Introducing REITs in Europe

The effect on housing real estate

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Abstract:

After the financial crisis of 2007-2008, the world experienced how an unhealthy increase in housing real estate prices could contribute to a financial crisis with severe consequences for the world economy.

This thesis asks the question if the introduction of real estate investment trusts (REITs), recently enabled in several countries in the EU through systems of legislation referred to as REIT regimes, affects the price of housing real estate in a country. The effect is tested by observing the growth rate of housing real estate prices after the legislation has been enacted using a fixed effects panel data model. The result suggests a significant short-term increase in the growth rate of housing real estate prices during the years following the enactment of legislation. This result could contribute to higher awareness regarding the effects of recent legislation and help legislators and investment professionals in avoiding economic shocks such as the financial crisis of 2007-2008.

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1. Introduction

1.1 Background

The price of housing real estate is an essential factor for the economy of a country and its households. For many households, their home is their most significant asset (Knoll, Schularick & Steger 2017), and the households mortgage to finance such a home is often the most substantial debt of the household (Kiyotaki, Michaelides, Nikolov 2011). Since the deregulation of the financial markets, household financials and the economy of the world have increasingly affected one another, as for example during the global financial crisis of 2007-2008 (Yunus 2018).

During the years before the global financial crisis, easily accessible mortgage loans and a general appetite for speculation made the purchase of a house not only the purchase of a home but also an investment for many households. This speculative behavior increased housing real estate prices. At the same time, there was a general increase in the quantity and complexity of financial instruments, resulting in the financial system becoming increasingly intertwined and different actors becoming more dependent upon each other. Simultaneously, credit requirements for households seeking mortgage loans decreased (Edey 2009).

The result was that complex financial products with seemingly low risk were created which relied on mortgage loans to households with low credit scores. As the security of the loans had become overvalued, creditors experienced significant losses when these households began to default and the entire financial system was affected. These events caused a sudden shift from loose credit requirements to tight credit requirements, which created dysfunction in the credit system and financial markets. This tightening of financial markets combined with a loss of consumer and business confidence reduced global economic activity significantly, resulting in increased unemployment, contractions of GDP in many countries' economies, and a decrease in asset values (Edey 2009).

During recent years, laws have been enacted across countries in the European Union enabling increased speculation in housing real estate (Maclennan, Miao 2017). These laws are often referred to as REIT regimes. REIT regime is a term used to describe the system of laws that enable the introduction of Real Estate Investment Trusts (REIT) in a country. A REIT is a fund that invests in real estate and offers a mixed portfolio of real estate to its

investors. The legislation enables these REITs by giving them the required tax exemptions so that from a tax perspective, the investment in one of these funds is equivalent to investing in real estate directly. The market for REITs is growing internationally, and some members of the EU are in the process of changing the legislation to make these investment vehicles possible as this thesis is being written (Cornelisse et al. 2006).

REIT regimes have existed on a global scale for more than fifty years and have been tested through several economic cycles. Studies reveal that there are risk-reward benefits and diversification opportunities by investing in REITs and adding them to a mixed-asset portfolio, along with other effects such as increased liquidity in the real estate market. A REIT can focus on a specific type of real estate or hold a variety of different classes. Possible classes include housing real estate, industrial real estate and commercial real estate. Investors are attracted to REITs because they typically pay a relatively high dividend yield and historically have had strong total return performance. Furthermore, REITs are generally considered to have a low correlation with stocks and bonds and hence have portfolio stabilizing features (Wu & Pandey 2012).

Like many types of regulations, regulations concerning REITs have in some cases been amended after the legislation was first enacted. Below is a summary of the past and present legislation processes of the countries in the EU with REIT regimes (PwC 2017).

Bulgaria	The initial Act that regulates BG-REITs (Bulgarian Real Estate Investment Companies) was published in 2003.
Finland	FIN-REIT was technically enabled in 1997 in the legislative framework, but it was only in 2010 that the first real estate fund was introduced based on amendments to the FIN-REIT Act.
France	In 2003, France was among the first to introduce a REIT regime among the European countries. The French REIT regimes are known as "SIIC" (Les Sociétés d'Investissement Immobilier Cotées).
Germany	German REITs called G-REITs were introduced through the REITA (German REIT Act) established in 2007.
Greece	Greece introduced a REIT law in 1999 that was legislatively amended in 2013.

