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International Bachelor of Economics and Business Economics

Analysing the Impact of the 2018 French Tax Reforms on Investment Behavior

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Introduction

As Nobel laureate Milton Friedman put it, 'The only way to reduce taxes is to reduce spending.' This raises the question of what happens when a country like France adopts a different approach. In 2018, the French government developed a landmark fiscal reform aimed at jumpstarting the country's economy by introducing a flat tax system. This thesis analyses the effects of this reform on investment behaviour in France relative to other EU countries and what options governments have to maximize tax revenue while attracting more investments to their capital markets.

For a country to introduce a major overhaul in its tax policy, understanding how taxes influence investment behaviour is crucial. Shackelford and Verrecchia (2002) also demonstrate that tax incentives can influence both share prices and trading volume around public disclosures of tax changes. In particular, they establish that tax incentives, notably capital gains tax rate cuts, can lead to bigger trading volumes as investors rebalance their portfolios in search of tax efficiency. Hence, it would mean that well-designed tax policies can stimulate market activity and probably improve the overall investment level.

This paper will further contribute to this literature by analysing tax reform in France. In the analysis, we benchmark investment behaviour in France against that in Belgium, Germany, Denmark, Ireland, Spain, Italy, Austria, Sweden, United Kingdom and The Netherlands. The research is more robust since it includes a wide range of economic structures and conditions from other EU nations, providing a comprehensive understanding of how diverse economic situations relate to the French tax changes. Moreover adding these ten control countries will help alleviate any small sample problems.

Our main research question is:

How did the 2018 French tax reforms, especially the initiation of the fixed tax on dividends and capital gains, change the investment behaviour in France compared to other Western European countries?

In order to comprehensively answer the main research question we will address three specific sub-questions.

The sub-questions are formulated next:

1. How did the portfolio investments in France change following the 2018 tax reforms?

2. What role did macroeconomic variables (e.g., GDP growth, interest rates, inflation) play in mediating the effects of the 2018 tax reforms on investment behaviour?

3. How do changes in the volume of portfolio investments in France compare to those observed in similar EU countries that did not undertake similar reforms at the same time?

The first sub-question, analyses changes in portfolio investments. These are direct indicators of investor behaviour and market confidence post-reform (Poterba, 2002). The choice to analyze portfolio investments is relevant for analyzing the impact of the French tax reforms for several reasons. First, the reforms focus more on portfolio investments, making them more susceptible to this policy change (Poterba and Samwick, 2003). Second, portfolio assets such as stocks, bonds and ETFs are very liquid and volatile, allowing for fast insight into the impact of tax reforms (Poterba, 2002).

The second sub-question investigates the role of macroeconomic variables such as GDP growth, interest rates and inflation. Considering how these factors interact with the tax changes will help understand the reforms and distinguish their specific effects on investment behaviour from broader economic developments. For example, Bernanke and Gertler (1995) discuss how interest rates affect investment decisions by influencing the cost of borrowing and the return on savings.

The third subquestion refers to a comparison with other EU countries. It contrasts the French reforms to similar EU countries that did not carry out such reforms and therefore provides a counterfactual benchmark to isolate the effects of the French reforms. In this respect, the

comparison, based on the Difference-in-Difference (DiD) methodology, is crucial for causal inferences.

Relevance

The centrepiece of the French reforms is the PFU "Prélèvement Forfaitaire Unique" or flat tax, essentially setting the tax rate on capital gains, dividends, and other financial income to a flat 30%. Paquier and Sicsic (2022), studied the impact of this tax reform on income inequality and public finances via a microsimulation model. To do so, the Difference-In-Difference (DiD) approach was used to compare changes in investment patterns in France with other Western European control countries. The focus of this research thesis remains on the impact of the reforms on portfolio investment position in France to other Western European countries.

Tax reforms, especially in the form of dividend and capital gains tax policies, have greatly impacted investor behaviour and market dynamics both at the domestic and international levels (Auerbach & Hassett, 2003). Tax reforms under the government of President Emmanuel Macron (2017-) which still stand to this day were designed to simplify the tax system and make the French financial market more attractive to investors (Fíonta & Fíonta, 2023). These measures cut the tax burden on dividends and capital gains to spur investment (Guceri & Albinowski, 2021). Considering the above, policymakers have to carefully examine tax policy changes and find out how such reforms are influencing economic growth and stability.

Some critics of the 2018 reform concluded that wealthier individuals, who were previously taxed at up to 45% on dividend income and capital gains, benefited the most from the new reform (PWC, 2023.). Thus unlike (capital) income tax in most countries, this tax is not a progressive tax system where higher incomes are taxed more heavily. However, a choice was given to people who were negatively impacted by the new tax system to opt for the original progressive tax system (PWC, 2023). To counterbalance losses to public finances resulting from this tax shift, the government imposed a solidarity tax' (prélèvement de solidarité) of 7.5% on all dividends and capital gains.

