Haute Ecole

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ICHEC
BRUSSELS MANAGEMENT SCHOOL

Enseignement supérieur de type long de niveau universitaire

Impact of micro and macro factors on the performance of real estate investment funds established in Luxembourg

Mémoire présenté par

Aline Florence FATTAL

pour l'obtention du diplôme de

Master en Gestion de l'Entreprise-MIBM-120

Academic year 2020-2021

Promoter:
Madame Nathalie Van Droogenbroeck

Boulevard Brand Whitlock 2 – 1150 Brussels

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ABSTRACT

As a well established centre for investment funds, Luxembourg offers retail investors the opportunity to invest in real estate investment funds. The objective is to study macro and micro factors impacting the returns of three real estate investment funds invested in the European Union. The factors found to be statistically significant illustrate that the variations in fund returns are influenced by the variations of a given factor. This shows that the risks arising from these factors are not mitigated by the fund, which is a limitation of the diversification theory. The performance indicators are carefully selected in order to compare real estate investment funds returns with the benchmark. Stakeholders of real estate investment funds give an overview of overall key players as well as the identical investors between the investment funds and benchmark. A quantitative and qualitative methodology is done to single out those factors that are statistically significant. The results are supplemented with an analysis of the cyclical relationship between the real estate investment funds returns and the business cycle. Finally, this study ends with a discussion about the limitations of this study and recommendations for further research.

Key words: Performance indicator, Stakeholders, Investors, Cycles, Diversification

TABLE OF CONTENT

LIST OF ABBREVIATIONS

S.A.	"*Société anonyme*"
SICAV	"*Société d'Investissement à Capital Variable*"
SICAF	"*Société d'Investissement à Capital Fixe*"
FCP	"*Fonds Commun de Placement*"
REIT	Real Estate Investment Trust
UCITS	Undertaking Collective Investment Transferable securities
CAPM	Capital Asset Pricing Model
AIF	Alternative Investment Fund
AIFMD	Alternative Investment Fund Managers Directive
CSSF	Commission de Surveillance du Secteur Financier
NAV	Net Asset Value
RAIF	Reserved Alternative Investment Fund
GDP	Gross Domestic Product
EU	European Union
US	United States
ECB	European Central Bank
REITs	Real estate investment trusts
et al.	et alia, at alii, at aliae, and others

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INTRODUCTION

An investment fund is a pool of money from various investors with the objective of providing added value for investors while protecting investors' capital and minimizing risks. Funds provide a considerable amount of benefits over individual investments. Diversification is known to be a strategy lowering investment risks as funds invest into a wide variety of asset types thus mitigating the downside risk of holding a single asset. The performance of single assets cannot outperform a well diversified fund on a risk adjusted basis. Furthermore, funds allow economies of scale as they can take advantage of their size to pay lower fees, therefore, increasing overall returns. Professional investment fund management is a more solid package for investors versus individuals investing by themselves. Individual investors benefit from investing small and frequent amounts in funds without having to accumulate enough capital to purchase the entire asset. Investment funds are typically subject to a regulatory framework and are supervised by local authorities.

Luxembourg has been a main leader in the industry of investment funds in the European market. Importantly, the offered products in this market are advantageous compared to others in regards notably to their tax treatment. Most funds are only subject to the registration duty and an annual subscription tax (being small amounts) applied on shares issued or transferred in Luxembourg. The Luxembourgish fund industry has been chosen for this study.

There is a lack of research focusing on the real estate investment funds established in Luxembourg. As a result, no comparison and analysis has been performed before on the large investment funds in Luxembourg. The paper examines the diversification of these funds and how they would react to fluctuations of universal factors. The factors selected on these specific funds are useful since they are general macro and micro factors and are, de facto, applicable to all real estate investment funds. Therefore, this study can become a reference for investment fund managers, investors and other stakeholders who want to mitigate risks associated with the potential strong fluctuations in investment fund returns in order to protect themselves from large losses.

Specifically, investment fund managers can set up alerts regarding the significant factors found in this study for their funds to monitor better fund returns and reduce risks, hence, enhancing fund returns on a risk adjusted basis. Potential investors or existing investors in real estate investment funds may benefit from the results of this study on two grounds: the study reinforces their choice of investment, as a means of avoiding the adverse effects of macro and micro economic factors in periods of economic downturn, and second, the study points out the limitations to diversification and highlights the risk which nevertheless remains. This risk should be taken into consideration when investors decide on the weight to be given to each of the assets in their investment portfolio.

Real estate assets include residential, commercial, industrial, hotels and office spaces, and are traded over the long-term differentiating themselves from traditional investments. Funds can invest directly into real estate assets or indirectly by buying shares issued by real estate companies. Given that diversification in real estate investment funds is limited as large capital amounts are required for

purchasing a single asset, this study has selected funds investing indirectly through other funds or companies, thus increasing diversification. The funds selected are established in Luxembourg, are open to individual investors and have assets in the European Union (hereafter referred to as "EU"). It is to be noted that significantly low interest rates in the EU over the last years implicitly impacted real estate market movements.

This study aims to understand which macro and micro factors influence real estate investment fund returns. The following research question is established: **What factors (i.e. macro and micro) contribute to the performance of three real estate investment funds?** Prior to the development of the methodology, a brainstorm was performed giving an overall context of this study. This led to the development of the following sub questions: What are the main stakeholders for funds? Which indicators are used to measure investment fund performance? How do the real estate investment fund returns perform in comparison to one another and the benchmark? What is the cyclical relationship between the real estate investment fund returns and the business cycle?

Furthermore, prior to conducting this study a set of **operational objectives** are laid out. The first one is to understand the concept of real estate investment funds. A literature review about this industry is performed providing an insight on top reasons for the success of the investment fund industry in Luxembourg. The second operational objective is the discussion of real estate cycle characteristics and concepts followed by an understanding of the cyclical relationship between the real estate investment fund cycles and the business cycles to clarify to some extent the ambiguity lying upon their relationship. The third operational objective is to determine macro and micro factors potentially impacting real estate investment fund returns. The last objective is to analyze the performance indicators used to measure real estate investment fund returns and to provide also an insight on how the respective selected funds performed in comparison to others in the selection and to the benchmark.

This study is based on applied research. The stated research question is aimed to be answered through the research conducted. This study challenges and contributes to a theoretical framework discussed in the literature, followed by an exploration phase to identify the required tools and concepts.

This work is composed of different chapters. Firstly, this study provides an overview of the chosen real estate market with its main features. The interaction between the business and real estate cycles, followed by different macro and micro factors influencing the real estate market are presented. Secondly, investment fund stakeholders and industry, with a focus on the Luxembourgish market, are presented. This section ends with a presentation of the performance indicators used to measure fund returns. Thirdly, the data for the real estate investment fund returns and for the macro and micro factors included in this study are collected. The results for the funds and the benchmark are presented and compared by highlighting the similarities and differences in the findings in an attempt at fulfilling the study objective. An assessment of the cyclical relationship between the real estate investment fund returns and the business cycle is performed. Finally, the recommendations and limitations of this study are presented followed by a conclusion.

CHAPTER 1: REAL ESTATE MARKET

A description of the real estate market with its main characteristics is given, followed by an outlook on the market. The interaction between business and real estate cycles is discussed with an attempt to understand their relation. Major macro factors (i.e. income, economic growth, interests, inflation, consumer confidence index and micro factors (i.e. vacancy rate, landscape, physical condition, socio – economic environment) are covered as they possibly impact housing prices. This discussion contributes in understanding underlying variables influencing the performance of real estate investment funds.

1.1. Overview of the European real estate market

1.1.1. Real estate market

The housing market is a fundamental element of the economy contributing to its balance. It remains an attractive investment asset class due to its profitability even during downturns.

Housing prices are among crucial determinants for housing affordability. It represents the capacity of a household to buy a house taking into consideration household earnings reflecting the performance of the economy. The market condition and economic variables also influence the affordability for an investor. For instance, a sudden increase in mortgage interest rates increases the cost for a buyer to take a mortgage. Prices give an insight on the development of the property market which is determined by underlying factors. These factors are monitored to identify and mitigate risks associated with the economy. Not only real estate can be seen as premises to be used for living or business purposes but also as income generating asset contributing to economic growth.

The generated income from an investment depends on the underlying category of real estate and is affected by identical key variables. Real estate has four main categories being residential, commercial, industrial and raw land depending on usage and needs. Residential real estate includes structures in the form of a house / villa or apartment, nursing homes, dormitories, student housing, vacation homes and garages. Commercial real estate is typically a building used by a company or private owner for professional use. It includes business facilities (i.e. office space), hotels, medical facilities, sport centers, schools, retail stores and shopping centers. Industrial infrastructure consists of warehouses, factories and power plants. Raw land is a starter for investors whether for commercial or residential usage.

An investor can choose to invest into real estate either **directly** or **indirectly**. Within the category of direct investment, two types of investment objectives are distinguished: income and speculative. Income investment would be made in residential or commercial properties which are rented out to generate income. Speculative properties attract investors seeking to make a profit from increased value. They include raw land, residential and commercial properties in strategic locations. An increase in land value may originate from an exploitation of resources it may have (e.g. discovery of valuable minerals). Speculative investment does not only rely on periodic rental income, but on investors' intuition and forecast of the market cycle.

Indirect investment consists essentially in purchasing investment funds which invest into the real estate market. Investment funds participate in both categories of real estate investment, income and speculative. They may (not always) pay out a dividend to investors. Hence, profits from investing into real estate investment funds are generated in different forms (capital appreciation and/or income).

The value of real estate is briefly talked through hereafter. The current market value of a property is seen as a professional measurement based on the cost of building it, and the advantage of its location and the design in relation to its purpose. New homes are valued higher than old ones unless there is a desire to maintain the antiquity or original architecture of an old home. The value of the land used for the building is also an element of a property's value. Land can be a precious resource when not much is available for construction purposes. Particularly, cities with large undeveloped spaces tend to have lower priced land and properties as there is room for further growth (Struyk, 2020).

Sellers are motivated to sell their home most likely in a timely fashion and perhaps with a discount. The possibility of conceding to several thousands of euros permits investors to get a deal done sooner. But the extent to which the seller is prepared to discount a property depends typically on his motivation. The level of motivation to do so increases with each passing day due to any number of reasons (e.g. the burden of maintenance costs). In general, the asking price for the real estate depends on the particular situation of the seller. In most cases, truly motivated sellers are more likely prepared to dialogue with a potential buyer. Some sellers may prefer direct buyers over brokers or sales agencies to save commissions. Institutional investors have higher motivation to sell and usually at a cheaper price in a shorter time period. Investors' ease or difficulty in purchasing real estate does not only depend on underlying prices and income levels but on real estate competitive advantage and investors' alternative investment options.

Clients who invest directly in the real estate market include real estate investment companies or individual investors, owners of (private) homes, owners of commercial or industrial concerns and owners of service providers. Buyers have customized lists with specific features being a priority to them. Understanding the main types of clients in the real estate market allows sellers to get an outlook on this market. Buyers need to look at several properties to know exactly what is on the market. They can use this to their own advantage as this gives them a greater ability to negotiate. Buyers need to attentively look at the number of days the property has been on the market. The longer the home has been available the more power he has negotiating for a lower price. The needs and interests of the buyer define the competitive advantage for this property in reference to another one on the market.

The choice of investment for an investor given different investment products boils down to the level of risk and return he is searching. The relation of real estate returns and risk is best assessed using yield simplying the comparison between real estate returns and other assets easier. The yield of a property is defined to be the amount in annual return an investor can get on his investment expressed in the form of rental income per year in percentage of property costs. Low property yield implies that the underlying property value is low which results in a decrease in investment return.

The real estate market offers more or less value compared to other markets (i.e. bonds) in certain circumstances. On the one hand, the housing market is particularly attractive when interest rates are low or even negative due to the ease of requesting credit. Any increase in interest rates can significantly impact real estate net returns even if the increase is just of one or two percentage points when the property has been financed with a variable rate, hence the importance of financing a property at fixed interest rates. Alternative markets (e.g. the bonds market) are less attractive when interest rates are low. When interest rates are high government bonds are in particular are a good alternative as they are considered to be safe investments. The real estate valuation depends on interest rates as when the returns decrease then the purchase price also decreases.

1.1.2. European real estate market

The location of real estate assets plays a primary role in several aspects in the purchasing process of a property as in the desire to find future tenants.

Considering that this work focuses on performance, the objective of this study is to choose a market registering high volume of purchases/sales in other words; the market selected in this study should be characterized by a large population. The average price of a real estate is important as it defines the range of potential returns. In sum, it is crucial to define a market in its most objective way taking into consideration investors' buying process and similar investment market of real estate investment funds established in Luxembourg.

Luxembourgish real estate investment funds either invest in Europe or on a global scale. As mentioned above, this study analyzes the performance of real estate investment funds, where this study would not be meaningful for funds investing on a global scale as changes are often related to differences in local distributing factors (i.e. political instability, social, legal or economic factors). As a result, the **European market** is a good choice for this study as investment fund assets are all located in the same market.

The EU consists of different countries linked into a common market through economic and regulatory harmonization. It is a large market and de facto, extremely diversified. It can be seen as a common market due to the free trade area and movement of labor, capital and services. This concept is based on uniformity: common economic cycles and similar environment (i.e. economic and cultural) across this market. For instance, the monetary policies promote a unified and stable political union supported by a common regulatory framework for all members. The EU creates stability and harmony across the continent as all nations belong to one union and all are working for their mutual benefits.

A brief description of the European real estate market provides an insightful overview helping the reader to get a thorough understanding of the current housing market before diving into a thorough analysis of the factors impacting the market. Similarly to other markets, the housing market has suffered due to the global financial crisis in 2008. After the financial crisis, some countries experienced a larger decrease in housing prices over others. In 2012, the EU was hit by a debt crisis causing the economy to undergo another recession. Since this period, the real estate market experienced a moderate growth. Many countries benefited from Brexit as offices have been relocated from the United Kingdom (hereafter

referred to as “UK”) to mainland Europe. The lack of supply of offices in European countries caused a shortage on a short-term basis consequently increasing their prices.

The price of real estate is reflected in buyers’ purchase patterns and the rental market. Housing prices have been on the rise in the eurozone with a value of 4.1% in both the euro area and the EU in the third quarter of 2019 (Eurostat, 2020a). Housing prices have been more or less stable between 2009 and 2014. In 2015, housing prices started to increase and reached a peak in 2019 as observable in figure 1. This data shows that the economy overall recovered from the 2008 crisis and the market is moving in a stable upwards movement.

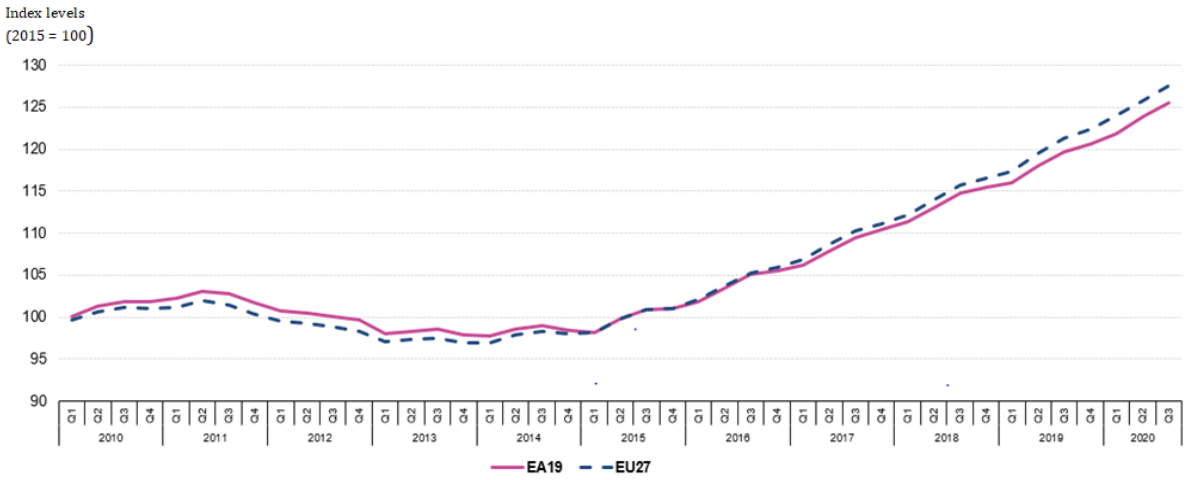

Figure 1: House prices – euro area (EA19) and EU 27 aggregates – 2010Q1-2020Q3, Index levels (2015= 100) (Eurostat, 2020b).

Average rental or purchase prices highly depend on the average price per square meter for a given location. The average rental price per square meter is important as it gives a comprehensive understanding of the real estate market across Europe. Clearly, Amsterdam and Paris have one of the highest monthly average rental costs for apartments among European cities in 2018 (Statista, 2018). Housing prices are the underlying component of overall performance in the European real estate market.

The **performance of the European market** is measured by the total turnover for real estate activities across the 27 EU countries. The value of output given by the real estate activity to the economy provides the contribution of this sector to the GDP. The Gross value measures specifically the contribution of a corporate subsidiary, company or municipality to an actual economy, sector or region. For real estate activities it sums up to be approximately 11.2% across the EU in 2019 (Eurostat, 2019). Equivalently, it amounts to about 1.5 million euros in 2019 (Eurostat, 2020c). It is following notably the performance of the wholesale and retail trade, transportation and accommodation sector.

Real estate activities are influenced by **levels of demand and supply**, which in turn depend on housing prices and underlying economic factors. The demand and supply levels are important in analyzing the real estate market and influence (expected) housing prices. Clients seeking to buy real estate create the

demand for purchasing a house while clients renting homes influence the rental market. For the European real estate market is it not possible to find an exact number of clients. This is probably due to the fact that this information remains confidential or individuals' names are not published.

Private household situation gives an insight on fundamental elements building the demand. It gives a good overview of families' socio – economic status. In 2017, private household wealth reached about 221.3 million with a total expenditure share of 54.4% of the gross domestic product (Echenique, n.d.). The average household income per year is around 17,461 euro with an average number of people in one household reaching just below 2.3 people in 2018 (Eurostat, 2018) (Eurostat, 2020d). A one- person household may find it harder to buy real estate depending on the exact location and household income as covering all monthly bills by oneself induces a lower saving rate for the household. In sum, household expenditure highly contributes to economic growth. Some households may find purchasing a home more affordable over others depending on supply levels within the market.

Housing stock across the EU gives an apprehension on the current supply levels. A large supply constraint occurs partially due to a lack of building permits. It is a significant factor for early real estate investments and acts as controlling real estate shortages. The granting of building permits to constructors is a necessary but not a sufficient condition to build a house. The overall course of the real estate building index acts like a business cycle indicator. The study presents the building permits index as shown in figure 2 (Eurostat, 2020e).

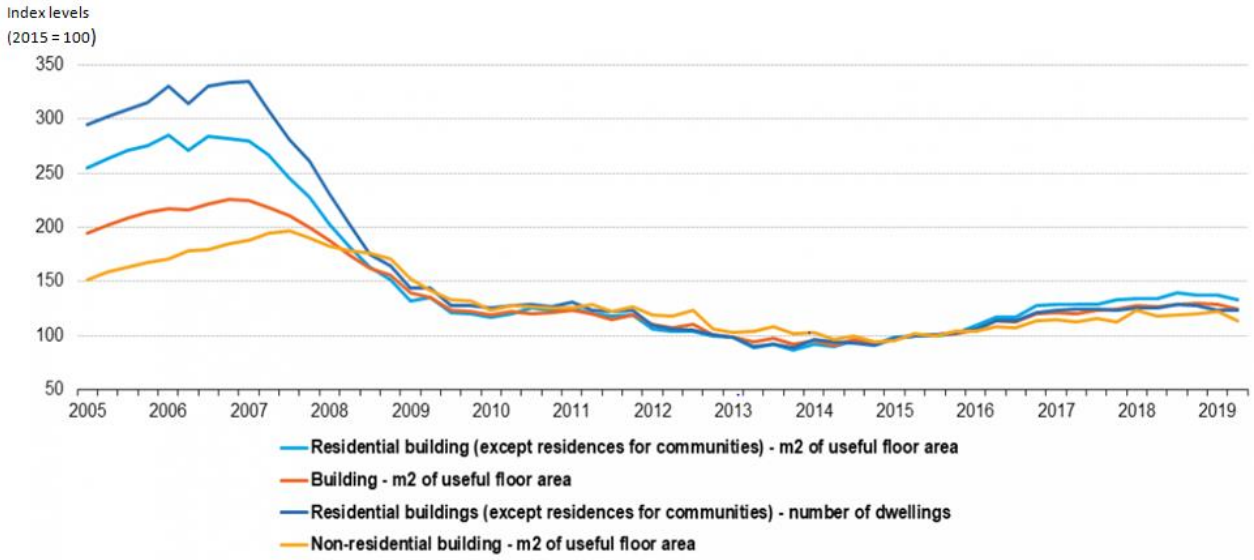

Figure 2: Building permits in the EU, 2005-2019 – quarterly data 2005-2019, Index levels (2015 = 100) (Eurostat, 2020e).

The number of **building permits** indicates the focus of the EU market on new buildings and housing transactions providing an overview of the quantities exchanged for both new and old properties in the European market. Figure 3 illustrates the overall housing transactions in the European market (i.e. including the UK). It displays a huge drop in 2014 and the total value (i.e. in billion of euros) as well as the

number of transactions did not reach the pre-crisis levels. The entire valuation of the housing prices is dependent on the banks' exposure to mortgages and this large decrease in valuation is could be explained by the impaired credit supply and demand in the European market (European Commission, n.d.a).

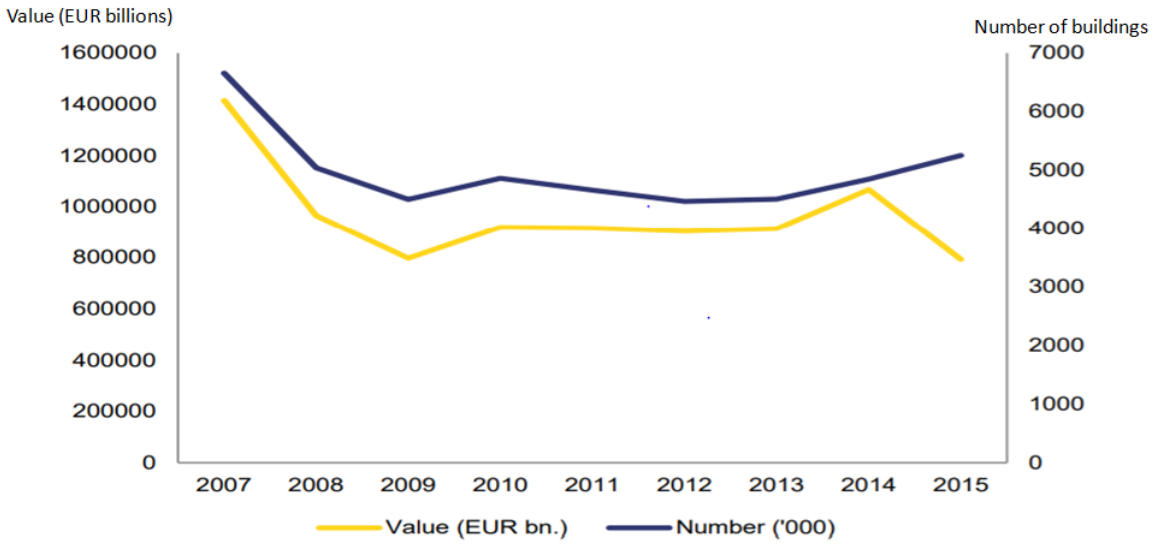

Figure 3: House transactions in the EU – 2007-2016, Value (EUR billions) & Number of buildings (European Commission, n.d.a)

A point often overlooked while looking at supply levels is the consideration of the **housing development intensity**, which provides an overview of the degree of site development. The housing development in Europe gives an insight on the number of completed dwellings per 1,000 citizens within a country. In short, the relation of the dwelling with the market is very clear: the amount of dwelling gives an insight on future supply levels. Any change in the dwellings implies an expected reflection on real estate prices. Deloitte published a study on the evolution of dwellings across European countries (Deloitte, 2019) (see Appendix 1: Housing Development Intensity – index number of completed dwellings per 1,000 citizens).

The European economy is managed by several companies present on this market representing a number of key players which gives an idea of the size of this market. The number of enterprises involved in the European real estate market is 1 319 778 with 2406.7 employees (Eurostat, 2020f). There are 126 companies dealing with specifically the process of buying or selling owned real estate across the EU (Eurostat, 2020g). Within the field of owned or leased real estate, there are approximately 819 enterprises across the EU. About 80% of real estate activities are performed by small companies leaving 11% to medium sized companies and finally 9% to large companies (Eurostat, 2020g). This illustrates the fact that **small companies play a vital role in the development of real estate activities**

The **construction cost index** in the EU provides specifically the trend of costs associated with the construction of buildings. The index includes raw materials, equipment and labor force. On average in the 28 European countries, the construction costs index reached around 108 in 2019, showing costs are

on average slowly increasing (Eurostat, 2020h). The construction costs are in line with labor costs and input materials as observed in figure 4. Hourly labor costs are about 28 euros in the EU in 2020, bringing a rise by 3.2% in construction (Eurostat, 2020i) (Eurostat, 2020j). The highest costs are in Belgium, Denmark and Luxembourg, while the lowest costs are in Bulgaria and Romania. The nominal hourly labor cost is the percentage change compared to the same quarter of the previous year, which has been on an increasing trend since 2018.

