of 1 if the states i and j are neighbors, STR_j is the

[3] As part of the analysis, other variables were also tested, such as economic maturity, level of corruption, common language, etc., but they did not prove to be statistically significant.

statutory corporate income tax rate in the state *j*, WTT_j is the rate of withholding tax in the state *j,* and X_j is a vector of dummy variables characterizing the presence of elements in the tax system of the state *j* enabling the application of ATP procedures.

The third group of models (related to research question number 3) responds to the assumption that applying ATP procedures may lead to an increase in certain types of cross-border payments (payment for management services, royalties, and interest). For each of these payments, two regression models were estimated, the construction of which is as follows.

$$\ln PAY_{ij} = \beta_0 + \beta_1 \ln FDI_{ij} + \beta_2 \ln GDPT_i + \beta_3 \ln STR_i + \beta_4 X_i + \varepsilon_i \quad (7)$$

$$\ln PAY_{ij} = \beta_0 + \beta_1 \ln FDI_{ij} + \beta_2 \ln GDPT_i + \beta_3 \ln ETR_i + \varepsilon_i \quad (8)$$

where PAY_{ij} is the dependent variable, which is either payments for management services (*MAS*), royalties (*ROY*), or interest (*INT*) to the state *i* from the state *j*, FDI_{ij} is the volume of FDI in the state *j* invested by entities which are residents in the state *i*, GDP_i is GDP in the state *i*, STR_i is the statutory corporate tax rate in the state *i*, X_i is the vector of dummy variables characterizing the tax system in the state *i* and ETR_i is the effective tax rate in the state *i*.

2.3. Data

We used the Eurostat database on FDI positions, flows, and income broken down by partner countries to obtain the data on FDI stock and flows from 2013 to 2019 (Eurostat, 2021). The amounts were in millions of euros on an annual basis. Notably, the amount of direct investment stock in the reporting country was taken from the Balance of payments indicators (FDI item). The data on FDI flows were downloaded from the Balance of payments statistics and international investment positions.

Dividends, reinvested earnings, income on debt, and interest on portfolio investments paid by the reporting country were obtained from the Balance of payments by country (BPM6) capital account, the debit side of primary income (Eurostat, 2021c – 2021f). To get the interest on portfolio investment paid from the reporting country, we had to transpose the data as only the credit side of the balance of payments was available for that item. License fees were also found in the Balance of payments by country but in the current account (item services) under the name "charges for using the intellectual property." (Eurostat, 2021a) Management services paid from the reporting country were available from the "International trade in services" table (Eurostat, 2021b).

Data on statutory and effective corporate tax rates, both in %, are from the database (European Commission, 2021).[4] Data on the tax system parameters related to aggressive tax planning behavior are from the European Commission report (2015). Within the report, 33 indicators of tax systems are stated for the EU countries. The indicators are considered active or passive given their possible role within the aggressive tax planning structures or marked as a lack of anti-abuse law. Active indicators may promote the creation of ATP structures, while passive indicators and lack of anti-abuse law allow for aggressive tax planning behavior. For example, an active parameter could be a zero corporate tax rate.

In contrast, a passive parameter would be the absence of withholding tax on passive income, such as dividends, interests, and royalties. Examples of a lack of anti-abuse laws are the lack of beneficial owner tests or thin-capitalization rules. Of the 33 indicators, eight are considered active, and 12 are passive; the same (12) goes for the lack of anti-abuse law. The last indicator is open for any other significant ATP indicator based on national experts' suggestions. Based on the European Commission report (European Commission, 2017), we have constructed a set of dummy variables used within the model (Table A1 in Appendix). The value of these variables did not change during the observed period.

3. Results

Table 3 presents the reduced models based on equations 1 to 4 with variables whose regression coefficients are significant, at least at the 10% significance level. The method of cross-sectional regression with fixed effects (recipient countries) was used for the estimation. Due to the presence of heteroscedasticity, robust standard deviations were used. The presented results confirm the expected influence of the control variables. These models analyzed the impact of the tax system on the volume and change of FDI in the investor's state (1st research question).