Previous studies of U.S. investor asset placement choices by asset and account type indicate that very few investors allocate their portfolios differently between their taxable and tax-deferred accounts (Poterba, 2002). Poterba took this as an indication that investors may not be responsive— or at least not highly responsive — to tax incentives for asset location decisions, which would temper the effectiveness of tax reform designed to influence them. Research by De Mooij and Ederveen (2003) synthesizes empirical findings about taxation and foreign direct investment, proving that while tax policy may have an impact on investment decisions, the magnitude of these effects could be very different across regions and sectors. While the initial findings from research based in the United States suggest limited responsiveness to tax incentives in asset location, a broader literature would suggest that this impact could be time and context-dependent. Such differences also extend to argue for more research focused on European investors' reactions to tax reforms, since the makeup of the U.S. market is not at all similar to that of European markets (De Mooij & Ederveen, 2003; Guceri & Liu, 2019).

Diamond and Saez (2011) emphasise the empirical fact that the different forms of capital can, in practice, be difficult to identify. This complexity can thus give rise to issues for tax policies and their implementation. Once again, the French reforms eliminated classification errors and reduced administrative burdens, both mostly in line with Diamond and Saez's (2011) belief that we must tax capital income. This thesis is in line with Diamond and Saez (2011) who proposed a reorganisation of capital tax regulations. Their research provides strong support for the analysis in this study. To provide some suggestions for how one might use the implications of the prélèvement forfaitaire unique (PFU) to help facilitate better tax policy in general and to move theory somewhat closer to practice.

Moreover, the reduction of taxes levied on capital gains and dividends reduces government revenues. This is a direct impact or reduction of taxes levied on financial income and capital gains. The central question that will challenge governments is the impact of such short-term revenues, against longer-term improvements in economic activity. Paquier and Sicsic (2022) have carefully analyzed such dynamics and found that the initial losses could be compensated

by the broader economic effects of the reforms, which, in the long run, can balance and even outweigh the primary losses from tax cuts. The increased investments of firms and households can broaden the tax base and result in greater taxes due to increased activity. The results of this thesis will help make practical recommendations for future tax policy design, such as implementing tax cuts gradually to reduce short-term revenue losses to the greatest extent possible. In addition to tax measures, consider implementing complementary policies to stimulate productivity. All of these can help ensure that fiscal stability is maintained while implementing a tax reform that achieves its intended goal.

Insights from researchers such as Paquier and Sicsic (2022), Diamond and Saez (2011) and Poterba (2002) may be helpful for the administration to address policy adjustments and alignments in a way to ensure that fiscal policies are indeed contributing effectively towards long-term economic goals. Therefore, the long-term implications of tax reforms on fiscal sustainability and economic competitiveness are vital to assure policy continuity and financial stability.

Theoretical Background

A theoretical framework will help establish the structural foundation for understanding the impact of 2018 French tax reforms on investment in France compared to other European Union countries. It combines economic theories and empirical evidence to provide a sound basis for analyzing investment decisions in the context of a flat tax on dividends and capital gains. The following sub-sections outline the main aspects of the theoretical framework: theories of capital gains and dividend taxes, behavioural responses to taxation, the macroeconomic setting of the analysis, and related empirical evidence and methodologies.

This analysis will use the main economic theories that explain the interaction between taxes and investment. The main theories underpinning this research include behavioural responses to taxation (Feldstein, 1995) and tax advantages of reforms (Modigliani & Miller, 1958).

<u>Behavioural Response to Taxation</u>

Feldstein's (1995) theory of taxable income explains how individuals react to tax increases to maximize after-tax income. He found that marginal tax rate changes have a major impact on taxable income. This thesis tries to empirically test if reducing the tax liability has indeed caused an increased level of portfolio investments. Correspondingly, a reduction in the tax rate for capital gains and dividends would increase, according to Feldstein (1995) the after-tax return to investors, thereby rendering them more attractive. In such a case, this higher attractiveness will increase investment activity as investors rebalance their portfolios to capture maximum after-tax return, thereby raising the general level of portfolio investments. In his study, Feldstein (1995) derived a large elasticity of taxable income concerning the marginal net-of-tax rate. He used a panel from the Treasury Department, which comprised more than 4,000 taxpayers, and from there compared the tax returns of the participants before and after the 1986 tax reform. More precisely, Feldstein obtained an elasticity over 1%, which implied that a one-percentage-point decline in the marginal tax rate could generate an increase in the taxable income of more than 1%. This finding is insightful in terms of the potential impact of the 2018 French tax reforms. It only goes to show that taxpayers have a strong behavioural response to different tax rates. In this regard, Feldstein's findings suggest that reducing tax liability can result in a significant increase in declared income and investment activity, lending support to the hypothesis that lower tax rates can stimulate economic growth.

Furthermore, Feldstein's (1995) research revealed that the tax policy design was quite complex. The research found that due to behavioural response to tax rate reductions, especially through income shifting, increased tax evasion, and changes in work and investment incentives, would reduce expected tax revenues. They tend to lower reported taxable income and open up new tax law loopholes, leading to lower tax revenues compared to projected numbers.

