

Understanding cross-national differences in housing
expenditures: Evidence for 28 European countries

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In some Western European countries, there is a shortage in (affordable) housing. Because, while housing expenditures increases, the reasons for differences between countries in housing expenditures is not always understood. This research will conduct a research to find out which variables determine housing expenditures. Thereafter this research will look whether there is a moderating effect of institutions on these direct effects, as more one explanation can be correct, such as financialization or shortages, depending on the institutional background. In this research 28 European countries over the years 2001 till 2017 are considered. This research found evidence that shortages counter-intuitively make housing expenditures cheaper, and that the effects of financialization is not that big in the 28 researched European countries. Furthermore, evidence has been found that institutions do moderate some effects of variables on housing expenditure.

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CHAPTER 1: INTRODUCTION

What makes Housing expenditures at the price levels they are? In some European countries the issue of housing and more specifically affordable housing has come to dominate the political discussion within some political parties and cities (Der Spiegel, 2018; de Volkskrant, 2019). The issue being that there are not enough houses, and those houses that are available are far too expensive relatively compared to disposable income. The rule of thumb when discussing housing prices is that the costs of housing must be below 30% of your disposable income. However, could it be that simple that housing expenditures are just a result of supply and demand?

Because, seeing housing as a supply and demand market is a quite a recent invention from the neoclassical school of thought within economics, which only came to dominate after the seventies. Classical economists such as Locke (1689) and Smith (1776) saw housing as a social right for example, and not as a good of production. Which still could mean that there can be a market for housing, however it should be regulated. This line of thought from Locke (1689) and Smith (1776) was a consequence of stating that land for example was fixed and irreproducible.

More economic libertarian economist such as Gleaser (2005) would say that housing nowadays is expensive due to failed government interferences, and that the market should make housing expenses cheaper. Because, regulations and rules that increase scarcity and therefore increase expenses as they view housing as a market with dead weight loss due to government intervention. However, if we look at the housing market in the more economic liberal countries, we see that there are also problems. When we look for example at the American case, we see that housing prices compared to income even with the economic crisis (2008-2012) has doubled in twenty years since the nineties (Hypostat, 2018).

What happened that the housing market prices increased so much? And more importantly what where the effects on housing expenditures, as that is what in the end of each month must be paid. Some economist such as Ryan-Collins (2019) argue that the effects of financialization and mortgages have had their effects on the housing market. Could that have had a direct effect on housing expenditures? Could it be that if governments choose to counter financialization that a direct effect would be that

housing expenditures becomes cheaper? Which brings us at the main question of this research, which factors have a direct effect on the housing expenditures of a household.

Except for the direct effects, one could also argue that determine into which variables have a direct effect on housing expenditures. For instance, the direct effect of shortages could be directly affected by institutions. Because if a country has strict price rules, or other regulations it could very well be that shortages do not affect housing expenditures. However, this could still result to other problems such as higher shortages as no one wants to build. Therefore, this research will also look at the moderating effects of institutions on the direct effect of different variables.

This research will therefore consist out of two parts. In the first part I will look on the direct effects of different parameters that are often called as determinants for housing expenditures by politicians: Shortages and Financialization. I will also test for more traditional arguments for housing expenditures such as Inflation and Land. In the second part of this research I will try to test my own hypothesis which is that institutions matter in which determinant is most important for explaining housing expenditures.

CHAPTER 2: POTENTIAL DRIVERS OF HOUSING

EXPENDITURES

This chapter provides some background on and literature review of possible factors accounting for cross-national differences in housing prices.

2.1. Country-level factors with a direct effect on housing expenditures

2.1.1. The degree of financialization of society

The first direct effect I will discuss is financialization. Financialization is the increasing power that financial institutions have on the market or in the case of this research the housing market. One way how financialization could potentially influence housing expenditures are the rules circumventing Mortgages. As these rules can make it easier for some people to buy a house. For example, many countries make it fiscally interesting to buy houses with tax cuts. Which then lead to investors buying more dwellings as this is fiscally incentivized. Moreover, the financial sector gets more power in the housing market as they own mortgages on most houses (Aalbers, 2017). Which will increase housing expenditures, as households will have to pay more money back to the bank.

The rules that are in place in the housing market about financing are per country quite different. In some countries one can take a mortgage of 110% on the worth of their house, whilst in other only 60%. Which has an enormous effect on how much money can be put into the market. This is due to how banks can create money with housing. As with loans new liabilities are created with assets. As such a bank can create more and more money if there is enough trust that the money will be repaid. Which is a sort of insider-outsider problem. As insiders take most of the benefits and outsiders must pay the costs.

There is more evidence that financialization can affect housing expenditures. Because as an OECD study of Andrews, Sanchez and Johansson (2011) stated that deregulation of the financial sector explained 30% of the increase in housing prices. Moreover Ryan-Collins (2019) stated that financialization of the housing market was the most important reason that housing prices have increased since the 1980's. As in the years between 1870 and 1980 mortgages always had been at least under the level of 30% of GDP and sometimes even decreased to 15% of GDP. Since 1980 level of mortgages

compared to GDP increased to 70% (Jordá, Schularick & Taylor 2016). That means that the mortgages have doubled in less than 30 years while before mortgages were always relatively constant. Which can be explained by deregulations which allowed to be put more money in houses.

Financialization can heavily impact prices, as Lapavitsas (2013) argued. He argued that financialization can lead to making profits without producing something. Which could have effects on the housing market as the fear of many policymakers are that investors buy significant number of houses and then rent those houses for profits to people who cannot afford to buy that house. Which is a problem because the reason that people cannot buy a house is due to that investors have more money and therefore can overbid for the house. Which leads to more expensive housing due to larger mortgage debt repayments.