FDI is invested more from larger countries (variable *GDP*) with more open economies (*OPN*). Geographical proximity (*NEI*) and the more significant difference in labor costs (*ULCdif*) also have a positive effect. From the regression coefficients for the tax variables, it is clear that FDI are allocated from the countries with a higher tax burden to those with a lower tax burden (*STRdif* and *ETRdif*). Of the indicators of aggressive tax planning, options *P29* (the locally incorporated company is not a tax-resident if its management/control resides in another state), *P14* (no withholding tax on interest payments), and *P17* (patent box or other preferential tax treatment of income from IP is possible) have a very significant effect.

[4] Descriptive statistics of non-binary variables and a link to the data source are provided in Table A in the Appendix.

These indicators can be found within the model structures of ATP (European Commission, 2017) in the target countries as well as the conduit countries. None of the three indicators is assumed to be within the model structures in the country of the head investor. The relevance of these indicators in this model thus points to the role of the conduit countries.

T a b l e 3

Factors Influencing the Level of Investment with a Focus on the Tax System of the Investor's State

	lnFDIstock	lnFDIstock	lnFDIchange	lnFDIchange
Const.	–21.5804*** 2.0434	–17.3860*** 2.0284	–21.8063*** 2.2746	−17.0817*** 2.3529
lnGDP	1.2502*** 0.0912	1.0419*** 0.0889	1.2132*** 0.1129	0.9802*** 0.1214
lnOPN	2.5320*** 0.2246	2.3724*** 0.2224	2.5359*** 0.2174	2.2867*** 0.2076
lnULCdif	0.0862*** 0.01829	0.1183*** 0.0182	0.0643*** 0.0210	0.0890*** 0.0236
NEI	1.9699*** 0.3438	1.8087*** 0.3373	1.5053*** 0.3469	1.4190*** 0.3514
lnSTRdif	0.0457*** 0.0149			
P14	0.7161*** 0.1291			
P17	0.8535*** 0.1790		0.7420*** 0.1846	
P29	3.2295*** 0.4232		3.6331*** 0.3316	
lnETRdif		0.0579*** 0.0185		0.0300 0.0184
R2	0.71	0.61	0.66	0.58
No. of observ.	624	624	466	466

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Source: Own calculation.

Typically, the indicator *P29* can be a part of the so-called two-tiered IP structure. The group of companies benefits from the mismatches in the tax residency rules so that, for some purposes, the company is considered a resident of one state (state of incorporation). In contrast, for other purposes, it is treated as the resident of another state (location of its management). With the use of licenses and sub-licenses within the group of companies, incoming royalties are not included for taxation purposes within the state of residence of the company receiving the royalties. This strategy was also a part of the so-called double Irish Dutch Sandwich structure (Holtzblatt et al., 2016).

The indicator *P17* is a part of any structure using the Patent Box regime and/or IP and cost-contribution agreements in the country of the investor (conduit country). These ATP structures allow companies to use preferential tax regimes typically

related to IP rights. Received royalties are either a part of the favorable patent box regime or can be allocated to the company with low effective taxation through the cost-contribution agreement.

No withholding tax on interest payment (indicator *P14*) can be part of various structures of ATP using debt financing. It is typical for either the target or conduit companies. Thus, our model for the investors' tax system points towards the structures where the company is in the conduit country rather than the final investor.

Table 4 summarizes the results of the estimated models that analyze the impact of the tax system of the recipient country on the volume and change of FDI (2nd research question).

T a b l e 4

Factors Influencing the Level of Investment with a Focus on the Tax System of the Recipient State

	lnFDIstock	**lnFDIchange**
Const.	−7.1167*** 1.9334	−8.5936*** 2.2909
lnGDP	0.6741*** 0.0967	0.5633*** 0.0988
lnOPN	1.2553*** 0.1870	1.4248*** 0.2687
NEI	2.0949*** 0.2576	1.6054*** 0.2711
lnSTR	−0.3949** 0.1918	
WTT	−0.0403*** 0.0079	−0.0339*** 0.0097
P23	0.5047** 0.1932	0.7365*** 0.2529
P30	1.1082*** 0.1725	0.8040*** 0.2128
R2	0.74	0.68
No. of observ.	624	466

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Source: Own calculation.