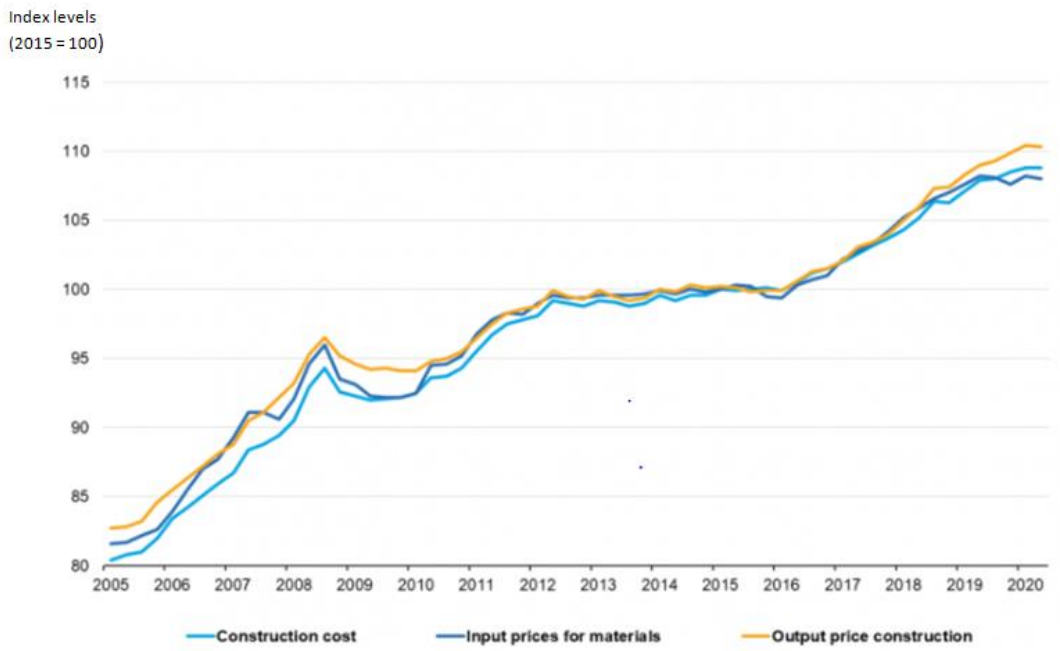

Figure 4: Construction prices and costs for 28 European countries unadjusted data – 2005-2019, Index level (2015 = 100) (Eurostat, 2020h).

Supply levels contribute to how the development occurs where the supply responds to price and demand pressures. A large supply constraint occurs partially due to a lack of building permits. It is a significant factor for early real estate investments and acts as controlling real estate's shortages. The granting of building permits to constructors is a necessary but not a sufficient condition to build a house. The overall course of the real estate building index acts like a business cycle indicator.

To **summarize the demand and supply levels** within the European real estate market, it is fruitful to take a look at figure 5. It is a graphical representation of demand and supply levels in relation to real residential investment and housing prices. Housing prices are directly related to both levels, which are explained in detail in next sections. The real residential investment curve in figure 5 relates to residential real estate (i.e. not necessarily a primary residence), which generates an income otherwise intended for investment. Below or above the curve, the demand and supply shock are represented. Figure 5 displays a curve of housing prices with the demand and supply shocks for the European market (see Appendix 2: House prices with supply and demand shocks across the European market). There was a significant drop in housing prices after the financial crisis, however, since 2013 the prices are in an upwards trend.

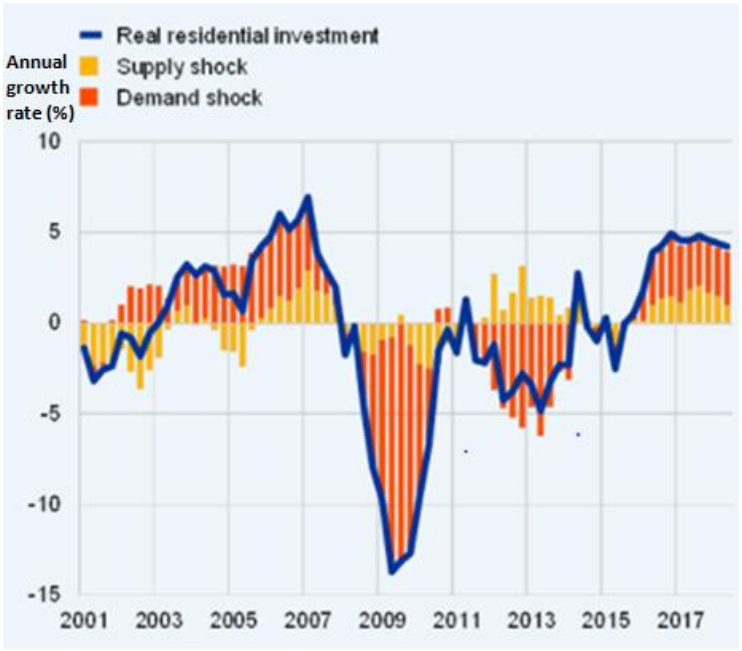

Figure 5: Real residential investment with supply and demand shocks across the European market – 2001-2017, Annual growth rates (in percentage) (Battistini *et al.*, 2018).

As mentioned above, there are other investment assets besides real estate. A little attention now is given to the relation between the **European bonds market**, **property yields** and **interest rates**. Property yields provide the amount of annual return an owner can expect to receive on his investment. In the long-run, the low-interest rates environment is a potential for increasing property yields ensuring real estate profitability. The gap in the volatility of property yield gives information on whether the property is correctly priced or not. Interestingly, there is a correlation between interest rates and property yields. The correlation measures the degree to which two factors are moving in relation to each other. From 2015 the yields are hovering between 1% and 2% as observed in figure 6 (PricewaterHousecoopers, 2020).

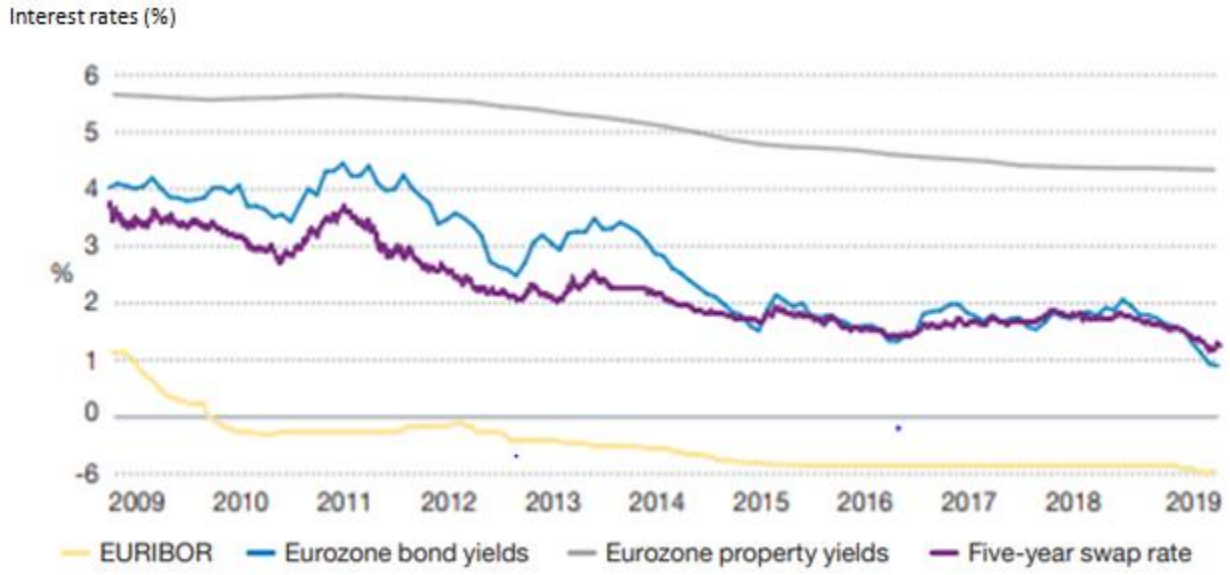

Figure 6: Eurozone property yields and interest rates (in percentage) – 2010-2019 (PricewaterHousecoopers, 2020).

This slightly upwards trend in the property yields may be explained by the asset purchase program. The European Central Bank, hereafter referred to as "ECB", launched in 2016 a corporate sector purchase program with the aim to repurchase the corporate bonds to enhance finance conditions across the European Union. Before this, the ECB had been purchasing assets issued by governments, agencies and European institutions. In effect, this program meant that more risky bonds are left to investors for purchase. This program ends in December 2018 but as of January 2019, the Eurosystem reinvested the principal payments of the securities that arrived at maturity from the corporate sector purchase program (European Central Bank, n.d.a). In contrast, according to the report performed by PWC global trends (2020), this program does not significantly impact real estate investment funds trends. In sum, policies and programs implemented by the ECB are taken into consideration to thoroughly understand the intervention of outsiders in the economy.

1.2. Real estate cycles

For a global comprehension of real estate fund performance it is fundamental to understand the concept of real estate cycles as they provide information regarding the returns of the real estate. Real estate cycles are characterized by the length of time it takes to finish one cycle. Major real estate cycles are moving in long-term cycles lasting between 20 to 30 years. The time horizon for holding investments lasts mostly between 5 to 10 years or more in the European market (PricewaterhouseCoopers, 2020). A potential investor has to understand that opportunities are linked to the current state within the real estate cycle and the cycle's length (Vanichvatana, n.d.). This fact shows that time is needed before seeing changes in the market.

Real estate cycle movements are due to **external** and **internal market forces** driving **prices up** or down creating a continuous interaction. Most obvious **internal forces** influencing price movements are the

dynamics of supply and demand, which are generally caused by underlying economic (and demographic) factors. There exists a time difference between an event and its consequences, which is called a time lag. For instance, the supply side in the real estate market shows a clear indication of a time lag between price changes, investment decisions and construction processes. When unexpected increases or decreases in supply volumes occur, the market reacts with adjustments in prices (either gradually or through shocks). Internal decision processes need to be adapted to the new situation, while seeking a minimization in investment risks. There is also a time difference between the internal decision and the start of construction due to the time taken to obtain permits and draw up plans (Rottke & Wernecke, 2002).

Major changes in the regularity of cycles are caused by **external forces** which create demand and supply shocks. Mueller (2020) showed the importance of the relation between business cycles and demand and supply levels in the real estate market (Hussein, 2011). Kaiser (1997) performed a study concluding that excessive supply of residential properties caused inflation and had a negative impact on real estate cycles. The extent to which these shocks influence demand and supply levels creates medium and long-term influences. Long-term influences are reflected by changes in the fundamental elements of the economy (i.e.in leading economic variables including economic growth and interest rates) (Rottke & Wernecke, 2002). In sum, these external and internal forces bring upwards and downwards trends in real estate cycles.

Similarly to business cycles, real estate cycles are characterized by different **phases**. Players in the market do not observe changes in supply levels immediately. This implies that investors tend to make their decisions on "old" information. As a result, after a period of high demand, too much construction occurs generating more supply than necessary. More homes are built compared to the actual demand, which leads the cycle into the oversupply phase and prices begin to fall (as seen in figure 7). Decreasing prices have a negative effect on the investment decision due to the freezing of construction plans (recession period). This period is characterized by a decrease in the vacancy rate but the economy remains fairly unstable. A low employment level inevitably induces a low demand for real estate. Buyers have more power to bargain over suppliers. Consequently, a drop happens in real estate construction and development inducing a slow pick up in the housing market (Hussain, 2011). Finally, low prices encourage buyers to increase their investment, thus restarting the cycle (recovery period). All cycle phases explained above are observable in figure 7 where each phase creates an impact on the other. A similar reasoning exists for changes on the buyers' side. The phases provide an indication to investors about possible returns of real estate and influence their investment decisions.

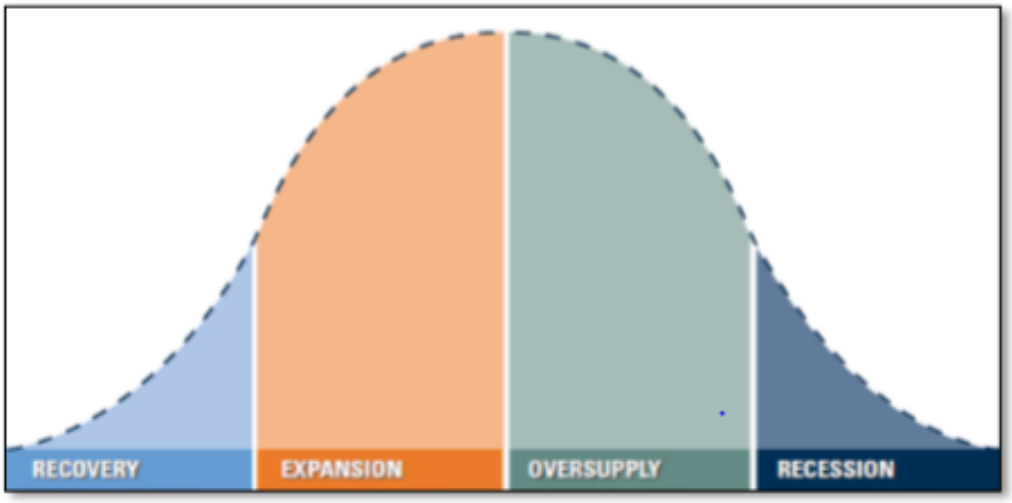

Figure 7: Phases of a real estate cycle (Hussain, 2011).

Despite the relation between business and real estate cycles being ambiguous, there are clearly defined areas showing interdependence between the economy and the real estate market. Policies regulating and monitoring the European market are in application in all countries, which induce the hypothesis of common fluctuations between countries' business and real estate cycles. Zelazowski (2017) confirms that the housing market and business cycles move significantly together in several economies across Europe. The interdependence and variation of the housing market cycles and business cycles were thoroughly studied by Zelazowski on the basis of data in the Polish, German, French, British and Irish markets. Zelazowski concluded that real estate cycles and business cycles in these economies are in the same phase for 60% of the analyzed time period (i.e. between 1971 Q1 and 2013 Q4) excluding Poland (for which the period of analysis was significantly shorter). Real estate cycles and business cycles were strongly correlated in the UK and Ireland. In conclusion, Zelazowski's study confirms the existence of significant strong correlations between the analyzed markets meaning that European countries are similar in the way real estate cycles compared with business cycles. This emphasizes the reason why this study chose to focus on the European market versus the global market.

Another study was conducted by Zelazowski (2018) to confirm the existence of synchronization of real estate cycles between different countries. It covers the period 1971-2014 based on these selected European countries: Belgium, France, Netherlands, Italy, Germany and the UK. The purpose was to identify the characteristics of the cycles in the chosen European housing markets and thereafter, assess the level of synchronization. Zelazowski found that for these European economies there is an occurrence of synchronization of housing cycles. Indeed, the implementation of the common currency and monetary policies significantly increased the level of harmonization of real estate cycles across these countries (i.e. except for the UK which did not adopt the euro). The highest levels of synchronization occurred in the housing cycles between the UK and France, while the lowest levels measured for the concordance index were observed for the Netherlands and Italy. He explains that historically, the housing cycles were primarily of a local nature and that the processes of creating a union gave a more international nature to

housing cycles. Zelazowski states that the real estate market is heavily influenced by socio – economic, legal and other factors.

It is insightful to present **some findings regarding the relation between the business and real estate cycles**. Pu and Zhao (2018) discuss the existence of a significant relationship between the market economy (i.e. economic growth) and the real estate industry. Hussein (2011) claims that government intervention helps to control the economy leading to both cycles move simultaneously. Pu and Zhao claim that after several years of a country's development, the relation between the real estate industry and economic growth becomes closer. However, the exact direction of the fluctuations of both cycles is not clear as the business cycle's performance does not necessarily bring an after effect on real estate prices.

Bearing all this in mind, some studies demonstrate that the housing cycle precedes the business cycle while others found the contrary. Hussein (2011) concludes that real estate cycle movements happen before the business cycle, as seen from figure 8. Concretely, the housing market is seen to be one of the driving forces for the business cycle which explains why the housing market cycle is seen to move before the business cycle (Zelazowski, 2017). In contrast, Zelazowski (2017) established another assumption: most changes in the housing market are due to major changes in economic variables, which are also significantly impacting the business cycles' direction. This supports the theory that economic consequences are reflected onto the real estate market. Pholphirul and Rukumnuaykit (2009) found for the Thailand market that in a contraction period real estate cycles lead economic cycles whereas at peak periods the opposite occurs. However, it does not always hold for all periods as Pholphirul and Rukumnuaykit found that although the real estate crisis preceded the economic crisis in the 1980s, the opposite happened in the 1970s. It is conceivable that the exact relation and direction of the fluctuations between both cycles in the European market depended on the period and no right answer exists. Both scenarios are discussed to provide an overview of what are the mechanisms involved in each case.

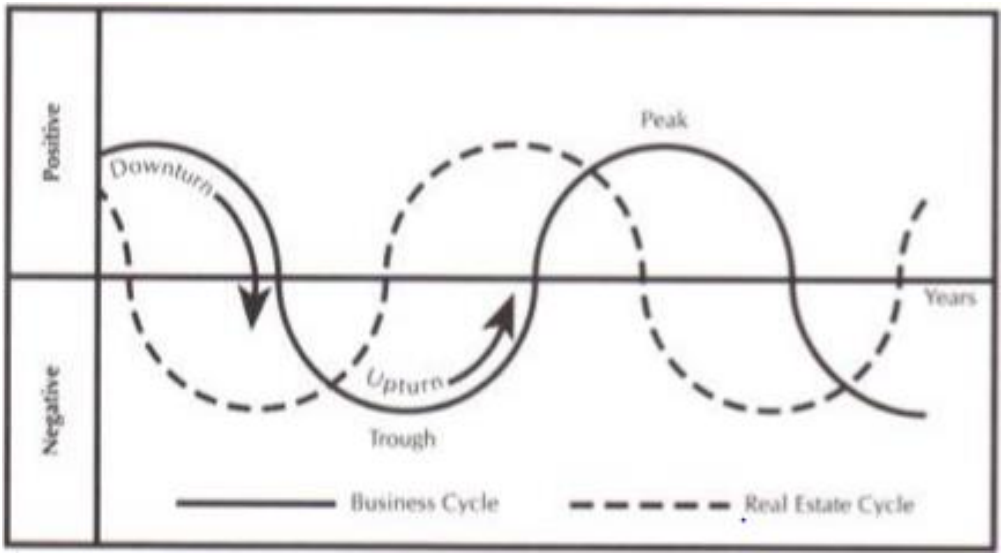

Figure 8: Real estate cycle and business cycle (Hussain, 2011).

On the one hand, a period where the **business cycle impacts** the **real estate cycle**, various underlying economic factors including national economic growth influence the real estate market (Pu & Zhao, 2018). A downturn in the business cycle leads to higher vacancy rates and a drop in profits in the real estate market. The reduction in profitability induces a decrease in property development. This clearly shows business cycles lead real estate cycles. Therefore, underlying economic factors affect the real estate market and define the extent to which the real estate cycle is a "mirror reflection" of the economy (Hussein, 2011, p.18). On the other hand, **real estate fluctuations** may **influence business cycles**. The real estate market is essential to national economic growth (Pu & Zhao, 2018). After all, this work focuses on real estate investment fund performance hence it is interesting to include housing prices and business cycles in this study. Several studies have shown the relation between real estate prices and the general economy. In sum, the real estate cycle and business cycle interact with each other and economic conditions shape the development of the fluctuations.

1.3. Determinants of performance

Although the formation of the EU enabled an increased synchronization of all housing cycles across the European countries, meaning national cycles increasingly moving together, this synchronization is still significantly lower compared to other industrial sectors or general economic cycles (Zelazowski, 2018). The reason lies upon the fact that real estate cycles are highly influenced by underlying economic factors which end up influencing not only the cyclicality as presented above but affecting real estate investment performance.

The underlying economic factors impacting real estate cycles belong to two environments. On the one hand, the **macro environment** refers to the broader condition of an economy existing as a whole as opposed to particular markets. Macro determinants relate to six main forces: social (and cultural), political, demographic, technological, ecological and economic (i.e. income, consumption level, inflation and interest rates). It could be thought of as an analysis of processes on a large scale. On the other hand, the **micro environment** refers to individual characteristics that influence the immediate area of the asset on different levels (i.e. performance, decision making). Real estate location and physical aspect are typical examples of micro factors that contribute to the success of real estate sales. The distinction between these two variables is hard as they are closely related to each other.

Nevertheless, this study attempts to distinguish macro and micro variables and provide firstly an insight of the macro environment by mainly focusing on macroeconomic factors followed by a brief discussion of micro factors. It is important to remember that prices define the performance of the real estate market. The role of the ECB on various determinants of the economy is shortly presented later.

1.3.1. Macro factors

Macroeconomic factors affect the economy as a whole and its overall strength and health. The region of study in this work is the European market. Macroeconomic variables include unemployment, inflation, economic growth, savings and consumer spending, which are important indicators for the economic output and performance. A brief discussion of the findings in academia is given to explain the chosen macroeconomic variables in this work.

Various studies have been done regarding the impact of macroeconomic factors on the housing market. Apergis (2003) found that housing prices are related to specific macroeconomic variables. He discusses employment rate and mortgage interest rates. Mortgage interest rates were shown to be the most influential determinant for housing prices followed by inflation. Apergis showed that developments in the employment sector bring a substantial influence on housing prices (i.e. meaning higher employment induces higher real estate prices). However, on a more regional level, migration of population, employment and household income are found to impact housing prices (Grum & Govekar, 2016).

Additionally, Grum and Govekar (2016) analyzed the impact of unemployment rates, the stock market performance, gross domestic product and industrial production on housing prices in the following different countries: France, Greece, Norway and Poland. They observed that the unemployment rates are significantly related to property prices. Pailla (2007) found that the consumption rate and property prices are strongly related, which means the level of household income is important as it fundamentally impacts property prices. On the contrary, Bardhan *et al.* (2007) thought that the most important factor impacting prices is Gross Domestic Product (i.e. measuring the market value of all the final goods and services produced for a given period) and real GDP (i.e. being an inflation adjusted measuring the value of all goods and services produced in an economy). Monetary policies have a strong connection with real estate prices (Grum & Govekar, 2016). Considering that this work focuses on the European market, this study focuses on macroeconomic variables which influence property prices in Europe. However, a non macroeconomic variable, demographics, is also presented as they are absolutely crucial for the European real estate market as this market highly depends on the population age structure (i.e. describes the age distribution of a population) and demographic dynamic. In this work, the following variables were selected as they are most likely to be relevant based on the above findings: economic growth (i.e. GDP), unemployment, consumption, demographics, and inflation and interest rates. This section ends with a brief summary of the effect of macroeconomic factors on housing prices.

Economic growth or decline is measured directly by the performance of the **Gross Domestic Product.** The average GDP level across the EU remained around 15 trillion euros in 2018. And the annual GDP growth decreased to around 2% in 2018 (see Appendix 3: Annual GDP growth (in percentage) across the EU from 1971 to 2018). The housing market is directly contributing to the economic output and growth. The same holds for the inverse relation. More specifically, this significant co-integration between the GDP growth and real estate capital returns is due to income required to purchase a property. The actual income of individual citizens is directly related to the GDP returns. In other words, the GDP acts as a reasonable estimator for movements of the real estate market (Asia Green Real estate, 2020).

Household wealth can be measured by real disposable income, i.e. net disposable income which is available for spending and savings after having deducted income taxes. Figure 9 displays the median income for all household types across the European Union. The disposable income is increasing across the years illustrating from 2010 to 2018.

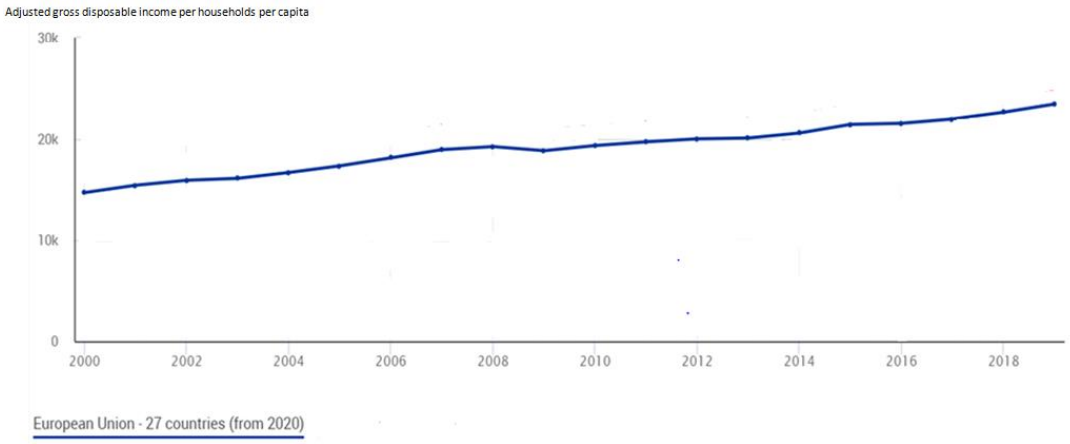

Figure 9: Disposable income in the EU – 2012-2018, Adjusted gross disposable income per households per capita (Eurostat, 2020k).

People who do not receive any income or do not have any sort of economic activity and not enough savings automatically cannot afford to buy a property. This refers especially to unemployed people having no other source of income. The unemployment rate represents the share of unemployed among all potential employees available in the job market. Beginning 2020, the unemployment rate reached a low of just 6.20% across the European market.

Consumer behavior is reflected in the **consumer confidence index**. An increase in consumer confidence implies more spending and economic growth. The confidence index is used to predict economic activity (within the upcoming year). This indicator is based on individual and general economic activity in the area as well as families' expectations. Figure 10 represents the consumer confidence index in the Euro-area based on the last ten years. It was significantly in an upward trend since 2013 and reached back the levels of 2012 early in 2020 (Lample & Ferruz, n.d.). Undeniably, the sudden decline in the index is justified by the crisis related to the global coronavirus pandemic. Analyzing population dynamics and composition in addition to consumer behavior is instructive especially for the real estate market.

Figure 10: Consumer confidence in the euro-area – 2012-2020, Consumer confidence index (Trading Economics, 2020a).

The **inflation rate** is a critical economic indicator for tracking housing prices. Inflation measures the average price level of a basket of goods and services in an economy over a period of time. This indicator gives an insight on the average citizen's financial health. All investors (i.e. including lenders) want to know how the inflation rate impacts their investment returns. What is obviously clear: an increase in inflation spills over to higher prices for consumer products. As a result investors possess a lower share of their disposable income available for property investment. In the literature, Kearl (1979) and Feldstein (1993) analyzed the impact of inflation on the housing sector with different views (Ouma, 2015). Feldstein stated that increasing inflation promotes a loss in taste for consumers to invest into real estate. Furthermore, Kearl (1979) showed that inflation brings an increase in expected housing prices (Ouma, 2015). Kearl (1979) and Feldstein showed that an increase in inflation rate decreases the demand for real estate investment (Ouma, 2015).