Hall and Jorgenson (1967) provide a theoretical framework that studies the influence of tax policy on investment behaviour. When tax policy changes affect depreciation allowances or investment tax credits, the cost of capital changes, which in turn affects the firm's investment decisions. This is because lower costs of capital make more investment projects viable,

resulting in increased capital spending. More than that, well-designed tax policies further boost economic growth by creating higher levels of investment, and increasing productivity and output. Moreover, Hall and Jorgenson (1967) found that well-designed tax policies could enhance economic growth and facilitate comparisons of the effectiveness in different financial situations.

Tax Advantages of Reforms

In this section of the theoretical background, we discuss how taxes affect the valuation of assets such as stocks, as well as the resulting effects on cash flows generated by these assets, such as dividends. The value of holding financial assets goes up with any reduction in taxes on dividends and capital gains (Modigliani & Miller, 1958). This theory could be used to understand the prospective financial revaluation of investment portfolios that may be encountered following the declaration of the tax revisions. Moreover, selling assets below their purchase price before the end of the fiscal year might increase after-tax income because of the tax loss harvesting strategy that allows investors to offset capital gains with capital losses, reducing in this way their taxable income (Modigliani & Miller, 1958).

Auerbach and Slemrod (1997) explain the effect capital gains tax rates have on the level of equity trading volumes. Using rich market data based on detailed transaction records, stock prices, and trading volumes gathered over several years from the major stock exchanges, they demonstrate how capital gains tax rate cuts increase trading activity and boost market liquidity. This paper gives a good basis for investigating the recent 2018 French tax reforms because of Auerbach and Slemrod's (1997) similar research on the economic effects of capital gains tax reforms on equity trading and market liquidity. We hypothesize that reduced capital gains tax rates will increase trading volumes and market liquidity for France. This hypothesis will be tested with the DiD approach, compared to other Western European countries. There are significant findings in this light that suggest individual trading volumes, and market activity might increase with overall market activity due to the lower tax rates introduced by the French reforms, thereby supporting the hypothesis that investment behaviour is driven by tax policy. Another study by Ivković, Poterba, and Weisbenner (2005) established that the impact of tax

policies is profound on trading behaviour and the portfolio rebalancing strategy. Their research on tax-motivated trading provides concrete empirical evidence of the individual investors' decision to alter their trading patterns to reduce tax liabilities. Based on this paper, we hypothesize that tax policy changes lead to significant changes in portfolio investment volume by individual investors. To verify this hypothesis, we will compare the portfolio volume of French investors before and after the tax reforms. In understanding these behavioural responses, the purpose of this paper lies, i.e., it helps us evaluate the effectiveness of the tax reforms.

Data

Data sources

The primary data source for this analysis is the "International investment position - quarterly and annual data (BPM6)" from Eurostat which aggregates data from EU members. For this analysis, data from the first quarter of 2005 until the fourth quarter of 2023 will be used. The unit of time for all dependent, independent and control variables are based on quarterly data. The year 2005 was used as the starting year for the study since this was the first year in which France and all the control countries provided significant complete data regarding the Portfolio Investment positions and control variables.

Dependent variable

Portfolio investment position is defined as the net holding of securities and other financial assets in a country (Eurostat, 2023). Portfolio investment position is relevant because it indicates the attractiveness of a country for foreign portfolio investors. A positive portfolio investment position will mean the country has a net inflow while a negative position means a net outflow. We will study how the changes in the Portfolio Investment Position determine whether the tax reform has made France more or less attractive to portfolio investors.

Independent variable

The independent variables used in this study are *post, treatment*, and *post * treatment*. Post is a dummy equal to 1 for the period after the 2018 tax reform and 0 otherwise. It picks up the time effect of the reform period across all countries in the sample.

Treatment is a dummy variable which is equal to 1 for France and 0 for all other Western European control countries. This will pick up the country-specific effect, therefore isolating France from all the rest.

Finally, the interaction term of *post * treatment* between post and treatment is the key variable in this DiD analysis. It takes the value 1 for France in the periods following reform and 0 otherwise. The variable thus picks up a difference stemming from the French tax reform in comparison to the control group. A significant coefficient on post * treatment would hence indicate that the tax reform had some peculiar effect on the investment position of France relative to other countries.

Control variables

In this paper, the impact of the French tax reform of 2018 on investment position will be isolated, and the factors which may have other influences need control. The control variables included here are Real GDP per Capita, Unemployment Rate, and Interest Rate. These variables account for independent conditions of macroeconomics, which might influence investment decisions, regardless of the tax reforms.

Eurostat also provides the necessary data on control variables real GDP per capita and unemployment rates. For data on short-term interest rates, we used the OECD database. Except for real GDP per capita, all data points for the independent variable as well as the control variables are available for each quarter from the first quarter of 2005 onwards to the fourth quarter of 2023.