Hungary	HU-REITs was enabled through the Hungarian REIT Act in 2011 by way of amendment of another act regarding Collective Investment Funds.
Ireland	The Irish REIT regime was introduced in 2013 by provisions in the Finance Act.
Italy	The Italian version of a REIT regime translates to "listed real estate investment company" and was introduced in 2007.
Luxemburg	Luxembourg has a special property fund regime instead of an articulated REIT foundation that enabled collective investment in real estate as of 2007 (SIF).
Spain	The Spanish REIT vehicle is known as "SOCIMI". This regime was introduced in 2009 with significant amendments in 2013.
United Kingdom	Through provisions in the Finance Act in 2006, the "UK REIT" was introduced and came into force on January 1st, 2007.

1.2 Problem discussion

After the global financial crisis of 2007-2008, the world experienced the consequences of combining speculative investment in housing real estate with low credit requirements and interdependent financial actors (Edey, 2009). The financial crisis is an example of the effect that housing real estate prices can have on the economy of a country, and with housing prices in the Eurozone increasing at a faster pace than before the financial crisis there is a reason to be cautious (Jones 2018).

Since several countries in the EU have already enabled REITs, there is pressure to enable such legislation in the remaining countries within the union. As REITs has previously offered investors diversified portfolios of different classes of real estate with competitive returns at advantageous tax levels (Cornelisse, Weber, Wijs, Blokland 2006) demand for housing real estate could increase after REITs are enabled in a country and thus increase housing real estate prices. Due to REIT regimes already being enacted, there exists data with which analysis of the effects of such legislation can be conducted. Housing real estate prices have previously been a key factor in one of the most significant financial crises experienced (Edey 2009). Thus, knowledge of how housing real estate can be affected by the introduction of

REITs is of importance before enabling such legislation and should be taken into account by present legislators.

Investment professionals task themselves with predicting market movements to invest in assets they deem will increase the wealth they manage. During the financial crisis of 2007-2008, many investment professionals experienced losses (Statman 2013). The losses of investors played an important part in the financial crisis spreading across the world due to decreased investment appetite and in some cases bankruptcy following the losses (Edey 2009). If the investment professionals had taken less risky positions, some of the negative effects of the crisis could perhaps have been averted. The information of how housing real estate prices develop after the introduction of REITs would add to the investment professionals knowledge of market movements. This knowledge would increase the ability of the investment professional to correctly judge the risk level of positions and possibly decrease the eventual future losses from economic shocks.

1.3 Purpose

The purpose of this paper is to establish whether legislation enabling the introduction of REITs have effects on housing real estate prices in the country and thus, give insights to be added to the legislative debate as well as useful knowledge for investment professionals.

1.4 Hypothesis

We have tested the following hypothesis:

"The legislation which enables the introduction of REITs in a country has the effect of increasing its price of housing real estate"

The results from testing this hypothesis provide information about how the introduction of REITs in a country affects the price of housing real estate, both in the case of the hypothesis being accepted and of being rejected.

1.5 Limitations

The test has been limited to countries in the European Union to increase the chances of obtaining complete and comparable data through EU statistics. Countries in the European Union should have similar monetary policies and currency with correlated development, making the results more comparable and minimizing the risk of biased results due to differences in unobserved variables.

1.6 Definitions

We have used the following definitions during the research process.

Date of legislation/Year of legislation
We define the date of legislation as a turning point between when REITs exist in a country and when they did not. The date of legislation is the date when legislation was enacted, enabling the introduction of REITs to a country. For our analysis, we only consider the year of legislation meaning the year in which the legislation was enacted.

Unsecuritized real estate
We define unsecuritized real estate as the real estate itself, meaning that owning an asset of unsecuritized real estate means to own a house or a property. Owning an asset like a REIT is the opposite of owning unsecuritized real estate in which the ownership of real estate is achieved through the holding of a security.

REIT
A Real Estate Investment Trust is a fund that invests in real estate. REITs can specialize in a specific type of real estate or a mix of different classes. The various classes include housing real estate, commercial real estate, and industrial real estate. REITs are invested in by buying shares and thus the investors are taxed for capital gains or dividends as a shareholder. To qualify as a REIT, requirements have to be met including ownership restrictions, income, and assets (Lee & Lee 2006).

REIT regime / Regulation enabling REITs
A REIT regime is the term used for a system of regulation concerning REITs. The laws consists of tax exemptions from corporate earnings tax for property companies. The purpose of the regulation is to avoid double taxation for investors owning real estate through a real estate company. Double taxation occurs when rental income is taxed as corporate earnings which are later taxed again as income for the investor. These laws make investing in real estate through a real estate company comparable to investing directly in real estate since both investors are taxed for rental income only once (Lee & Lee 2006).

Net Asset Value
We define Net Asset Value as the value of the real estate assets owned by a REIT. The REIT which owns the underlying assets has one value when the value of the real estate assets that the REIT owns can differ.

