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Master in Monetary and Financial Economics

Thesis

"Dynamics of Corporate Effective Tax Rates: Insights from Tax Havens"

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1. Introduction

Tax havens have accumulated significant attention in the global financial landscape, representing jurisdictions that offer businesses and individuals favorable tax climates characterized by minimal or nonexistent taxation. The concept of a tax haven, as outlined by experts, surrounds territories that qualifies the reduction or avoidance of taxes, often extending beyond the investor's home country. Over period of time, tax havens have developed from being termed "fiscal paradises" to more commonly known as "offshore centers," which serve as attractive locations for those seeking beneficial tax systems. These jurisdictions are differentiated by a few key characteristics, including low or zero taxation, lack of transparency, and an unwillingness to share tax-related information with foreign authorities. Understanding the nature of tax havens is crucial, especially in the context of international tax competition, which can drive countries to lower their tax rates in a "race to the bottom," ultimately impacting global tax revenues. This study searches though into the dynamics of effective tax rates within these environments, exploring the interplay between economic, institutional factors, and tax policy to illuminate the determinants shaping tax outcomes and investment decisions across a diverse range of countries.

Building upon prior work by (Fernández-Rodríguez et al., 2021), this study aims to contribute to this discourse by investigating the business and institutional factors influencing effective tax rates in developed economies. By examining whether corporations are inclined to invest in countries with lower tax rates, we consider key economic, governance, and policy-related factors that shape tax outcomes.

Our study is informed by a comprehensive data collection effort spanning from 2010 to 2022, getting-together information on effective tax rates and independent variables such as GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, and statutory tax rate for a selection of 11 tax haven countries. This

dataset provides a power base for assessing the impact of these variables on effective tax rates through regression analysis. By utilizing panel data regression models and fixed effects analysis, we try to uncover significant determinants of effective tax rates, offering insights into the factors driving tax policy outcomes and investment decisions within the context of emerging economies. While the OLS model provides a broader viewpoint on the overall relationships, the Fixed Effects model highlights the specific impact of state tax rates within individual countries or years. This distinction is crucial for policymakers and investors seeking to understand the drivers of effective tax rates and tailor strategies accordingly.

This research design aims to provide refined understanding of how economic and institutional factors outline corporate tax planning and investment strategies in diverse global environments. Section 2 describes what is a tax haven country, the characteristics of tax haven countries and how they are correlated with the effective tax rates. Section 3 shows the building of our research design, the data we use and the models we use to get the results. Section 4 describes the results of the mean, standard deviation, and the correlation coefficients between the variables we use in this study. Finally, the OLS estimation results, the fixed effects estimation results and a comparison between the results of the estimations.

2. Tax Havens

2.1 What is a tax haven?

According to financial dictionaries and definitions by experts like Bistriceanu, (2001), nation or political entity that provides businesses and individuals with a tax environment of low or nonexistent taxation is known as tax haven. This may include lowering or avoiding taxes in the nation of residence of the investor. Bistriceanu, (2001) specifically highlights a tax haven as providing more favorable tax environment to non-residents compared to their country of residence.

In recent times, the term "fiscal paradise" has transformed into "offshore center"[1], commonly used in business field to refer to locations with favorable tax systems. Gravelle, (2022) in a report for the Tax Justice Network, differentiates between tax havens and offshore centers. Tax countries that create laws aimed at undermining other states' tax regimes. However, specialists such as bankers, solicitors and accountants who work in offshore financial centers enable anyone who want to use these regulations for tax purposes to do so.

2.2 Characteristics

Tax havens play an important role in designing effective tax rates for corporations in today's global economy. These jurisdictions, characterized by favorable tax climates and minimal taxation, offer opportunities for tax minimization, and influence the overall tax burden faced by taxpayers.

Dharmapala, (2023) states that tax havens are defined by several key characteristics, including low or zero taxation, lack of transparency, and a reluctance to provide information to foreign

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[1] Offshore center is a center where the bulk of financial sector activity is offshore on both sides of the balance sheet.

tax authorities. The OECD has developed primary listings of tax havens, initially outline in its publication (HARMFUL TAX COMPETITION An Emerging Global Issue, 1998). This report established criteria for identifying tax havens, emphasizing the lack of taxes or extremely low rates of effective taxes as a primary consideration. Specifically, jurisdictions with no or nominal taxes, especially if they cater to non-residents seeking to avoid taxes in their home countries, are considered tax havens. Moreover, tax havens frequently have regulations or administrative procedures that make it difficult for other governments to transmit pertinent tax data. Transparency is lacking in tax havens, and they typically do not require substantial economic activity to justify tax benefits, indicating a focus on attracting tax driven investments and transactions.

However, the criterion related to "no substantial activities" was later abandoned by the OECD in 2001 and formally withdrawn in its 2002 progress report. The OECD recognizes the right of jurisdictions to determine their own tax policies, including the imposition of direct taxes and setting appropriate tax rates.

Tax havens as discussed by Gravelle, (2022) and Tobin & Walsh, (2013) leverage their favorable tax systems and lack of transparency to attract corporations seeking to reduce their tax obligations. This application for tax havens can lead to lower reported incomes and profits in higher-tax authorities, consequently impacting ETRs for multinational corporations and high-net-worth individuals. They showcase that tax havens take advantage of the substantial cross-border movement of corporate investment and the corresponding tax base. The low tax rates offered by tax havens are likely to influence both the investment decisions and tax avoidance strategies of foreign investors. Extensive literature has documented the substantial effects of these low tax rates on investment and tax planning activities.

Dharmapala et al., (2006) discovered that the average level of wealth is higher than in non-havens. They are mostly well-governed and often have legal systems with British roots, with

many being dependent territories rather than fully sovereign states. Additionally, tax havens tend to have smaller populations and are more likely to be island nations, which contributes them to be more inclined towards economic openness.

Slemrod & Wilson, (2009) claim that tax havens increase or facilitate tax competition. This competition leads countries to lower their tax rates in order to attract investment, creating a phenomenon known as "race to the bottom", which ultimately reduces tax revenue in these counties.

In this paper, we focus on the study conducted by Fernández-Rodríguez et al., (2021) highlights the factors that influence the effective tax rate (ETR) in developing nations, with a particular emphasis on the BRICKS (Brazil, Russia, India, China, and South Africa) and MINT (Mexico, Indonesia, Nigeria, and Turkey) groups. This research takes into account both more recent variables like firm growth, earnings, management, and deferred tax as well as more established ones like size and debt. The study also looks at specific institutional components for each nation, such as GDP growth, institutional quality, level of development, index of economic freedom, and statutory tax rate.

According to Fernández-Rodríguez et al., (2021) emerging economies exhibit rapid economic growth in contrast to industrialized ones, along with ongoing processes of industrialization and internationalization. These elements combined with their perceived potential, make them attractive markets for investors and companies and that make them attractive as tax havens.

Tobin and Walsh, (2013) demonstrate that tax havens profit from the significant international mobility of business investment and its associated tax base to their advantage. The low tax rates offered by tax havens are likely to influence both the investment decisions and tax avoidance strategies of foreign investors. The significant effects of these low tax rates on investment and tax planning activities have been extensively established in the literature.

Overall, tax havens are characterized by minimal, or no taxation combined with significant limitations of sharing tax-related information with other countries. They provide avenues for minimizing taxes and ensuring financial confidentiality.