Real GDP per capita, is the average amount of economic output per person and can be viewed as an all-in-one indicator of economic prosperity. A higher GDP per capita, generally speaking, depicts a richer economy, which might attract more foreign investment because of the presence of better market potential and stability (Alfaro et al., 2004). Moreover, utilising real GDP per capita will account for inflation and give a more accurate comparison over time when controlling for price changes. Using this control accounts for the overall economic health and growth of the countries in the sample. Economic growth plays an important role in investment behaviour. According to Barro (1991), there is empirical evidence of a positive relationship between GDP growth and investment. The rationale behind controlling real GDP growth is that if there is any observed variation in investment behaviour, that should be because of tax reforms and not just because of economic trends.

Controlling unemployment is essential because it significantly impacts consumer confidence and spending, which influences investment growth (Ganong and Noel, 2019). High unemployment rates would depress household incomes and aggregate demand, triggering reduced investment activity. When high unemployment rates, investor confidence tends to wane, leading to lower stock prices and reduced market liquidity, further dampening investment (Aghion et al., 2010). Finally, with the unemployment rate as a control variable, we are better placed to pick up any changes in economic conditions that may influence investment behaviours.

Interest rates, on the other hand, affect the cost of borrowing as well as the earnings in saving and hence play a crucial role during investment. Reduced interest rates would, generally, increase the investment in equities and real estate (Bernanke and Gertler, 1995). However, in academic papers, the exact effects of these fluctuations of interest rates on investment have long been questioned, and if these are significant. However, it remains important to account for these factors. By including interest rate effects, we can net out monetary policy conditions that impact investment decisions.

A major correlation between these control variables can lead to problems in the estimation. To test this we included the correlation between these control variables in Table 1 below.

Table 1

Table 1: Control variables correlation

	Real GDP per capita	Unemployment rate	Interest rate
Real GDP per capita	1.000		
Unemployment rate	-0.4941	1.000	
Interest rate	-0.0883	-0.1736	1.000

Note: The correlation matrix shows moderate correlation between Real GDP per Capita, Unemployment Rate and Interest rate.

The correlations shown in Table 1 are not high enough to suggest severe multicollinearity. The strongest relation is that between Real GDP per Capita and the Unemployment Rate, which is -0.4941, a correlation of moderate degree. The higher the GDP per capita, the lower the unemployment rate. This makes intuitive sense, as a growing economy usually correlates with lower unemployment. These results thus increase our confidence in the control variables and decrease the probability of multicollinearity being present.

Summary statistics

Table 2 provides the summary statistics of the data set's key dependent and independent variables. The table is divided into two parts with the first being the mean, minimum and maximum of the untreated observations (European control countries). The second part of the table has the same descriptive statistics for the treated country France. Appendix 1 shows the combined summary statistics of all observations.

Table 2

Table 2: Summarize statistics

Treatment = 0	Obs	Mean	Std. dev.	Min	Max
Portfolio Investment	738	-219102	328896.5	-1101694	701500
Real GDP per capita	735	36426.24	9028.34	21850	77430
Unemployment rate	730	7.822055	4.186023	2.8	26.7
Interest rate	750	1.115733	1.688386	-.8	6.4
Treatment = 1					
Portfolio Investment	75	-583349	353496.8	-1130702	131074
Real GDP per capita	75	31608.93	950.8795	30250	33290
Unemployment rate	75	8.928	1.085352	6.8	11
Interest rate	75	1.024	1.638378	-.6	5

Note: The following table presents the summary statistics for the key variables used in the analysis. Portfolio investment position is the net holding of securities and financial assets minus liabilities in millions of euros. Real GDP per capita measures the average economic output per person adjusted for inflation. The unemployment rate is the percentage of the labour force which is unemployed. Interest Rate indicates the cost of borrowing and returns on savings. Post is a dummy variable equal to 1 for the period after the 2018 tax reform and 0 otherwise.

The average Portfolio Investment Position for the control group is -219,102 indicating that on average, countries in this group face a net outflow of portfolio investments. Hence, foreign investors have more net financial assets in these nations compared to the number of domestic investors who hold such investments abroad. For France, the mean portfolio investment position is way lower at -583,349. This large net outflow of France suggests a relative decline in portfolio investments compared to the control group.

The mean real GDP per capita stands at 35,980.2, which portrays a sense of general economic prosperity across the included countries. The range, a minimum of 20,000 and a maximum of 77,430 indicates that there is economic diversity in the sample: on one hand, those economies are less well off, and on the other, those that are very developed. The unemployment rate reflects fundamentally how good or bad the labour market condition is. The sample average of unemployment rates stands at 7.93, being the percentage of the labour force that is unemployed and actively searching for employment. The significant range in the unemployment rate, from a minimum of 3.0% in Germany to a maximum of 26.7% in Spain, indicates that there are major discrepancies in labour market health across Europe. The final control variable is Interest Rate where the mean interest rate across the sample is 1.11%, suggesting that on average, borrowing costs are relatively low. However, the negative values set a period for unconventional monetary policies. It ranges from –0.8% to 6.4%, representing several monetary policy environments and their interaction with investment decisions.