More importantly, inflation has an inverse relationship with interest rates. A low interest rate promotes economic growth, which increases money in circulation and inflation. This contributes to an increase in housing demand. A low interest rate benefits the debtors as they pay a low interest on their mortgage. However, creditors suffer from the fact that the repaid money is worth less than what they have lent out. Unanticipated inflation rate benefits debtors as the money to be paid to the credit institution is worth less, while the credit institution suffers as the money borrowed is worth less. Note that the average inflation rate across the EU is currently at historical lows, roughly 1.6% (The World Bank, 2020).

Population flux is assumed to be not a macroeconomic factor significantly influencing the real estate market. Figure 11 illustrates the population growth (i.e. aged 20-49) in the EU and it is significantly on an upwards curve since 2017 for the next few years to come (based on the projections) (Battistini *et al.*, 2018). This movement drives up the demand for the property market. This can be caused by an increase in birth rates, immigration or workforce migration.

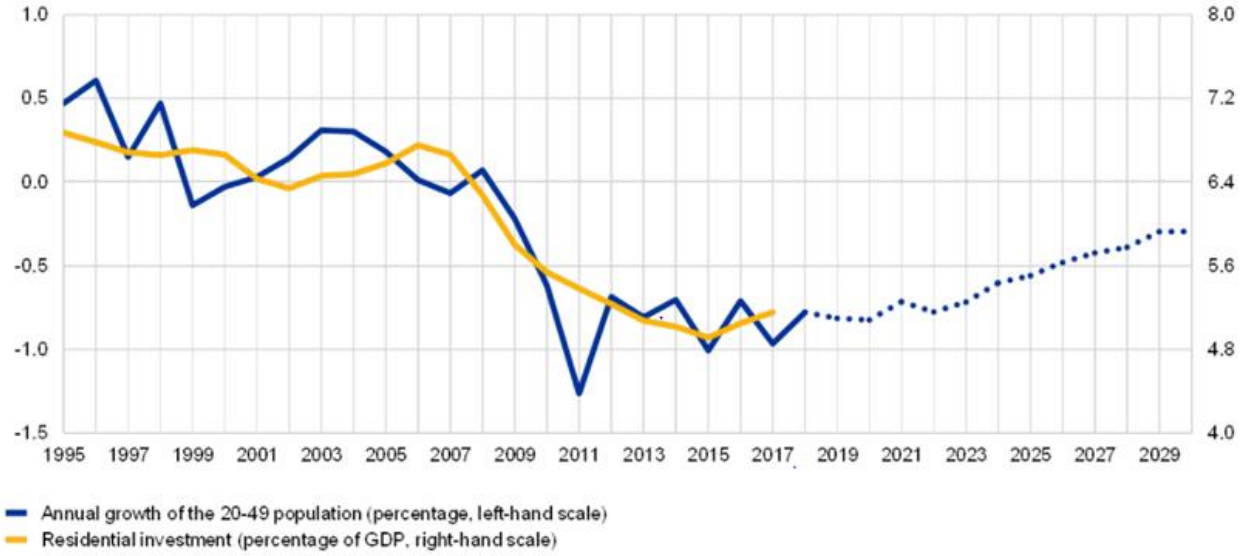

Figure 11: Annual growth of the population (aged 20-49) and residential investment – 1995-2029, Annual average of the 20-49 population (percentage), Residential investment (percentage of GDP) (Battistini *et al.*, 2018).

The study of **demographics** consists in studying the population growth, age, gender, race, income and migration patterns. It includes the study of socio economic (i.e. age, income, sex, occupation, education, family and size) information on a population (Bujang *et al.*, 2010). Demographics may affect the long and short-term economic conditions in different ways and give an insight on typical age groups (i.e. aged 20-49) investing in real estate. The age groups have different financial priorities and real estate demand. Labor output depends on the young and middle age workers as very young and old people tend not to contribute much. According to the study performed by Aksoy *et al.* (2015), demographic structural (i.e. variations in proportions of the population in every age group from one year to the other) changes significantly influenced key macroeconomics variables. For instance, the age composition of demographics gives an insight on the magnitude of impact of a demographic change. In sum, a change in the demographic composition affects housing demand explicitly which impacts housing prices.

The **mortgage market** needs to have special attention due to its importance especially for the residential market. Most potential buyers have a limited amount of money meaning that borrowing money to purchase a home is necessary. Mortgage interest rates, availability of mortgages and Euribor rate affects housing demand. The advantage of low mortgage interest rates for buyers is that they can afford a larger mortgage and get in return more value. Changes in mortgage interest rates greatly influence consumer confidence. Particularly, the ECB Euribor rate is the average interest rate provided by banks in the EU for unsecured short-term mortgages to banks. The Euribor is an important benchmark for a range of financial products priced in euros (i.e. included mortgages, savings accounts) (Hayes, 2019). Surprisingly, the Euribor-rate is almost at 0.00% since 2016. As observable from figure 12, the rates are reaching a historical low implying a high pressure on demand in the market.

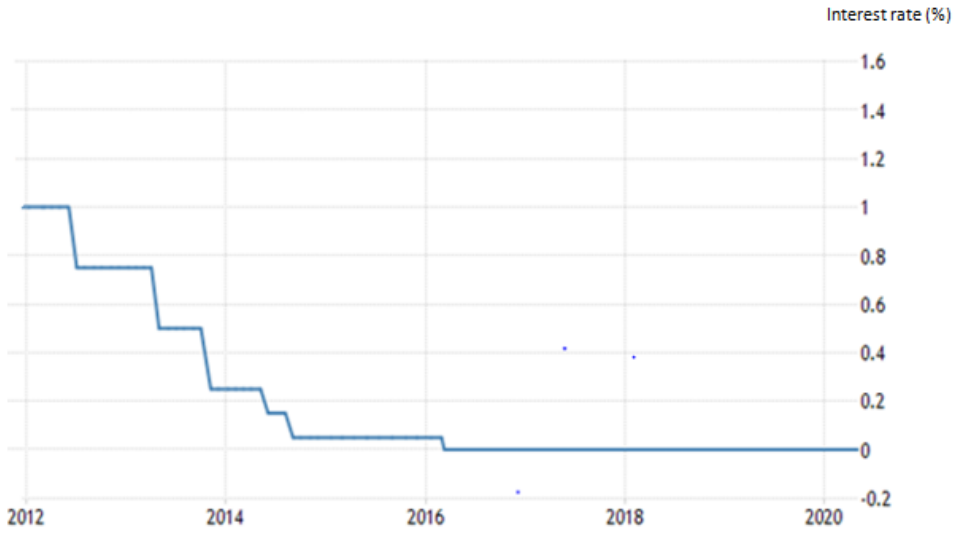

Figure 12: Euro Area Interest Rate – 2012-2020, Interest rates (percentage) (Trading Economics, n.d.b)

All economies across the EU are regulated by a **financial institution** to ensure the well functioning of the economy. This is performed by the ECB who monitors the macroprudential policies by, for instance, increasing or decreasing the money in circulation (i.e. called expansionary monetary policy). Its aim is to mitigate any risk (i.e. especially systematic) related to real estate by keeping the unemployment rate low (European Central Bank, 2017). Financial stability is promoted across this market. Excessive household or company debt is an example of what could lead to systematic risk. The policies help to smooth the credit cycle and increase resilience of banks in case of a potential increase in housing prices.

A financial crisis or a simple downturn in the economy influences banks' resilience in giving out mortgages. When the economy is in a downtrend with a high unemployment rate, there is a higher risk of clients losing their jobs and defaulting on their mortgages. Banks stop or reduce the amount borrowed to each other. In consequence, it becomes more difficult for consumers and businesses to receive credit as banks are reluctant to lend in these circumstances. However, the ECB intervenes by regulating interest rates and the money supply circulating in the economy in order to mitigate the consequences of the downturn or economic crises.

There is no particular focus on political, social, technological, environmental and legal factors in this work. This is due the fact that this work thoroughly focuses on macroeconomic factors as its primary interest is the analysis of investment fund performance. However, a small bracket on the legal system is insightful to once again emphasize the importance of political stability, while there are different legal systems around Europe for the sellers, buyers and tenants. The fact that tenants and landlords are subject to a set of laws and policies implies that the real estate market is a safe asset for investment.

Macroeconomic factors influence housing prices hence impacting the performance analysis of the European real estate market. Fluctuations in interest, inflation, households income and employment levels impact housing prices. Demographics is impacts the demand of real estate. The demand and

supply shocks are generally caused by changes in underlying factors. This may influence the evolution of housing prices.

1.2.2. Micro factors

Micro factors explain the housing profit beyond macroeconomic variables. These variables include determinants uniquely influencing the investment profitability as each investment is different. Equivalently, an investor should not choose to purchase a property without some feelings whether or not it matches his expectations. There are various ways for investing into real estate and each one has its own characteristics. These following characteristics are talked through in this section: costs, location and amenities, physical condition, environment.

Real estate investments produce income but also generate **costs** (e.g. repairs) to maintain assets in good working conditions. For instance, usage of utilities, cleaning service and insurance are all costs related to the maintenance of real estate. Some property owners prefer to call upon a property management team to ensure the real estate is properly managed in all aspects. Maintaining land requires the least amount of costs compared to other real estate types. Costs are dependent mainly on the type of usage quality of the construction and location. Some regions have cheaper labor costs over others and labor force used for repairs and maintenance is generally obtained locally.

Location is among the most important strategic factors for real estate and plays a vital role in determining real estate prices. A neighborhood can be safe or high class over a certain period of time, but this may change with time. The opposite happens when city planners engage in converting degraded and unsafe areas. Some neighborhoods are more expensive than others, which inevitably affects real estate prices (Van Alstede, 2014). Property's value or a prospective higher income could potentially be created by the desirability of a location as a result of it being strategically advantageous (Klimczak, 2010). This desirability creates demand which in turn allows for higher real estate prices. Note that the desirability of a property can change throughout time (due to external factors) but the land on which the property lies on is characterized by its uniqueness, immobility (i.e. given parcel of land can never be moved) and indestructibility. Buying a property at a better location gives better profitable options later onwards. Certain investors are prepared to pay a slightly higher price to purchase a real estate at a strategically better place. The potential generated income is a factor of perceived measurement of the safety and class of a neighborhood. A bad looking neighborhood generating low income can be perceived to be less desirable as often associated with a bad reputation. In sum, targeting a good neighborhood should be the priority of investors if it is a concern to them.

Strategic location of the real estate includes not only the location of the asset itself but its **accessibility** and **appearance to amenities** around the neighborhood. Amenities include schools, public transportation, parks, sport facilities, grocery stores and restaurants. Not only these amenities contribute to the living style of the local population but provide opportunities for local employment. They shape communities and define the attractiveness of a specific neighborhood. The proximity to amenities impacts property's valuation: the value of the real estate increases the smaller the distance of the real estate with the amenity. The location in which investors invest defines the types of people he will most likely be dealing with. As the neighborhood in which the property is located defines the type of

tenants interested in this property, which shapes the demand. For instance, if the property is near a university, then mostly the buyer will be dealing with students. The return for the buyer could be better if he decides to focus on properties in a badly reputed neighborhood but may be harder to find tenants. The buyer needs to decide what profiles he is targeting based on his objectives. Basically, the location defines the ease of access to facilities of social and technical infrastructure.

Social infrastructure includes healthcare (i.e. hospitals), education (i.e. schools and universities), public housing (i.e. prisons, community housing). A proximity to busy roadways and community centers making it less desirable to live. However, it could ease commuting on a daily basis to work. Future plans in the neighborhood matter and finding out them can dramatically influence (or reduce) the property's value. Depending if the investor wants to purchase the asset within a city or smaller town undoubtedly affects purchasing price.

Strategic determinants of the real estate location primarily include **the real estate physical condition**, which mainly is defined by its **architecture** (i.e. construction of the house walls) and design. Its originality, innovativeness and beauty impact the real estate price and value. A good or unique architecture style always takes into account the durability, usability and beauty of the commercial real estate. The design of the building ensures a good utilization of space. The value of the building decreases if the layout of the property limits the owner from fully using its space. More value is placed on buildings with uncommon styles as it is hard to replicate buildings particularly special and unique ones. The age of the building or unit is a major player in an investor's decision. It is defining the value and giving out information on the likelihood of a newly built or refurbished unit to not undergo in the near future renovation and remodeling. The year, quality and size in square-meters are fundamental factors impacting property's valuation and define to some extent tenants' quality of life. In sum, the building's physical aspect and condition contributes to the aesthetic of an area (Wealth and Property, 2014).

Property purchase depends highly on prospective **buyers' needs and wishes**. While some buyers seek to fix properties, most home buyers prefer a house that is ready to move – in and ready for usage. They are willing to pay even a premium price for this service. The National Association of Realtors clearly states that houses with upgraded kitchens and bathrooms are more attractive to investors as renovation represents a major expense (i.e. headache) for buyers. Hence, upgraded investment recoups its value especially when selling the property on the market (Matthews, 2018).

Another fundamental characteristic in terms of the real estate location is the **environment** (i.e. the landscape design and views) in which the property finds itself. Outdoor spaces are important within the landscape as it increases the property's value. If the garden areas are nicely maintained with a close access to nature, then it could bring up demand to this area. When the government sets up big plans for a particular area, then it could highly impact infrastructures for a practical set of profiles of homeowners. Hence, the environment of a real estate asset defines its features and desirability for buyers.

The socio - economic environment includes the **neighborhood demographic** and **social-occupational** characteristics (Klimczak, 2010). Determinants include, for instance, higher education development, improvement of social and transport infrastructure, growth in a small business and trade. The type of

development in the real estate's area is extremely important especially for its pricing. The development of the area reflects itself on the price. Some buyers may avoid noise, high traffic volume, zoning restriction and local regulation. This behavior influences local building activities and real estate prices (Matthews, 2018). In sum, socio-economic determinants define real estate investment's attractiveness to the extent of influencing investors' decision-making process (Van Alstede, 2014).

Furthermore, the **vacancy rate** plays a significant role in market shifts and gives a better understanding of the phase in which the market currently finds itself. Differently thought, this vacancy rate stands for the time between one renter and the next one. It is possible that the requested rent is above average of properties in this location. A neighborhood with a high vacancy rate induces a drop in real estate prices, bringing an increase in buyers and investors' confidence. While an area with low vacancy rates particularly attracts first time home buyers, which is great for sellers as housing prices go up. This indicator highlights real estate performance. Alternatively, it can be seen to provide information on how successful an owner or company fills up open positions. Investors can use this indicator to determine the worth of an investment.

In conclusion, discussing economic variables including both macro and micro factors allows the reader to gain a complete picture of the housing market and its relation to the housing prices. The macroeconomic variables bring up the conclusion that they not only affect the general cycle of the market but specifically supply and demand, which in turn affect housing prices. Among the most meaningful microeconomic factors are location and socio – economic factors for the real estate valuation and uniqueness, which contributes to meeting demand. These factors provide an emphasis on contributing to real estate cycles movements.

CHAPTER 2: INVESTMENT FUND MARKET

An investment fund is a pool of money that belongs to different investors and which is used collectively in order to purchase the securities with the aim of receiving a higher return. Funds exist for various industries and asset classes. Some of these funds could be perceived by investors to be more advantageous for investing due to the returns being adjusted to a given risk level. Fund investment styles and legal framework play a crucial role in the returns of funds (Shortman, 2010). Different levels of complexities within the fund impact and contribute to the competition among various structures (i.e. legal regime) and investment styles. Above all, increasingly diversified types of funds (i.e. real estate) drive the competition in the market.

An investment fund can be classified as an **open** or **closed-end** fund. On the one hand, open-end funds give investors the opportunity to invest or redeem fund shares as long as there is a continuous flow of liquidity within the fund. The price of an open-end fund corresponds to the Net Asset Value (and hereafter referred to as "NAV"). It is equal to the total value of assets in a fund subtracting the liabilities and total number of shares outstanding (Himbert, 2014). On the other hand, closed-end funds are mainly focused on long-term investments and no new capital inflow to the fund occurs once the fund is closed.

This section presents the investment fund industry and their stakeholders. Highlights of the success of the investment fund industry in Luxembourg are presented. Luxembourgish investment funds offer different products depending on investors' profile. A description of the Luxembourgish real estate investment fund market is provided following a presentation of key stakeholders in funds. This section ends with a talk about the theory and the performance metrics used in this study.

2.1. Luxembourgish funds industry

The Luxembourgish market is known for its continuous strong growth of their investment funds industry. Luxembourg investment fund industry is known for cross-border fund distribution. Funds established in Luxembourg are actively investing in over 70 countries, with a specific market focus on the Asian, European, Latin American and the Middle Eastern market. There is a constant increase in the market share (in percentage) of fund initiators from various different countries to choose Luxembourg for the establishment and management of their funds. Luxembourg is becoming the gateway target country for the European and global investment fund market. The Luxembourgish market is constantly looking to include technology and innovation in the offered real estate investment products.

This work focuses **on funds established in Luxembourg** for the following reasons. Several of the industry's services and initiators are located in Luxembourg. There are a lot of management companies with various backgrounds. The advantages of funds established in Luxembourg can be split into three pillars namely: economical, industrial and product wise. There are several positive aspects in terms of the country's economic aspects: Firstly, the country is politically and socially stable. Secondly, it possesses a highly skilled and multilingual workforce. Thirdly, it has various tax treaties building a competitive

network of tax compared to other nations. Fourthly, the industry sector is subject to several regulatory regimes. The **Luxembourgish authority**, called "*Commission de Surveillance du Secteur Financier"* (and hereafter referred to as "CSSF"), is playing a crucial role in the supervision of the financial sector (i.e. investment companies, the investment fund industry) (Association of the Luxembourg Fund Industry, 2016).

Management companies are specialized in handling the services related to the products and demonstrate capabilities in attracting asset managers. Funds are considered to be on an international platform with a distribution of cross-border funds. Hence, they are easily accepted by financial regulators in other parts of the world. According to a study published by the European Fund and Asset Management Association (EFAMA), about one out of ten funds in the entire world is established in Luxembourg. Luxembourg is ranked among the top largest fund domiciles in the world with about 9.3% of the market share followed by Ireland, Germany, France ranked with respectively 5.3%, 4.6% and 4.5% (Association of the Luxembourg Fund Industry, 2016).

The new upcoming competitor to Luxembourg is Dublin, which has a large capacity to attract future businesses, as this city is particularly successful and known within English-speaking countries making it easier to attract potential clients as there is no language barrier. Ireland manages to market itself fairly easily as it is generally a lower-cost country for establishing and maintaining businesses. While for the UK, traditionally, Jersey is a particularly attractive hub for investors for establishing funds due to its efficient tax system. However, it is not part of the EU implying that it is not exposed to some of the advantages Luxembourg entails. Despite all these competitors, Luxembourg remains a leading hub in Europe for establishing and managing investment funds and this market offers highly diversified products (Association of the Luxembourg Fund Industry, 2016).

Before presenting the various products offered in Luxembourg, this study firstly gives a brief overview of the **legal framework** and regulatory overview of investment funds in order to understand the different products. Importantly, the choice of a regulatory and legal framework defines fund investment policies and strategies, the tax components and marketing strategies. Funds registered in Luxembourg are exempt from taxation on income and benefit from an exemption on withholding tax. On the legal scale, there is a possibility to choose between a (more) unregulated or regulated real estate investment vehicle and then, the organizational criteria (e.g. such as a fund of funds, closed or open-end fund)

Firstly, a brief overview of the difference between a **regulatory** and an **unregulated framework** is provided (CMS, 2015). Essentially, the regulated framework implies that those funds are supervised and authorized by the Luxembourgish authority to perform their activities. An investment fund is subject to a primary law:

the Law of 19 of December 2010 on undertakings for collective investment (i.e. named the UCI law) or

the Law of 15 June 2004 on the investment company in the risk capital (i.e. called the SICAR law) or

the Law of 13 February 2007 on specialized investment funds (known as the SIF law) or

the law of 23 July 2016 on Restricted Alternative Investment Funds (the RAIF law). RAIFs are not under direct supervision by the Luxembourgish local authorities, but they are managed by a supervised entity, the AIFM (KPMG, 2018).

Importantly, regulated funds provide a high level of investors' protection. On the contrary, unregulated funds are not subject to any of the above laws. Unregulated vehicles are usually set up as companies or partnerships. Note that, vehicle is a means used by investors to gain positive returns on their invested money. The unregulated funds offer a higher level of flexibility (i.e. in the choices of the provided services) and lower fees. This section moves on with a presentation of legal basic structures for investment vehicles.

Investment vehicles can be formed either as an investment company or based on a contractual form as a common fund. The next part of this section discusses different types of investment companies and common funds. Firstly, investment companies with variable capital are called "*Société d'Investissement à Capital Variable"* (hereafter referred to as "SICAV"). SICAV is an investment vehicle with **variable capital** subject to low annual subscription tax, where the capital amount at any time is always equal to the NAV. While an investment company structure with fixed capital is defined to be the "*Société d'Investissement à Capital Fixe"* (hereafter referred to as "SICAF"). The SICAV is defined to be a public open-end investment company, while the SICAF is an investment vehicle with a fixed capital, therefore, closed-end fund. Secondly, the common fund called "*Fonds Commun de Placement"* (hereafter referred to as "FCP") is an open-end fund with a contractual co-ownership entity where the co-owners are not liable to the amount they have contributed. The contract connects the fund management company with its investors, where they become co-owner of the fund by the purchase of shares. These funds are destined rather for individuals as it is fairly cheap to create, while SICAVs are rather used by professional investors (Ferguson & Braun, 2016) (KPMG, 2018) (Fauverque, 2016).

Real estate investment funds can invest directly into real estate assets or via an "intermediary". Real estate investment funds can be created as a structure of "Funds of Real estate Funds", which means a fund invests into another real estate fund or via "indirect real estate funds", who themselves invest into a listed property-related securities (Ketenci & Ketenci, n.d.). In other words, funds may be investing into shares that are issued by real estate companies. Note that, the majority of real estate investment funds are established as SICAVs as basic structure and shares are sold to professionals (or well-informed investors) subject to risk diversification rules as protection mechanism for investors (Ketenci & Ketenci, n.d.).

The main products offered in the Luxembourgish investment fund industry are thoroughly presented. Luxembourg became a prime leader after having implemented the European framework for collective investment funds which strengthened its position in the investment fund industry. These collective investment funds have a sole purpose of bringing together investors' capital and invest the money collectively into a portfolio of financial instruments. The collective investment funds are subject to the **Directive on Undertaking for Collective Investment in Transferable Securities** (European Commission, n.d.b).These funds invest basically in the form of an investment fund into various securities (i.e. stocks, bonds, stocks and bonds), while being highly regulated on the European level through a set of common

rules and regulations. In fact, the following two types of investment funds offered in Luxembourg are the **Undertakings for Collective Investments in Transferable Securities** (and hereafter referred to as "**UCITS**"), and **Alternative Investment Funds** (and hereafter referred to as "**AIFs**").

Firstly, **UCITS fund** are easier to **attract retail investors** who have a preference for **regulated funds**. These investment funds invest through highly regulated vehicles. Fund shares are distributed publicly to retail investors across any EU Member State providing investors certain protection mechanisms. The Directive states that a European passport is provided to all funds established in an EU Member State. This implies that it can easily be marketed across different EU member states. UCITS are very flexible from a product perspective and can invest with a wide range of investment strategies and into highly liquid assets. The main conditions for a fund to be qualified as a UCITS scheme is that it must invest capital collected from the public into transferable securities and other liquid assets as investors should be able to redeem their shares. Investments are conducted into transferable securities which are generally admitted or traded on a regulated market.

The basic structure and the applicable legislation to UCITS define notably investment policies of funds. The basic company structure for an UCITS can be either in the form of a common contractual fund or as an open or closed-end investment company with variable or fixed capital. The FCP has no legal personality and has to be managed by a Luxembourg management company (Luxembourg for Finance, n.d.). The applicable legislation for UCITS is the law of 17 December 2010 known under Part I ("UCITS law") and Part II. Essentially, the difference between Part I and II are in the rules of investing or borrowing for the undertaking collective investments. The main difference of Part II is that there is no European passport and hence the shares cannot be so freely marketed across the EU. Furthermore, independently of the selected UCITS scheme, the fund can be set up as a single fund or as an umbrella fund that is composed of several sub-funds where each one has different investment objectives and policies. In general, investment funds do not invest more than 10% of the fund assets into transferable securities issued by the same body as funds are subject to strict policies to ensure risks are diversified.

Secondly, the **Alternative Investment Fund Managers Directive** (hereafter referred to as "AIFMD") is a comprehensive regulatory and supervisory framework that transposed the EU regulatory landscape for the **Alternative Investment Fund**. According to Article 3 in the Directive, it is stated that the AIFMD only applies to AIFMs who either directly or indirectly manage AIFs whose total assets under management exceeds the threshold of EUR 100 million. While the AIFMD applies to AIFs whose assets under management does not exceed a total amount of 500 million euros if the portfolio is unleveraged (i.e. no debt) with no redemption rights exercisable during the period of the next 5 years following the first investment in each AIF (European Parliament and Council, 2019) .

This Directive states that the Alternative Investment Fund Manager is authorized to supervise investment funds. The Alternative Investment Fund Manager (AIFM) is a legal person whose business is to manage one or several AIF funds. There are two groups for AIFMs, the authorized AIFMs and registered AIFMs. The authorized AIFMs are required to comply with the Directive and can provide their management services to the respective AIF and market it across the European Union, while registered AIFMs are exempted from several requirements given the fund size is smaller. Funds comply regardless

of their legal status or if it is regulated or unregulated. Concerning funds and managers located in a third country, can be possibly covered by this Directive (ElvingerHoss, 2015). For instance, in the context of Brexit, UK-based fund managers became the third-country managers in the context of the Alternative Investment Fund Managers Directive (AIFMD).

The **main differences** and **identical points** between UCITS and AIFs, is that UCITS type funds are dedicated to known as traditional investments (e.g. bonds and stocks) whereas AIFs allow investors to directly invest in real estates, private equity, real estate, commodities, hedge funds and venture capital. But the UCITS scheme allows investors to invest into shares of real estate companies that invest themselves into real estate assets through funds of funds. Importantly, UCITS are subject to a number of additional rules in contrast to AIFs (Luxembourg for Finance, n.d.). For instance, UCITS type funds cannot invest more than a specific, proportion of their assets in one single holding. These rules contribute to the mitigation of the risks at the fund level (CS-Avocats, 2021). Whereas a non-UCITS type fund may invest for example a large proportion of its assets into a single property that is more sensitive to fluctuations of a specific factor, thus this could significantly impact the fund returns.