2.3 Effective Tax Rate in Tax Havens

Most countries typically complement reductions in statutory tax rates (STR) with expansions in the tax base to uphold tax revenue gathering. Therefore, it is suitable to examine the progress of the Effective Tax Rate (ETR) corporations, given that STR is not a valid measure of the amount of taxes. United States Government Accountability Office GAO, (2008) have noted a consistent decline in ETRs globally over the last 20 years. The correlation between tax havens and ETRs is evident in that study, which it highlights how income reporting locations correlate with ETRs the application of tax havens by U.S. taxpayers can significantly influence ETRs and tax planning strategies, underscoring the connection between tax havens and the broader tax landscape. By channeling income through tax havens, individuals and corporations can significantly reduce their ETRs, illustrating the impact of tax havens on tax planning strategies. The study of Slemrod & Wilson, (2009) shows the phenomenon of international tax competition, the countries lower their tax rates to attract investment. Tax havens intensify this competition by offering exceptionally low tax rates, influencing effective tax rates globally. Dharmapala, (2023) examines the characteristics and determinants of tax havens, clarifying on how these jurisdictions impact corporate taxation. The study explores the relationship between tax haven status and corporate tax rates, including their effect on ETRs.

Fonseca-Díaz et al., (2014) examine determinants of the corporate ETR in EU, including factors related to tax havens. The study highlights the impact of tax havens on ETRs, particularly in emerging European countries. These investigations underscore the importance

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of understanding how factors, like economic growth, institutional quality, and tax policy dynamics interact with the presence of tax havens to shape ETRs.

Shackelford & Shevlin, (2001) study covers various topics including the determinants of ETR. It provides insights into how tax havens affect ETRs based on empirical evidence from accounting research.

In recent years, there has been a notable increase in research on this are due the significance of ETR, as evidenced by comprehensive reviews conducted by Shackelford & Shevlin, (2001) , Hanlon & Heitzman, (2010), Graham et al., (2012), and Wilde & Wilson, (2018). The main goal of earlier studies in this field was to determine the factors that influence ETR. Although more recent business variables have been included. Size, leverage, asset structure, and profitability are the most occurring variables in the literature currently in publication.

Some studies delve into business factors determining ETR within specific geographical regions. Fernández Rodríguez & Martínez-Arias, (2011) considered the USA and the EU, Delgado et al., (2012) focused on the EU, and Miotto & Vilajoana Alejandre, (2019) covered the Eurozone. Fonseca-Díaz et al., (2014) examined a set of 63 nations worldwide and cited institutional characteristics as possible ETR determinants.

These studies collectively demonstrate how tax havens exert a substantial influence on ETRs through their facilitation of tax minimization and avoidance strategies. Understanding this relationship is crucial for policymakers, businesses, and individuals navigating the complexities of international taxation and striving to optimize their tax planning strategies in an increasingly globalized world.

3. Research Design

The relationship between effective tax rates and corporate investment decision has become a focal point of interest in international business and economic research. Effective tax rates, which encapsulate the overall tax burden faced by corporations in different jurisdictions, are influenced by a multitude of factors including economic growth, institutional quality, and tax policy dynamics. Understanding the determinants of ETRs is crucial for policymakers and multinational corporations seeking to optimize tax planning strategies and investment locations.

This research seeks to contribute to this discussion by investigating the institutional determinants and corporate factors that influence effective tax rates in developing economies. Specifically, our study aims to find out whether corporations are going to invest in countries with lower tax rate, while taking into account key economic, governance, and policy-related factors that shape tax outcomes. The investigation is guided by the work of Fernández-Rodríguez et al., (2021) , who explored similar subjects in the context of emerging economies. The study by Fernández-Rodríguez et al., (2021) underscores the importance of economic and institutional factors, such as GDP growth, corruption control, and economic freedom, in shaping effective tax rates across emerging markers. Building upon their insights, our research seeks to replicate and extend this analysis, focusing on a selected group of determinants including GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, and statutory tax rate. These variables might influence ETRs and investment decisions.

3.1 Data collection

For the purposes of the study, we gather data on effective tax rates for each of the 11 countries over the period 2010 to 2022. ETRs obtained by the World Bank Open Data and International Monetary Fund. The 11 countries are the following: Switzerland, Luxembourg, Cyprus, Bahamas, Hong Kong, Singapore, Cayman Islands, Netherlands, Macau, United Arab Emirates, and Germany. The chosen countries represent a diverse range of jurisdictions, including European Nations, Asian financial centers, Caribbean islands, and Middle East hubs. This diversity allows for a comprehensive analysis of effective tax rates across different regions with varying tax policies and economic structures. For these group of countries, we collected data from 2010-2022 (available data in that range of years) for the dependent variable of effective tax rate (ETR) and the following independent variables: GDP growth rate (GDPGR), corruption control (CORRCNTRL), economic freedom (ECONFREE), government effectiveness (GOVEFF), rule of law (RULELAW), regulatory quality (REGQUAL), and statutory tax rate (STR).

The GDP growth rate obtains annual GDP growth rates for the 11 countries and is expressed as the percentage change between year *t* and *t-1*. Moreover, corruption control use indices -2.5 (weak) up to 2.5 (strong) to measure corruption control or transparency. Economic freedom index ranges from 0 to 100, classifying countries into five categories. "Free" from 90 to 100 points, "mostly free" from 70 to 79.9 points, "moderately free" from 60 to 69.9, "mostly unfree" from 50 to 59.9 points and "repressed: from 0 to 49.9 points. Also, government effectiveness, which is a regulatory quality, ranges from -2.5 (weak) up to 2.5 (strong). Rule of law obtains indices reflecting the strength and reliability of legal frameworks and it ranges from -2.5 (weak) up to 2.5 (strong). Finally, the statutory tax rate, obtains data on the statutory corporate tax rates applicable in each of the 11 countries.

3.2 Model Specification

In our study we define the effective tax rate (ETR) is our dependent variable (Y) for the analysis. We use the collected economic and institutional variables (GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, and statutory tax rate) as independent variables (X).

We use the effective tax equation (1) based on the study of Fernández-Rodríguez et al., (2021). This equation offers a perspective on the business and factors influencing tax rates.

The general form of a panel date regression model can be represented as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + \alpha_i + e_{it} \qquad (1)$$

Y_{it} is the dependent variable of interest (effective tax rate) for country i at time t.

$\beta_0, \beta_1, \beta_2, \ldots, \beta_k$ are the coefficients to be estimated, representing the effects of the independent variables on the dependent variable

α_i is the country-specific fixed effect, capturing unobserved heterogeneity across countries that remains constant over time

e_{it} is the error term, representing random disturbances or unobservable factors affecting the dependent variable

3.3 OLS Estimation

We performed Ordinary Least Squares (OLS) regression (equation (2)) to estimate the relationship between the effective tax rate and the independent variables. Based on (Fernández-Rodríguez et al., 2021) study, we specify the model as:

$$ETR_{it} = \beta_o + \beta_1 GDPGR_{it} + \beta_2 CORRCNTRL_{it} + \beta_3 ECONFREE_{it} + \beta_4 GOVEFF_{it}$$
$$+ \beta_5 RULELAW_{it} + \beta_6 REGQUAL_{it} + \beta_7 STR_{it} + \varepsilon_{it} \qquad (2)$$

ETR_{it} is the Effective Tax Rate (ETR) for country i in year t. This is the dependent variable representing the overall tax burden faced by corporations in a specific country and year.