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2. Theory and literature review

2.1 Theory review

Here follows a review of theories that can explain effects in housing real estate prices. Theories which have been assumed when analysizing the results of the test.

Asset liquidity

The degree of how liquid an asset is in a market is defined as how quickly it can be purchased or sold, which affects the pricing of an asset. Conventionally, real estate is considered relatively illiquid (Häggbom & Åsenius 2017). Amihud and Mendelson (1986) found that there's an incentive to increase the liquidity in assets due to higher yield requirements of assets associated with "illiquidity", which therefore have a lower price due to the liquidity risk. It is assumed in this thesis that higher liquidity in a market increases asset prices in the market and vice versa, including the housing real estate market.

Transaction costs and international capital inflow

Globally, real estate is subject to high transaction costs, and it is estimated by Cheng, Lin and Liu (2008) that it ranges from 7-13% of the asset price. It is suggested by Stoll and Whayley (1983) that valuations by investors are based on the net returns after transaction costs. According to Thapa & Poshakwale (2010) lower transaction costs increases the international capital inflow to a market and Tillman (2013) and Kim & Yang (2011) suggests that an increase in international capital inflow increases asset prices. This theses assumes that lower transaction costs increases international capital inflow and that increased international capital inflow increases asset prices, including housing real estate.

Modern Portfolio Theory and Portfolio Diversification

Modern portfolio theory was introduced by Harry Markowitz. The short definition of portfolio theory states that based on the correlation/covariance between asset classes, diversification can maximize returns and minimize the total risk of a mixed asset portfolio (Case, Yang & Yildirim 2012) and (Markowitz 1952). Diversification is the process of reducing investment risk by investing in asset types that are not correlated. In essence, the relevance of modern portfolio theory is that it shows benefits of diversification, and there is a strong indication in academia that real estate as an investment is a diversifying alternative (Bekkers, Doeswijk, & Lam 2009). Further, Yokoyama, Neto and Cunha (2016) presents evidence of diversification power for REITs as an investment type. It is assumed in this thesis that

increased diversification in an asset attracts investors as they want to maximize returns and minimize risk.

<u>Interest rates</u>

Monetarism is the economic theory which proposes that changes in a market's money supply alter the performance of the economy. This was advocated by Milton Friedman in the 1960s. In summary, the money supply or relative liquidity level in a market lowers and raises interest rates (Dunaev 2010). Berlemann & Freese (2013) advocates that an increase in interest rates lowers housing real estate prices and that a decrease in interest rates increases housing real estate prices, which is assumed in this thesis.

<u>Labour economics</u>

Several studies of recessions show that shocks in wealth due to unemployment affects asset prices and consumption, with higher unemployment lowering asset prices and consumption demand (Person 1930), (Temin 1976), (Mishkin 1978) and (Olney 1999). We assume that higher unemployment reduces asset prices and vice versa, including housing real estate prices.

2.2 Literature review

A summary of research in the area of REITs and of what causes movements in real estate prices, valuable knowledge when relating the result of this thesis in a broader perspective.

Gilberto (2001) determined that there is a common factor between the performance of REITs and of unsecuritized real estate returns when the effects of the stock and bonds markets are removed. He found that REITs provides exposure to the underlying value of unsecuritized real estate returns but also gives the investor the variance of the markets for stocks and bonds.

Quigley (1999) argues that the price of real estate can be derived from a classical supply and demand model. He builds the value of supply from a function of price, vacancy, and the number of construction permits. Demand is built from a function of price, income, population, and employment. He concluded that these factors do explain real estate prices but not the short-term variance in real estate prices. Dokko, Edelstein, Lacayo and Lee (1999) finds that the price of real estate in a certain city is affected by three factors: the capitalization rate, growth rate, and cyclical adjustment. The capitalization rate captures the relative volatility of the city cycle. The city growth rate synthesizes the citywide market value trend

fundamentals, while cyclical adjustment reflects the dynamic duration of the cycle. Tomura (2010) demonstrates that housing market boom-and-bust cycles are created because house prices rise when households are uncertain of the length of a period of high-income growth which later fall at the end of this period. He also adds that this theory is only correct when the economy is open to international capital flows. Liao, Zhao, Lim and Wong (2015) concluded in a case study of Singapore that an increase in foreigners' property acquisitions increases regional housing prices. Brana, Djigbenou and Prat (2012) researched the effects of global monetary shocks on emerging countries. More specifically, they studied the effects of global surplus liquidity and its spillover effects into emerging countries. They found a strong positive relationship with GDP and consumer prices as well as a weaker relationship with share prices and, our focus, real estate prices

3. Methodology and Data

3.1 Methodology

The choice of a quantitative and deductive research method is somewhat natural because the test investigates the measure of a quantitative change before and after a particular event. To do this, a hypothesis was first formulated regarding the quantitative measure, that has then been tested. Therefore, due to the formulation of a hypothesis, this research employs a deductive method.