Next, the main difference and similarities between both types of products in terms of **their asset management companies** are briefly presented. Some funds may be self managed, however due to the increase in regulatory requirements after the financial crisis, management companies are authorized to manage UCITS funds. The management company is known under ManCo for this investment fund. While for Alternative Investment Fund Manager (AIFM), management companies are authorized to manage alternative investment funds. Moreover, investment fund managers can outsource the management of the fund day-to-day operations to investment management companies called ManCo (stands for Management Company). Alternatively, might prefer these companies for their fund management meaning that the fund operates with an external AIFM. This is due to the abilities of these companies to ensure that the fund is AIFM compliant.

A brief description of the UCITS and AIFs real estate market, in terms of its market size and share, is provided. For the **UCITS fund market**, the total net asset under management for UCI initiators in Luxembourg is around 5,090.775 billion euros in February 2021 (Association of the Luxembourg Fund Industry, 2021a). The Luxembourgish UCITs market counts around 3,611 funds in December 2020. The breakdown by investment policies in terms of the total net assets invested in the real estate market is around 93,495 million euros with around 332 UCITS funds as observable in table 1 (Association of the Luxembourg Fund Industry, 2021b). Overall, the real estate market is the sixth largest market following the fixed-income (i.e. mainly bonds) and equities market. Whereas, the investment class distribution of Funds has 2,136 UCITS funds equivalent to total net assets of 93,495 million euros as shown in table 1 (Association of the Luxembourg Fund Industry, 2021b).

Table 1: Investment class distribution (Association of the Luxembourg Fund Industry, 2021b).

	December 2020	
Investment class distribution	Number of Fund Units	Net Assets (millions of euros)
Fixed Income	3,212	1,412,963
Equity	4,055	1,619,138
Balanced	3,628	963,995
Money Market & Cash	229	414,483
Funds of funds	2,136	283,325
Real Estate	332	93,495
PE/Venture capital	612	105,755
Other	386	80,626
Total	1,459	4,973,780

A brief overview of the **AIFs** real estate investment fund **market share** and **size** is provided. Figure 13 represents the percentage of various types of AIFs across the European Union, where real estate funds represent about 12% of total AIFs. Furthermore, real estate funds remain the third-largest AIF type (after private equity and hedge funds) in terms of size with an equivalent market share of about 11% of all AIFs in 2017. The market size in itself is measured by the total assets under management represented by the NAV, which is estimated to be around 523 billion euros (European Securities and Markets Authority, 2019) and roughly 4,530 alternative investment funds with a domiciliation in Luxembourg (Norrestad, 2021).

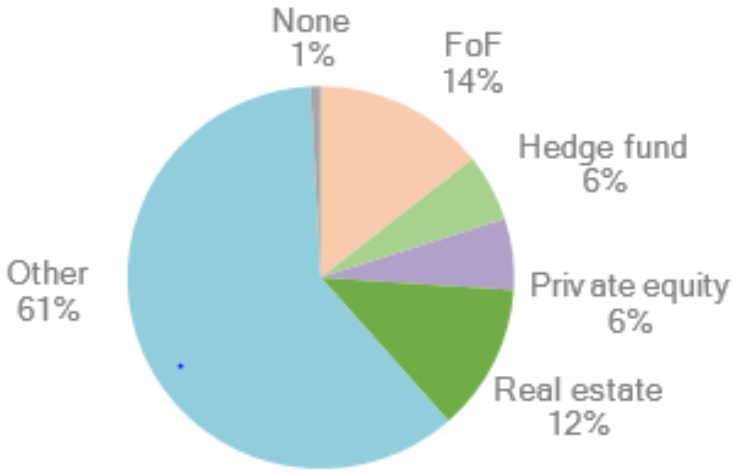

Figure 13: AIF types in the EU (European Securities and Markets Authority, 2020).

After having provided a main overview of the characteristics of both offered products, this section continues with a presentation of **main shareholders** and **asset management companies**. An exhaustive list publicly available with information regarding the investors is impossible to find considering this information is confidential. However, in accordance with the publication of the CSSF, the concentration

of the type of investors is about 95% of institutional investors for real estate funds at the end of 2018 for the AIFs (Commission de Surveillance du Secteur Financier, 2016).

Major institutional investors for UCITs and AIFs are notably insurance companies and pension funds for the real estate investment funds market. According to the statistics elaborated by Perqin real estate online, about 15% of all institutional investors invest into public pension funds (Perqin Real Estate, n.d.). Real estate funds remain the largest investment for most public pension funds. This high participation in is due to the fact that the funds mainly focus on long term investments. Amundi and BlackRock are known companies within the pension fund industry whereas, AXA, Aegon, Allianz, Prudential, BNP Paribas Cardiff are known insurance companies based in Europe (PricewaterhouseCoopers, 2015). The Starwood Capital Funds Services Luxembourg is an institutional investor with a primary focus on real estate classified as the 10th most global opportunistic real estate fund in March 2015 investing into AIFs (Starwood Capital Group, 2020). As it is not possible to find an exact number or an exhaustive list of institutional investors in this market, a non-exhaustive list of investors is presented.

The Association of the Luxembourg Fund Industry made an interesting analysis from surveyed real estate funds investing directly into real estate. The most common type of real estate investors is found to be institutional investors (representing about 87% of all real estate investors). The other investors are high-net-worth individuals (about 7.7%) (Association of the Luxembourg Fund Industry, 2020). Figure 14 below provides a good insight of the stakeholders' group for the real estate market of which 29% of the clients are pension funds and 21% insurance companies (Commission de Surveillance du Secteur Financier, 2018a).

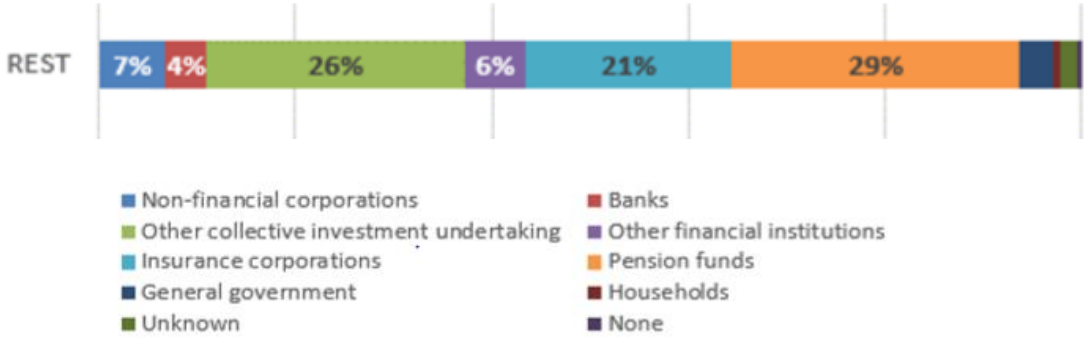

Figure 14: Investor group type per AIF types for the funds registered in Luxembourg (in percentage of the NAV) (Commission de Surveillance du Secteur Financier, 2018a).

Moreover, the number of asset management companies is about 314 in 2016 in Luxembourg being a leader in Europe (EFAMA, 2018). Among these companies there are about 97 firms that are registered in Luxembourg and are defined to be under the surveillance of the CSSF according to the annual report published (Commission de Surveillance du Secteur Financier, 2018b). Furthermore, the total number of asset management companies operating across Europe reached around 4,200 in 2016 (EFAMA, 2018). The major management companies for UCITS funds and for alternative investment funds are JP Morgan asset management with an amount of 277,363 million euros under management. In addition, DWS Investment (Deutsche bank) and Amundi are part of the top largest asset management companies in

Europe as observed in table 2 (Luxembourg for Finance, 2019). After presenting the different products offered in the Luxembourgish real estate market and providing an overview of the real estate investment, this section moves on with a talk about the performance metrics for measuring fund returns.

Table 2: Luxembourg Asset Management Groups (Luxembourg for Finance, 2019)

Ranking	Management Company and/ or Alternative Investment Fund Manager Group	Nationality of the Group	Assets under Management (in EUR millions)
1	JP Morgan Asset Management	US	277,363
2	DWS Investment (Deutsche Bank)	DE	175,261
3	Amundi	FR	154,831
4	BlackRock	US	143,908
5	UBS Fund Mangement	CH	131,024
6	FIL Investment Management (Fidelity)	US	110,787
7	Schroders Investment Management	GB	109,087
8	Aberdeen Standard Investments	GB	90,659
9	Pictet Asset Management	CH	85,71
10	Eurizon Capital	IT	85,047
11	Franklin Templeton International	US	83,27
12	BNP Paribas Asset Management	FR	78,8
13	Nordea Investment Funds	FI	72,017
14	AllianceBernstein	FR	63,913
15	Invesco Management	US	58,278
16	GAM	CH	53,417
17	Union Investment	DE	48,433
18	Robeco	NL	47,409
19	Deka International	DE	45,658
20	Universal-Investment	DE	45,447

2.2. Stakeholders

Freeman (1984) defined stakeholders to be including a “broad and a narrow sense”. In the “broad sense”, the stakeholder is any identifiable group or individual who has the possibility to affect the achievements of an organization’s goals through his interests. The stakeholder does not necessarily own a share of the company but can inversely affect the goals of the organization. In the “narrow sense”, a stakeholder is any identifiable group or individual contributing to the organization’s existence (Niu *et al.*, 2010).

Miller (2019) discusses the importance of stakeholders. They contribute to the business by enabling innovation, new features and developments. He concluded that there are some crucial elements contributing in a positive manner to the company’s strategy: innovation, business growth, shareholder’s value, social responsibility, and customer and employee loyalty. For instance, disagreements regarding the company’s management and strategy can have a negative impact on the company’s strategy.

There are two major groups of stakeholders in a business defined as **internal** and **external**. An internal stakeholder is a person or a group of people that directly contributes to the company’s internal operations. This type includes for example employees, shareholders, board members and owners of the

business. **External stakeholders** are individuals or groups that are outside of the business but can affect the business in terms of its returns through, for instance, its productivity and financing. This type includes, for example, the outside community, government, suppliers and trade unions. External and internal stakeholders are distinguished depending on their financial activities and level of interests. It has been shown in the literature that the success of the business is directly related to the continuous flow of a good relation between internal and external stakeholders.

Internal stakeholders are considered to be part of the company's management team with a direct interest in the company's success through remuneration or investment. Internal stakeholders influence the company's performance and strategy through their voting rights, which are generally based on the number of shares (or percentage) of major investments, appointment and monitoring of the top management. The board of directors is an elected group of individuals that represent the company's shareholders. Typically, they are in charge of the governing and management of the company and make important decisions. Those owning a larger stake at the company might play a more important role in meeting the company's leaders and contributing in the development of ideas in a organization. Typically, internal stakeholders have a more direct influence on the organization due to their proximity with the project over external stakeholders. External stakeholders are indirectly influencing the organization's operations and decisions by, for instance, presenting information. The decisions made by the company are of interest to external stakeholders. However, external stakeholders cannot bring a change in the company's members. They do not participate in the company's internal operations and decision making.

The **relation** between stakeholders and the businesses is important as the decisions and actions taken should benefit both parties. Adiguzel and Artar (2017) showed that this relation depends solely on five vital factors: trust, commitment, dependency, coordination and participation in the decision making. The trust established through the relation with other companies is important as it allows the business to operate safely. A primary objective of the business should be to set the relation with its stakeholders to ensure and limit any potential conflict of interests. The strong commitment of the stakeholders within a competitive environment enhances the business. This helps the business to pursue its activities and goals. A good coordination between various parties limits the appearance of problems. Communication is a key factor for ensuring that stakeholders are able to bring success to the business. Finally, the participation in the decision making gives stakeholders the possibility to be part of the business operations (Adiguzel & Artar, 2017).

Next, the relationship between stakeholders and investment funds is discussed to get an understanding on how they contribute to the investment fund performance. In the context of investment funds, stakeholders are key players contributing to the continuous growth of the investment fund by, for example, helping them to remain innovative (i.e. investing in outstanding assets) in order to attract and retain investors. Stakeholders play a significant role as they contribute to the competitive environment and significantly impact fund management and performance.

On a primary basis, stakeholders involved in the investment fund industry are introduced with a clear understanding of each individual's interests. There are no additional or different stakeholders for real estate investment funds. Performance of real estate investment funds depends not only on the capital

pooled from investors but on the dedication of investors and employees (e.g. risk managers and administrators) in charge of side and core activities of funds. The four main tasks present within an investment fund are investment management, marketing (i.e. performed by a fund promoter) and administration. The internal stakeholders involved in the investment fund industry are a set of different players that are in charge of managing various day to day activities related to fund management. These players include, for instance, investment managers, fund administrators, consultants and investors. The external stakeholders involved with investment funds are fund promoters, government and media. The interaction and impact of investment funds with the society and community are briefly presented later.

Shareholders are considered to be a subset of the stakeholders but are often interchanged with stakeholders. A shareholder is an investor being a person or an organization owning a share of a company's stock known to be equity. He entails a voting power, which includes the election of the directors and members of the board of directors. Investors influence the management depending on the conditions of the respective fund. The performance of the fund determines the share on the assets each shareholder would be allowed to receive. Each investor has different rights that can affect the claims or demands (Belmont, n.d.). In the event of a bad performance, he is most likely to be losing all his money as he is the last priority to be paid. Investor's objectives are essentially to achieve a maximum return possible on their investments. He has the right to transfer his ownership by selling his share to a different investor through the stock exchange if the fund is listed. Interests of all stakeholders must be taken into consideration to ensure no conflict of interests.

Investors in investment funds are classified as retail and institutional investors. An institutional investor is an organization or a representative for some entity that trades securities with a sufficient amount of shares to qualify for receiving benefits (i.e. negotiation in favor of lower fees) and most of them invest on behalf of their clients. While a retail investor is just an individual who manages his own money, buying and selling, for instance, equity shares but due to the small amount of transactions they usually need to pay higher commissions. Some investors can be characterized to be high-net-worth investors if they are in possession of a high-net-worth of money (i.e. a minimum of equivalent amount of 125,000 EUR). The participation in the fund is usually only open to "well-informed investors" or known to be highly knowledgeable individuals, with the required skills (Limestone, n.d.).

Asset management companies are crucial to the development and management of investment funds. They receive the duties of holding and investing into securities from the pooled capital of investors into the financial market. They are responsible for managing the daily operations of the investment fund. They employ fund managers, accounts, analysts, risk managers, auditors responsible for the daily maintenance of investment funds. The compliance department plays an active role in managing the risks and avoiding financial crimes. The next part of this work elaborates on these employees who participate in the activities of the investment fund on a daily basis.

Investment fund managers act on behalf of investors and invest according to a predefined framework. They are in charge of managing the daily trading activities with the aim of adding value to the fund, by for instance, setting up the investment strategies of a fund and deciding on which assets the funds

should invest in. Studies on potential clients or companies but also on investment assets are part of the investment fund daily duties.

The **compliance department** ensures for example that investment funds respect external and internal rules and work to meet key regulatory objectives to protect investors. They work with the aim of complying with the regulatory framework, while ensuring that no clients or investments are related to financial crime. These rules focus on supporting consumer confidence and identifying risks faced by the investment fund. Typical areas of executing their activities are the following: identification, prevention, monitoring and detection. This activity involves a comprehensive monitoring and analysis of a sensitive field within the investment fund market.

Fund administrator ensures the financial and legal compliance of a fund. His duties are typically composed of two activities: the fund accounting and registration, and transfer agent. A transfer agent is a trust company or a similar institution that maintains the investors' financial records and follows investors' account balances. He is in charge of distributing to the shareholders the dividends and capital gains. This set of services supports the running and management of a fund including all back office work, while ensuring efficient planning and implementation of the day-to-day activities. The fund must be set up in accordance with the rules and regulations. Its traditional activities include, for instance, financial reporting, opening and controlling bank accounts and executing the payment of expenses related to the functioning of the fund. The activities may be outsourced to a fund administration company who is in charge of performing all required activities (Acca Think Ahead, n.d.).

Risk managers play a vital role within investment funds as their activity includes setting up internal processes and building systems with the purpose of identifying, measuring, controlling and managing risks in regard to their investment activities. Risk managers have to set the objectives in terms of notably the tolerance of risk and the amount of losses managers are ready to face resulting from a bad investment.

Auditors are crucial for checking and controlling that the investment fund complies with the rules and policies set by the authorities. They walk through key controls by verifying that processes and operations are done effectively and perform regular tests on investment fund performance and compliance. Auditing investment fund financial statements is an important activity for investors planning to invest into the fund. In sum, this activity aims to analyze and verify the consistency and accuracy of fund reports.

Subsequently, funds are managed by a **depositary** (e.g. bank), which monitor, audit and verify assets ownership. It is required by the law to ensure that the assets of funds established in the EU are safe. Ultimately, it also has to monitor and supervise that the laws are respected in the fund activities (i.e. fund accounting records are correct) conducted by the fund or of its management company. The depository bank is responsible for ensuring custody and the safeguarding of the fund assets (Van Alstede, 2014).

It is useful to **summarize the players** present in investment fund companies for a comprehensive understanding of the interaction of the key stakeholders in this industry. Figure 15 illustrates an investment fund with investors' savings (i.e. for retail and institutional investors). The investment management company (i.e. named as ManCo in figure 15) tries to handle the pool of capital with the help of fund administrators, risk and compliance managers and auditors. External Investment Management Company is delegated to be supervising the outsourced activities of the investment fund. Finally, the depository and fund administration are depicted to be monitoring and in charge of the administrative aspects of the investment fund.

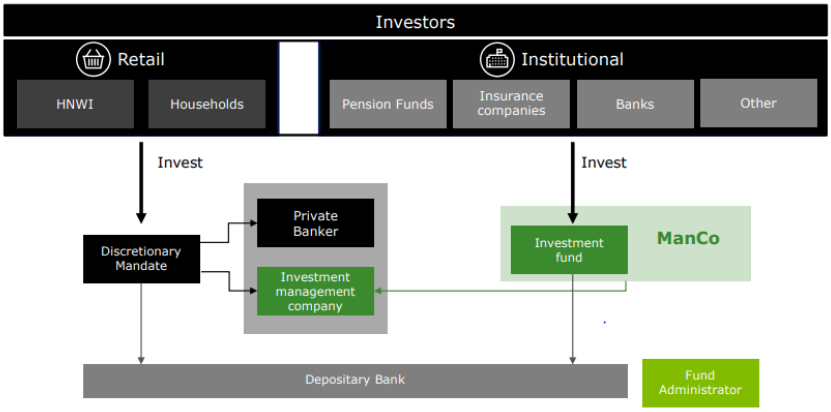

Figure 15: Key players involved in the management of investment funds (Deloitte, 2016).

Afterwards, the fund is governed through a **Board of Directors** (i.e. general partners and managers) voted by the shareholders. The board of directors has the primary role of ensuring that the fund is managed within the views and interests of the fund. It reviews and approves the main contracts with the outsourced companies. They approve the policies and procedures in order to ensure that the fund is compliant and executing its activities in line with its objectives. Following the talk about the employees involved in the fund activities, it is crucial to move on with a brief overview of the external stakeholders contributing to the function of the fund.

There are various bodies participating in the pre-launch work. The main players responsible for the take-off of the fund independently from the fund structure are: **promoters and asset management companies (**i.e. if applicable and already existing). Their activities depend deliberately on the considerations of the fund structure, governance, operation, control, fund information and investment policies. This is related to the fact that funds under the UCITS, 2010 law part II UCIs and SIF need to receive an authorization from the Luxembourgish authority before launching their investment fund.

The **fund promoter** plays a major role in requesting the authorization for investment funds to execute its activities. He is essentially responsible for the establishment and maintenance of the fund. The investment strategy of the fund aims to remain consistent during its existence. A considerable amount of time is needed for the fund promoter to assess clearly the fund objectives, policies and strategies. The fund promoter decides notably on the registration procedure and structure of a fund. He begins by selecting the activities which will be outsourced based on, for instance, economies of scale (i.e. a higher

activity refers to less costs) and the regulatory framework. This is the way by which investors gain access to professional investment management. Fund promoters contribute to increasing the investment management company's reputation. They need to understand how to effectively attract multiple rounds of investment through issuing securities, making private placements and listing the securities on the stock exchange and they have expertise and knowledge about the assets of funds (Deloitte, n.d.a).

Banks and **creditors** are part of main external stakeholders in investment funds as a majority of investment funds take on leverage. Financial institutions are playing a significant role in shaping and determining the financial stability of the financial markets. This is a win-win situation as financial institutions make a profit through the annual interest rate paid by customers, while the leverage contributes to a significant increase in investment fund returns.

Alternative investment funds can be listed on **recognized stock exchanges.** There is a key advantage for investors as they can buy and sell AIF shares through stock exchanges. Funds with a variable capital of investment allow investors to buy and sell shares at their convenience on the stock market. The stock market is a platform allowing for this exchange to happen implicitly being a crucial player (Edelweiss, n.d.). Public entities have a significant place within investment funds as seen above but local authorities are considered to be a key player from another perspective.

Local authorities supervise that investment funds comply with all rules and regulations. More specifically, as mentioned above, the CSSF is a competent authority for financial institutions and professionals in the market. It plays a major role in supervising the financial sector in Luxembourg by ensuring all policies and rules are successfully applied, by supervising, authorizing and informing appropriate institutions and investment funds. They supervise that investment funds fight money laundering and terrorist financing. It investment funds do not comply with the policies then the CSSF has an obligation to give sanctions.

The **media** could possibly influence portfolio managers' investment decisions. Perramon Ayza (2014) analyzed the influence of the media on decisions taken by investment fund managers. Some fund managers have been interviewed in his studies and they claimed that the media does not have a large influence as it has access to specialists providing detailed analysis. Perramon Ayza (2014) states that the press has a particularly strong influence on small stakeholders due to the little information they have access to regarding these companies. According to the study performed by Deephouse (n.d.), overall media has decreased its influence on the financial market. However, investment management companies treat the media with caution as investment movements are occasionally impacted by its publications. Shiller (2000) conducted another study where he found that the press did not generally influence investors' decisions. The media plays a role in giving out information and is in relation with financial analysts and managers who contribute in maintaining the good reputation and informing the public about its performance. But Shiller (2000) considered that the media participates in shaping investors' ideas. Often the media brings in negative information which in consequence induces a negative influence on the company (Perramon Ayza, 2014).

Another important external stakeholder to discuss is the creation of a **loyal community**. Investors are prepared to give money for investment based on various key features (i.e. trusts and performance) of investment companies. Fund investing into real estate allows for further development which in consequence brings a positive impact on society. More importantly, investment fund companies ensure that their reputation within a community remains positive helping them to attract investors.

Trade unions exist to provide employees the possibility to influence companies and shape them on social and economic policies. Ultimately, this gives the possibility to employees to ensure that they work in a safe and healthy environment. It can be seen as pressure groups with the aim of influencing public policy with a specific objective in mind. It forms a legal unit which stands on the side of employees and acts on the company with the objective of bringing a change. Trade unions exist in every country and each one is important as individuals are too weak to bring forward their interests. Collaborating with several employees has a larger effect and brings more value to the respective company. Trade unions could potentially influence company's decisions and impact shareholders' interests. Potential conflict of interests may arise due to different interests between, for instance, these stakeholders.

From a different aspect, real estate investment funds contribute in trying to bring a **social impact** onto the market. They inevitably contribute to society by providing social and environmental benefits. For instance, through investment of funds, the members of the community can gain confidence that the respective project can further develop. Funds contribute to the economy and population in a positive manner through its investment. Especially, in this market due to large sums required for real estates, investment funds play a crucial role in contributing and allowing the development of the real estate. Evidently, people need to have a property to live in and investment management companies need to have a space dedicated to its operations. This is especially insightful in underserved areas where investment opportunities can leverage the social experience.

Before concluding, it is important to mention that stakeholders contribute to the **reputation of a company** and it is a way for achieving a competitive advantage. According to the studies performed by Deephouse (n.d.) the reputation showed to have positively influenced fund performance and strongly influenced the investment fund decisions.

In sum, the stakeholders of investment funds are important to the functioning and performance of the fund. Internal stakeholders are mainly led by shareholders and employees who contribute to the functioning of the fund. Regarding external stakeholders, it can be seen that the government plays an important role by verifying that investment funds comply on a daily basis with the policies and regulatory framework. The stock exchange consists of an excellent trading venue for buyers and sellers. Finally, local community and positive social impact of investment fund assets were presented.

2.3. Performance measurement

Performance of real estate investment funds provides an insight into the attractiveness of funds for investors. It plays an important role in fund investment strategies and allows managers to stand out and attract investors' attention if the fund is performing well (in comparison to its peers). In addition,

it helps investors find the best investments matching their investment profile. Rational and quantifiable indicators are used by investors and fund managers in order to have an outlook on fund performance. Furthermore, it provides an insight into how funds performed over the last years and contributes in helping investors make their investment choices. This section presents the theory and performance indicators used in this study.

Investors look at the returns achieved by fund managers. They analyze whether investments made by fund managers are within the risk constraints and conform to their objectives. A necessity arises in defining the performance measurement and what needs to be taken into consideration. There are two dimensions which need to be taken into consideration: the portfolio returns and risks (Aftalion & Poncet, 2003). As a result, the expected return of the fund needs to be clearly defined. It is essentially measured by the NAV of a fund (Goel *et al.* 2012). This clearly shows fund performance and expected returns are very different concepts. Total risk of the portfolio should be minimized for a given level of expected returns (WikiMemories, 2014). Investors have a risk level at which they are prepared to invest and do not accept higher levels. Importantly, investors take into consideration the respective fund risk and expected returns in their investment decision making process. Next, two theories regarding investors' expected returns and fund diversification are presented.

2.3.1. The modern portfolio theory

The modern portfolio theory explains the benefits of **fund diversification** for reducing risks. The theory is based on Markowitz's hypothesis that essentially states that it is possible for investors to build an optimal portfolio in order to maximize returns by taking a quantifiable amount of risk. The risk can be reduced with the help of the diversification theory illustrating the benefits of a fund being diversified. A portfolio is defined to be diversified when it contains a mix of different asset types in an attempt to reduce the total risk of the portfolio (Segro, 2020). For instance, a selection of securities from different sectors could be a great way to diversify risks. There are benefits of diversification in the portfolio if the securities held within the portfolio are not perfectly correlated with one another meaning that they respond differently, often in opposite ways to the influences of the market (Chen, 2021).