β_o is the intercept or constant term, it represents the baseline value of the effective tax rate when all independent variables are zero.

$\beta_0, \beta_1, \beta_2, \ldots, \beta_8$ are the coefficients corresponding to each independent variable

$\beta_1 GDPGR_{it}$ is the coefficient representing the effect of GDP growth rate on the effective tax rate. A positive coefficient suggests that higher GDP growth rates are associated with higher effective tax rates, all else being equal.

$\beta_2 CORRCNTRL_{it}$ is the coefficient representing the effect of corruption control (e.g., measured by an index) on the effective tax rate. A negative coefficient suggests that better corruption control is associated with lower effective tax rates.

$\beta_3 ECONFREE_{it}$ is the coefficient representing the effect of economic freedom on the effective tax rate. A negative coefficient implies that higher economic freedom is associated with lower effective tax rates.

$\beta_4 GOVEFF_{it}$ is the coefficient representing the effect of government effectiveness on the effective tax rate. A negative coefficient suggests that higher government effectiveness is associated with lower effective tax rates.

$\beta_5 RULELAW_{it}$ is the coefficient representing the effect of the rule of law on the effective tax rate. A negative coefficient indicates that a stronger rule of law is associated with lower effective tax rates.

$\beta_6 REGQUAL_{it}$ is the coefficient representing the effect of regulatory quality on the effective tax rate. A negative coefficient suggests that higher regulatory quality is associated with lower effective tax rates.

$\beta_7 STR_{it}$ is the coefficient representing the effect of the statutory corporate tax rate on the effective tax rate. A positive coefficient suggests that higher statutory tax rates lead to higher effective tax rates.

ε_{it} is the error term for country for country i in year t. This term captures unobserved factors and random variation that affect the effective tax rate but are not accounted for by the independent variables in the model.

We are expecting to get a coefficient table in which we get the estimated coefficients that represent the average change in the independent variable (ETR) associated with a one-unit increase in each of independent variable, holding other variables constant. Moreover, the table will show the standard error (std. error) which represents the standard deviation of the sampling distribution of the coefficient estimate. The t-value is the coefficient divided by its standard error, indicating the significance of each independent variables. Also, the p-value indicates the probability of observing the t-value if the null hypothesis is true. Finally, the 95% confidence interval provides the confidence interval for each coefficient, which gives a range of values that likely include the true coefficient with a specified level of confidence (95% in this case).

By estimating this regression equation using OLS with our dataset, we can assess the impact of GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, and statutory tax rate on effective tax rates across 11 countries from 2010 to 2022. The results will help identify which factors significantly influence effective tax rates and provide insights into the determinants of tax policy outcomes and investment decisions within these countries. In general, equation (2) presents the regression equation and estimated coefficients derived from the OLS analysis and it highlights the interpretation of coefficients and significance testing to assess the impact of independent variables on ETRs.

3.4 Fixed Effects Model

The fixed effects model extends the basic regression model by including country-specific fixed effects, which help account for unobserved heterogeneity across countries that might influence the effective tax rates (ETRs) and investment decisions. Based on (Fernández-Rodríguez et al., 2021) study, we specify the model as (equation (3)):

$$ETR_{it} = \alpha_i + \beta_o + \beta_1 GDPGR_{it} + \beta_2 CORRCNTRL_{it} + \beta_3 ECONFREE_{it} + \beta_4 GOVEFF_{it}$$
$$+ \beta_5 RULELAW_{it} + \beta_6 REGQUAL_{it} + \beta_7 STR_{it} + u_{it} \qquad (3)$$

ETR_{it} is the Effective Tax Rate (ETR) for country i in year t, which is the dependent variable.

α_i is the country-specific fixed effect for country i. This term captures the time-invariant characteristics of each country that affect the effective tax rate and investment decisions but remain constant over time.

$\beta_0, \beta_1, \beta_2, \dots, \beta_8$ are the coefficients corresponding to each independent variable (GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, statutory tax rate).

$GDPGR_{it}, CORRCNTRL_{it}, ECONFREE_{it}, GOVEFF_{it}, RULELAW_{it}, REGQUAL_{it}, STR_{it}$ are the independent variables representing the economic and institutional factors influencing ETRs for country i in year t.

u_{it} is the error term capturing unobserved factors and random variation affecting ETRs for country i in year t.

By incorporating country-specific fixed effects into the regression model, we can effectively control for unobserved heterogeneity across countries and obtain more precise estimates of the effects of GDP growth rate, corruption control, economic freedom, government effectiveness, rule of law, regulatory quality, and statutory tax rate on effective tax rates and investment decisions. The fixed effects model allows for a deeper understanding of how these factors influence tax policy outcomes within a diverse set of countries over time. In general, equation

(3) describes the incorporation of country-specific fixed effects into the regression equation to account the unobserved heterogeneity across countries. It discusses the role of fixed effects in providing more precise estimates of the effects of independent variables on ETRs.

3.5 Interpretation of the Results

The coefficient interpretation role is to analyze the estimates coefficients (β) to understand the impact of each independent variable on ETRs. Positive coefficients suggest a positive relationship between the variable and the ETRs and negative coefficients suggest a negative relationship. Moreover, we want to assess the statistical significance (p-values) of the coefficients to determine if the relationships are statistically significant. Also, we examine the fixed effects to understand how country-specific characteristics influence the effective tax rates beyond the effects of the independent variables. Finally, we want to analyze the implications of effective tax rates and other factors on investment decisions and determine which factors significantly affect investment behavior in the context of varying effective tax rates.

By conducting OLS estimation and fixed effects analysis using the specified model and dataset, we can gain valuable insights into the determinants of effective tax rate across 11 different countries and their implications for investment decisions. This approach allows us to assess the impact of economic and institutional factors on corporate tax planning and investment strategies withing emerging economies.

4 Results

4.1 Mean, Standard Deviation, Min, Max

STATA provided statistical measures help in understanding the central tendency, variability, and range of values within a dataset, providing insights into the distribution and characteristics of the data (Table 1).

Variable	Obs	Mean	Std. dev.	Min	Max
ETR	143	14.62706	10.57036	0	30.18
STR	143	11.58878	8.302545	0	25.8
GDPGR	143	2.140629	7.091129	-54.01	25.26
ECONFREE	143	76.9993	7.5198	61.1	90.6
CORRCNTRL	143	1.467063	0.567748	0.35	2.17
RULELAW	143	1.261189	0.5556958	0.02	1.99
GOVEFF	143	1.485245	0.4505768	0.41	2.28
REGQUAL	143	1.41958	0.5761124	-0.15	2.25

Table 1: Mean, Standard Deviation, Min, and Max of the variables

The data provided includes descriptive statistics for 8 variables across the countries and time periods, based on 143 observations. The mean is calculated by summing all values in the dataset and dividing by the number of observations in each case. The mean provides a measure of the "typical" value in the dataset. The standard deviation measures the dispersion of values around the mean. It indicates how much the values deviate from the average. A higher standard deviation suggests that the values are more spread out, while a lower standard deviation indicates that the values are closer to the mean.