3.1.1 The population and the sample

The test was conducted on the countries in the European Union that have enacted legislation enabling the introduction of REITs between 2001 and 2017. The test examines the effects on housing real estate prices after the enaction of the legislation. Therefore, the population consists of all these countries, and the sample consists of these countries during the years of 2001 to 2017. The choice of only including countries which have enacted legislation between the years 2001 and 2017 is because of the availability of data about those countries.

3.1.2 Econometric method

To test the hypothesis, we constructed an econometric panel data model with the annual change of an index for housing real estate prices as the response variable (ΔHouse_price_index), i.e., the growth rate. In terms of variables of interest, we constructed a dummy variable that takes the value of 1 for the year after the year of legislation (year_1). To account for lagged effects, we added lagged time variables for two years and three years after the year of legislation (year_2 and year_3). We constructed dummy variables that take the value of 1 for each country in the sample (country_k). We also added variables to control for GDP growth (GDP_growth), unemployment rate (unemployment_rate), interest rate (interest_rate), exchange rate in comparison to the country's largest trade partners (exchange_rate), and population growth (population_growth). Finally, we added a dummy variable for each year (t_20XX) from 2001 to 2017. By using Panel data, there is a cross-sectional dimension (i) and an intertemporal dimension (t) for all variables except the dummy variables for each year (t_20XX) which only have an intertemporal dimension as well as the variables for country (country_k) which only have a cross-sectional dimension.

By using Panel data, we were able to test for effects that are both time-dependent and country dependent, which adds a dimension to the results. The data is unbalanced panel data due to some observations being missing for some countries during some time periods.

The estimation is fixed effects. By using fixed effects, we lose one observation which decreases variation and thus makes the standard error higher. We had though the benefit of eliminating the error term for the cross-sectional variables, which removes the possibility of the coefficients being inconsistent because of correlation with the cross-sectional error term. The effect of decreasing omitted variable bias by adding controls are increased because we included intertemporal effects other than just the variables themselves as when only using cross-sectional data. The choice of this model allows us to increase the control for unobserved effects from the unique characteristics of our different countries; however, this comes with the assumption that the unobservable unique characteristic stays constant over the time period. Since the intertemporal error term still exists, we assume that our estimators are not affected by country-specific effects that change over time and that the coefficients are thus consistent. Inconsistency is possible if countries change their REIT legislation during a time of trend in housing real estate prices, as discussed further on.

We constructed the following equation for the model giving the annual change in housing real estate prices.

$$\Delta\,House\_price\_index_{it} = \beta0 + \beta1 * GDP\_growth_{it} + \beta2 * interest\_rate_{it}$$
$$+ \beta3 * unemployment\_rate_{it} + \beta4 * exchange\_rate_{it} +$$
$$\beta5 * population\_growth_{it} + \beta6 * year\_1_{it} + \beta7 * year\_2_{it} +$$
$$\beta8 * year\_3_{it} + \beta9 * Country\_k_i + \beta10 * t\_20XX_t + V_{it}$$

A fixed effect estimation model applies the following assumptions. It is assumed that the dependent variable (ΔHouse_price_index) can be described as a linear regression of the independent variables. It is also assumed that the regressors are exogenous and thus that there is no correlation between the error term and the regressors, except in the case of fixed effects models where the fixed effect is allowed to be correlated with the regressors. Finally, it is assumed that it must be impossible to express any of the regressors as a linear function of the other regressors.

The robust command is used for the regression, making the standard errors terms heteroskedasticity robust and thus consistent. By using the robust command, the regression will not be overly affected by violations of the fixed effects assumptions.

3.1.3 Validity and Reliability

The validity of this test is partly determined by the choice of index as a proxy for housing real estate prices. This index is gathered by the European Central Bank. The European Central Bank states that the data comes from national sources and that the national coverage can differ between countries. The problem of possible inconsistency between countries can negatively affect the validity of the test results.

To increase the probability of finding the true effect during the years of the sample after the year of legislation, we wanted to minimize the risk of bias due to omitted variables. The inclusion of controls reduces this risk. However, it is an open question whether these controls are sufficient. Homoscedasticity can be considered impossible when considering country-wide effects, and the risk of significant heteroskedasticity for the variables of interest always exist.