It states that it is not enough to look at investors' expected returns and risk of an individual stock but investing into several stocks can provide a benefit of an overall reduction of risk for a given level of returns. The modern portfolio states that the total risk for an individual stock return has two components, identified to be systematic and unsystematic risk. Firstly, the **systematic risk** is also known under the term of "**undiversifiable risk**", due to the fact that this risk is still subject to market-wide systematic risk no matter the level of diversification in the fund (Fontinelle, 2019). The market risk cannot be diversified. Secondly, the "**unsystematic risk**" is referred to as a unique risk related to a specific company or industry in contrast to the systematic risk, which can be diversified when investing into different securities. This is in fact represented by the component of the security's return that cannot be correlated with the general market movements. Investors benefit from holding diversified portfolios instead of individual stocks (Mcclure, 2020a). Overall, an investment fund can decrease its firm specific risk for a given level of returns by investing into several different securities as observable from figure 16 where the total portfolio risk is represented on y-axis and the number of stocks on x-axis. Unsystematic

risk starts to decrease when funds invest into more securities as the unsystematic risk can be diversified away. After a certain amount of securities, unsystematic risk approaches almost zero and thus total risk is equal to the systematic risk (Thakar, 2020). The next part presents the expected return of a fund for a given level of risk followed by a presentation of the selected performance indicators in order to conduct the study.

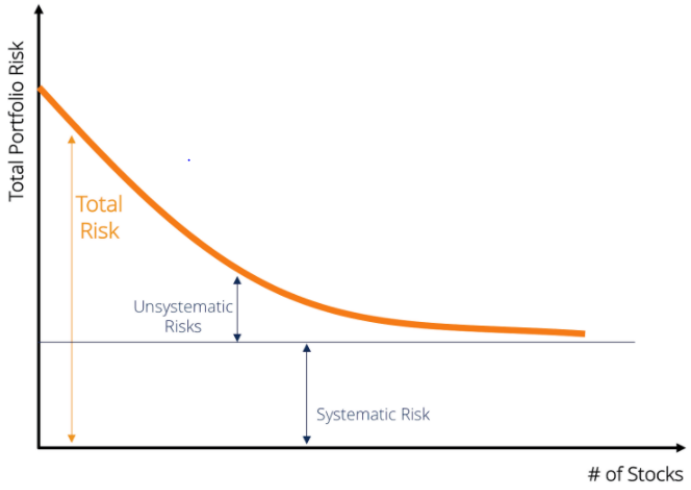

Figure 16: Unsystematic risk and the systematic risk of a portfolio (Thakar, 2020).

2.3.2. Capital Asset Pricing Model

The Capital Asset Pricing Model referred hereafter as the "CAPM", is used in the context of evaluating securities and estimating investors' expected returns for a given level of risk. It is based on the concept that the investor's returns will be only higher, on average, by investing into a more risk security. The **CAPM** relates **risk** and **expected return** of a security or portfolio and states that investors request an additional expected return for bearing unsystematic risk, called risk premium.

The model assumes that investors hold diversified portfolios and require a return for the security's systematic risk as all unsystematic risk can be diversified away. Investors can borrow and lend at the risk free rate of return and trade securities at competitive market prices without incurring taxes or transaction costs. Only efficient portfolios are held giving the highest expected return for a given level of risk and the risk free rate is the minimum level of returns required by investors. Investors are assumed to have homogeneous expectations regarding the risk and expected returns of securities. The CAPM is based on the assumption that investors have an identical time horizon, meaning that they can buy or sell the assets in their portfolios at one point in time (Berk & DeMarzo, 2014).

A **benchmark** is used in order to analyze fund returns as it is a good reference point for comparison used by fund managers and investors. Simply, an index can be a good benchmark as it represents all securities in the market within specific asset classes. It is a standard method for measuring the fund risk and performance. Basically a benchmark gives an idea of the fund performance compared to its peers in this same group and type of investment (Issu, 2013).

The **expected return** of a security is the return investors should be expecting to receive after an investment. Investors expect to receive in return the rate on a risk-free asset plus the risk premium. Risk-free rate of return, called the "market portfolio rate" is the theoretical rate of return of an investment with no risk, typically, obtained from the US Treasury bill rate. Risk premium depends on the security's beta. Beta measures the stock risk by reflecting the measurement of changes in the price level relatively to the overall market. On the one hand, beta value is "one" when the expected return on a security is equal to the average market return. On the other hand, the value is "minus one" if there is a perfect negative correlation with the market returns (Mcclure, 2020b).

Expected risk premium is the difference between the risk-free rate of a security and the risk-free rate of the market. As illustrated in figure 17, the capital market security is the line showing the optimal combination between portfolio risk and return. Now, the tangency point between the efficient frontier and the Capital Market Line represents the "ideal market portfolio" or known rather under the "efficient portfolio" (Chen, 2020a). In other words, it is the optimal portfolio formed by the tangency with the efficient frontier (The Economic Times, n.d.). It is a set of optimal portfolios that offers the highest level of returns for a given level of risk as observed in figure 18. This portfolio generally has a high level of diversification of its investments (Ganti, 2020a).

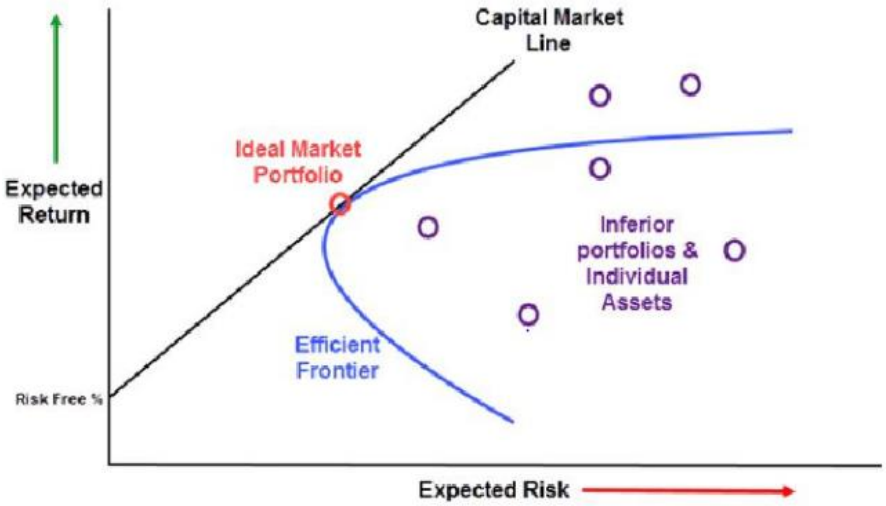

Figure 17: Graphical representation of the efficient portfolio in CAPM (Chen, 2020a).

All the portfolios on the right hand side of the efficient frontier are not optimal as they possess a higher level of risk for a given expected rate of return. The **Capital Market Line** (hereafter referred to as "CML") goes through the risk-free investment (i.e. the point formed by the line crossing the vertical axes denoted "expected return" on the graph present below), which includes portfolios offering high expected returns given a defined risk level. Or it can be seen to include the lowest risk for a given level of expected return. Differently said, portfolios with the best trade-off between expected returns and risk are located on this line (Ganti, 2020a).

2.3.3. Performance indicators

Performance indicators must be coherent, accurate and reliable and provide an adequate performance measurement. According to the study performed by Cahart (1997), a negative correlation is found between the expense ratios, transaction costs, and load fees which all have a direct and negative impact on the performance of the funds (Cahart, 1997). In addition, Gil-Bazo and Ruiz-Verdu (2009) confirmed the hypothesis that the performance and expenses are negatively correlated (Sanzhar, 2013). Correlation stands for the process of setting up a connection between two or more factors.

The reason for choosing classical financial performance indicators from the theoretical literature is explained by the fact that several new performance indicators exist but are in development or being applied on funds but there is no existence yet of a solid academic literature. There is a lot of documentation available for these traditional indicators allowing this study to be conducted safely. In addition, these indicators are relevant and helpful for the performance measurement of (real estate) investment funds (Issuu, 2013).

The three traditional performance indicators from the CAPM are presented. Sharpe (1966), Treynor (1965) and Jensen (1968) have developed performance measures for risk-adjusted returns (Pui See & Jusoh, 2012). Firstly, the **Sharpe Ratio** performance indicator is a measure of the portfolio excess return relative to the portfolio total variability (i.e. risk). It can be seen as a measure of the ratio between the fund volatility and adjusted return. Volatility is a measure for the dispersion of returns of a given security. Usually, it is measured either as the standard deviation or variance between returns of a security and the market index. A portfolio with a higher value is considered to be performing more efficiently over its peers. The efficient portfolio has the highest Sharpe Ratio over any other portfolio in the economy, as it provides the highest reward per unit of volatility of any available portfolio (The Economic Times, n.d).

The actual formula of the Sharpe ratio is the measure of the excess portfolio return over the risk-free rate compared to the standard deviation. Formula (1) states the Sharpe ratio:

$$Sharpe\ ratio = \frac{R_p - R_f}{\sigma_p} \quad (1)$$

where R_p stands for the expected return of a portfolio. R_f represents the risk-free rate of return and σ_p is the standard deviation of a portfolio (The Economic Times, n.d.).

To explain a little bit the formula, if two funds have the same level of expected returns, then the one with higher standard deviation results in a lower Sharpe ratio. In order to compensate for this, the portfolio needs to increase its expected return. Hence, simply said, the Sharpe ratio shows how much additional return an investor earns by taking additional risk. Note that, the Sharpe ratio is zero for a risk-free investment (The Economic Times, n.d.). The main advantage is that this method uses the total risk in its denominator. In consequence, it is able to highlight the risks due to the diversifiable part (i.e. the fund is not investing in the same assets as the efficient market portfolio and open to invest in more risky investments) (Schneider, 2009).

Secondly, the **information ratio** is a measurement of a portfolio return relative to a benchmark. More specifically, it measures the performance based on the risk-adjusted returns of a portfolio to a benchmark. In addition, it attempts to identify the consistency of the performance by including a tracking error or standard deviation. This tracking error is the difference between the price behavior of an asset or a portfolio with the price behavior of a benchmark. In other words, it reports the standard deviation being the difference between the return an investor receives and that of a benchmark (Chen, 2020b).

Formula (2) is the following:

$$Tracking\ error = \ Standard\ Deviation\ \ (Price\ of\ the\ asset - \ Benchmark) \tag{2}$$

In short, a higher information ratio indicates a better performance given a certain level of risk. In essence, it identifies by how much portfolio returns exceeded the benchmark. Moving on to the information ratio formula (3), it is equal to the return of a portfolio minus the benchmark divided by the tracking error denoted by ω:

$$Information\ ratio = \frac{R_p - R_m}{\omega} \tag{3}$$

The main difference with the Sharpe ratio is that the information ratio has a difference in the measurement of the performance. The Sharpe ratio measures on risk-adjusted return, using a risk-free asset, whereas the information ratio is based on the return of portfolio in relation to the benchmark. The Sharpe ratio measures how an investment portfolio outperformed the risk-free rate on a risk-adjusted basis (Murphy, 2019).

Thirdly, **Jensen's Alpha** is also based on a risk-adjusted performance measure. It represents the expected return of a portfolio being above or below the values predicted by the CAPM. Jensen's Alpha is a way to check that it is earning the right return given the level of risk.

Formula (4) for the alpha is based on the CAPM:

$$alpha = R_p - (R_f + beta\ (R_m - R_f)) \tag{4}$$

where R_p is the expected return of a portfolio and R_m stands for the expected market return in other words the benchmark.

Needless to say, alpha is the excess return (i.e. either above or below the expected market return) and takes into consideration the total risk, the systematic risk but not the advantages of diversifiable risk. If a portfolio is providing higher expected returns over the returns of the efficient market portfolio for a given risk level, then alpha is positive and thus defined to be "outperforming". On the other hand, a portfolio is defined to be "underperforming" the market, if expected returns are lower than the returns of the efficient market portfolio, hence alpha is negative in this case. Evidently, according to the CAPM, when a portfolio provides the same return as the efficient market portfolio then alpha is significantly different from zero.

The **Security Market Line** (hereafter referred to as "SML") is a line giving the expected return for each security in a portfolio in relation to the market risk (Retzloff, n.d.). It provides an insight on whether the portfolio provides good expected returns for a given systematic risk level. Figure 18 represents the SML which serves as a graphical representation of the CAPM. The x-axes shows different levels of systematic risk (i.e. being the beta) or known as market risk and the y-axes represents the expected return of a portfolio. The market portfolio is the efficient portfolio following the CAPM with a systematic risk of one. Alpha equals to the vertical distance between the security's return and the SML with the expected returns for a given risk level. Figure 18 shows that a security is said to be "undervalued" by the letter "U" compared to the benchmark and "overvalued" by the letter "O". The reason for a security to be above the SML line is that it gives a higher return for a given level of risk and not enough demanded in the market. Similarly, a security said to be "overvalued" means that it gives lower returns over the market for a given level of risk implying that the security is highly demanded (Tavagapedia, n.d.).

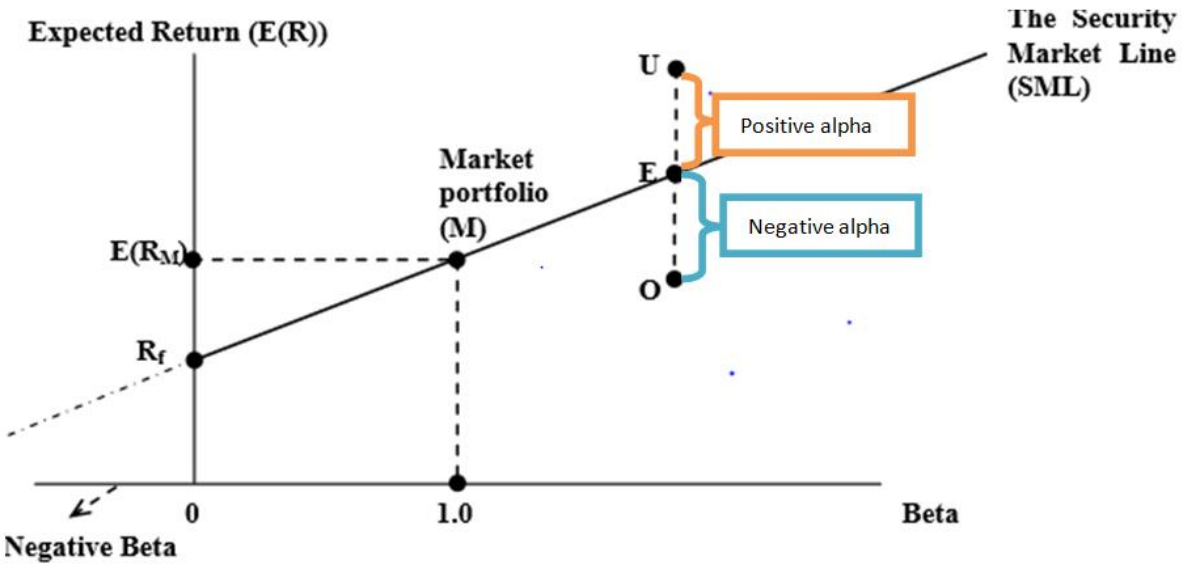

Figure 18: The Security Market Line in the CAPM (Hodnett, Hsieh, 2012).

The rankings of both measures (i.e. Jensen's Alpha and Sharpe ratio) will differ and depend on the level of systematic risk present in the portfolio. For instance, the Sharpe ratio for a portfolio can be low due to a high level of unsystematic risk (i.e. diversifiable risk) and high alpha measures.

In conclusion, the investment fund market in Luxembourg is presented with a highlight of the most important reasons for the success of the financial sector in Luxembourg. The two main products offered being the UCITS and AIFs on the market are presented with the market size and share. Main stakeholders of an investment fund are presented. This section ends with three performance indicators, being the Sharpe ratio, information ratio and Jensen's alpha that are selected for this study.

CHAPTER 3: APPLICATION

This chapter presents the data collected, methodologies applied, and results achieved. This section begins by introducing the data collected for notably the macro and micro factors included in the models followed by the methodologies applied and the timeframe decided for the analysis. The results for the real estate investment funds are presented and compared by highlighting the similarities and differences in order to fulfill the objective of this study. This section ends with a discussion regarding the limitations and recommendations for further research.

The purpose of this study is to find out what is known, what is not and what can be developed further. A study can take several forms, but exploratory and explanatory are the main forms. Firstly, the exploratory form is used for a study that initially identifies the subject and then addresses the problem by carrying out several methods with the aim of answering the research question. This design is intended to get a better understanding of the exact nature of the problem for which the problem is not yet resolved and no prior studies exist. In other words, no conclusive response is provided to the problem leaving the door open for further research. This research design enables the analysts to set a strong foundation for building up the research methodologies and finding appropriate variables to be tested. Secondly, explanatory research aims to understand the relationship between the variables of a phenomenon. It identifies the cause-and effect relationship defining how the variables are interacting between each other (DiscoverPhDs, 2021). The research purpose of this study is defined to be of explanatory phase as it sets up a problem that is not yet resolved and aims to be answered by carrying out specific methodologies with particular objectives.

Two existing methodologies were applied for choosing the data collection and performing the data analysis. The methods are known to be **qualitative** and **quantitative**. They can be divided into two types of research, primary research and secondary research (Oxbridge Essays, 2020). The primary research is when the researcher takes on the role himself to collect the data and uses real–time data with the objective of collecting the data for a specific study under the researchers' responsibilities. The secondary research involves re-analyzing, interpreting, or reviewing "past data" gathered already by researchers. This information is accessible via, for instance, past researchers, government records, various online and offline resources. On the one hand, a qualitative approach is defined to be the collection of data in the form of words over numerical values. Various techniques are used in order to gather the data, for instance, there can be focus groups, discussions, interviews and qualitative observation (QuestionPro, n.d.a). On the other hand, a quantitative approach includes the process of objectively gathering and analyzing numerical data in order to describe, predict or control various variables. The results of a quantitative approach involve experiments, surveys and testing, which are derived by using statistical, mathematical or computational techniques. The reason for selecting this method for the main part of this study is that it is more suitable for closed-ended questions where quantitative data is used to answer

the research question. The results achieved from this research method are usually based on statistics (QuestionPro, n.d.b).

3.1. Data collection and methodology

3.1.1. Presentation of the real estate investment funds data collected

Several existing real estate investment fund data are consulted with the help of several criteria considered during this process. Firstly, the data collection process starts by looking at a sample of real estate investment funds established in Luxembourg. As explained above, funds established in Luxembourg are regulated and supervised according to EU standards. Secondly, the focus is on selecting funds that are subject to a strong regulatory framework as for coherence purposes it is better to perform an analysis on funds subject to a homogenous regulatory framework, as tighter regulations and stronger supervision contribute to more stability and less volatility in returns. Considering that this study aims to analyze factors influencing the fund performance, it is wiser to concentrate the study on funds providing good returns (in comparison to other funds over a long period or the benchmark).Thirdly, for regulated funds there is a certain level of diversification within the fund assets that is required in order to reduce risks. Fourthly, the investment target countries selected are those of the EU which are well correlated.

The real estate investment funds, hereafter referred to as "the funds", were selected based on specific criteria. All investment funds should be established in Luxembourg with Europe being the investment market. Ideally, all three funds should have similar regulatory framework and investing into similar assets. This would ensure that the selected funds in this study have similar backgrounds proving the validity, accurateness and coherence for this study.

The website called "Test Achats" was consulted in the process of searching for funds registered in Luxembourg (Test Achats, 2020a) (Test Achats, 2020b) (Test Achats, 2020c). The first fund selected is BNP Paribas Funds Europe Real Estate Securities EUR hereafter referred to as "**BNP Paribas Fund**". After having performed an initial analysis considering this fund, the results retrieved were not comprehensive enough in order to answer the research question thoroughly. Therefore, to make this analysis more exhaustive, two more funds are selected named AXA World Funds Framlington Europe Real Estate Securities and Horizon Pan European Property Equities Fund hereafter referred to as "**AXA World Fund**" and "**Horizon Pan Fund**". They are of the same legal structure and type, with similar assets and the same benchmark category as the BNP Paribas Funds. The addition of similar funds provides better understanding of factors potentially impacting fund performance.

The three selected investment funds for this study are of the same legal form (SICAV) and registered in Luxembourg. They are under the supervision of the CSSF. As explained in chapter 2, this legal form allows the investment fund to increase or decrease its capital after the creation of a fund. This implies that the shareholders may vary throughout the existence of the fund. All three funds are governed based on the provisions of Part I of the Law of 17 December 2010. These funds are of the UCITS type, in order to satisfy the restriction applicable to UCITS in terms of types of investments (direct investments in real estate assets not being allowed), they invest rather into equities which are shares of listed companies

that invest themselves into real estate assets or other investment funds known as “Funds of Funds”. The study moves on with the presentation of the methodology and the data collected.

3.1.2. Presentation of the methodology and data collected

The time frame considered in this work is presented before talking over the methodologies applied to the funds. The analysis period covers the 1st of March 2014 to the 1st July 2020. The reason for the choice of this timeframe is to take into consideration the “restructuring” that occurred for the BNP Paribas fund. This fund was launched on the 17th of June 2013 and opened on the 31st of January 2014 (BNP Paribas Asset Management Luxembourg, 2020a). I preferred selecting the data starting exactly from this time until mid 2020 to ensure that the fund is subject to the same governance framework throughout the entire period. In order to ensure efficiency and coherence in the analysis, the same periods were selected for the other two funds. The reason that this period terminates at the end of July 2020 lies in the fact that at this moment the fund data has started to be collected and analyzed.

3.1.2.1. Qualitative approach

The qualitative method is used in order to understand various characteristics of the funds. This study opted for the **secondary research** type as it seeks to analyze existing reports that are published online by the asset management companies of the respective fund. These reports can provide useful information and contribute efficiently to the answers of the research question. They are the best source of qualitative data, as these are generally not published elsewhere. The objective of this part of the study is to obtain more detailed information regarding the location of the assets and the stakeholders.

Concretely, this method involves the consultation of fund reports that are published on the website of the asset management companies as well as on third party websites. The fund reports consulted were mainly monthly based as they provide more detailed information. The **main asset location** and **holdings** are also described in these reports or on third party websites. Furthermore, the fund prospectuses are also consulted as they describe, for instance, the fund governance and investment guidelines. Importantly, the downloaded monthly reports for the funds (i.e. dated from end of September, October and November 2020) and the benchmark (i.e. entitled FTSE EPRA Nareit Developed Europe Index dated October 2020) are dated a little later than the reviewed period in this analysis. This is due to the fact that the analysis was conducted around the end of the year 2020, and thus there was a little delay in the reports downloaded. This should not significantly impact the end results as real estate assets are generally invested on a long-term basis meaning funds are not subject to drastic turnovers.

3.1.2.1. Quantitative approach

In this section, there is a discussion on how the **quantitative methodology** is applied to the data obtained on the three funds. Specifically, the data collected for this analysis is performed based on the CAPM presented in chapter 2. There is a thorough description of the way the quantitative methodology is applied, the models are constructed and the data analysis is conducted with the help of statistics. It is important to remember that the models should result in a good fit in order to ensure the accuracy of this study. Next, there is a presentation of the way the performance metrics are applied on the funds.

Afterwards, a discussion is held about which macro and micro factor data are gathered for the respective models followed by a description of how the data analysis is performed. The data analysis' objective is to understand which macro and micro factors indeed influence fund returns.

The **data collection** for the three funds is explained as follows. The data collected for the purpose of this study are the daily NAVs. The historical daily NAV values are downloaded from the BNP Paribas Asset Management's website for the BNP Paribas Fund returns (BNP Paribas Asset Management, 2020a). Next, the daily NAVs for the AXA World Fund are downloaded from the AXA Investment managers' website (AXA Investment Managers, n.d.). Finally, the Horizon Pan Fund data is retrieved from the official website of Janus Henderson Asset Management company (Janus Henderson Investors, n.d.).

Next, the data of the **benchmark** is presented. The benchmark returns (i.e. being the FTSE EPRA/NAREIT Developed Europe (FTUPRA) (i.e. priced in EUR)) are found on the platform called Investing.com by performing a Google search (FTSE epra/nareit Developed Europe historical rates, n.d.). It is the general one for this sector, but asset management companies have built 'custom indices' from this benchmark. The benchmark was created through value-weighting, meaning companies included will contribute to the index according to their market capitalization. It is impossible to reproduce the exact same benchmark as the one used by investment fund managers. Because the benchmark FTSE EPRA NAREIT Europe (25% Capped) 8/32 (NR) is the main category for all three funds, it is also selected for this paper. The benchmark was created through value-weights by reducing or increasing the weights of the largest companies in percentage based on their market capitalization in the index.

The data of the **risk-free rate** needs to be chosen carefully due to its importance in the model. The German bond EURIBOR rate is the selected risk-free rate considering that Germany is a major bonds market within the eurozone. The data selected is the EURIBOR on a 1-month historical average of the observations throughout the period (European Central Bank, n.d.b). The unit of the dataset is percent per annum and hence requires a little manipulation in order to convert the data in percentage on a monthly basis. The actual rate equals the percent per annum divided by 360 days multiplied by 30 days. This is the standard formula applied to convert the percent per annum rate to a monthly rate disregarding the aspect that some months have 30 whereas others 31 days. Note that, the data was collected over the period: 1st of March 2014 until 31st of May 2020. For the months of June and July 2020, a different data source was used to fill up the missing data but its data collection methodology is considered to be not significantly different (Global – rates, n.d.).

The quantitative methodology is applied by building **two models** based on the frequencies available for the macro and micro data gathered. There is a **monthly and quarterly model** built for each fund including the risk-free rate, the fund and benchmark returns. Months and quarters are great time frames considering that real estate performance spans over long-term cycles making daily observations not relevant for this study. The monthly model is defined to be the main model as there is a slight larger set of observations over the quarterly one. Moreover, a larger dataset provides a better average of the mean for the sample data increasing the accurateness of this study.