The mean of ETR is 14.63% which is the percentage of the taxable income that is paid in taxes. STR's mean is 11.59% which represents the average official tax rate that entities have to pay before any changes on the tax rate. Moreover, the mean of GDPGR is 2.14% which is the annual growth rate of the countries during that period of time. The mean of ECONFREE has an average score of 77, which represents the degree of economy autonomy in the countries. The higher the score, the greater economic freedom, which in that case means that the countries we examined have a relatively high level of economic freedom. The mean of CORRCNTRL is 1.47. In general, the range of corruption control is from -2.5 to 2.5, meaning that countries with higher scores have stronger anti-corruption efforts while lower scores represent higher level of corruption. The score of 1.47 indicates that countries have a good control of corruption. Furthermore, the mean of RULELAW is 1.26 that indicates that the list of countries we have in our study have a strong rule of law. The rule of law ranges from -2.5 to 2.5 indicating that higher values mean stronger rule of law. The mean of GOVEFF is on average 1.49 which suggests that the countries have more effective governance because the range of the government effectiveness ranges from -2.5 to 2.5, with higher values representing more effective governments. The mean of REGQUAL is on average 1.42. Again, the range for that variable ranges from -2.5 to 2.5, with higher values suggesting better regulatory practices. That means that though the score of that variable, countries have good regulatory quality.

Following, standard deviation for each variable has a meaning. ETR's means essential differences between countries, STR's standard deviation shows the diversity of tax policies between the countries, GDPGR's shows fluctuations that indicate that some countries have higher growth rate while some others faced low growth periods. The standard deviation of ECONFREE indicates variation because of the higher and lower scores, CORRCNTRL's indicates that most of the countries have similar scores of corruption control, RULELAW's represents differences in how strong the rule is in the countries, GOVEEFF's shows that

countries have similar levels of government effectiveness and finally REGQUAL standard deviation indicates variability and differences between countries, but not extreme.

Overall, the values of the mean indicate an overall view of the general governance and economic conditions across the years examined and countries. The means suggest high levels of economic freedom and governance quality among the countries, with moderate levels of tax rates and economic growth.

Moreover, based on statistics for different countries across the variables, we get the following results (Table 2).

Countries	ETR	RULELAW	GOVEFF	REGQUAL	STR	ECONFREE	GDPGR	CORRCNTRL
Bahamas	0	0.3484615	0.6707692	0.18	0	66.76154	0.3715385	1.206154
Cayman Islands	0	0.7761538	1.189231	0.9846154	0	82.63846	2.684615	0.7969231
Cyprus	11.92308	0.8615385	1.070769	1.026923	11.92308	69.8	1.193077	0.7876923
Germany	30.06462	1.624615	1.505385	1.644615	15.825	73.22308	1.502308	1.807692
Hong Kong	16.5	1.598462	1.733077	1.936923	16.5	89.78461	2.363077	1.668462
Luxembourg	27.37846	1.784615	1.696923	1.75	20.62846	75.55385	2.883077	2.03
Macau	12	0.8	1.210769	1.611538	12	71.11538	2.231539	0.6476923
Netherlands	25.1	1.795385	1.787692	1.819231	25.1	75.46923	1.399231	1.950769
Singapore	17	1.765385	2.218462	2.089231	17	88.13077	4.328462	2.100769
Switzerland	20.93154	1.833077	1.956154	1.706154	8.5	81.64615	1.710769	2.031538
United Arab Emirates	0	0.6853846	1.298462	0.8661539	0	72.86923	2.879231	1.11
Total	14.62706	1.261189	1.485245	1.41958	11.58878	76.9993	2.140629	1.467063

Table 2: Summary statistics: Mean, Group Variable: Countries

The mean ETR varies significantly across countries, ranging from 0 to 30.06. Countries like Germany, Hong Kong, Luxembourg, and Switzerland have relatively higher mean ETRs compared to others. Bahamas, Cayman Islands, and United Arab Emirates have mean ETRs of 0, indicating potentially lower effective tax rates or tax incentives. The mean RULELAW index

ranges from 0.348 to 1.795. Singapore has the highest mean RULELAW index, indicating strong adhesion to the rule of law. Bahamas and Cayman Island have lower mean RULELAW indices compared to other countries. The mean GOVEFF index varies from 0.671 to 2.218. Singapore has the highest mean GOVEFF index, suggesting effective government performance. Countries like Bahamas and Cayman Islands have relatively lower mean indices. The mean REGQUAL index ranges from 0.18 to 2.089. Singapore has the highest mean REGQUAL index, indicating better regulatory quality. Bahamas and Cayman Islands have lower mean indices compared to other countries. The mean STR varies across countries, ranging from 0 to 25.1. Netherlands and Germany have relatively higher mean STRs compared to other countries. Bahamas, Cayman Islands, and United Arab Emirates have mean STRs to 0, suggesting potentially lower state tax rates or tax incentives. The mean ECONFREE index ranges from 66.76 to 89.78. Hong Kong has the highest mean index, indicating high economic freedom. Bahamas and Cyprus have relatively lower mean GDPGRs. The mean GDPGR index ranges from 0.37 to 4.33. Singapore has the highest mean index, suggesting higher economic growth, while Bahamas have the lowest between the chosen countries, which indicates low economic growth. The mean CORRCNTRL index ranges from 0.65 to 2.10. Singapore has the highest mean index, indicating better control of corruption. Bahamas, Cayman Islands have relatively lower mean indices.

These statistics provide insights into the diversity of economic, legal, regulatory, and governance characteristics across the represented countries. Countries exhibit notable differences in tax rates, legal environments, governance effectiveness, economic freedom, tax policies, corruption controls, and economic performance.

The following table, (table 3) shows the correlation coefficients between Effective Tax Rate (ETR) and the independent variables that are in Stata.

	ETR	STR	GDPGR	ECONFREE	CORRCNTRL	RULELAW	GOVEFF	REGQUAL
ETR	1							
	143							
STR	0.872	1						
	0							
	143	143						
GDPGR	0.0074	0.0243	1					
	0.9306	0.7732						
	143	143	143					
ECONFREE	0.1679	0.2229	0.0997	1				
	0.045	0.0075	0.2362					
	143	143	143	143				
CORRCNTRL	0.6979	0.5842	-0.0094	0.3929	1			
	0	0	0.9117	0				
	143	143	143	143	143			
RULELAW	0.8478	0.765	0.0143	0.5433	0.8469	1		
	0	0	0.8652	0	0			
	143	143	143	143	143	143		
GOVEFF	0.6124	0.5944	0.0769	0.6914	0.7605	0.898	1	
	0	0	0.3611	0	0	0		
	143	143	143	143	143	143	143	
REGQUAL	0.7392	0.7688	0.0196	0.6011	0.5985	0.8677	0.8674	1
	0	0	0.8161	0	0	0	0	
	143	143	143	143	143	143	143	143

Table 3: Correlation matrix between the variables

Table 3 is a correlation matrix, showing the correlation coefficients between different variables. Correlation coefficients range from -1 to 1, where: 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation. According to the results of the table, ETR has a strong positive correlation with STR, suggesting that countries with higher STR have higher ETR. ECONFREE, CORRCNTRL, RULELAW, GOVEFF, REGQUAL are positively correlated with each other, suggesting that these governance indicators tend to improve better. GDPGR has a weak positive and negative correlation with the variables, indicating that economic growth rates do not strongly correlate with the other variables in the dataset. These correlations are useful to understand the interdependencies between economic factors and the economic analysis.