The test only includes annual data, meaning that we account for the year of legislation rather than the quarter-year of legislation or month if analyzing quarterly or monthly data. Do we capture the correct effect when considering the "turning point" of a country having REITs as being an entire year? Legislation can be created at the beginning of a year and at any time up until the end of a year. This could lead to immediate effects not being accounted for when legislation was made at the beginning of the year. In addition, development occurring before the date of legislation could be mistakenly included as an effect of legislation.

There could be a negative effect on validity due to the possibility that there are differences in the regulation enabling REITs, between the different countries in the dataset. The possibly differentiating parts of the legislation in a certain country could have specific effects on the price of housing real estate in that country which wouldn't be differentiated in the test.

In terms of reliability, the paper can be redone using a similar index but other countries and time periods. The results would give the same insights as long as the indexes used are created using the same type of data.

3.2 Dataset

The proxy used for the change in housing real estate prices is an index from the European Central Bank covering the years from 2001 to 2017. The index is a yearly average based on data from national sources. It considers new and existing properties and includes both houses and apartments. It is deflated by the private consumption deflator, and is an unbalanced panel which signifies that the years of observation vary between countries. This can lead to less accurate results.

To calculate GDP growth, we have used chain-linked values of millions of Euros with 2010 as the index year, to calculate the annual change each year from 2001 to 2017. As an index that consists of data gathered during an extended period of time, inconsistencies can exist between datasets for different countries and different time periods in the index.

For the unemployment rate, we utilized data from Eurostat which displays the unemployment rate as a percentage of the active population. Active population is defined as the fraction of the population that is employed or actively seeking employment. Classification of people actively seeking employment can differ between countries and data can be hard to collect. Furthermore, we wanted to capture the effect of differing unemployment on the price of real estate in which the nature of that effect can be discussed. The price of real estate could be

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affected by how large a fraction of the country's active population that works. Alternatively, there could also be an effect by how large a fraction of the entire population that does not work and needs support from the active population either through family or social benefits. This could question if unemployment rate as a percentage of active population captures the complete effect of unemployment on housing real estate prices.

For interest rate, we have used Maastricht criterion bond yields from Eurostat as a proxy. These consists of long-term interest rates on government bonds collected by the European Central Bank. They are currently available for 27 of the member countries and have a maturity of about ten years, and are replaced regularly to keep maturity constant. According to Eurostat, there exist some differences in the definition of bonds between countries. This could also cause inconsistency in the data.

For exchange rate, we have used an index from Eurostat that compares the country's exchange rate to its largest trade partners. The index includes real exchange rates compared with 19 trade partners. Choosing precisely 19 trading partners can skew the results between each country because countries of different sizes should have differing amounts of essential trade partners. This can have the effect of the index containing exchange rates with little importance for some countries and of missing exchange rates of greater importance for other countries.

For population growth, we gathered data from Eurostat giving the annual change in the mean population. Data for population growth contains both immigration and newborns. Immigrants can be argued to have the most direct effect on housing demand because they tend to be at the age where they require a home for themselves and their family in contrast to a newborn living in their family's house until adult age (Wu, Pandey, Vivek 2012). This can cause the coefficients for population growth to differ between countries because of differing proportions of immigrants and newborns. However, newborns do increase the family size and create the need for larger homes which would have the effect of increased demand for housing real estate.

Data sources are listed in the reference list.

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4. Empirical results and analysis

4.1 Empirical result

After calculating the regression, we obtained the following output:

	Coefficient	Robust Standard Error	T-value	p-value	95% Confidence Interval	
GDP_growth	.5746	.2092	2.75	0.007	.1607	.9884
interest_rate	.1154	.3678	0.31	0.754	-.6121	.8429
unemployment_rate	-.7358	.2165	-3.40	0.001	-1.164	-.3076
exchange_rate	.4878	.1961	2.49	0.014	.0998	.8757
population_growth	-.6838	1.0283	-0.67	0.507	-2.7177	1.3500
year_1	6.6544	3.0008	2.22	0.028	.7189	12.5898
year_2	4.2663	1.9575	2.18	0.031	.3944	8.1382
year_3	1.5780	1.2117	1.30	0.195	-.8187	3.9747
_cons	11.6981	3.7249	3.14	0.002	4.3304	19.0658

For the controls, there is a statistical significance at significance level 0.99 for GDP growth and unemployment rate and a statistical significance at level 0.95 for exchange rate. The coefficients for population growth and interest rates are not statistically significant. GDP growth has a positive coefficient of approximately .57, which is interpreted as a 1% increase in GDP growth increases the growth rate of housing real estate prices by 0.57% and vice versa. The coefficient is positive, as can be expected because an increased level of economic activity should increase general demand.