The next part of this section presents the monthly model built with and without the macro and micro factors followed by a discussion of the data analysis computed in order to measure the goodness of fit of the model. The section continues with the talk of the application of the performance metrics followed by a presentation of the macro and micro factors added to the model. Subsequently, similar steps are conducted for the quarterly model. Once the monthly and quarterly models are set up, a data analysis is performed using statistics to turn the quantitative data into useful information in order to answer the research question. Statistics is a great tool as it summarizes the patterns of the data and describes the relationships between different variables. Specifically, test significance is applied on the data in order to identify factors that influence in a significant way the fund returns.

a) Monthly basis model

Before explaining the details of the monthly model, it is important to mention that this work considers only the change in percentage of the NAV on a monthly basis. Hence the daily NAV values collected are converted into monthly values for all three funds. The conversion is done by subtracting the NAV value of the last day of the month from the NAV value at the beginning of the month. This difference is multiplied by 100 to get this value in percentage (Sadeghzadeh, 2018). Concretely, as observed from formula (5) below all daily NAV values are transformed into monthly NAV values, namely $Return_t$ in the following manner. The value of the last day of month t is represented by $NAV_{t,s=S}$, while the value of the first day of month t is given by $NAV_{t,s=1}$.

$$\mathrm{Return_t} = \frac{\mathrm{NAV_{t,s=S}\text{-}NAV_{t,s=1}}}{\mathrm{NAV_{t,s=1}}} \qquad (5)$$

After the discussion of the set up of the monthly model, data analysis is performed with the aim of assessing the goodness of fit of the built model. The analysis is conducted by applying statistical knowledge in order to transform the quantitative information into useful information. Firstly a simple linear regression is performed on the data based on the CAPM (presented in Chapter 2) using an excel function (i.e. the regression function). As observable from formula (6), the dependent variable is the fund returns (R_p) minus the risk-free rate (R_f). The independent variable is the benchmark (R_m) minus the risk-free rate (R_f) and the alpha is the intercept coefficient from the regression and beta is the beta value as presented in the CAPM.

$$\mathrm{R_p\text{-}R_f} = \mathrm{alpha} + \mathrm{beta}\ (\mathrm{R_m\text{-}R_f}) \qquad (6)$$

This is motivated by the need of having the model's fitness in order to determine its reliability and avoid taking into consideration the possibility of an inflated alpha value which may occur due to various factors being added to the model. Subsequently, the goodness of fit of the model can be computed by applying the R squared. It gives an indication of the accuracy of the model as it measures the proportion of variations in the dependent variable (i.e. fund returns) explained by the benchmark minus the risk-free rate.

Following the description of the data analysis performed and how to measure the goodness of fit of the model, it is time to provide a brief description of the performance metrics applied on both models set up. Firstly, the Sharpe ratio, as shown in Formula (1), is computed by taking the average on the EURIBOR rate data for the given period in excel. This computation is followed by taking the average of the fund returns. The excess return is obtained by subtracting the mean of the returns from the EURIBOR rate. The denominator is the standard deviation of the fund returns. It is calculated by taking the square root of the sum of the difference between the fund returns and its mean squared. Afterwards, it is multiplied by one over the number of observations (i.e. 77 observations for the monthly data).

Secondly, the information ratio, as shown in Formula (3), is built with a numerator being the results achieved by primarily taking the averages of the fund returns and the benchmark returns followed by the squared difference of both for a given month. The denominator, specifically the tracking error, is achieved through the computation of the standard deviation. The standard deviation is the square root of the sum of the difference between the fund returns and the benchmark squared for a given month multiplied by the number of observations (i.e. 77 observations for the monthly data).

Following the discussion of the performance metrics and the simple regression performed on the funds, it is time to discuss the macro and micro factors data collected for this model. The macro and micro variables are mostly downloaded from the Eurostat database (Eurostat, n.d.a). The data related to the UK prior to February 2020 was excluded from the analysis in order to ensure a uniform data set, since after this date the UK left the EU. This is because no data is available for the 28 EU countries after February 2020. The unemployment rate added to the model is in fact the harmonized unemployment rate which is measured by the ratio of the unemployed to the labor force. The unit of measurement is the monthly rate of change as a percentage of the active population. The inflation rate used is the Harmonized Index of Consumer Prices (HICPs). Similar steps are taken for the download of the inflation rate and the interest rate (Eurostat, n.d.b).

Household income is included in this model as a potential factor influencing the capacity of investing in real estate. It is an interesting variable as it takes into consideration the population age. The first variable is the household income excluding the homeowners' occupation in the surveys. The second variable applies to homeowners between 30 and 49 years old, while the third one is applicable to household income for homeowners between 50 and 64 years old (Eurostat, n.d.c).

Next, the following indicators are included in the model: construction confidence indicator, consumer confidence index, total construction in the EU and interest rates. The **construction confidence indicator** gives an overview of the general development of the construction sector contributing to the understanding of consumer behavior. The data collected is based on results from business surveys representing the economic situation and future developments in construction and is seasonally adjusted. A higher measure indicates more confidence among consumers (Eurostat, n.d.c). The **Consumer Confidence Index** is defined as the degree of optimism of the economic state where consumers express their willingness to spend or save through their activities (Ganti, 2020b). The **total construction** data in the EU is retrieved on a monthly basis, which gives an indication on how the economy is overall related

to the total construction sector (e.g. including all types of construction). Clearly, real estate is a large part of the construction sector but not exclusively (Eurostat, n.d.**c**).

Interest rates are included in the models due to its potential influence on fund performance. Interest rates play an important role in how the property market behaves, particularly, impacting supply and demand. In general, low interest rates encourage prospective buyers to enter this market. Investing in real estate is a big commitment increasing the chances that investors take a mortgage. A higher rate means people are generally less willing to take out a mortgage. Hence, this factor plays an important role in the real estate market (Eurostat, n.d.d).

The next step is to conduct a multiple linear regression by including the independent variables presented above in the model. As formula (6) shows, the dependent variable is still the investment fund returns minus the risk-free rate and several independent variables are included in the regression in addition to the benchmark minus the risk-free rate. This step aims to understand which factors do in a statistically significant way influence the variations in the fund returns over the reviewed period in this study in order to answer the research question (Beers, 2020).

Formula (7) states the multiple linear regression for the monthly model:

$$R_p - R_f = alpha + beta\left(R_m - R_f\right) + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_3 Z_3 + \gamma_4 Z_4 + \gamma_5 Z_5 + \gamma_6 Z_6 + \gamma_7 Z_7 + \gamma_8 Z_8 + \gamma_9 Z_9 \quad (7)$$

where the letters in the above regression stand for the following variables:

Z_1 = Interest rates

Z_2 = Unemployment rate

Z_3 = Inflation rate

Z_4 = Construction confidence index

Z_5 = Consumer confidence index

Z_6 = Household income for homeowners

Z_7 = Household income for homeowners aged 30-49

Z_8 = Household income for homeowners aged 50-64

Z_9 = Total construction as a whole

Before entering into detail about the data analysis applied, the next part discusses the quarterly model built as macro and micro factors only had quarterly values. Afterwards, there is a discussion of the data analysis applied homogeneously to both models ensuring the coherence and reliability of the model.

b) Quarterly basis model

The quarterly model is built with macro and micro factors of which the frequencies are only quarterly. The steps of converting the monthly NAV values of the funds used in the monthly models into quarterly values are explained followed by a graphical representation of the fund returns. One year is divided into four quarters with a distinctive duration of three months. The period starts from the second quarter in 2014 until the 1st quarter of 2020. The monthly NAVs of the funds were selected from the first quarter of 2014 up to the second quarter of 2020 for the covered period in the analysis. However, the quarterly model covers up to the first quarter of 2020 as the data of some variables were not available for later quarters at the moment the data was downloaded. The period is defined according to the data available for variables. The conversion of the monthly NAVs into quarterly values is performed through a simple average of the values over three months in order to retrieve the value over a specific quarter.

It is time to present the macro and micro factors added to the quarterly based model. The model includes the Gross Domestic Product, costs and expenses, the total level of loans and liabilities in the EU. A little overview is provided for some of the added variables in order to get a better understanding of their potential relation to the fund returns. These factors were selected based on the factors chosen in chapter 1 except for the total level of loans and liabilities in the EU. This factor was added following the reflection that the EU possesses a high level of debt which could have impacted the demand and supply of the market. The next part of this section begins with an examination of the construction cost index, followed by input prices for raw materials, the output price index and the building permits. Afterwards, the Gross Domestic Product data, the Housing price index and the ECB total balance are presented.

Costs and expenses involved in the European real estate market are talked over. The **construction cost index** and the **output price index** in construction are included in the model. The construction cost index in the EU provides specifically the trend of costs associated with the construction of buildings (Eurostat, n.d.e). The index includes raw materials, equipment and labor force. The data is selected for the 27 European countries and is added to the quarterly basis model. On average, the construction costs index reached around 108 in 2020 as observable from figure 19, showing costs are on average slowly increasing (Eurostat, 2020k). The construction costs are aligned with input prices for materials and output price construction as observed on figure 20 (Eurostat, 2020k). Moreover, figure 19 gives a general overview of how construction costs, input prices for materials as well as the output price for construction are moving in relation to one another. This section continues with a more detailed discussion of input prices for raw materials.

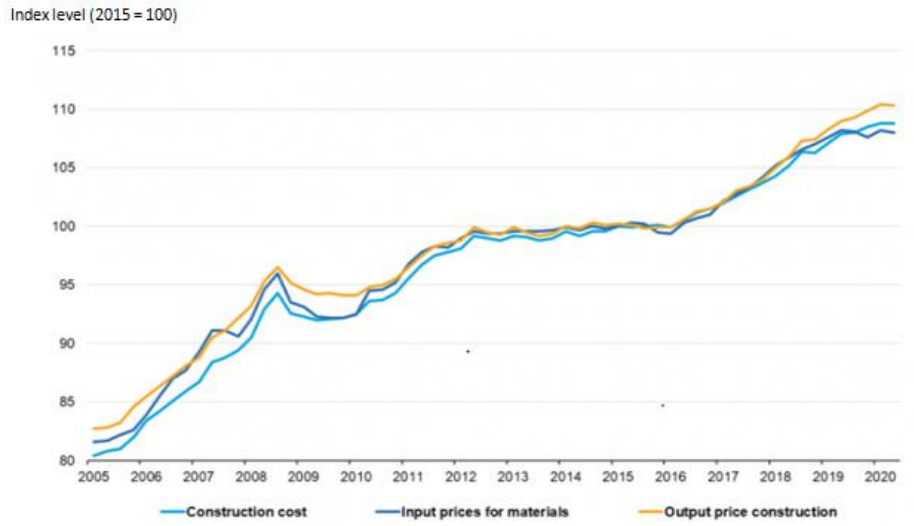

Figure 19: Construction prices and costs for 27 European countries – 2005-2020, Index level (2015= 100) (Eurostat, 2020k).

Input prices for **raw materials** on a quarterly basis are included as a factor affecting the price of constructing new buildings. The output price index for construction data was downloaded from the Eurostat database (Eurostat, n.d.e).

Building permits is the amount granted across the 27 EU countries. It gives an overview of the state of the economy in the near future as an increase in building permits indicates more interest to build. It shows the supply levels of real estate across the European market. The data is seasonally adjusted, meaning that it attempts to measure and remove influences of predictable seasonal patterns (i.e. trends and cyclicality) (Eurostat, n.d.f).

Gross Domestic Product is the first variable in the quarterly model. The data measures the value of all finished goods and services produced at their current market prices not adjusted for inflation. The unit of the collected data is given at market prices. Their measurement is in the form of chain linked volumes assuming that the base index 2010 equals 100. This method consists of putting together two indices overlapping a given period, where one is rescaled with the aim of setting its value equal to that of the other one in the same period. Note that it is a popular method applied to the GDP data (Eurostat, n.d.g).

Next, the **housing price index** data is also gathered from the Eurostat database. It includes housing price changes of all residential properties either new or old. The market prices are considered for determining the value of the asset. Self-built dwellings are not part of the index, but land prices are included in the index. The data is presented as a quarterly index (2015 =100) where changes are represented in terms of the annual rate. Even though this index is not a macro or micro factor, it should be included in this analysis as high transaction volume is an indication of interest in this market and prices represent well the consensus between buyers and sellers. Considering that the funds invest into real estate assets, hence it is interesting for this study to understand whether housing price fluctuations influence fund returns (Eurostat, n.d.h).

ECB assets including the total loans and liabilities measured in dollars (i.e. the currency applied is not relevant as looking only at the difference in the variations) and the **housing price index** in the EU are added to the model. These factors are not considered to be macro factors but affect the purchasing power of investors (i.e. demand and supply). However, it is essential to include them in the model as the liability levels significantly increased since 2014 and housing prices do influence fund performance (Fred Economic Data, n.d.).

Following the discussion of all macro and micro variables included in this model, a multiple linear regression is conducted (similarly to what was performed for the monthly model). Formula (8) shows that the dependent variable is still the fund returns minus the risk-free rate and the independent variables are included in the regression in addition to the benchmark minus the risk-free rate.

$$R_p\text{-}R_f = \text{alpha} + \text{beta}\,(R_m\text{-}R_f) + \varphi_1 W_1 + \varphi_2 W_2 + \varphi_3 W_3 + \varphi_4 W_4 + \varphi_5 W_5 + \varphi_6 W_6 + \varphi_7 W_7 + \varphi_8 W_8 \quad (8)$$

where the letters in the above regression stand for the following variables:

W_1 = Construction cost index –in national currency

W_2 = Building permits – number of dwellings

W_3 = Input prices for materials – in national currency

W_4 = Output price index in construction – in national currency

W_5 = Gross domestic product at market prices

W_6 = ECB Balance sheet: all sectors; total loans; liabilities

W_7 = Housing prices

W_8 = Housing price index (occupied by landlords)

Statistical knowledge is applied on both models following the regressions performed on the monthly and quarterly model. Concretely, tests of significance are conducted on the outcome of the regressions in order to understand whether a factor does in a statistically significant way impact the fund returns. A sample dataset is chosen to test the claim, called the null hypothesis, set on the population while the alternative hypothesis is the other claim. The null hypothesis in this study is the assumption that the factor's coefficient value included in the model is zero.

Typically, the significance is expressed as a p-value of the corresponding regression coefficient. The p-value describes how likely that the event of the null hypothesis is true and its value ranges between 0 and 1. In order for the null hypothesis to be rejected, the p-value should be below (or equal to) the 0.05 threshold (i.e. given 95% confidence interval). In other words, there is strong evidence for the alternative hypothesis to be true at a given 5% confidence level and the factor's coefficient value is significantly

different from zero. This means that fluctuations in the factor do influence in a statistically significant way the fund returns. Therefore, the p-value determines the statistical significance of the respective factor in the model based on the gathered sample data (Mindrila & Balentyne, 2013). Importantly, this study focuses more on factors that are found to be statistically significant. The other selected factors (e.g. interest rates, inflation rate, GDP) in the quarterly and monthly models are disregarded due to the factor's coefficient being statistically insignificant.

In summary, the qualitative method is applied to understand various characteristics of funds, such as the fund stakeholders and assets location. The consultation of the fund reports provides support to the interpretation of the results found following the application of the quantitative approach. The fund reports consulted are highly reliable as they are published on the official website of the fund asset management companies confirming their authenticity. The quantitative approach is presented with an explanation of the setup of the monthly and quarterly model, followed by the approach taken for the interpretation of the regression coefficient. The data downloaded is considered to be reliable ensuring the validity and accuracy of this study conducted as it is mainly retrieved from highly reliable institutions (i.e. official database site of Eurostat and the official website of the fund management companies). The next part presents the results followed by the application of the methodologies for the given period reviewed. Subsequently, an analysis of the cyclical relationship between the statistically significant factor found and the respective fund returns is performed with cycle characteristics.

3.2. Results

Before responding to the research question stated in the introduction, this section starts by answering the stated operational objectives and sub questions by applying the stated methodologies described above. Firstly, a detailed overview of the funds is provided. Secondly, there is an analysis of how the fund returns moved in relation the business cycle. Thirdly, the results of the performance indicators for the funds are presented. Fourthly, the main stakeholders of the funds are talked through by highlighting those that are identical in the funds and the benchmark. The geographical location of fund assets illustrates to what extent the fund portfolios are diversified. This section ends with the statistically significant macro and micro factors found for the funds followed by a little comparison performed on the results.

3.2.1. Fund overview

Prospectuses are initially consulted to gain an overview of the respective fund before going deep into the analysis. The prospectus of the BNP Paribas Fund states that it aims to achieve long-term growth of its investments in EUR by successfully actively managing the fund (BNP Paribas Asset Management Luxembourg, 2020b). The fund invests at least two third of its assets into shares issued by real estate companies without actually owning the underlying real estate assets. Specifically, the fund seeks to increase its value by investing into transferable shares issued by real estate investment companies in Europe or companies exercising their activity in the European real estate market. These shares are negotiated on European regulated markets. Investors or stakeholders' main profits are derived notably through ownership, management and development of real estate in the European market. The Horizon Pan Fund objective is to increase the capital of the fund by investing at least 75% of the assets into shares of real estate companies.

Investment strategies are managed by an investment fund manager who has a broad discretion over the fund composition. He can decide if the fund invests with an overweight or underweight compared to the benchmark composition or invests into countries or sections not included in the benchmark. The fund is not allowed to invest over a given threshold in shares issued by the same entity as it has to comply with diversification rules. Table 3 presents basic information about the three selected funds. The risk indicator is given based on the fact that the fund invests into shares whose values strongly vary throughout time (BNP Paribas Asset Management Luxembourg, 2020a) (AXA Investment Managers, n.d.) (Vwdgroup, 2020).

Table 3: Basic information about the BNP Paribas Fund, AXA World Fund and Horizon Pan Fund

Funds	BNP Paribas Fund	AXA World Fund	Horizon Pan Fund
Foundation/launch date	31/01/2021	16/08/2005	01/07/1998
Total Net Assets (in million euros)	271,065,054	569,181,328	30,838,708.00
High/Low risk	high risk	high risk	almost high risk

This section ends with a brief discussion of the additional characteristics of the funds selected in this study. The BNP Paribas Fund seeks to ensure its investments are aligned with the policies established by BNP Paribas Asset Management. Specifically, the fund investments are inclusive towards environmental (e.g. efficient regarding energy, reduction of toxic gas and waste), social and governance policies (BNP Paribas Asset Management, 2020a). In other words, the fund investments are environmentally friendly. The AXA World Fund as well as the Horizon Pan Fund investment managers take also into consideration these policies in the fund investment strategies (AXA Investment Managers, n.d.).

3.2.2. Relationship between fund returns and the business cycle

As stated above in chapter 1, the business cycle and real estate cycle inevitably are related. The relationship between the fund performance cycle and the business cycle consists in assessing overall if the fund performance cycle moved in advance, tailed or constant, with the business cycle as presented in chapter 1. The BNP Paribas Fund and the Horizon Pan Fund returns are presented first due to the similarities in their return patterns. These funds may implicitly have an almost homogeneous relationship with the business cycle, meaning both cycles are moving in similar patterns and defined to be in cycle.

The relationship between the **BNP Paribas Fund** returns and the business cycle are **synchronized** and there are no notable phase differences between them. A graph of the BNP Paribas Fund returns and the business cycle (i.e. GDP at market prices for 27 countries in the EU) helps to understand the relationship between both. Figure 20 distinguishes 8 common troughs in both cycles which are highlighted in this figure with triangles in the covered period. Both series indeed follow the four phases of a cycle presented in chapter 1 as they simultaneously entered a downturn and upward phase. However, this is not applicable for the entire period reviewed. For instance, in 2015, some differences are observed as the fund moved with a stronger volatility compared to the business cycle between April and November 2015, but both cycles reached a common trough in April and November 2015 (note that in April 2015 the fund returns reached a slightly lower trough) (as seen from circle 1 in figure 20). Importantly, they tend towards the same direction where this fund moved with a stronger volatility compared to the business cycle. In the upcoming year, as observable in figure 20 (see circle 2), there are also for example some differences, as the business cycle went through a contraction phase and hit a trough whereas the BNP Paribas Fund reached a trough a couple of months later. This shows that the business cycle acted in advance of the fund cycle in the short run. Besides, there are several common troughs in both cycles in the year 2017, 2018 and 2019.

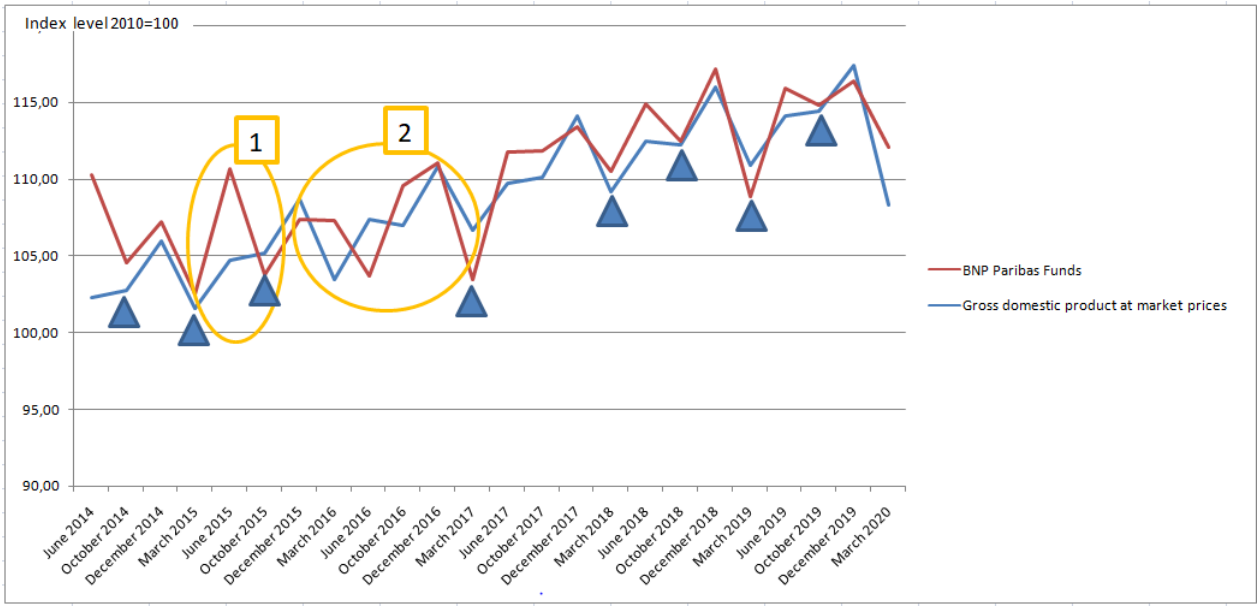

Figure 20: Graphical representation of the BNP Paribas Fund returns and the business cycle – 2014-2020, Index level (2010= 100)

Similarly, the **Horizon Pan Fund** cycle had a **strong synchronization** with the business cycle over the whole period. Figure 21 distinguishes 6 common troughs in both cycles which are highlighted in this figure with triangles in the covered period. In contrast, to the BNP Paribas Fund and the business cycle, the Horizon Pan Fund returns are even more synchronized with the business cycle. The series were strongly in cycle in the years 2014, 2015 and 2016 in contrast to the BNP Paribas Fund. Furthermore, between the first quarter of 2017 until the first quarter of 2020, both cycles were strongly synchronized but the fund returns moved with stronger volatilities in the upwards and downwards trends in comparison to the business cycle. In 2016, the returns moved after the business cycle until December 2016, which could be explained by economic factors potentially affecting the underlying assets in a stronger manner (see the circle in figure 21).

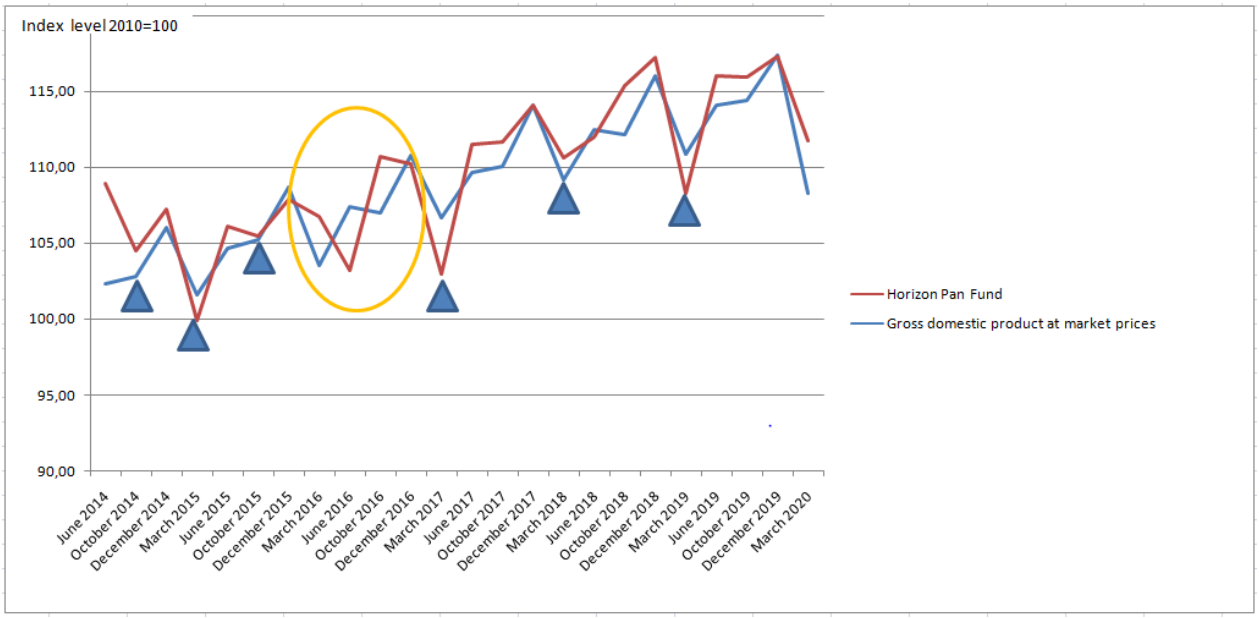

Figure 21: Graphical representation of the Horizon Pan Fund returns and the business cycle – 2014-2020, Index level (2010= 100)

The **AXA World Fund** is **highly cyclical** with the business cycle and followed similar patterns as the other two funds, nevertheless, the series moved in **stronger upwards** and **downwards moves** compared to the business cycle. According to figure 22, 8 common troughs in both cycles are found and highlighted with triangles in the reviewed period. Similarly to the BNP Paribas Fund, this fund moved with a stronger volatility compared to the business cycle between April and November 2015, but both cycles reached a common trough in April and November 2015 (as seen from circle 1 in figure 22). Alike for the BNP Paribas Fund and the Horizon Pan Fund, a period of a-cyclicality is observed between the returns of this fund and the business cycle in the year 2016 and a similar analysis can be conducted (see circle 2 in figure 22). Overall, the AXA World Fund returns are in a strong relationship with the business cycle.