4.2 OLS estimation results

ETR	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
STR	0.3232129	0.0635466	5.09	0	0.1975373	0.4488885
GDPGR	0.0697428	0.0364616	1.91	0.058	-0.002367	0.1418525
ECONFREE	-0.3400068	0.0515194	-6.6	0	-0.4418963	-0.2381173
CORRCNTRL	0.9531985	1.029299	0.93	0.356	-1.082439	2.988836
RULELAW	18.92591	1.742079	10.86	0	15.48062	22.37121
GOVEFF	-12.23038	1.836296	-6.66	0	-15.86201	-8.598757
REGQUAL	4.528257	1.402032	3.23	0.002	1.755468	7.301045
constant	23.38175	3.237983	7.22	0	16.97802	29.78549

Source	SS	df	MS
Model	14652.2183	7	2093.17405
Residual	1213.80278	135	8.99113174
Total	15866.0211	142	111.732543

Number of obs=	143
F(7, 135)=	232.8
Prob > F=	0
R-squared=	0.9235
Adj R-squared=	0.9195
Root MSE=	2.9985

Table 4: OLS Estimation Results

Table 4 represents the results of the Ordinary Least Squares (OLS) regression analysis. This table presents the results of a regression analysis with ETR (Effective Tax Rate) as the dependent variable and several independent variables: STR, GDPGR, ECONFREE, CORRCNTRL, RULELAW, GOVEFF, and REGQUAL. At least one of the independent variables has a significant impact on the dependent variable, as the entire model is statistically significant (Prob > F = 0.0000). With a coefficient determination (R-squared) is 0.9235, the independent variables in the model account for 92.35% of the variation in the

dependent variable (ETR). The number of the independent variables in the model is taken into account when calculating the adjusted R-squared, which come out to 0.9195. Furthermore, the F-statistic is 232.80 indicates a large ratio of model variance to residual variance. A larger F-statistic implies a stronger relationship between the independent variables and the dependent variable.

Each coefficient represents the effect of the corresponding independent variable on the dependent variable, holding other variables constant. Here's how you can interpret the coefficients: The coefficient of STR is 0.3232129 with a standard error of 0.0635466. It's statistically significant at the 1% level (P>|t| = 0.000), suggesting that the statutory tax rate has a significant positive linear relationship with the dependent variable. The coefficient of GDPGR is 0.0697428 with a standard error of 0.0364616. It's marginally significant at the 5% level (P>|t| = 0.058), suggesting that the GDP growth rate may have a positive linear relationship with the dependent variable, but this relationship is not as robust. ECONFREE coefficient is -0.3400068 with a standard error of 0.0515194. It's statistically significant at the 1% level (P>|t| = 0.000), suggesting that economic freedom has a significant negative linear relationship with the dependent variable. CORRCNTRL coefficient is 0.9531985 with a standard error of 1.029299. It's not statistically significant at conventional levels (P>|t| = 0.356), suggesting that control of corruption may not have a significant linear relationship with the dependent variable. RULELAW: The coefficient RULELAW is 18.92591 with a standard error of 1.742079. It's statistically significant at the 1% level (P>|t| = 0.000), suggesting that the rule of law has a significant positive linear relationship with the dependent variable. GOVEFF coefficient is -12.23038 with a standard error of 1.836296. It's statistically significant at the 1% level (P>|t| = 0.000), suggesting that government effectiveness has a significant negative linear relationship with the dependent variable. Finally, REGQUAL coefficient is 4.528257 with a standard error of 1.402032. It's statistically significant at the

1% level (P>|t| = 0.002), suggesting that regulatory quality has a significant positive linear relationship with the dependent variable. The intercept (constant) represents the estimated value of the dependent variable when all independent variables are zero. In this case, it's statistically significant at the 1% level (P>|t| = 0.000).

Overall, STR, ECONFREE, RULELAW, GOVEFF, and REGQUAL have statistically significant coefficients (P < 0.05), suggesting they have a significant impact on ETR. GDPGR has a coefficient with a P-value of approximately 0.058, indicating marginal significance (P < 0.1). CORRCNTRL's coefficient is not statistically significant (P > 0.05).

4.3 Fixed effects estimation

ETR	Coefficient	Std. err.	t	P>t	[95% conf.	interval]
STR	0.9856416	0.024203	40.72	0	0.9377408	1.033542
GDPGR	0.000218	0.002144	0.1	0.919	-0.0040253	0.0044613
ECONFREE	-0.0120727	0.0078542	-1.54	0.127	-0.0276171	0.0034716
CORRCNTRL	-0.0921507	0.1053767	-0.87	0.384	-0.3007043	0.1164029
RULELAW	0.337611	0.1826244	1.85	0.067	-0.0238254	0.6990474
GOVEFF	-0.1770167	0.1717746	-1.03	0.305	-0.5169799	0.1629465
REGQUAL	-0.0174572	0.1250299	-0.14	0.889	-0.2649068	0.2299924
constant	4.130904	0.7399975	5.58	0	2.666357	5.595451

Number of observations=	143
Number of groups =	11

sigma_u	5.467515
sigma_e	0.17229736
rho	0.99900792
F test that all u_i=0: F(10,125)=4076.25	Prob > F = 0.00

Obs per group:	
minimum=	13
average=	13
maximum =	13
F(7,125) =	289.53
Prob>F =	0

R-squared:	
Within =	0.9419
Between =	0.7635
Overall =	0.7641
corr(u_i,Xb)=	0.1947

Table 5: Fixed Effects Regression (Country-level analysis)

Table 5 represents the results of the Fixed effects regression based on the ETR with 143

observations and countries as the group variable (11 groups). Within R-squared is 0.9419,

which indicates that 94.19% of the variance in the dependent variable (ETR) is explained by the independent variables within each country. Between R-squared is 0.7635, which indicates that 76.35% of the variance in ETR is explained by differences between countries. Overall R-squared is 0.7641 which indicates the overall proportion of variance in ETR explained by the fixed-effects regression model.

F-statistic, where $F(7, 125) = 289.53$, Prob > F = 0.0000, indicates that the fixed-effects model is statistically significant, suggesting that at least one of the independent variables has a significant effect on the dependent variable. STR is highly significant positive effect on ETR ($p < 0.001$), GDPGR) is not statistically significant ($p = 0.919$). Moreover, ECONFREE is not statistically significant ($p = 0.127$), CORRCNTRL is not statistically significant ($p = 0.384$), RULELAW is not marginally significant ($p = 0.067$), GOVEFF is not statistically significant ($p = 0.305$), and REGQUAL is not statistically significant ($p = 0.889$).

F-test of group effects where, $F(10, 125) = 4076.25$, Prob > F = 0.0000 is highly significant, indicating significant differences in ETR among the countries.

The coefficient for STR is highly significant ($p < 0.001$) which indicates that variations in STR have a significant impact on ETR across different countries. Specifically, for every one-unit increase in STR, ETR increases by approximately 0.986 units.RULELAW has a marginally significant positive relation with ETR. The other variables do not show statistically significant effects on ETR at conventional significance levels (all p-values > 0.05). This suggests that differences in GDP Growth Rate, Economic Freedom, Control of Corruption, Government Effectiveness, and Regulatory Quality across countries do not have a significant impact on ETR in the fixed-effects regression model.

In general, the primary driver of variation in ETR among countries appears to be STR. Other factors examined, do not show significant effects on ETR in the fixed-effects regression model.