The size (ln*GDP*) and openness (ln*OPN*) of the recipient economy and geographical proximity (*NEI*) positively influence the level of FDI. Conversely, investors are discouraged by higher corporate tax rates (ln*STR*) and withholding tax rates (*WTT*). On the contrary, it would have a positive effect if the tax system supported the implementation of some ATP methods. The relevance of the indicators *P23* (group taxation with acquisition holding company allowed) and *P30* (unilateral ruling on, e.g., interest spread or royalty spread can be obtained) was confirmed within the models.

Group taxation with acquisition holding company allowed (*P23*) can be typically used within ATP structures using offshore or hybrid loans. These structures

assume the introduction of interest payments that can be offset by the domestic law of the target country against the profits of another company within the group.

The possibility of obtaining a unilateral ruling on, e.g., interest spread or royalty spread (*P30*) is specific to the structure of IP and cost-contribution agreements. Some countries provide companies with unilateral rulings to allocate interest or royalty payments to low-tax jurisdictions, certifying favorable tax arrangements.

The models presented in Table 5 analyze the impact of ATP rules on selected flows between the recipient and investor states (3rd research question).

T a b l e 5

Factors Affecting Cross-Border Flows of Payments for Management Services, Royalties, and Interest

	lnMAS	**lnMAS**	**lnROY**	**lnROY**	**lnINT**	**lnINT**
Const.	–3.2359*** 1.0579	–2.1740*** 0.4719	–3.4778*** 0.7376	–4.3615*** 0.6829	−3.3216*** 0.8241	−1.7241** 0.6281
lnFDIstock	0.3541*** 0.0393	0.3674*** 0.0199	0.5964*** 0.03179	0.5897*** 0.0564	0.5235*** 0.0377	0.4963*** 0.0344
lnGDP	0.6273*** 0.0674	0.5728*** 0.0349	0.4373*** 0.04871	0.4347*** 0.0722	0.3967*** 0.0680	0.4852*** 0.0883
lnSTR	–1.3272*** 0.1620		–1.2758*** 0.2314		−0.7684*** 0.2496	
P7					1.4490*** 0.3483	
P9					0.6781*** 0.1366	
P24	0.3643** 0.1302					
lnETR		–1.4611*** 0.1634		−0.9909*** 0.2135		−1.4634*** 0.3162
R2	0.82	0.82	0.77	0.76	0.81	0.80
No. of observ.	514	514	378	378	346	346

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Source: Own calculation.

The results confirm that payments are predominantly directed towards larger countries (ln*GDP*) and countries whose residents invest in the recipient state (ln*FDIstock*) in all three cases. From the tax factors, negative regression coefficients at the statutory (ln*STR*) or effective tax rate (ln*ETR*) show that these payments flow more to the countries with lower tax burdens. In the case of indicators of aggressive tax planning, the scope of payments for management services increases with the absence of CFC rules (*P24*). Interest payments flow more to the states where the following indicators were recorded: *P7* (no deemed income from the interest-free loan; non-arms length transactions) and *P9* (tax deduction for intra-group interest costs).

The absence of CFC rules (*P24*) allows various ATP structures to optimize the overall tax position. This indicator is mentioned within the model ATP structures

for Offshore loans, Hybrid loans, Interest-free loans, Patent boxes, and IP and cost-contribution agreements structures (European Commission, 2017).

The indicators *P7* and *P9* allow tax optimization for interest payments. The possibility of deducting deemed interest in one state and, at the same time, not taxing deemed income from the interest-free loan (P7) is at the core of the so-called interest-free loan structure. Offshore loan structures (and other structures using interest payments) can benefit from the tax treatment when tax deduction does not depend on the tax treatment in the creditor's state (*P9*).

4. Discussion and Conclusion

The results of our analysis show that apart from the economic characteristics of individual countries, such as their market size, openness, and wage level, the tax system plays an essential role in deciding the allocation of FDIs in EU countries. This is in line with other studies on determinants of FDI factors as summarized, e.g., by De Mooij and Enderveen (2003) and Abbas (2023). Investors consider not only the parameters of the tax system in the country where the investment is directed but similar considerations are also made concerning the country where the parent company is located. However, in addition to the corporate tax rate, investors also take into account other parameters of tax systems, and our analysis shows that these are the ones that influence the implementation of aggressive tax planning structures.