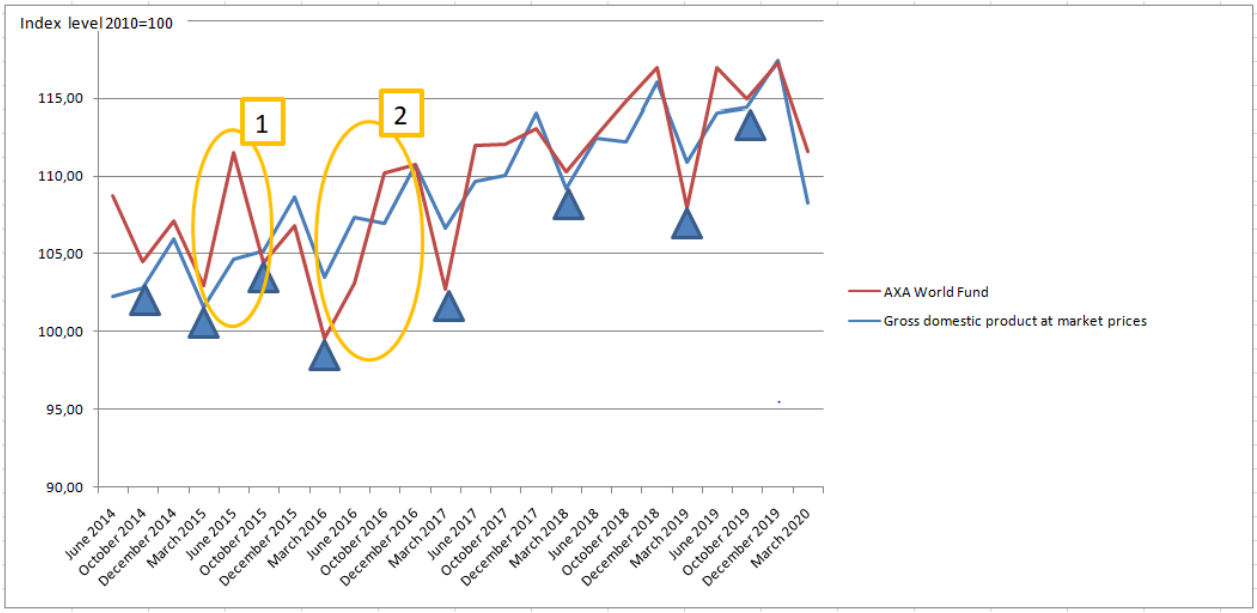

Figure 22: Graphical representation of the AXA World Fund returns and the business cycle – 2014-2020, Index level (2010= 100)

The slight a-cyclicality identified in 2015 between the fund series and the business cycle is potentially explained by several factors and governmental decisions influencing the patterns of cycles affecting the country's economy and real estate outlook. In June 2015, there was a new plan published as the "Five Presidents' Report Completing Europe's Economic and Monetary Union" on the European market (European Commission, n.d.c). The four main pillars of this report are the Economic, Financial and Fiscal Union, and Democratic Accountability, Legitimacy and Institutional Strengthening. The plan aims to build stronger macroeconomic policies in order to better deal with shocks in the union while fostering growth, building greater responsibility and integration in the European Union. A financial and fiscal union is required as unsustainable fiscal policies may threaten the financial stability of the union. Hence the first initiatives were implemented as of 1st of July 2015 and the European commission adopted a package in October 2015 for executing the actual plan (European Commission, n.d.c). Consequently, this plan highly contributed to changes in the business cycle patterns as stated above, monetary policies and government interventions can significantly impact the course of cycles. As presented above, the fund invests into various European markets explaining the potential reasons for the a-cyclicality between both series in 2015 and 2016

None of the inconsistencies in the patterns between the fund returns and the business cycle are significant. The importance of demand and supply levels in the development of both cycles is not negligible, nonetheless well monitored. The larger variations lasted only over a short period of time and were not significant. Differently said, any extreme variation is washed away by the portfolio's diversification.

Considering that the period reviewed in this study lasts around 6 years, it is not relevant to discuss long-term cycles (i.e. on average real estate cycles last 18 years) (Esajian, n.d.). The duration from trough-to-

trough gives an insight on the length of the fund cycle and business cycle. On average, there is a time span of six months to one year between every trough for the funds. The cyclical movements of the chosen funds and the business cycle are characterized to be short-term cycles. As the length of an upwards and downwards trend is typically lasting a couple of months with at least one full cycle over a given year for these funds and the business cycle. The cycle consisted clearly of different patterns (i.e. expansions, peaks, contractions and trough phases), but mostly both cycles moved simultaneously across the phases with no clear evidence that one led the other one. Differently said, no significant time lags existed between the fund cycle and the business cycle suggesting that both moved simultaneously.

The fund returns and business cycle are well synchronized. As presented in chapter 1, some argued that real estate cycles depend on the business cycle, in other words, moving after the business cycle while others argued the opposite. The BNP Paribas Fund and the Horizon Pan Fund followed similar patterns (with similar magnitudes) in their returns and are well synchronized with the business cycle. Whereas, the AXA World Fund returns pursued slightly different patterns in comparison to the other two funds. However, there was a small tendency for the fund returns to react after the business cycle for only a short period of time (mainly in the year 2016). On the whole, all fund returns and the business cycle are moving in similar patterns (i.e. together went through the same phases) with no significant inconsistencies. As a result, it can be stated that no significant a-cyclicality exists between the fund returns and the business cycle; therefore, both series are well synchronized.

3.2.3. Performance measurement

Before talking about the fund performance, it is important to state that the results obtained following the performance of the simple regression for the monthly model show that there is a great goodness-of-fit in the monthly model. The R squared is around 70% for the funds (see Appendix 4: Simple linear regression results – Monthly model). The results convey that the independent variables (i.e. risk-free rate and benchmark) explain well the fluctuations in the fund returns for the monthly model; confirming that the data of the risk-free rate and benchmark are well selected. Furthermore, the R squared for the AXA World Fund and Horizon Pan Fund for the quarterly model are lower, while the BNP Paribas Fund has roughly still the same value as in the monthly model (see Appendix 4: Simple linear regression results – Monthly model).

The results of the three performance indicators for the funds are described. Firstly, as observable from table 4, the **Sharpe ratio** found for the BNP Paribas Fund is 0.13 and for the Horizon Pan Fund is 0.11 implying that both funds generated slightly higher returns on a risk-adjusted basis in comparison to the AXA World Fund that has a slightly lower Sharpe ratio (i.e. 0.09). The portfolio is more valuable with a higher Sharpe Ratio as a smaller denominator induces lower correlation between the underlying assets thus decreasing the portfolio risk on a risk adjusted basis. As a result, its returns are less likely to be significantly impacted by fluctuations due to diversification of the risks in the fund.

Table 4: Summary of the performance metrics results for the BNP Paribas Fund, AXA World Fund and Horizon Pan Fund

Performance metrices	BNP Paribas Fund	AXA World Fund	Horizon Pan Fund
Sharpe ratio	0.13	0.09	0.11
Information ratio	0.16	0.09	0.07
Alpha value	0.47 p-value 0.11	0.31 p-value 0.33	0.40 p-value 0.19

Secondly, the results of the **information ratio** are presented for the funds. The information ratio for the BNP Paribas Fund is 0.16 as observed in table 4 implying that active management of the fund does result in slightly higher returns over the benchmark on a risk-adjusted basis. The low ratios observed for the other two funds show that their returns are not strongly outperforming the benchmark. Differently said, portfolio managers were not able to significantly outperform. In fact, the tracking error results show that the fund returns do follow up closely to the benchmark, which is coherent with the above findings. This implicitly means that investing into the index fund would not have provided investors significantly higher returns either. However, a slight increase in the information ratio for the BNP Paribas Fund may be explained by the performance of constituents that are not present in the benchmark. The lower information ratio for the AXA World Fund and the Horizon Pan fund is aligned also with the low results found for the Sharpe ratio (see Appendix 4: Simple linear regression results – Monthly model).

Thirdly, the simple linear regression shows that the alpha value (i.e. intercept variable) for all funds is positive and statistically insignificant based on the built monthly model (see Appendix 4: Simple linear regression results – Monthly model). Finally, the alpha values are all positive but according to the p-values retrieved from the regression coefficient, it is clear that they are not statistically significant (i.e. as the p-value of the coefficient is above the 5% significance level). This implies that investment fund managers were not able to significantly outperform the benchmark, which is aligned with the results found for the other metrics.

Moreover, the fund returns are plotted in order to compare the returns of a respective fund to its peers and the benchmark. The series are quarterly values as they illustrate better for main trends of the fund returns and the benchmark. Figure 23 shows that there are 7 common troughs (highlighted with triangles in the reviewed period) reached by the fund returns and the benchmark. In the year 2015 and 2016, the fund returns are not moving in similar patterns (i.e. especially the AXA World Fund), however, overall the fund returns are well synchronized in the period reviewed. The benchmark is moving in similar patterns to the fund returns. However, in 2015, the benchmark performed less well compared to BNP Paribas Fund and AXA World Fund, while the benchmark outperformed the funds in 2017 (see circle 1 and 3 in figure 23). Overall, the fund returns reached common troughs with the benchmark except, for instance, in the year 2016 and towards the end of the year 2017 where the funds performed worse (see circle 2 and 3 in figure 23). Nevertheless, it can be stated that the funds did not significantly outperform the benchmark, therefore, these observations are aligned with the results of the performance metrics. This confirms that the selected funds were a good choice as the returns are moving coherently in comparison to its peers and the benchmark building a good base for this study.

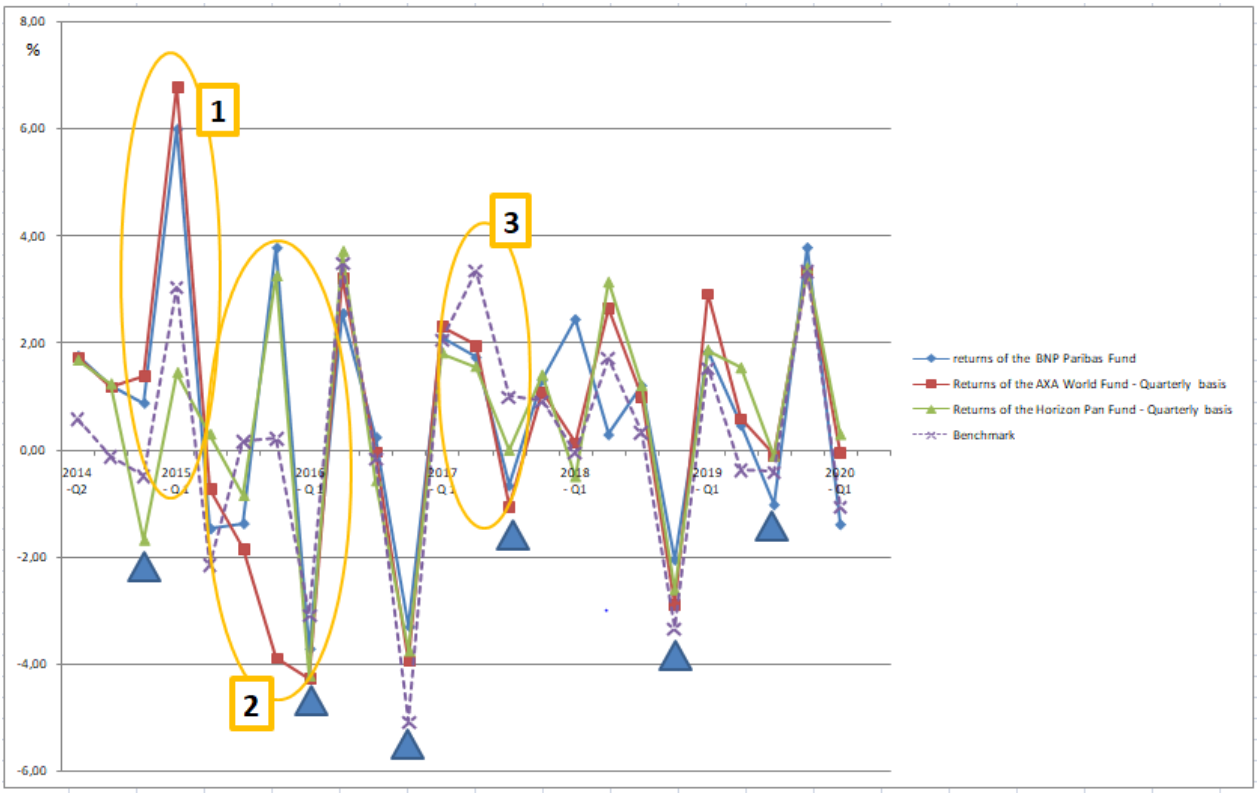

Figure 23: Graphical representation of the BNP Paribas Fund, AXA World Fund and Horizon Pan Fund returns in comparison to the benchmark – Q22014-Q12020

3.2.4. Funds Holdings

Following the presentation of the fund performance, this section continues with a presentation of the fund holdings as well as the assets location by highlighting similarities and differences between the funds and benchmark. Typically, the number, type and location of assets contribute to the degree of diversification of a fund. The observation of identical top holdings between the funds and benchmark imply that they are not acting as a 'competitive advantage' over its peers and the benchmark.

Namely, table 5 represents a summary of the **10 top holdings** held by the fund and the benchmark. These holdings are represented in terms of their weight (in percentage) in the fund (see the legend in table 5). **Identical** holdings observed to all funds and benchmark are Vonovia SE, Deutsche Wohnen SE, Segro PLC, Leg Immobilien AG, Gecina Nom (see (*) in table 5), while Unite Group PLC is the only identical stakeholder to all funds (see (**) in table 4). All funds except for the Horizon Pan Fund invested with the biggest weight (in percentage) in Vonovia SE, whilst the Horizon Pan Fund invested with the biggest weight in Deutsche Wohnen SE (see legend in table 5).

Table 5: Summary of the top 10 holdings of the funds and the benchmark

Holdings (in % of the fund)	BNP Paribas Fund	AXA World Fund	Horizon Pan Fund	Benchmark
Vonovia SE (*)	9	8	7.5	15
Deutsche Wohnen SE (*)	3	8	9	7
Segro PLC (*)	7	7	7	6
Leg Immobilien AG (*)	8	7	5	4
Gecina Nom (*)	4	3	5	3
UNITE Group PLC (**)	4	4	4	0
Wihlborgs Fastigheter AB	0	0	4	0
Fastighets AB Balger B	0	0	5	0
CA Immobilien Anlagen AG	0	0	4	0
Aroundtown SA	4	0	4	2
Warehouses de Pauw	0	5	0	0
Unibail-Rodamco-Westfield	3	4	0	2
Castellum AB	0	3	0	2
Safestore Holdings PLC	0	3	0	0
Land Securities Group PLC	6	0	0	0
Merlin Properties Socimi Sa	4	0	0	0
Swiss Prime Site	0	0	0	3
PSP Swiss Property	0	0	0	2
Other institutional and retail investors	45	48	45	54
(*) holdings identical to all funds and benchmark				
(**) holdings identical to all funds				
Legend				
	X > 7%			
	4% < X ≤ 7%			
	0% < X ≤ 4%			

These identical holdings are mainly specialized in the field of the residential real estate market targeting the lower and middle class, and students (e.g. Unite Group PLC is a leader in student accommodation based in the UK). The French company named Gecina Nom is mainly specialized in holding and managing commercial real estate (i.e. offices with a focus of about 80% of its total activities). Segro PLC is a company that owns, develops, rents out and operates industrial properties located in the UK and across Europe. Above all, these are institutional investors that trade large quantities of securities.

Even though the funds invested a large share of their portfolio in identical large institutional investors, it is crucial to present also some of the investors (among the top 10 constituents) which are **non-identical** to all funds in order to understand how the funds differentiate. According to table 5, the AXA World Fund invests into Warehouses de Pauw Sca with a weight of 5% in the portfolio, which is a company that develops and invests into logistics warehouses and is a key player in this field in the European market. Another non-identical holding of this fund is Castellum AB based in Sweden. Its main activity consists in leasing out commercial space for stores, offices, schools but also apartments. In addition, the Safestore Holdings PLC is a fund located in the UK. It owns and operates self storage facilities with a portfolio focused on the British and French market. Unibail-Rodamco-Westfield is a company that owns and develops primary retail assets including shopping malls and airports. The Horizon Pan Fund invests with a weight of 5% in Fastighets AB Balger B as observed in table 5. This company generates its revenues mainly from owning and managing real estate by investing mainly in residential and commercial real estate. The properties are being managed in northern European countries such as Sweden, Denmark, Norway (PitchBook, n.d.). The CA Immo company focuses its core businesses on investing in businesses

that involve leasing, managing and high – quality office buildings. Aroundtown SA is a large company with a focus of its activities in Germany and the Netherlands with the aim of generating revenues and bringing added value to its owned and managed real estates. As can be seen in table 5, the section "other clients" includes institutional and retail investors representing about 50% of the weight in the fund and benchmark.

The **investment strategy** of a fund is defined in the prospectus meaning that it can invest into specific types of holdings. Funds own different investment strategies contributing to the funds competitive advantage and diversification. The BNP Paribas Fund and the Horizon Pan Fund holdings tend to invest more in the residential real estate sector over the AXA World Fund that has a slightly stronger focus on the commercial and industrial sector. Thus this fund may be more sensitive to fluctuations of different macro and micro factors compared to the other two funds considering that its investment portfolio slightly differs. The next part of this section illustrates diversification of a fund emerging from the uniqueness of a real estate asset through its location.

Holdings invest, own and manage real estates in **different locations** contributing to the diversification of a fund. Table 6 represents the weight (in percentage) of the assets in the fund according to their geographical location (see the legend in table 6). It confirms that the funds and the benchmark focus specifically on investments in key European countries (i.e. mainly western countries). They invest a large amount in the British and German real estate market, whereas France and Sweden represent each respectively an average of about 10% of the fund weight. In general, funds do not all have its assets in the same location. For instance, the AXA World Fund does not have assets located in Spain, whilst this is the case for the BNP Paribas Fund and the Horizon Pan Fund. All funds and the benchmark do have assets located in Finland except for BNP Paribas Fund. As a result, the fund diversification is shown through the diversity of its assets location.

Table 6: Summary of the assets location of the funds and the benchmark

Asset Location (in % of the fund)	BNP Paribas Fund	AXA World Fund	Horizon Pan Fund	Benchmark
The United Kingdom (*)	26	27	25	26
Germany (*)	21	26	33	33
Sweden (*)	12	13	11	12
France (*)	11	12	7	6
Belgium (*)	4	11	8	7
Switzerland (*)	3	5	2	7
Austria (*)	2	1	4	1
Norway (*)	2	1	2	1
The Netherlands	0	1	0	3
Spain	6	0	5	2
Irland	0	0	0	1
Finland	0	2	1	2
Italy	0	0	0	0
(*) location identical to all funds				
Legend				
	X > 20%			
	5% < X ≤ 20%			
	0% < X ≤ 5%			

Real estate unique characteristics (i.e. streetscapes, views and neighborhoods) are talked through in chapter one. Properties remain unique due to its specific characteristics and risks which implicitly contribute to the appreciation of the asset. In general no public information is provided regarding the exact location of these estates. But BNP Paribas Fund prospectus states that investments adhere to the investment policies laid out by BNP Paribas Asset Management Company. This reasoning is applicable also to both other funds, which inevitably means that the assets of these funds contribute positively to the environment and society and are carefully chosen in order to comply with the policies laid out implicitly contributing and enhancing the society in a positive manner.

3.2.5. Macro and micro factors

Following the presentation of the holdings and asset location of the funds, this section continues with a presentation of the results achieved for the monthly and quarterly models after running the regressions. The results of the R squared show that about 65% to 72% of the fluctuations of the independent variable are explained by the dependent variables (as observed in tables 7, 8 and 9 below). This means that the selected variables in the model explain well the variations in the fund returns. For instance, the BNP Paribas Fund has an R squared of 0.72 in the monthly model indicating that about 72% of the variations (i.e. more specifically being the excess returns subtracted from the risk-free rate) are explained by the factors in the model.

Before presenting the statistically significant factors found for the funds, it is interesting to look at the **beta** retrieved following the simple linear regression run for the respective funds in the monthly model as contributes to this study. The beta value being the coefficient of the benchmark minus the risk-free rate is on average 0.75 for the funds and found to be statistically significant in the monthly model (see Appendix 4: Simple linear regression results – Monthly model). This means that the fluctuations of the fund returns are 78% of the market returns in a given period. This shows that the funds are indeed not fully mimicking the market returns confirming that some of the holdings are different from the benchmark. The next part of the section presents the statistically significant macro and micro factors found for the funds followed by an analysis of the relationship between the respective factor and the fund returns.

Firstly, the results found for the BNP Paribas Fund are discussed followed by those found for the AXA World Fund and the Horizon Pan Fund. As observable from table 7, the following statistically significant factor found for the BNP Paribas Fund given a 95% confidence interval in the monthly model is the **total construction**. This is explained by the fact that the corresponding p-value of the coefficient value of the total construction data is 0.0337 ($\leq$ 0.05) (see table 7 below).

Table 7: Multiple linear regression results for the BNP Paribas Fund – Monthly model

	SUMMARY OUTPUT: Regression Statistics
R Squared	0.7569

	SUMMARY OUTPUT: Factors	
	Coefficients	*P-value*
Intercept (alpha value)	-5.2084	0.3638
Benchmark - risk free rate	0.8145	5.21823E-20
Interest rates	0.0867	0.9186
Unemployment rate	0.5657	0.1458
Inflation rate	1.0672	0.1141
Construction confidence indicator	-0.1780	0.0563
consumer confidence index	1.7044	0.2540
household Income for homeowners	-0.2235	0.6912
household Income for homeowners aged 30-49	-0.3488	0.6851
household Income for homeowners aged 50-64	-1.0696	0.1417
TOTAL construction as a whole	0.2238	0.0337

Secondly, the factors found to be statistically significant (i.e. by looking at the p-values) in the AXA World Fund are presented. As observed in table 8, the corresponding p-value of the coefficient value of the **unemployment rate** is 0.053 ($\leq$ 0.05). As a result, this factor is influencing in a statistically significant way the fund returns.

Table 8: Multiple linear regression results for the AXA World Fund – Monthly model

	SUMMARY OUTPUT: Regression
R Squared	0.6976

	SUMMARY OUTPUT: Factors	
	Coefficients	*P-value*
Intercept (alpha value)	-11.6060	0.0670
Benchmark - risk free rate	0.7734	3.55519E-17
Interest rates	-0.6232	0.5025
Unemployment rate	0.8255	0.0539
Inflation rate	0.8530	0.2464
Construction confidence indicator	0.0033	0.9741
consumer confidence index	-0.2737	0.8664
household Income for homeowners	0.1710	0.7811
household Income for homeowners aged 30-49	0.5253	0.5770
household Income for homeowners aged 50-64	-0.6891	0.3844
TOTAL construction as a whole	0.0766	0.4998

Thirdly, the results from table 9 show that the **household income for homeowners in their 50s and 60s** and the **consumer confidence index** are found to be influencing in a statistically significant way the Horizon Pan Fund returns. This socio economic factor includes the income and age which plays an important role in the real estate market. These elements strongly reflect assets returns as, for instance, households with high income can afford renting more luxurious real estates. It is great times for people who are in their 50s and 60s to invest into properties as investors still have the possibility to take long-term mortgages from banks or households that have collected enough savings over the years. Housing related assets play an important role in wealth distribution as real estate is considered to be a safe investment. The fund also has a large number of retail investors among which it is likely that a large proportion are between their 50s and 60s. The consumer confidence index illustrates investors' behavior, in the sense that, if consumers are optimistic then they will spend on average more. The significance of this factor can be explained by the fact that potential retail investors are looking more at their expected financial situation.

Table 9: Multiple linear regression results for the Horizon Pan Fund – Monthly model

	SUMMARY OUTPUT: Regression
R Squared	0.7326

	SUMMARY OUTPUT: Factors	
	Coefficients	*P-value*
Intercept (alpha value)	-1.4257	0.7942
Benchmark - risk free rate	0.8274	3.01894E-19
Interest rates	0.8605	0.3471
Unemployment rate	0.1375	0.7001
Inflation rate	0.5579	0.4239
Construction confidence indicator	0.0985	0.8879
consumer confidence index	3.8337	0.0164
household Income for homeowners	-0.5809	0.3300
household Income for homeowners aged 30-49	-0.9759	0.2798
household Income for homeowners aged 50-64	-2.0798	0.0077
TOTAL construction as a whole	0.0863	0.4151

Next, the above mentioned statistically significant factors are plotted with the fund returns providing another angle to the results. A graphical illustration is used to analyze the degree of synchronization between the statistically significant factors and the fund returns. Some cycles characteristics (e.g. cycle lengths and phases, time unit and unit measurement) are applied to the respective factor and the fund returns to get a better understanding of the nature of their relationship. In order to consider the difference in unit measurement (e.g. results based on surveys, NAV calculation of the fund returns) and scale of the significant factors in this study, the data is plotted by cumulating the data points using excel. This makes the analysis easier and this thus paper can analyze the degree of their synchronization.

Firstly, the statistically significant factors found in table 5 for the BNP Paribas Fund are presented. The total construction is plotted with the BNP Paribas Fund returns in figure 24. Indeed there are several common troughs until the year 2018 as observable from the figure and then there is one in the year 2018, followed by another two around January 2019 and July 2019. A drastic trough occurred in March and April 2020. The existence of several common troughs shows that the series are well synchronized. It can be stated that both are moving at the same time and no series is leading the other one, as a result, the fund returns possess a strong relation with these two factors.