ETR	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
			28			
STR	0.3030125	0.0646964	4.68	0	0.1749501	0.431075
GDPGR	0.0969413	0.0441458	2.2	0.03	0.0095573	0.1843252
ECONFREE	-0.3793935	0.0543844	-6.98	0	-0.4870442	-0.2717428
CORRCNTRL	0.5073549	1.064548	0.48	0.634	-1.599853	2.614563
RULELAW	19.80844	1.786961	11.08	0	16.27126	23.34562
GOVEFF	-11.43975	1.94141	-5.89	0	-15.28265	-7.596848
REGQUAL	4.079167	1.453325	2.81	0.006	1.2024	6.955934
constant	25.59466	3.375628	7.58	0	18.91281	32.2765

Number of groups=	13
Number of observations=	143

sigma_u	0.89548571
sigma_e	3.0212837
rho	0.08075435
F test that all u_i=0: F(12,123)=0.83	Prob > F = 0.6183

Obs per group:	
minimum=	11
average=	11
maximum=	11
F(7,123)=	230.66
Prob > F=	0

R-squared:	
Within=	0.9292
Between=	0.6292
Overall=	0.9226
corr(u_i,Xb)=	-0.0972

Table 6: Fixed Effects Regression (Time-Series Analysis)

Table 6 represents the results of the Fixed effects regression based on the ETR with 143 observations and years as the group variable (13 groups). Within R-squared: 0.9292 indicates that 92.92% of the variance in the dependent variable (ETR) is explained by the independent

variables within each year. Between R-squared: 0.6292 indicates that 62.92% of the variance in ETR is explained by differences between years. Overall R-squared: 0.9226 indicates the overall proportion of variance in ETR explained by the fixed-effects regression model.

F-statistic where $F_{(7, 123)} = 230.66$, Prob > F = 0.0000 indicates that the fixed-effects model is statistically significant, suggesting that at least one of the independent variables has a significant effect on the dependent variable.

STR is highly significant positive effect on ETR ($p < 0.001$), GDPGR is marginally significant positive effect on ETR ($p = 0.030$), ECONFREE is highly significant negative effect on ETR ($p < 0.001$), CORRCNTRL is not statistically significant ($p = 0.634$). Moreover, RULELAW is highly significant positive effect on ETR ($p < 0.001$), GOVEFF is highly significant negative effect on ETR ($p < 0.001$), and REGQUAL) is marginally significant positive effect on ETR ($p = 0.006$). The constant term is highly significant ($p < 0.001$).

F-test of group effects, where $F_{(12, 123)} = 0.83$, Prob > F = 0.6183 is not statistically significant, suggesting that there are no significant differences in ETR among the years.

Overall, the analysis suggests that several factors, including STR, GDPGR, ECONFREE, RULELAW, GOVEFF, and REGQUAL, have significant effects on ETR across different years. However, CORRCNTRL does not show a significant effect on ETR in the fixed-effects regression model.

4.4 OLS vs. Fixed Effects

A comparison between the results of OLS estimation and the Fixed effects regression (Country-level analysis) for the variables in the relation of ETR is the following: OLS has an R-squared value of 0.9235, indicating that approximately 92.35% of the variance in ETR is explained by the independent variables included in the model. Fixed Effects Within R-

squared is slightly higher at 0.9419, indicating that 94.19% of the variance in ETR is explained by the independent variables within each country. The OLS model explains less variance between countries compared to the Fixed Effects model, as indicated by the Between R-squared of 0.7635.

The overall model of OLS is statistically significant (Prob > F = 0.0000) and the fixed-effects models are also statistically significant (Prob > F = 0.0000). Both OLS and Fixed Effects models show a statistically significant relationship between the independent variables and ETR.

In OLS estimation model, STR, ECONFREE, RULELAW, GOVEFF, and REGQUAL have statistically significant coefficients ($P < 0.05$). GDPGR has a marginal significance ($P < 0.1$), while CORRCNTRL's coefficient is not statistically significant ($P > 0.05$). In Fixed Effects estimation model STR is the only variable with a highly significant positive effect on ETR ($p < 0.001$). Other variables do not show statistically significant effects on ETR at conventional significance levels (all p-values > 0.05). OLS estimates show more variables with significant coefficients compared to Fixed Effects.

In OLS estimation model, each coefficient represents the change in ETR associated with a one-unit change in the independent variable, holding other variables constant. The Fixed Effects estimation model is similar to OLS but considering variation within each country or year rather than overall variation.

Both analyses suggest that several factors, including state tax rates, economic freedom, rule of law, government effectiveness, and regulatory quality, influence the effective tax rate. However, the Fixed Effects model emphasizes the importance of STR, while the OLS model indicates significant effects for a broader range of variables. The Fixed Effects model provides insights into the variation in ETR within each country or year, while the OLS model captures overall relationships between variables.

5 Conclusion

Tax havens, also known as fiscal paradises or offshore centers, offer minimal taxation and financial secrecy, shaping effective tax rates (ETRs) for corporations globally. They attract businesses seeking to minimize tax liabilities, contributing to international tax competition and reducing tax revenue for higher-tax jurisdictions.

Our research investigates the determinants of ETRs in emerging economies, focusing on a diverse group of 11 countries from 2010 to 2022. Building upon previous studies, particularly Fernández-Rodríguez et al., (2021) the study aims to understand how economic growth, governance quality, and tax policies shape ETRs and investment decisions. Data collection involves gathering ETRs and independent variables such as GDP growth rate, corruption control, economic freedom, and statutory tax rate.

The OLS regression reveals that STR, Economic Freedom, Government Effectiveness, Rule of Law, and Regulatory Quality significantly impact ETR. Specifically, higher STR and lower Economic Freedom and Government Effectiveness are associated with increased ETR. Meanwhile, stronger Rule of Law and Regulatory Quality correspond to lower ETR. However, the impact of GDP Growth Rate and Corruption Control on ETR is not statistically significant in the OLS model. In contrast, the Fixed Effects analysis highlights STR as the predominant factor influencing ETR variation among countries. Other variables such as Economic Freedom, Government Effectiveness, Rule of Law, and Regulatory Quality do not exhibit significant effects on ETR in this model. Notably, the Fixed Effects model emphasizes within-country variations in ETR, providing insights into the specific influences of STR within each country. Comparing the two models, OLS estimates demonstrate more significant coefficients across a broader range of variables, suggesting a comprehensive impact of multiple factors on ETR. Conversely, the Fixed Effects model underscores the singular importance of STR in driving ETR differences among countries. Both models contribute valuable insights into understanding

the complex relationship between tax policies, institutional factors, and investment decisions across diverse economic contexts.

Comparing the aims and findings of the study conducted by Fernández-Rodríguez et al., (2021) with our study, reveals intriguing similarities and differences in the analysis of corporate tax Both studies explore the determinants of ETRs, with the Fernández-Rodríguez et al., (2021) focusing on a broader range of business characteristics and institutional factors, while our study concentrates more on specific economic and governance indicators. Fernández-Rodríguez et al., (2021)emphasize the complexity of tax burden determinants, including both traditional business variables and newer institutional factors. In contrast, the our study provides a detailed analysis of specific variables like STR, Economic Freedom, and Regulatory Quality, highlighting their significant impact on ETRs. While both studies contribute valuable insights into the factors shaping ETRs, the our study provides a more focused analysis of the economic and governance variables influencing tax burden in emerging economies.

Overall, tax havens are countries with low or zero STR which lead with lower ETR. By exploiting low STR in tax havens which is significantly related to ETR, it can reduce ETR which lead to an attractive investment location for corporations.