The post variable is a dummy variable set to 1 for the period beyond the 2018 tax reform. The average value of 0.31 tells that 31% of observations are in the post-reform period, and hence it allows for a comparison between the pre-and post-reform investment behaviours.

These summary statistics provide a broad view of the dataset and describe the diverse economic variations pertaining to the key variables. One needs to understand these basic statistics to interpret the results of regression analysis and reach informed conclusions.

Methodology

A difference-in-difference (DiD) approach will be used to analyse the impact of the tax reforms. Several different methods are available for analysing policy reforms such as regression discontinuity design (RDD), propensity score matching (PSM), synthetic control methods (SCM), and difference-in-difference (DiD) approaches. Each technique has distinct advantages based on the context and nature of the policy reform under consideration. However, the method of Difference-in-Difference analysis seemed more appropriate than others in determining the true effects of this aggregate tax reform on investment portfolio positions. This method can control for unobserved confounding variables such as global changes in the economic landscape or country-specific policies that might be influencing the outcome, ensuring that any observed effects are due to the 2018 French tax reform. Second, the DiD approach compares time differences in outcomes between the treatment and control groups to control for time-invariant unobserved heterogeneity. Ensuring that the observed effects are the result of the 2018 French tax reforms and not of any constant country characteristic. These strengths increase the robustness and reliability of the analysis, hence clearly establishing a link between reforms and investment behaviour.

Because the 'choice of treatment' is determined on an aggregate basis, the DiD technique is appropriate for assessing this policy. This methodology allows for the estimation of the reform's effect by comparing the changes in investment behaviours over time between two groups: the treatment group (France) and the control group (Belgium, Germany, Denmark, Ireland, Spain, Italy, Austria, Sweden, the UK and The Netherlands). These countries are selected based on their comparability with France in terms of economic characteristics, geographical proximity, and membership in the EU (except the UK). These countries combine diversified economies similar to that of France, and their use helps to isolate the effects of the French 2018 tax reforms on investment behaviour.

These ten control countries are used so that I can balance sufficiently high statistical power with the complexity of the analysis. Including these Western European and relatively homogenous groups of economies minimizes the variability that may arise due to regional

differences in their economies. It guarantees similarly high levels of data quality, which is necessary for conducting precise estimates in a DiD framework. This is also in line with the methodological literature, which insists that homogeneity in the selected control groups ensures that data quality is enhanced (Imbens & Wooldridge, 2009). The DiD approach is robust to policy implementation differences across jurisdictions or groups as long as the parallel trends assumption is not violated. This attribute could be important in making comparisons of policy reforms across a country, such as those implemented in the French tax reform. The parallel trends assumption is further discussed in our results section where we perform some robustness checks on our dataset.

Model Specification:

The regression model for the DiD analysis will be specified as follows:

$$Y_{it} = \beta_0 + \beta_1 \times Post_t + \beta_2 \times Treatment_i + \beta_3 \times (Post_t \times Treatment_i) + \epsilon_{it}$$

where:

- Y_{it} is the investment volume,

- $Post_t$ is a dummy variable that equals 1 for the period after the tax reform (2018 onwards),

- $Treatment_i$ is a dummy variable that equals 1 for France, which underwent the treatment,

- β_3 (the coefficient of interest) measures the impact of the tax reform.

Results

Robustness checks

Before presenting the actual results section of this analysis we will perform two robustness checks to ensure the reliability of the results. First, a Placebo test will be performed two years before the actual reform of 2018. Secondly, the assumption of parallel trends will be visually and empirically tested.

Placebo Test

The placebo test is used to check whether there are significant effects in a period before the actual reform. If the tax reform had an impact, then this should result in an insignificant placebo interaction term. This analysis consequently looks into the fact that the observed effects in the main analysis are due to the reform, and not due to pre-existing trends. As a placebo test, it should also be included that a period—a pseudo-reform period—will be considered before the actual reform (two years before). This two-year period is chosen so that the time capture would be long enough to gather any possible pre-existing trends or shocks affecting investment behaviour. It is also close enough to the actual reform to ensure that economic conditions and external factors are comparable. The key regression results can be seen below.

Table 3

Table 3: Regression results Placebo test Diff-in-Diff

Dependent variable Portfolio Investment	(1)	(2)
Placebo Post	-67122.67* (35777.92)	-54391.11 (38549.92)
Treatment	-353570*** (46820.2)	-356465.1*** (46578.75)
Placebo Post * Treatment	-101183.9* (57801.39)	-83425.68 (57257.74)

Real GDP per capita		-3.292736*
		(1.809179)
Interest rate		8300.182
		(7578.018)
Unemployment rate		-17277.68***
		(3180.65)
Constant term	-211825.8***	37652.72
	(12956.01)	(95740.86)
Number of observations	813	802

Note: Above is the table of estimates for a DiD regression model testing for placebo effects before the 2018 French tax reform. The dependent variable is Portfolio Investment. The key independents are Placebo Post, Treatment, and their interaction. Real GDP per capita, Interest Rate, and Unemployment Rate are also controlled. Clustered standard errors at the country level. The standard error is always shown in brackets. Moreover, * indicates $p \leq 0.10$, ** indicates $p \leq 0.05$, and *** indicates $p \leq 0.01$.