Within the first group of models, three indicators of the state's tax system from which the investment is made were found. These were (1) the local company is not a resident if it has management in another state, (2) the absence of withholding tax on interest paid (similar to Bialek-Jaworska and Klapkiv, 2021), and (3) the patent box or other preferential tax regime on income from intellectual property rights (similar to Falk and Peng, 2018). The positive relationship between the FDI stock in the investing country and these three indicators suggests using these countries as conduit countries through which the investment is directed. If we look at specific countries with these tax system elements, Cyprus stands out because all three indicators are present. Countries with two elements in their system are the Netherlands, Malta, Belgium, Luxembourg, Estonia, Austria, and Hungary. These countries usually appear in the professional literature (Tørsløv et al., 2023; Lejour, 2021; European Commission, 2022) as suitable locations for tax optimization. The EU countries Lejour (2021) classified as conduit countries are Ireland, Luxembourg, the Netherlands, Cyprus, Malta, Belgium, Hungary, and Austria, which match most of the countries identified by our analysis.

In the second group of models, focused on analyzing the specific elements of the tax system in the recipient country, two indicators proved to be statistically significant and had a positive impact on the FDI stock (and a change of this stock) in that country: (1) the possibility of group taxation with the holding company and (2) unilateral ruling on, e.g., interest spread or royalty spread can be obtained. Both elements are present in the tax systems of only three countries – the Netherlands, Luxembourg, and Italy.

The relatively high values of regression coefficients for the indicators of aggressive tax planning show that this phenomenon is significantly present throughout the EU despite the long-term efforts of the European Commission to reduce these activities.

The use of aggressive tax planning subsequently affects the scope of some types of cross-border payments, especially royalties, interests, and payments for management services, which is confirmed by the results of our third group of models where the dependent variable of interest, royalty and management services payments is explained among other things by the presence of specific indicators of the investing country's tax system. It has been shown that the absence of CFC rules in the country from which the investment was made positively affects the level of managerial services paid to this state from the recipient country. No taxation of deemed income from interest-free loans and tax deductions of intra-group interest costs are present in the country from which the investment was made. This positively influences the amount of interest paid to this country from the recipient country. These results are in line with, e.g., Beer and Loeprick (2015) and Janský and Kokeš (2015). A high sensitivity of these payments to the tax rate in the destination country is also evident.

Certain limitations burden the presented analysis. First, we only examine relations between EU member countries (because indicators of aggressive tax planning are unavailable for non-EU countries). At the same time, the application of ATP is often associated with using tax residence in countries outside the EU, which usually show a low level of transparency and taxation. This is confirmed by several studies such as Janský and Palanský (2019), UNCTAD (2015), and Bolwijn et al. (2018).

Another tax factor the presented analysis cannot capture is the influence of specific (individual) preferential regimes and investment incentives because specific data on these regimes are not published for all the EU Member States. However, their existence may partly affect the size of the effective corporate tax rate.

Despite the above, our analysis leads to clear conclusions that it is necessary to continue eliminating incentives and gaps in national tax systems that allow aggressive tax planning. Considering the countries specified based on the first group

of models, it seems that the initiatives within the European Union addressing the issue of base erosion and profit shifting aim in the right direction, especially demanding the introduction of withholding taxes in respective states (European Commission, 2022). Not having withholding taxes on royalties, interest, or dividends allows the channel of untaxed money outside of the EU.

Ongoing discussions and actions taken on the grounds of international institutions, mainly OECD, EU, and UN, are gradually closing doors to ATP behaviors and are believed to lead to fairer taxation. This happens not only through the new legislation implemented by the EU countries based on EU directives, such as the Anti-tax-avoidance Directive (ATAD) or Directives on Administrative Cooperation (DACs) but also by the ongoing effort of the European Commission to suppress the overuse of tax rulings that could be considered as illegal state aid. Considering the results showing that also patent boxes and tax treatment of intellectual property can play a role in certain ATP structures, surprisingly, none of the above-mentioned initiatives focus on this direction. So far, not even the currently discussed proposal of the European Commission on harmonization of the tax base of a group of companies – Business in Europe: Framework on Income Taxation (BEFIT).