Interest rate has a positive coefficient of approximately .12, interpreted to mean that a 1% increase in interest rate has a positive effect of 0.12% on the growth rate of housing real

estate prices and vice versa. However, the coefficient of the interest rate variable is not statistically significant, and a 95% confidence interval lies approximately between - 0.61 and + 0.84. It was expected that the coefficient for interest rates would have been negative because lower interest rates should increase housing real estate prices (Berlemann & Freese 2013).

The coefficient for unemployment rate has a negative coefficient of approximately - .74, which was interpreted to signify that a 1% increase in unemployment rate in the country's active population has a negative effect of 0.74% on the growth rate of housing real estate prices and vice versa. It was expected that higher unemployment rate would decrease housing real estate prices (Person 1930).

Exchange rate has a positive coefficient of approximately .49. This is interpreted to signify that an increase of 1% of the exchange rate compared to a country's largest trade partners increases the growth rate of housing real estate prices by 0.49% and vice versa.

Population growth has a negative coefficient of approximately -.68, interpreted that an increase of 1% in population growth has a negative effect of 0.68% on the growth rate of housing real estate prices and vice versa. This effect was not expected because an increased population should increase demand for housing, although the effect is not statistically significant with a 95% confidence interval lying approximately between -2.7 and +1.4.

In terms of the variables of interest, year_1, year_2 and year_3, it is evident that the coefficients are all positive. For the year directly after the year of legislation, the effect is substantial with a positive coefficient of approximately 6.7. This result was interpreted to mean that the growth rate of housing real estate prices increased by 6.7% the year after the year of legislation enabling REITs. For the coefficients year_2 and year_3, the result was interpreted to signify that the growth rate of housing real estate prices increased by approximately 4.3% during the second year after the year of legislation and 1.6% during the third year after the year of legislation. The coefficients for year_1 and year_2 are significant at a 0.95 level in relation to year_3, which is not statistically significant with a t value of 1.3.

4.2 Analysis

4.2.1 Short term effect

The test demonstrates that for year one after the year of legislation, the growth rate of housing real estate prices increased by 6.7%, two years after by 4.3%, and three years after by 1.6%. This indicates that legislation enabling REITs have a definite short-term effect on the price of housing real estate. It does not increase the growth-rate permanently, but does increase the growth rate for two years and then subsequently retracts. Is this a sudden and short-lived correction of asset prices or is it a purely psychological phenomenon? If it is a correction of asset prices, a reason for this could be that investors have miscalculated the value of housing real estate before the introduction of REITs. This could be plausible assuming that the introduction of REITs introduces more investors to the housing real estate market, and thus a larger number of analysts are contributing to the market consensus of value.

Another reason for the short-term effect being a correction of pricing could be a higher frequency of trades of housing real estate. The introduction of REITs would increase the number of trades of housing real estate due to the initial purchase of assets for new REITs. If many REITs are introduced in the immediate time after the legislation, many transactions would occur in a short period of time. This would increase the probability of assets being correctly priced because new information would be incorporated in asset prices more often than if trades were performed with longer intervals of time in between. Also, higher liquidity in housing real estate as an investment asset would decrease the liquidity risk and thus increase the price (Amihud & Mendelson 1986).

It is possible that the short-term effect is not just a correction of prices but a purely psychological phenomenon. When legislation is made that enable REITs, business opportunities appear for investment professionals to create and manage these funds. The procedure of creating a fund involves raising capital and then investing this capital. After that, the investment professionals earn money from managing the fund and its positive performance (Silveira & Wright 2016). When many new funds are created, new capital is invested into the market, and thus prices should increase. Whether or not assets should be traded at this new price might not always be of concern to investment professionals since their performance is evaluated by the performance of their fund today. If the assets that the fund have invested in are increasing in value, the investment professionals and their

investors could be content even if there are no fundamental reasons for the asset price to increase, since their wealth is for the moment growing.

4.2.2 Pre-trend

The introduction coefficients (year_1, year_2 and year_3) could be biased due to the timing of legislation that enables REITs. If, for example, the legislation is enacted during years of low growth in housing real estate prices, for instance for the purpose of increasing the growth rate, the coefficients of introduction will be negatively biased by the prior low development of house prices. The opposite could be true if introduction occurs during years of high growth of housing real estate prices. By using a fixed effects estimation model, we eliminated the cross-sectional error term, but the intertemporal error term still exists and could cause this kind of bias.

To control for the possible correlation between the introduction coefficients and the intertemporal effect of introduction timing, we inserted dummy variables for the year of legislation (year_of) and the year before the year of legislation (year_before) to the regression. Signs that there may be a correlation between the introduction variables and the timing of introduction could either be positive coefficients for year_before and year_of, indicating that the legislation was enacted during years of positive growth of housing real estate prices and thus have a positive bias on the introduction coefficients. On the other side, there could be negative coefficients for year_before and year_of, indicating that the legislation was enacted during years of negative growth of housing real estate prices. Thus, have a negative bias on the introduction coefficients.