The placebo test results show that there is some weak evidence of pre-existing trends in the portfolio investment positions of France before the actual implementation of the 2018 tax reforms. While the main DiD estimates suggest a significant ($p \leq 0.01$) impact of the reform, the placebo results imply that some caution is needed in interpreting these findings, as there might be other factors influencing the portfolio investments already taking place before the reforms. Further robustness checks or alternative methodologies might be required to isolate more accurately the true impact of the 2018 tax reforms.

Parallel trends assumption

This key assumption of a difference-in-difference analysis is that other outcomes for the treated and non-treated groups would have changed in the same way in the absence of treatment. However, this does not mean the trends of treated and control groups have to be linear. They can be non-linear and still be parallel. The DiD method can thus account for time-invariant observed and unobserved factors that vary over time but not with time-varying factors that differ between the treatment and control groups. An advantage of our panel data set with multiple periods before the reform is the ability to test this assumption. We can assess this assumption by either a regression or a graph with visual inspection. First, we test if the

treatment and control groups had parallel trends using a regression analysis for the pre-treatment period.

Table 4

Table 4: Parallel Trends Assumption Regression

Variable	Coefficient
Pretreatment_treatment	-163,362.2*** (40,310.75)
Date	-6.40e-07*** (9.79e-08)
Constant	774,047.1*** (159,136.7)

Note: The variable 'post' is omitted because of collinearity. The analysis is limited to the pre-treatment period (post = 0)

Table 4 shows that the parallel trends assumption may not hold. Significant differences exist in the pre-treatment period between the treatment and the control group, indicating that post-reform differences might not be attributed solely to the reform per se. Together with the placebo test, this calls for further robustness checks and probably the application of alternative methods that could address the observed differences. Additionally, the graph below shows France's Investment position (blue line) and the mean portfolio investment position of the control group (red line). The trends were significantly different before the reform in 2018 and this together with our empirical analysis leads us to believe the parallel trends assumption might not hold in this dataset. There are thus likely time-varying differences between France and the control countries which affect the interpretability of our results. To increase the robustness of this analysis we will employ the different approach of Propensity Score Matching (PSM) to address these issues.

Figure 1
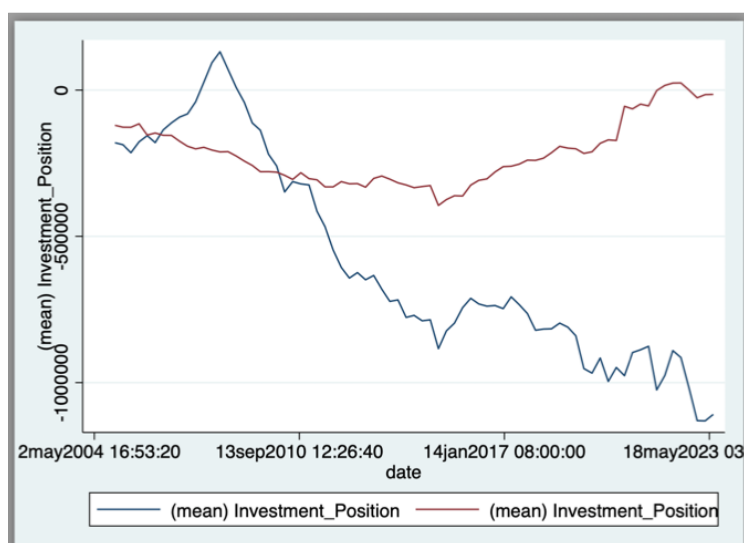
Note: This figure shows the trend of Portfolio Investment Positions in France (blue line) compared to the mean Portfolio Investment positions in the control countries (red line). Portfolio Investments are shown on the y-axis while the period is shown on the x-axis.

Difference-in Difference results

This section will begin by presenting the findings of a Difference-In-Difference approach with fixed effects. This procedure will then be repeated with propensity score matching to adjust for the unparallel trends. The simple DiD regression without fixed effects or PSM has been included in Appendix 2 for comparison.

One should omit the treatment variable in fixed effects DiD analysis because the fixed effects already control for all time-invariant characteristics of the entity, including treatment status. This will avoid multicollinearity and redundancy and place emphasis on an interaction term that reveals a different impact of the treatment over time. While the DiD method itself controlled for time-invariant differences between the treatment and control groups, fixed effects provide further robustness by controlling for unobserved factors within each group. This control helps to net out the pure effect of the tax reforms from other time-invariant variables that differ across countries.