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Appendix

Table A

Descriptive Statistics of Non-Binary Variables

Variable	Description	Source	Mean	S.D.	Min	Max
lnFDIstock	FDI stock	Eurostat (2021)	6.02	3.17	–3.40	13.6
lnFDIchange	Year-on-year change in FDI stock	Own calculation based on Eurostat (2021)	5.6	2.87	–2.30	12.6
lnGDP	GDP in euros	Eurostat	12.1	1.55	9.23	15.0
lnOPN	Openness of the economy	Own calculation based on Eurostat (2021) data on export, import and GDP	4.75	0.469	4.04	5.96
lnULCdif	Difference between unit labor costs	European Commission (2021)	–6.88	6.53	–11.5	3.63
lnSTRdif	Difference between statutory corporate tax rates	Own calculation based on EC (2018)	–7.13	6.30	–11.5	3.33
lnETRdif	Difference between effective corporate tax rates	Own calculation based on EC (2018)	–7.06	6.27	11.5	3.38
lnSTR	Statutory corporate tax rate	European Commission (2021)	3.07	0.33	2.30	3.64
lnETR	Effective corporate tax rate	European Commission (2021)	2.99	0.33	2.20	3.65
WTT	Withholding tax rate	European Commission (2021)	7.44	10.0	0.00	26.4
lnMAS	Payments for management services	Eurostat (2021b)	2.67	2.63	–4.09	8.41
lnROY	Payments for royalty fees (licence fees)	Eurostat (2021a)	2.17	2.63	–4.09	9.82
lnINT	Interest payments	Eurostat (2021f)	2.65	2.63	–4.09	9.27

Source: Own calculation.

T a b l e A1

Theme	No. of Indicator	Subject	Category
Dividends received	P1	Too generous tax-exemption of dividends received	Passive
Dividends paid	P2	No withholding tax on dividend paid (absent under domestic law)	Passive
	P3	No withholding tax on dividend equivalents (e.g. Buy-back of shares)	Passive
	P4	No beneficial-owner test for reduction of withholding tax on dividends	LoA-A
	P5	Tax deduction for dividends paid	Active
Interest income	P6	Income from certain hybrid instruments non-taxable	LoA-A
	P7	No deemed income from interest-free loan (non-arm's length transactions)	Active
Interest cost	P8	Tax deduction for intra-group interest costs	Passive
	P9	Tax deduction does not depend on the tax treatment in the creditor's state	LoA-A
	P10	Tax deduction allowed for deemed interest costs on interest-free debt	Active
	P11	No taxation of benefit from interest-free debt	LoA-A
	P12	No thin-capitalization rules	LoA-A
	P13	No interest-limitation rules	LoA-A
	P14	No withholding tax on interest payments	Passive
	P15	No beneficial-owner test for reduction of withholding tax on interest	LoA-A
Allowance for equity capital	P16	Notional interest deduction for share capital	Active
Royalty or other IP income	P17	Patent box or other preferential tax treatment of income from IP	Active
	P18	No taxation of capital gain (fair market value) upon transfer of IP	Passive
Royalty or other IP costs	P19	Tax deduction for intra-group royalty costs	Passive
	P20	No withholding tax on royalty payments (absent according to domestic law)	Passive
	P21	No beneficial-owner test for reduction of withholding tax on royalty	LoA-A
	P22	RandD tax incentive obtainable also for costs that are reimbursed	Passive
Group taxation	P23	Group taxation with acquisition holding company allowed	Passive
CFC Rules	P24	No CFC rules	LoA-A
Foreign legal entities	P25	Tax qualification of foreign partnership does not follow that of the foreign state	Passive
	P26	No rule to counter a mismatch in tax qualification of a domestic partnership between own state and a foreign state	LoA-A
	P27	No rule to counter a mismatch in tax qualification of a domestic company between own state and a foreign state	LoA-A
Tax-free company	P28	Nil corporate tax rate	Active
	P29	Locally incorporated company not tax-resident if management/ control is in another state	Active
Ruling practices	P30	Unilateral ruling on e.g. Interest spread or royalty spread can be obtained	Passive
	P31	Excess profits rulings	Active
GAAR/SAAR	P32	No general or specific anti-avoidance rules to counter the model ATP structures	LoA-A
Other themes	P33	Any other significant ATP indicator to be identified by national tax experts	

Note: Indicators are marked as active if promoting tax planning structures, or passive, if making the tax planning structure possible but not promoting it by itself. Lack of anti-abuse (LoA-A is when there are missing rules that could hinder aggressive tax planning as such.

Source: European Commission (2017).