After adding the new dummy variables and rerunning the regression, we obtained the following results:

	Coefficient	Robust Standard Error	T-value	p-value	95% Confidence Interval	
year_before	-.1562648	1.882798	-0.08	0.934	-3.880888	3.568359
year_of	2.618627	1.363891	1.92	0.057	-.0794745	5.316728

Year_before has a negative coefficient of approximately -.16, which was interpreted such that the growth rate of housing real estate during the year before the year of legislation was -.16%. Year_of has a positive coefficient of approximately 2.62, which signifies that the growth rate of housing real estate during the year of legislation is positive 2.6%. The coefficient year_of has statistical significance at significance level 0.9 while the coefficient year_before is not statistically significant.

The coefficient year_before is slightly negative with a 95% confidence interval between approximately - 3.9 and + 3.57, not giving any apparent signs of pre-trend. The coefficient of year_of is statistically significant but harder to interpret since there is no information about when during the year the legislation was enacted. If the legislation was enacted at the end of the year, the coefficient demonstrates that the growth rate of housing real estate prices was positive prior to the introduction of REITs and one could argue that the introduction coefficients are positively biased. If the legislation is enacted at the beginning of the year, the effects can be considered to be due to the legislation as for the coefficients for year_1, year_2 and year_3.

When considering the coefficients of year_before and year_of together, the signs of the coefficients are not consistent in the way that would indicate pre-trend in housing real estate prices. However, there remains a risk of biased introduction coefficients. Due to the lack of information about the date of legislation, the chance of enactment of legislation during the later part of the year exists, which could lead to the conclusion that there was a positive trend before the legislation. Since the coefficient for the year before legislation indicates no trend, it is plausible that the positive trend during the year of legislation, in the case of late enactment of legislation, could be the result of announcement effects. If the legislation was announced before the enactment of the legislation, it could have the effect of investors anticipating the increase of housing real estate prices, leading to investments and price increases before the date of legislation. This would argue that the increase in housing real estate prices can be deduced to be an effect from the legislation enabling REITs, even when legislation is enacted later during the year of legislation.

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4.2.3 Effects of increased capital inflow

Our results of increased growth rate for housing real estate could be explained by an increase in capital inflow to the housing real estate market after the introduction of REITs. A reason for this could be that less capital is required for single investors to invest in real estate compared to investing in unsecuritized real estate, such as purchasing a building directly. REITs are a diverse portfolio of real estate which lowers the risk-level of the asset due to diversification advantages (Wu & Pandey 2012). This would attract investors (Markowitz 1952) and could increase the possible exposure to housing real estate for investors with certain risk level restrictions, which also would increase the amount of capital on the housing real estate market. REIT introductions could also have the effect of lowering research and transaction costs for international as well as domestic investors because many REITs are traded publicly, which could increase the inflow of both international (Thapa & Poshakwale 2010) and domestic capital to the housing real estate market. An increased amount of capital on the market would increase the demand and thus the price of housing real estate. Increased capital on the market could also increase the frequency of trades, which would lower the liquidity risk and thus also have the effect of increasing the price (Amihud and Mendelson 1986).

4.2.4 Differing significance for year-dummies

The dummy variables capturing the effects for the years 2001 to 2017 reveal expected patterns corresponding with general world economic development during these years. An noteworthy observation is that the significance of these dummy variables varies. Some are statistically significant at a significance level of 0.99, and some have p-values in the interval of 0.5 to 0.9. This suggests that the movement of housing prices in our countries of choice move with high correlation during some years and low correlation during other years. The economic and monetary union (the EU) in which the countries included in this test are a part of might explain the characteristics of the coefficients of the yearly dummies. This should increase the correlation of housing real estate prices between member countries. The years with p-values around 0.2 are 2001 and 2009. The years 2013 to 2015 have p-values between 0.69 and 0.81. 2016 have a p-value of 0.127. All other years have p-values below 0.1. In 2001, Greece joined the third stage of the EMU, which involves adapting the Euro as a currency (Featherstone 2003). This event could have the slight effect of increasing the p-value for the dummy variable for 2001 to 0.2 since the real estate market in Greece might take some time to adapt and move in tandem with the real estate markets of other member countries, thus decreasing correlation. However, during the following years many other

countries joined the third stage of the EMU (European Central Bank 2018), but none of these countries were included in our test. The years 2008 to 2012 have negative coefficients ranging from - 4 to – 6, indicating a decrease in housing real estate growth, intuitively as a result of the financial crisis. All the variables for these years have p-values below 0.05 except for 2009. The reason for this might be the immediate confusion of market actors after the significant fall in asset prices during 2008 (Camerer & Fehr 2006). This could have the effect of making real estate markets behaving more stochastically and being less correlated with the real estate markets of other countries. We could not find a plausible explanation for the high p-values of 2013 to 2015 or the p-value of 0.2 for 2016.