Table 5

Table 5: Regression results Difference-in-Difference with fixed effects

Dependent variable Portfolio Investment	(1)	(2)
Post	128889.4 (118118.4)	281257.6* (95277.69)
Treatment		
Post * Treatment	-636426.7*** (118118.4)	-722700.5*** (105264.8)
Real GDP per capita		-25.85653*** (4.265859)
Interest rate		35003.34 (20734.07)
Unemployment rate		-9111.782 (10862.59)
Constant term	-272906.4*** (31672.57)	654144.9** (212487)
Number of observations	813	802

*Note: This table shows the estimates of the DiD regression model with fixed effects, which examine the effects of the 2018 French tax reforms on Portfolio Investment. Variables of interest: Post, Treatment, Post * Treatment. Control variables: Real GDP per capita, Interest Rate, Unemployment Rate. The standard errors are clustered at the country level. The standard error is always shown in brackets. Moreover, * indicates $p \leq 0.10$, ** indicates $p \leq 0.05$, and *** indicates $p \leq 0.01$.*

Preliminary DiD results with fixed effects return a negative and significant coefficient for the interaction term Post * Treatment, indicative that, relative to the control group of other EU countries, the flat tax reform in France was associated with a large decline in portfolio investments. In particular, the coefficients of -636,426.7 in the first column and -722,700.5 in the second column with control variables arguably point to a severe volume decline after the reform. In other words, the 2018 tax reform may have inadvertently discouraged portfolio

investments rather than encouraged them. This unintentional consequence could potentially be attributed to broader uncertainty in the economy or due to other concurrently occurring policy changes that overshadowed the reform. According to the theory of "Investment under Uncertainty" (Dixit and Pindyck, 1994) investment decisions are very sensitive to uncertainty. Major changes in tax policy can generate uncertainty about the future course of the economy and the stability of policy, which may lead to a temporary decline in investment until the new environment is better understood. Furthermore, Hall and Jorgenson (1967) argue that investment is affected by the cost of capital. While reducing taxes on capital gains and dividends should reduce the cost of capital and spur investment, the actual impact does depend upon other conditions in the economy and the perceptions of investors (Hall and Jorgenson, 1967). If this reform effort had been coordinated with economic uncertainties or negative signals, then the perceived risk would have increased the effective cost of capital, thus reducing investment activity.

To further validate these findings and address the potential issues of non-parallel trends, Propensity Score Matching (PSM) was applied. By creating a synthetic control group, which statistically is very similar to the treatment group using only observable characteristics, PSM is more likely to guarantee appropriate comparisons. The methodology controls for all pretreatment differences that may have effects on the outcome and isolates unbiased measures of the impact of reforms.

Propensity Score Matching is a robust method used in observational studies to address confounding variables and create a more reliable comparison between treatment and control groups. It calculates propensity scores, which provide the probability of each given treatment against the observed covariates, for instance, GDP per capita, unemployment rate, and interest rate, all using logistic regression. In this thesis, based on these scores, the Propensity Score Matching procedure will be applied by matching France—this is the treated, against other European countries, the control group. It is important to ensure that there is a balance of the covariates between the two groups. The estimated treatment effect comes from a comparison of the changes in portfolio investment behaviour before and after the tax reforms in France relative to the matched control countries.

Table 6

Table 6: regression results Diff-in-Diff with Propensity Score Matching

Dependent variable Portfolio Investment	(1)	(2)
Post	153150.3*** (29599.83)	188965.2*** (30853.3)
Treatment	-163362.2*** (44529.24)	-167543.4*** (39260.44)
Post * Treatment	-660687.6*** (55944.17)	-681428 *** (53897.63)
Real GDP per capita		-4.859809** (1.90301)
Interest rate		22621.77*** (7099.567)
Unemployment rate		-14941.54*** (3080.419)
Constant term	-264341.5*** (12506.19)	-936.3204 (95086.56)
Number of observations	813	802

*Note: This table shows the estimates of the DiD regression model with Propensity Score Matching, which examines the effects of the 2018 French tax reforms on Portfolio Investment. Variables of interest: Post, Treatment, Post * Treatment. Control variables: Real GDP per capita, Interest Rate, Unemployment Rate. The standard errors are clustered at the country level. The standard error is always shown in brackets. Moreover, * indicates $p ≤ 0.10$, ** indicates $p ≤ 0.05$, and *** indicates $p ≤ 0.01$.*

The PSM-adjusted DiD estimates consistently return a negative and significant impact of the tax reform on portfolio investments. The interaction term remains negative and significant, with coefficients of -660,687 and -681,428 in the two models, respectively. These results strengthen the preliminary findings from the fixed effects model that the investment behaviour decline is indeed due to the 2018 tax reforms. This makes results robust across

methods and lends credibility to the conclusion that the tax reform had a deterring effect on portfolio investments.

Conclusion

This thesis estimated the impact of the 2018 French tax reform on investment behaviour through a Difference-in-Differences methodology. The main results of this research are that the reforms did show significant impacts on investment behaviours, as captured by the change in portfolio investment positions. This section interprets and addresses such findings that help to answer sub-questions, and outline them to the broader theoretical and empirical contexts set out earlier in the thesis.