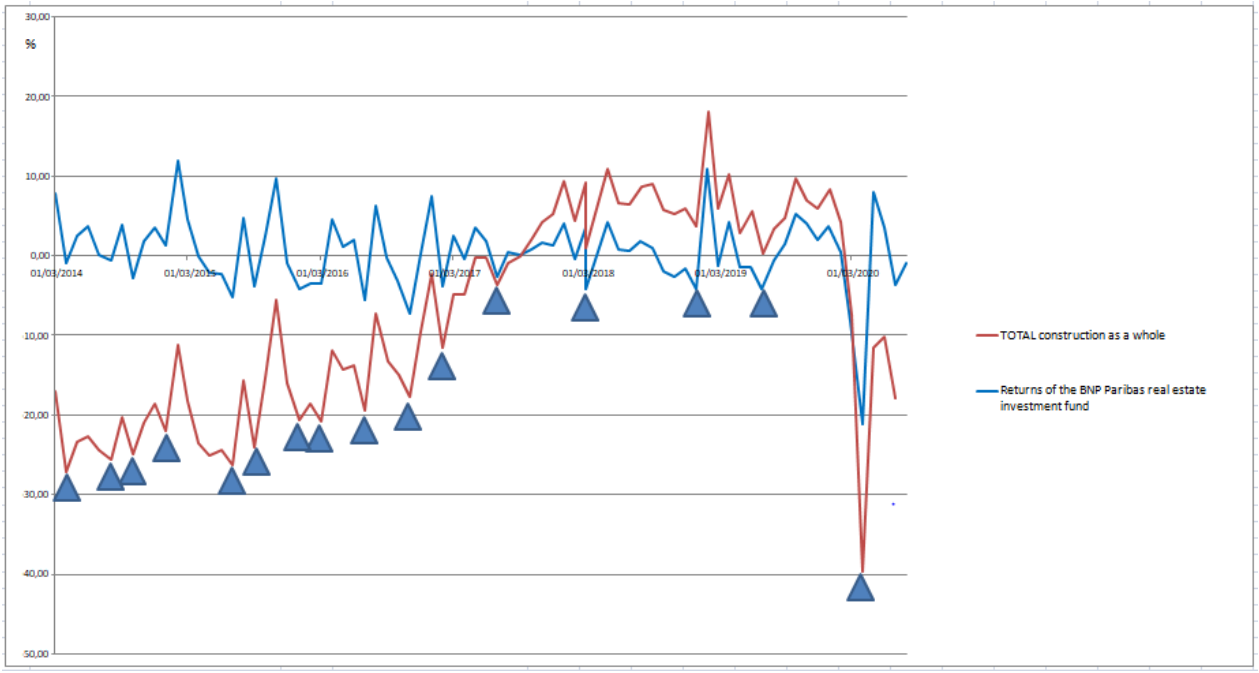

Figure 24: Graphical representation of the total construction (as a whole) and the BNP Paribas Fund returns – Q22014-Q12020

Secondly, the factors found to be statistically significant for the Horizon Pan Fund are presented. Figure 25 includes the series of the household income for homeowners in their 50s and 60s, the consumer confidence index and the Horizon Pan Fund returns. A cycle is confirmed considering that there are four solid periods with common troughs for both factors and the fund returns. The first trough is observed in January and February 2015, followed by another one towards the end of 2016, early 2019 and a significant new bottom in March and April 2020. Indeed, it is observable that the construction confidence indicator and the household income are highly pro-cyclical with the returns of the fund. Generally, the residential construction sector is unusually more cyclical with the business cycle in comparison to other sectors (Leamer, 2007). Hence, it confirms that the residential construction sector indeed moved in relation with the fund returns. In the next section, a similar analysis is conducted for the AXA World Fund.

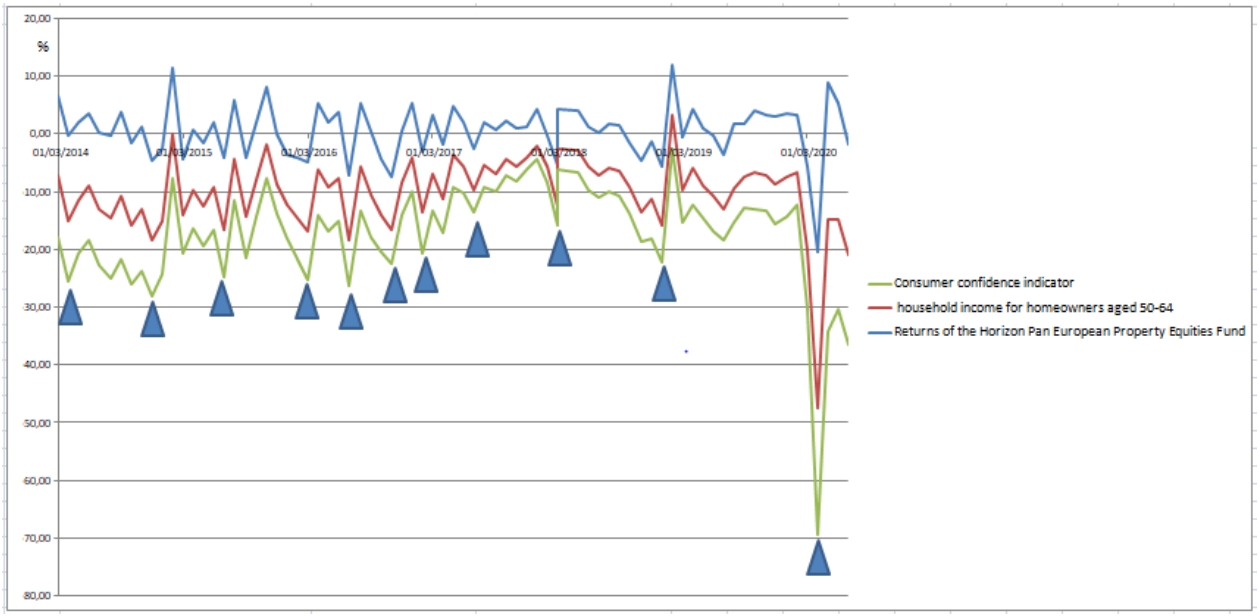

Figure 25: Graphical representation of the construction confidence indicator, income household series and the Horizon Pan Fund returns– Q22014-Q12020

As presented above the statistically significant factor found for the AXA World Fund returns is the unemployment rate. Figure 26 represents the unemployment rate and the AXA World Fund returns. There should be an inverse relationship observable between the unemployment rate and the real estate market for both series to be well synchronized. However, overall the unemployment rate was fairly stable in the period reviewed with a slight decrease in its trend from 2014 versus 2020. For example, between September 2015 and March 2016 there was a slight increase in the unemployment rate while the fund returns decreased by a lot. From July 2017 until January 2018 and in the months of March and April 2020, there was a sharp decline in the fund returns even-though the unemployment rate was stable on average (i.e. around 7.50). Thus a slight increase in the unemployment rate did not strongly impact the trend of the fund performance. This can be explained by the fact that the effects are potentially firstly observed on the economy as time is required until the effects reflect themselves onto the real estate market. The series are not synchronized and no clear phases of in patterns of the series are distinguished, as a result, the series are a-cyclical.

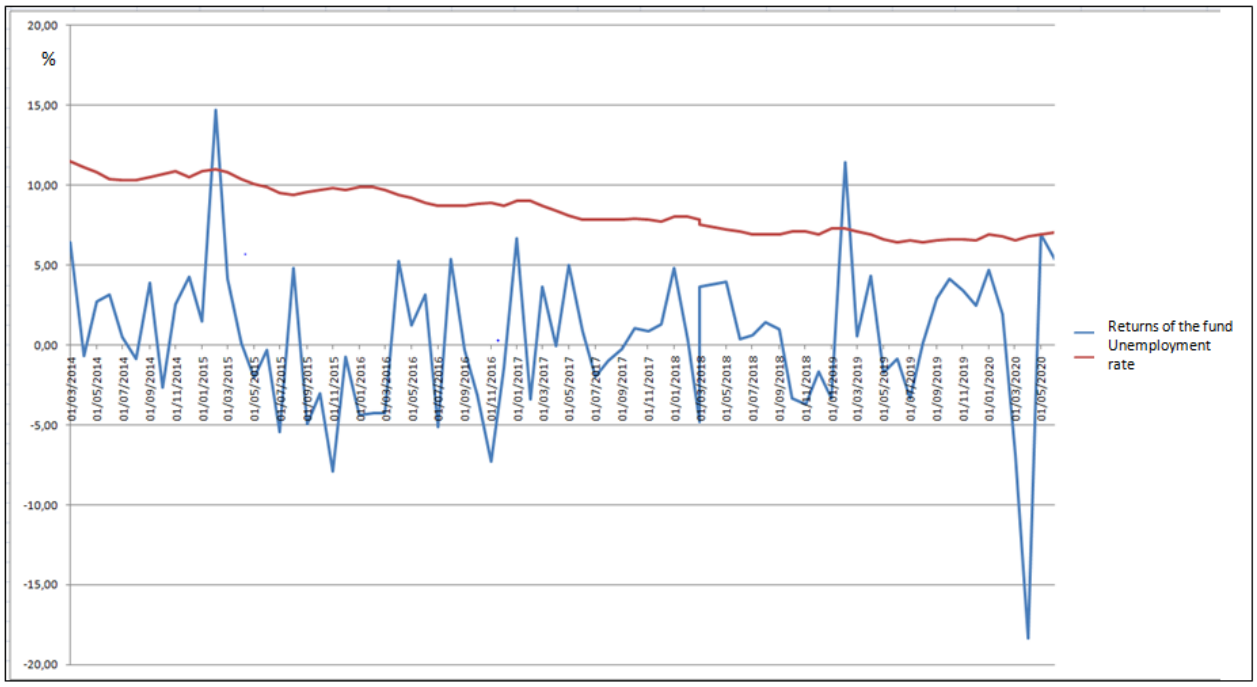

Figure 26: Graphical representation of the unemployment rate and the AXA World Fund returns – Q22014-Q12020

Various indicators influence the behavior of funds returns of which some are included in the model set up. However, the vacancy rate is not included in the quantitative model as only limited data is available. Its contribution to the cyclic behavior of funds returns is not negligible as it influences properties supply and demand levels giving an insight on potentially required rent and price adjustments and landlord turnovers. Overall, the European average office vacancy rate on average was recorded to be 5.2% in the European Union (Savills, 2020). As it can be seen most cities have low average vacancy rates but Berlin has a particularly low value suggesting that real estate demand is higher over supply. Considering that a large amount of assets are located in Germany and the UK as presented above, the vacancy rates are found to be low. The vacancy rate is overall low implying a good balance between demand and supply in the real estate market. As a result, this factor is not significant for these funds.

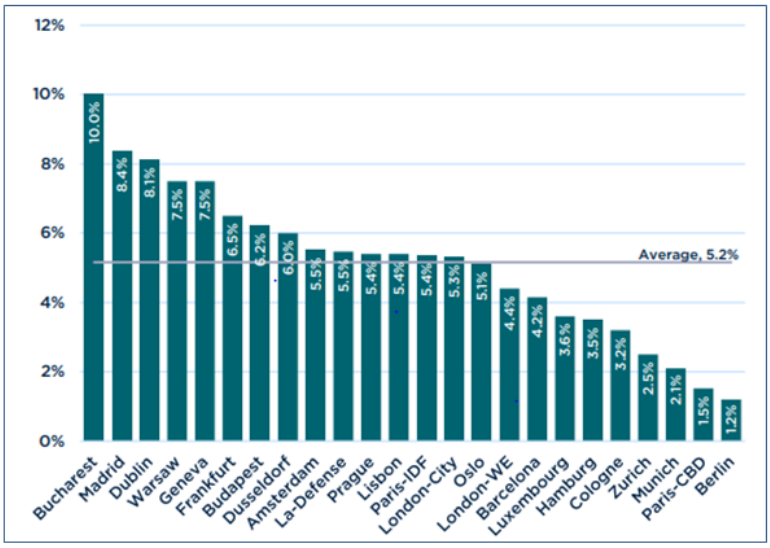

Figure 27: The office vacancy rate in 2020 for European cities (Savills, 2020).

3.2.6. Summary of the results

Before ending this section, the results obtained for the funds are briefly presented and compared by highlighting the similarities and differences. As presented above, the **R squared** for all funds are very similar. **The main statistically significant factors found from the monthly model for the funds are the total construction (as a whole in the EU), the household income for homeowners in their 50s and 60s, consumer confidence index and the unemployment rate.** Note that no statistically significant factors are found following the performance of the multiple linear regressions in the quarterly basis model (see Appendix 5: Multiple linear regression results – Quarterly model).

As observed from table 10, only the BNP Paribas Fund' returns are influenced in a statistically significant way by fluctuations in the construction sector which is also aligned with the holdings of the fund. This is astonishing considering that the construction sector is a crucial player in the real estate market. This shows that the degree of diversification in the AXA World Fund and the Horizon Pan Fund is strong enough to withstand any fluctuations from this sector. This may be due to the fact that the holdings of these funds invest mainly into buildings not requiring much renovation. The consumer confidence index and household income are found to be influencing in a statistically significant way only the Horizon Pan returns. This shows that changes in the investors' opinions (i.e. being optimistic or pessimistic regarding their expected financial situation) and household income does impact the fund returns.

Table 10: Summary of the fund results

Results	BNP Paribas Fund	AXA World Fund	Horizon Pan Fund	Comparison Summary
R-squared	**0.72**	**0.65**	**0.68**	Strong similarities
Monthly model	Total construction (as a whole in EU)	Unemployement rate	Consumer confidence index household Income for homeowners aged - 50-64	**Differences** between the funds but **similaries** between the factors found for the respective fund
Performance measures	Sharpe ratio: **0.12** Information ratio: **0.15**	Sharpe ratio: **0.094** Information ratio: **0.0885**	Sharpe ratio**: 0.1141** Information ratio: **0.0694**	Very similar

Moreover, the **unemployment rate** is the only factor found to be statistically significant in the AXA World Fund. Three reasons that potentially explain the statistical significance of the unemployment rate for only this fund. Firstly, it can be explained by the fact that this fund invests strongly in the commercial and industrial real estate market in contrast to the other funds targeting the residential real estate market. In general following an unfavorable shock in the economy, residents suffer job losses but may still afford the rent with the help of for instance state aid or alternatively, residents may move to places with cheaper rents. In the commercial sector, an unfavorable shock leads to a higher layoff rate which in turn allows businesses to reduce occupational space and help them maintain profit margins. In contrast to residents, businesses do not easily receive external support in situations of distress.

Secondly, the statistical significance of the unemployment rate is explained by the fact that "other" holdings (i.e. not identical to the other two funds) are probably not such a great diversification factor for its fluctuations. Thirdly, the vacancy rate and unemployment rate are related to each other as areas with low unemployment rate reflect high real estate demand contributing to the increase in real estate. Whereas a high unemployment rate may influence property values as the local economy drives population growth and housing demand. As it can be seen from table 6, the BNP Paribas Fund and the Horizon Pan Fund returns invested more in the German market in comparison to the AXA World Fund. The German market has a particularly low vacancy rate, therefore, it builds a strong resilience towards economic shocks. It can be said that this market contributes positively to the diversification at the fund level explaining why the unemployment rate for the BNP Paribas Fund and the Horizon Pan Fund returns are found to be not statistically significant.

After the presentation of the different factors in relation to the respective fund returns, similarities and differences are observed with the cycle's characteristics. The total construction (as a whole in the EU) is indeed well synchronized with the BNP Paribas Fund returns. In addition, household income for homeowners aged 50 to 60 and the consumer confidence indicator are found to be highly pro-cyclical. In contrast, the unemployment rate is a-cyclical with the AXA World Fund returns. Analyzing the relationship between the fund returns and the factors gives a strong base for predicting future behaviors of the fund returns as the factors series are shown to be closely following the trend. This inevitably

confirms that the variations of these three factors are aligned with the fluctuations of the fund returns and vice-versa.

The results show that the factors found to be statistically significant are all different between the funds but similar within the respective fund. The fund returns are indeed influenced by four macro and micro factors in the timeframe of this study. This relatively small number is explained by the level of diversification in the respective funds. The funds are diversified both in real estate asset types (i.e. commercial and residential) and location (i.e. across notably different European countries), and holdings. In fact, the extent to which the funds underlying assets are affected by macro and micro factors depends on the individual characteristics of each asset forming the individual risk. The risk of an unexpected change or variation of the value of individual assets due to such macro and micro factors is well hedged across the fund thanks to diversification. Diversification helps reduce any unexpected and significant fluctuations from macro and micro factors arising in the value of individual assets of the funds thus contributing to the enhancement of the returns.

3.3. Discussion

After the discussion of the results achieved by both quantitative and qualitative methodologies, this section gives further interpretations to the above findings. Firstly, the limitations are acknowledged. Secondly, this study highlights a number of new perspectives and recommendations that would be beneficial for further research before answering the research questions in the conclusion.

The findings of this study contribute to and highlight the limitations of the existing theory of fund diversification. Though the overall findings support the existing theory on fund diversification, the theory is limited as these funds were not able to hedge against or diversify risks arising from the few factors found to be statistically significant. The funds selected were considered to be relatively traditional investment funds as they are of UCITS type. The UCITS framework ensures that they have a well diversified portfolio offering low risk. In particular, investments into real estate assets by such funds are made indirectly, through holdings of real estate companies or other funds, not directly in particular real estate assets. Also factors selected in this study are general economic factors and applicable to all real estate investment funds of UCITS type and established in Luxembourg.

A limitation encountered in this study is that some attributes influencing fund returns are not included. The scope of selected macro and micro factors is limited to existing factors thoroughly studied in the literature for the real estate market and the business cycle. Taxation was not included in this study as funds established in Luxembourg are exempt from taxation on income and capital appreciation. As seen throughout the year 2020 which was marked by COVID19 crisis, a situation of a “force majeure” with COVID-19 (i.e. which occurred throughout Europe from March 2020), the fund returns were only impacted on a short-term basis. Indeed, the returns of all funds strongly decreased in a similar manner to the benchmark in March and April 2020 and recovered within a short period. The findings show that the fund returns are highly cyclical and synchronized with the business cycle. Nevertheless, long-term consequences of this “force majeure” on the real estate market cannot be negligible. The review period of this study ends mid 2020 which is not a long enough timeframe for fund returns to reflect long-term side effects of this event (e.g. changes in consumer behavior being reflected in real estate demand and supply levels).

Equally important, features and characteristics of an investment fund are not part of this study even though some of these probably do influence fund returns. For instance, fund size is found to be having an effect on fund returns, but there are others such as fund age and portfolio turnover rate as discussed in the literature (Dhume, 2014). It can be said that these attributes may contribute in creating the competitive advantage of a fund. It should be mentioned that in a context of fund returns following very similar patterns, the inclusion of these fund attributes in this study might have provided more insights in understanding deeply the competitive advantage of one fund to another. The reason for such attributes to not have been included in this study is that overall returns of funds with different attributes show strong similarities due to diversification and only slight differences due to different attributes.

This study is based on a theoretical framework, the CAPM, which inevitably means there are limitations which cannot be denied. This model is known to be criticized in the literature for its unrealistic

assumptions and several studies have been conducted to try to weaken the limitations for this study. In particular, the timeframe assumption is not a limitation given that in real estate investment funds, investments are made on a long term basis. The CAPM assumption that investors do not pay taxes, being indifferent to receiving income as a dividend or as capital gain, is aligned with the scope of this study as investment funds established in Luxembourg are not subject to withholding taxes.

The selected performance indicators based on the CAPM model are very popular although it should be stated that there are some significant weaknesses discussed in the literature. The power of measure and accuracy is not very good, as the CAPM in reality does not hold. The funds invest with different investment styles compared to the benchmarks. The alpha measure is extremely sensitive to the beta value and can mislead the results if there is a correlation between the fund and benchmark (Schneider, 2009).

On a practical level, the application of a quantitative methodology ensures a certain degree of objectivity throughout the study conducted. This study provides an analysis based on authentic documentation implying that a certain level of objectivity is ensured. However, there is a limitation on the quality of data in the sense that it could not independently be verified and may contain potential errors. The quantitative methodology set up for this study is constructed based on applying theories. There were difficulties encountered during the setup of the model as the data had to provide a sufficient "goodness of fit" in order to make this study reliable. Potential errors (e.g. in the data collection and manipulation) in the model or mistakes during the application of the theory might have occurred, but significantly impacted the end results given that the results are aligned and coherent between the different funds and in relation to the benchmark. It can be concluded that overall this study was conducted in good conditions and these limitations should not have impacted significantly the end results.

Furthermore, it should be noted that the sample size in this study is small as only three funds were selected in this study. The fund returns are found to be highly synchronized (or correlated) with each other as well as with the benchmark and business cycle. This is most likely the case also for other funds not included in this study but subject to the same regulatory framework and possessing a similar profile to these funds. In addition, as this is also a statistical work, the factors found to be statistically significant for these funds are probably relevant for other funds. Therefore, the small sample size of funds in this study should not be significantly impacting the end results.

On the same page, the timeframe of this study is relatively short considering that the fund main investments are in real estate. The reviewed period is just above 6 years for this study, a relatively short period given that real estate cycles are long-term (i.e. on average 20 years) (Case, 2017). However, the fact that the period is 6 years should not be impacting the results of this study as the main objective is to understand which macro and micro factors impact fund performance. Nevertheless, this study does also discuss the correlation between the fund returns and the business cycle, where limitation of the timeframe might have impacted results. The coherence of the achieved results indicates that such impact if it existed was minimal.

A path for further development following the limitations considered could be to extent the scope of potential macro and micro factors impacting real estate investment fund returns in this study by including, for instance, unforeseen events and specific features of investment funds. Furthermore, a larger time span (i.e. at least 20 years) could be considered in order for the analysis to include at least one full real estate cycle.

On the same wavelength, a further research that could be explored is to include a larger scope of types of funds in the analysis. Firstly, the analysis could include funds that are more aggressive or of different investment styles and legal structure. This study focused on funds under the same regulatory framework and established in Luxembourg, but it could be interesting to also include funds established and managed in other countries across Europe and for under different regularly framework. In particular this work focused on funds that are of the UCITS type, investing into shares of real estate investment companies. One could include so called alternative investment funds which invest directly into real estate. Secondly, one could add fund attributes, classified to be macro and micro factors, to the model constructed, such as fund size.

Another direction of research can focus on a specific investor profile and his choice of fund. Considering that the funds selected were not significantly outperforming the benchmark one can qualify them as corresponding to a low risk/low expectation profile. This study could be repeated with funds offering higher returns for higher risk. This could be useful for asset management, to help them understand how they can make their funds more attractive to shareholders to invest. Further research could benefit and contribute not only to the literature but also benefit investors and asset management companies by understanding better the incentives of each player in the market.

The performance metrics applied in this study are related to the CAPM as stated in chapter 2. Only one existing theory has been selected for this study. Further investigations could be performed by including other theories covering fund performance and elaborating about other indicators, which could support the findings or provide new insights. It could be interesting to analyze particularly the influence of macro and micro factors on fund performance during periods of downturn, in order for investment fund managers to better mitigate the fluctuations arising from adverse circumstances.

This study shows a different insight from what has been stated in the literature as the fund returns are not leading or lagging the business cycle. Regardless, one could imagine that in reality there are minor delays between the start of a real estate construction and its final results. An inevitable span of time between real estate demand and supply exists. This study reveals that the findings are not fully aligned with what is discussed in the literature, which could be an open door for further investigations.

CONCLUSION

The main objective of this study is to understand which macro and micro factors impact the performance of real estate investment funds on the basis of data retrieved for three such funds established in Luxembourg.

The study is based on an explanatory phase the problem setup is not yet resolved and two methodologies are applied in order to fulfill the objectives of this study. Chapter 1 provides an overview of the real estate market, emphasizing the main characteristics, followed by a discussion about the relationship between the business and real estate cycles. An outlook on some of the top reasons for Luxembourg being such an attractive hotspot for investment funds is presented in Chapter 2. The main products offered in this industry and main players are briefly talked over. The chapter ends with a presentation of the performance indicators selected for this study. Chapter 3 provides an overview of the methodologies applied and the data collected for the macro and micro factors included in this study. The findings are presented and a comparison is performed between the results obtained for each of the funds studied as well as between the benchmark. In this chapter, the relationship between the fund returns and the business cycle is assessed, as well as the statistically significant macro and micro factors impacting the fund returns. This chapter ends with a discussion about the limitations of this study and recommendations for further research.

Several criteria are used in the selection process of the funds for this study. In order to ensure that the funds are subject to a homogenous regulatory framework, all three selected funds are established in Luxembourg and subject to the Luxembourgish authority for the supervision and regulation of funds. The three funds selected are: the BNP Paribas Fund, the AXA World Fund and Horizon Pan Fund all of which invest in the EU real estate market. Three are of the same legal form (SICAV), allowing investors to increase or decrease their stake after the fund is set up. The timeframe of this study is from the 1st March 2014 until the 31st July 2020. The returns are obtained from the monthly NAVs.

The analysis is conducted based on the modern portfolio theory explaining the benefits of fund diversification. This study is based on the theoretical framework named the CAPM (Capital Asset Pricing Model). The selected performance indicators are the Sharpe ratio, Information ratio and Jensen alpha. As observed from the findings in chapter 3, the results were found to be fairly similar for all investment funds, showing that the fund managers were not able to significantly outperform the benchmark. The fund returns were found to be strongly cyclical, correlated with each other and with the benchmark. These findings show that investors should not be expecting to receive significantly higher returns over that of the benchmark.

The methodologies used in order to answer the research question are quantitative and qualitative, although the quantitative approach is the main one for this research. The qualitative methodology consists mainly in consulting fund reports published online on the respective investment management company's website or on websites of third parties, while the quantitative one involves building a

monthly and quarterly model based on the CAPM with and without the selected macro and micro factors.

This research answers successfully the stated research question. The findings are presented by highlighting the similarities and the differences between the three funds and the benchmark. According to the results, most of the largest holdings found are identical in all three funds and the benchmark confirms the strong similarities in their returns. Furthermore, some macro and micro factors were found to be influencing in a statistically significant way the fund returns. Factors are the construction confidence indicator, the total construction, the unemployment rate, consumer confidence index and finally household income for homeowners aged 50 to 64. The comparison performed between the results obtained for each of the analyzed funds highlights certain differences, which can be explained by the diversification of the assets at the level of each fund.

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