4.2.5 Discussion of controls in relation to earlier research

According to Quigley (1999), demand is partly constructed by the size of the population, which in our results have a negative coefficient, and unemployment, which in our results have a negative coefficient. We found that both population and unemployment decreases housing real estate prices. Following Quigley, higher population and lower unemployment increase demand which increases real estate prices. Thus, our observations reinforce the research conducted by Quigley on unemployment, but contradicts the results regarding population.

Our results also indicate that an increase in interest rates increases the price of housing real estate, which contradicts the conclusions of Brana, Djigbenou and Prat (2012) which argue that global surplus liquidity to some extent increases real estate prices.

5. Conclusion

After performing the statistical analysis and analyzing the results, we can accept the research hypothesis:

"The legislation which enables the introduction of REITs in a country has the effect of increasing its price of housing real estate"

We accept the hypothesis with the added conclusion that the introduction of REITs in a country has a positive short-term effect on the growth rate of housing real estate prices. The short-term effect consists of the growth rate of housing real estate prices increasing by approximately 6.7% during the first year after the year of legislation, by approximately 4.3% during the second year after the year of legislation, and by approximately 1.6% during the third year after the year of legislation. The effects of the first and second year after the year of legislation are significant at a significance level of 0.95. The effects of the third year after the year of legislation are not significant with a p-value of 0.195.

For legislators, these results should be an insight added to the debate whether to enact legislation enabling REITs since the development of housing real estate prices can have considerable effects on the economy of a country. For instance, if there is opinion to enable REITs in a country, this result can provide support for the argument that REIT regimes would increase housing real estate prices, which could contribute to overvaluation. Because of the possibility of increased housing real estate prices, the case could be made for a more detailed analysis of the housing real estate market before enacting the legislation. This could contribute to increased awareness of the consquences of such legislation, and help avoid unwanted economic events such as the financial crisis of 2007-2008.

For investment professionals, this knowledge could be applied when predicting the development of housing real estate markets when legislation enabling REITs is enacted. This could increase the ability of the investment professional to judge risks correctly, and thus make them more resilient to future potential economic shocks.

6. Reflection

6.1 Additional data

To further expand the test and lower the risk of omitted variable bias on the interest variables, the test could have benefited from adding controls in the form of household savings rates, mortgage loans amortization degrees, and other detailed information about household behavior.

6.2 Future research

Moving forward with our conclusions, future research could look at long-term effects after the introduction of REITs. We conclude that the introduction of REITs in a country has a positive short-term effect. How does the housing real estate markets of countries with REITs move after these effects have worn off, compared to housing real estate markets of countries without REITs?

An interesting area of research would be to investigate the correlation of REIT markets of different countries. Do they move in tandem with each other? Does any particular market lead the development of other markets? Could this lead to evaluations for REIT markets that follow other REIT markets to differ significantly from the Net Asset Value of their own portfolios?

Additional research could also look further into the effect of announcement of legislation on the growth rate of housing real estate prices, which could provide better insights into the psychological aspects of this area.

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Sources of datasets:

- **Unemployment:** "Unemployment by sex and age - annual average - sex: total, age: total - percentage of total population"
  <http://appsso.eurostat.ec.europa.eu/nui/show.do?wai=true&dataset=une_rt_a>
  Extracted: 2018-04-23

- **House price index**: "The residential property price indicator - Series: RPP.A."COUNTRY".N.TD.00.4.R1 "
  <https://sdw.ecb.europa.eu/browse.do?node=167216>
  Extracted: 2018-04-23

- **GDP Growth:** "GDP and main components (output, expenditure and income) - Chain linked volumes (2010), million euro"
  <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en>
  Extracted: 2018-04-27

- **Interest Rate:** "EMU convergence criterion series – annual data"
  <https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00097&plugin=1>
  Extracted: 2018-04-23

- **Exchange Rate**: "Industrial countries' effective exchange rates - Real effective exchange rate (deflator: consumer price index - 19 trading partners - Euro area) - annual data"
  <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_eff_ic_a&lang=en>
  Extracted: 2018-04-27

- **Population growth**: " Population change - Demographic balance and crude rates at national level - Average population - Total"
  <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_gind&lang=en>
  Extracted: 2018-04-27