Appendix A

Available data of 11 countries from 2020-2022[2]

Effective Tax Rate(ETR)													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cayman Islands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cyprus	10,00	10,00	10,00	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50
Germany	30,18	30,18	30,18	30,18	30,18	30,18	30,18	30,18	29,83	29,90	29,90	29,94	29,83
Hong Kong	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50
Luxembourg	28,59	28,80	28,80	29,22	29,22	29,22	29,22	27,08	26,01	24,94	24,94	24,94	24,94
Macau	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00
Netherlands	25,50	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,80
Singapore	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00
Switzerland	21,17	21,17	21,17	21,15	21,15	21,15	21,15	21,15	21,15	21,15	21,15	19,70	19,70
United Arab Emirates	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Statutory Tax Rate													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cayman Islands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cyprus	10,00	10,00	10,00	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50	12,50
Germany	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825	15,825
Hong Kong	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50	16,50
Luxembourg	21,84	22,05	22,05	22,47	22,47	22,47	22,47	20,33	19,26	18,19	18,19	18,19	18,19
Macau	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00	12,00

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[2] IMF/OECD [International Monetary Fund/Organisation for Economic Co-operation and Development], 2017. Tax Certainty IMF/OECD Report for the G20 Finance Ministers March 2017.

https://taxfoundation.org/data/all/global/corporate-tax-rates-by-country-2022/

https://github.com/TaxFoundation/worldwide-corporate-tax-rates/blob/master/source_data/RealGDPValues.xlsx

https://tradingeconomics.com/country-list/corporate-tax-rate?continent=g20

https://www.heritage.org/index/pages/about

Netherlands	25,50	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	25,80
Singapore	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00	17,00
Switzerland	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50	8,50
United Arab Emirates	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Regulatory Quality													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	0,55	0,52	0,39	0,19	0,17	0,15	0,24	0,11	0,17	-0,06	0,00	0,06	-0,15
Cayman Islands	1,16	1,14	1,10	1,11	0,85	0,80	0,77	0,74	0,97	0,97	1,05	1,05	1,09
Cyprus	1,42	1,23	1,12	0,91	1,09	1,05	1,04	1,02	0,86	1,00	0,99	0,85	0,77
Germany	1,57	1,55	1,53	1,54	1,70	1,71	1,81	1,77	1,76	1,71	1,58	1,63	1,52
Hong Kong	1,87	1,78	1,94	1,92	2,05	2,18	2,14	2,16	2,22	1,98	1,78	1,57	1,59
Luxembourg	1,67	1,86	1,76	1,77	1,63	1,65	1,71	1,68	1,75	1,69	1,84	1,91	1,83
Macau	1,35	1,33	1,35	1,34	1,73	1,76	1,77	1,75	1,61	1,62	1,74	1,78	1,82
Netherlands	1,73	1,80	1,75	1,76	1,76	1,79	1,96	2,04	2,01	1,85	1,75	1,74	1,71
Singapore	1,78	1,78	1,96	1,96	2,23	2,25	2,17	2,11	2,12	2,15	2,21	2,23	2,21
Switzerland	1,62	1,62	1,65	1,62	1,80	1,73	1,90	1,88	1,79	1,65	1,58	1,72	1,62
United Arab Emirates	0,32	0,45	0,67	0,77	0,99	1,10	0,96	1,00	0,92	0,97	1,07	1,01	1,03

GDP Growth Rate(GDPGR)													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	1,54	0,61	3,09	-2,95	0,74	0,60	0,45	0,07	1,57	1,80	-23,82	13,71	7,42
Cayman Islands	-2,70	1,20	1,20	1,30	3,50	3,80	4,00	3,60	3,90	3,60	3,90	3,60	4,00
Cyprus	2,01	0,40	-3,45	-6,55	-1,86	3,37	6,75	4,36	4,06	3,23	-4,98	5,51	2,66
Germany	4,18	3,92	0,42	0,43	2,23	1,74	2,23	2,47	1,53	0,56	-4,92	2,87	1,87
Hong Kong	6,77	4,81	1,70	3,10	2,76	2,39	2,17	3,79	2,86	-1,19	-6,50	6,42	1,64
Luxembourg	4,86	2,54	-0,35	3,65	4,30	4,31	4,57	1,80	3,11	2,30	-1,77	6,89	1,27
Macau	25,26	21,67	9,24	11,20	-1,20	-21,59	-0,72	9,89	5,44	-4,71	-54,01	17,99	10,55
Netherlands	1,34	1,55	-1,03	-0,13	1,42	1,96	2,19	2,91	2,60	1,81	-3,81	5,03	2,35
Singapore	14,53	6,34	4,46	4,84	3,94	2,99	3,24	4,34	3,44	0,73	-4,14	7,60	3,96
Switzerland	3,00	1,69	1,01	1,85	2,45	1,33	1,72	1,80	2,75	0,93	-2,52	3,72	2,51
United Arab Emirates	1,60	6,93	4,48	5,05	4,28	5,11	3,06	2,37	1,19	1,68	-6,13	2,29	5,52

Economic Freedom													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

Countries												
Bahamas	67,30	68,00	68,00	70,10	69,80	68,70	70,90	61,10	63,30	62,90	64,50	64,60	68,70
Cayman Islands	78,00	78,80	78,90	79,60	80,10	83,00	84,90	82,00	81,00	85,00	87,00	88,00	88,00
Cyprus	70,90	73,30	71,80	69,00	67,60	67,90	68,70	67,90	67,80	68,10	70,10	71,40	72,90
Germany	71,10	71,80	71,00	72,80	73,40	73,80	74,40	73,80	74,20	73,50	73,50	72,50	76,10
Hong Kong		89,70	89,90	89,30	90,10	89,60	88,60	89,80	90,20	90,20	89,10		
Luxembourg	75,40	76,20	74,50	74,20	74,20	73,20	73,90	75,90	76,40	75,90	75,80	76,00	80,60
Macau	72,50	73,10	71,80	71,70	71,30	70,30	70,10	70,70	70,90	71,00	70,30		
Netherlands	75,00	74,70	73,30	73,50	74,20	73,70	74,60	75,80	76,20	76,80	77,00	76,80	79,50
Singapore	86,10	87,20	87,50	88,00	89,40	89,40	87,80	88,60	88,80	89,40	89,40	89,70	84,40
Switzerland	81,10	81,90	81,10	81,00	81,60	80,50	81,00	81,50	81,70	81,90	82,00	81,90	84,20
United Arab Emirates	67,30	67,80	69,30	71,10	71,40	72,40	72,60	76,90	77,60	77,60	76,20	76,90	70,20