Main research question:

How did the 2018 French tax reforms, especially the initiation of the fixed tax on dividends and capital gains, change the investment behaviour in France compared to other Western European countries?

The empirical analysis has shown that portfolio investment positions in France declined significantly after the reform. This negative trend contradicts the expectations set by the tax policy changes aiming at making France more attractive to investors. In particular, the DiD regression results with negative significant coefficients for the interaction term, Post * Treatment, can be interpreted that such tax reforms might have inadvertently discouraged portfolio investments. This decline can be attributed to various factors resulting from increased economic uncertainty such as laid out by Dixit and Pindyck (1994) and possible non-conformity with the expectations of the investors. Poterba (2002) also found similar evidence that investors may be unresponsive—or at least not very responsive—to tax incentives for asset location decisions, limiting the effectiveness of tax reform aimed to affect them.

The first hypothesis stated that portfolio investments in France would increase as a result of the 2018 French tax reform, this is currently rejected. The second hypothesis suggested that

macroeconomic variables, particularly real GDP growth, interest rates, and unemployment, played a significant influence on the 2018 tax reform and investment behaviour. This hypothesis is partially supported. The findings indicate that macroeconomic variables, while important in their own right, were insufficient to mitigate the adverse effects of tax reforms on portfolio investments.

It is therefore a clear signal to policymakers regarding the unintended consequences of changes in tax policy such as a decrease in investment. Future reforms would need to consider the broader economic environment and potential investor responses. Analysis requires very careful design of tax policies to be implemented such that the economy can be geared toward growth and stability, without deterring investment.

As such, the findings of the current thesis contribute to the wider body of literature on the impact of tax reforms on investment behaviour. Guided by theoretical works such as those from Feldstein (1995), Hall and Jorgenson (1967) and Modigliani and Miller (1958), this research attempts to understand how changes in tax policy influence investment decisions. In this sense, this study enriches the empirical evidence in the continuous debate on the effectiveness of tax reforms as a stimulus for economic activity.

The unintended negative impact of the 2018 French tax reforms on portfolio investments led to the conclusion that policymakers should consider a variety of factors when developing tax policies. First, consideration of the general economic environment and investor sentiment is paramount. Policies complementary to tax reform that would improve investor confidence and economic stability are therefore important. Gradual implementation of the changes in taxation might also reduce their initial unforeseen negative effect on investment.

Future research can investigate a variety of approaches for expanding on the conclusions of this thesis. Future research can specifically analyze the interaction effects with the other concurrent policy changes of the tax reform, which might incorporate changes in monetary policy or regulatory adjustments that can create combined impacts on investment behaviour. The uncertainties in this analysis about the robustness of the results from unparalleled trends remain. Although the robustness has been improved with fixed effects and Propensity Score Matching. Comparative studies involving other countries that have similarly effected tax

reforms will not only generalize findings but also enhance the comprehensiveness of policy recommendations.

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Appendix

Table A1

Table A1: Combined Summarize statistics

Variable	Observations	Mean	Min	Max
Portfolio Investment	813	-252704	-11374409.8	701500
Real GDP per capita	810	35980.2	21850	77430
Unemployment rate	805	7.925	2.8	26.7
Interest rate	825	1.1074	-.8	6.4
Post	825	.30667	0	1
Treatment	813	.09091	0	1

Note: The following table presents the summary statistics for the key variables used in the analysis. Portfolio investment position is the net holding of securities and financial assets minus liabilities. Real GDP per capita measures the average economic output per person adjusted for inflation. The unemployment rate is the percentage of the labour force which is unemployed. Interest Rate indicates the cost of borrowing and returns on savings. Post is a dummy variable equal to 1 for the period after the 2018 tax reform and 0 otherwise.

Table A2

Table A2: regression result Diff-in-Diff without fixed effects

Dependent variable Portfolio Investment	(1)	(2)
Post	153150.3*** (29599.83)	188965.2*** (30853.3)
Treatment	-163362.2*** (44529.24)	-167543.4*** (39260.4)
Post * Treatment	-660687.6*** (55944.17)	-681428*** (53897.6)
Real GDP per capita		-4.859809** (1.903)
Interest rate		22621.8*** (7099.6)
Unemployment rate		-14941.5*** (3080.4)
Constant term	-264341.5*** (12506.19)	-936.32*** (95086.56)
Number of observations	813	802

Note: This table shows the estimates of the DiD regression model, which examines the effects of the 2018 French tax reforms on Portfolio Investment. Variables of interest: Post, Treatment, Post * Treatment. Control variables: Real GDP per capita, Interest Rate, Unemployment Rate. The standard errors are clustered at the country level. The standard error is always shown in brackets. Moreover, * indicates $p \leq 0.10$, ** indicates $p \leq 0.05$, and *** indicates $p \leq 0.01$.