Corruption													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	1,35	1,35	1,32	1,33	1,31	1,10	1,07	1,13	1,10	1,10	1,11	1,15	1,26
Cayman Islands	1,12	1,34	1,35	1,35	1,01	0,97	0,48	0,48	0,46	0,43	0,44	0,47	0,46
Cyprus	0,97	0,86	1,24	1,24	1,07	0,97	0,79	0,75	0,61	0,60	0,35	0,37	0,42
Germany	1,77	1,74	1,82	1,80	1,81	1,78	1,78	1,80	1,90	1,87	1,83	1,78	1,82
Hong Kong	1,95	1,85	1,73	1,64	1,62	1,61	1,52	1,57	1,64	1,65	1,62	1,68	1,61
Luxembourg	2,04	2,15	2,11	2,12	2,07	2,05	2,05	1,94	2,05	2,07	2,02	1,84	1,88
Macau	0,41	0,43	0,42	0,55	0,84	0,57	0,79	0,60	0,68	0,67	0,77	0,82	0,87
Netherlands	2,09	2,08	2,09	2,02	1,96	1,83	1,86	1,75	1,89	1,87	2,00	2,00	1,92
Singapore	2,17	2,10	2,12	2,07	2,07	2,05	2,04	2,09	2,13	2,12	2,12	2,14	2,09
Switzerland	2,06	2,03	2,14	2,12	2,15	2,09	1,94	1,94	1,97	1,95	2,05	1,96	2,01
United Arab Emirates	0,89	1,07	1,16	1,27	1,20	1,03	1,13	1,10	1,12	1,07	1,08	1,15	1,16

Rule of Law													
Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bahamas	0,72	0,61	0,61	0,63	0,66	0,57	0,23	0,16	0,07	0,05	0,02	0,07	0,13
Cayman Islands	0,89	0,88	0,89	0,90	0,59	0,78	0,76	0,74	0,74	0,73	0,73	0,74	0,72
Cyprus	1,21	1,07	1,09	1,03	1,07	1,01	0,69	0,85	0,72	0,73	0,55	0,61	0,57
Germany	1,64	1,62	1,67	1,64	1,85	1,76	1,58	1,57	1,59	1,58	1,52	1,57	1,53
Hong Kong	1,54	1,55	1,57	1,57	1,86	1,79	1,68	1,68	1,73	1,57	1,55	1,41	1,28
Luxembourg	1,84	1,82	1,79	1,81	1,90	1,84	1,72	1,70	1,77	1,75	1,74	1,75	1,77
Macau	0,72	0,69	0,65	0,64	0,95	0,89	0,82	0,81	0,97	0,88	0,81	0,78	0,79

Netherlands	1,81	1,81	1,85	1,83	1,97	1,91	1,85	1,76	1,74	1,74	1,71	1,70	1,66
Singapore	1,62	1,66	1,72	1,70	1,82	1,78	1,79	1,78	1,80	1,84	1,84	1,82	1,78
Switzerland	1,75	1,72	1,81	1,80	1,99	1,91	1,91	1,89	1,89	1,86	1,78	1,77	1,75
United Arab Emirates	0,32	0,50	0,53	0,61	0,65	0,61	0,82	0,77	0,77	0,81	0,88	0,80	0,84

Government Effectivness													
Countries	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Bahamas	1,07	0,97	0,98	0,87	0,73	0,68	0,68	0,54	0,50	0,45	0,41	0,42	0,42
Cayman Islands	1,25	1,24	1,25	1,22	1,18	1,13	1,14	1,18	1,16	1,13	1,08	1,24	1,26
Cyprus	1,53	1,56	1,38	1,36	1,14	1,02	0,93	0,89	0,88	0,96	0,84	0,70	0,73
Germany	1,52	1,50	1,53	1,51	1,67	1,66	1,66	1,61	1,52	1,50	1,31	1,29	1,29
Hong Kong	1,68	1,64	1,83	1,74	1,83	1,88	1,80	1,86	1,86	1,71	1,62	1,49	1,59
Luxembourg	1,72	1,74	1,66	1,62	1,65	1,69	1,66	1,64	1,74	1,70	1,79	1,68	1,77
Macau	1,35	1,33	1,09	1,06	1,46	1,41	1,14	1,34	1,16	1,13	1,08	1,08	1,11
Netherlands	1,77	1,82	1,84	1,81	1,84	1,83	1,82	1,81	1,81	1,77	1,81	1,73	1,58
Singapore	2,28	2,19	2,20	2,13	2,22	2,25	2,21	2,23	2,23	2,23	2,28	2,25	2,14
Switzerland	1,87	1,86	1,88	1,82	2,11	1,97	1,97	2,02	2,00	1,92	1,97	1,99	2,05
United Arab Emirates	0,92	1,07	1,16	1,19	1,45	1,50	1,41	1,41	1,43	1,38	1,29	1,37	1,30

Appendix B

Descriptions

ETR	Effective tax rate measures the overall tax burden faced by corporations, considering deductions, credits, and other tax strategies. Crucial for assessing tax competitiveness, investment decisions and government revenue.
CORRCNTRL	Corruption control measures anti-corruption efforts and governance transparency. It can be measured on a scale from -2.5 to +2.5. Higher scores represent stronger anti-corruption efforts, and lower scores suggest higher level of corruption and less transparency.
GOVEFF	Government Effectiveness is the efficiency of government institutions and service delivery. Is typically measured on a scale from -2.5 to +2.5. Higher scores represent more efficient government institutions and service delivery. Lower scores suggest inefficiencies and challenges in governance.
REGQUAL	Regulatory Quality is the effectiveness of government institutions and service delivery. Is usually measured on a scale from -2.5 to +2.5. Higher scores represent more effective regulations that promote market competition. Lower scores suggest poor regulatory quality and potential barriers to market entry competition.
RULELAW	Rule of Law is the strength and impartiality of legal systems. Higher scores indicate stronger and more impartial legal systems. Lower scores suggest weaker rule of law and potential biases in legal proceedings.
STR	Statutory tax rate is the official tax rate before deductions or adjustments. Is typically expressed as a percentage.

ECONFREE	Economic freedom is the degree of government institutions and service delivery. Is usually measured on a scale from 0 to 100. Higher values reflect greater economic freedom with less government intervention. Lower values indicate more government control over economic activities.
GDPGR	GDP growth rate is the annual change in GDP, indicating economic performance. Positive values indicate economic growth and negative values indicate economic contraction.
Mean	The mean (or average) represents the central tendency of a dataset. It is calculated by summing all values in the dataset and dividing by the number of observations. The mean provides a measure of the "typical" value in the dataset. The mean values of independent variables provide a snapshot of the economic, institutional, and regulatory conditions in the selected countries. They serve as benchmarks for comparison and analysis.
Standard Deviation	The standard deviation measures the dispersion or spread of values around the mean. It indicates how much the values deviate from the average. A higher standard deviation suggests that the values are more spread out, while a lower standard deviation indicates that the values are closer to the mean.
Min	Indicates the smallest observed value.
Max	Indicates the largest observed value.
cons	Constant term that represents the intercept of the regression equation.
SS	The sum of squares is the measure of the total variability explained by the regression model or the variability left unexplained by the model. It

	represents the sum of the squared differences between the observed values of the dependent variable and the values predicted by the regression model.
df	Degrees of freedom represent the number of independent pieces of information in a sample that are available to estimate a parameter or test a hypothesis. df regression: This is the degrees of freedom associated with the regression model and is equal to the number of independent variables (excluding the intercept) used in the model. df residual: This is the degrees of freedom associated with the residuals (error terms) and is equal to the total number of observations minus the number of parameters estimated in the regression model (including the intercept).
MS	Mean squares are obtained by dividing the sum of squares by the corresponding degrees of freedom MS regression: this is the mean squares associated with the regression model and represents the explained variance per degree of freedom. MS residual: this is the mean squares associated with the residuals (unexplained variance) and represents the unexplained variance per degree of freedom.
sigma_u	Standard deviation of the random effects (country-level, or year-year)
sigma_e	Standard deviation of the residuals.
rho	Intra-class correlation coefficient, indicating the fraction of variance in ETR due to differences between countries.

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