This idea is also mentioned by Aalbers (2017) who argued that policymakers should counter the grow of influence of investors. As the assets of investors in the housing markets have increases from 31% of GDP to 117% of GDP while levels of financialization increased. And as Investors want to make profits this means that houses are rented or sold for higher prices at the market than if those investors did not intervene. The problem here is that those higher sell prices or rents are not because of investments the investors did. Investors mainly earn money here due to arbitrage. Which gives a clear relationship between financialization and housing expenditures, as financialization here gives room for those types of investors. The increase of housing expenditures then can be explained by two mechanisms.

The first mechanism being that people can get a loan more easily when markets are more financialized which could be visible by an increasing Loan-To-Value (LTV) ratio. As in a research of Fernandez (2016) there was found evidence for a strong correlation between higher LTV ratios and financializations of the housing market. Because financialization and higher LTV ratios both are an effect of liberalization of the financial sector. Financialization then can lead to even higher LTV ratios as the financial markets becomes stronger.

Higher LTV ratios causes then higher housing expenditures as the higher mortgages must be repaid. Moreover, there is more money in the market which means higher housing prices which also must be paid (Tressel, 2010). The IMF study found evidence that there was a correlation between bank

credits and housing prices. For each 10% that credit increased housing prices were expected to grow with 6%. Which shows us that mortgages have a significant effect on the increase of Housing prices and therefore Housing expenditures.

The second mechanism that causes that housing expenditures can increase with deregulation is that banks and other investors themselves can more easily buy assets such as houses. Investors would invest in housing as an asset absorption measure as the overflow of liquidity due to financialization would leave less investments that investors can invest in (Fernandez, 2016). Which would mean from a basic economic viewpoint that there will be more buyers in the markets which means demand increase. This higher demand would result in a higher equilibrium price. Because extra buildings will not be built, the reason for this is that bank and investors do buy those houses to sell or rent them. Which means that there is technically not a shortage, as there are enough dwellings for people that want a dwelling. These people only must pay a higher price for their dwelling. which in turn would make the investment more profitable which leads to more investors going into the housing market. Hence, the expenditure for housing increases.

These two mechanisms would explain why housing expenditures has increased a lot since the 1980's. Therefore, I argue that financialization increases housing expenditures.

H1: Increases in Financialization leads to increases in Housing expenditures

2.1.2. Inflation rate

Inflation and Housing expenditures were closely linked to each other in the 80's different authors such as Kearn (1979), Dougherty & van Order (1982), Porteba (1984), all concluded that inflation decreases housing expenditures. Because low inflation would lead to more people wanting to invest in assets as the returns are then higher compared to other investments. Which would make Inflation on first sight an ideal indicator for determining Housing expenditures. However, housing stock these days are such a big part of the economy in most advanced economies that one could argue that the relationship these days could be the other way around. Which means that housing prices affects inflation. Because if housing becomes more expensive in countries where already a big part of the population pays

more than 25% of their disposable income to the costs for housing. Then an increase in housing prices has a direct significant effect on disposable income that it is imaginable that labor unions would insist on higher wages for people to be able to pay their bills.

In economic literature there is also a second effect that inflation possibly could have on housing prices as low inflation alone has probably an effect on pricing of housing. As houses are an asset which increase in value over time, even doubled when adjusted for inflation since 1980 (Knoll, Schularick & Steger, 2017). Therefore, as a house is considered an asset, at times of uncertainty or low inflation investor might try to buy dwellings as an asset. Which we often see happening with art or even gold.

Because as discussed earlier dwellings would make a great asset for investors who do not know in which project, they should invest their money. An investor then could choice to invest in housing as the returns are relatively high with low inflation. Furthermore, investors will not simply put the money on their bank accounts as low inflation often means low rent rates of the bank on capital. Which than increases housing prices as the demand for housing increases. Thirdly, an investor will invest in housing as a housing is an asset in which money can be put easily when the markets are increasingly volatile.

Schwab (1982) argued that inflation also influenced Housing expenditure. Schwab reasoned that when inflation increases on the short-term housing costs will increase, as inflation is calculated into the expenditures. On the long term however, housing expenditures would decrease. As inflation would decrease the demand for housing. Which would lower the price as every economist should know.

Therefore, I deem it likely when that when inflation is low, housing expenditures increase. As higher inflation decreases the demand for housing and hence the expenditure for housing. And lower inflation increases the demand for housing by investors for example.

H2: increases in Inflation lead to decreases in Housing expenditures.

2.1.3 Population Density

Housing expenditure can be determined by different variables as I explained in previous sections. One of the variables that is given significant influence to change in housing expenditures are land prices. Knoll, et al. (2017) stated in their research that a large part of the increase in housing prices

(81%) could be explained by the increase of land prices. Which would make land our most important variable to explain the level of housing expenditures.

The question that than remains is what makes land expensive, a cause that is often mentioned in academic literature is regulations of the housing market. Glaeser, Gyourke and Saks (2005) concluded that the increases in housing prices in the United States was mainly due to regulations in densely populated areas. These regulations made it according to Glaeser et al. (2005) more expensive and difficult to build, hence the more expensive housing. However, this argument can be refuted by looking at Singapore Phang's (2001) research showed that in Singapore there was a viable scheme for affordable housing, where the government owned almost all the land. The heavily regulated housing market in Singapore resulted in decreasing ratios for the part of income that was spend on rent for housing. Housing became relatively cheaper in this regulated market.

The fact that the effects of regulations are at least dubious to what extend they affect land prices. This result was shared in the research of Quigley and Rosenthal (2005). Quigley and Rosenthal also concluded that it is at this time impossible to make assumptions that can hold when comparing regulations with housing prices. They also stated that the research of Gleaser et al. (2005) only gave indirect evidence.

Glaeser, et al. (2005) stated that the supply and demand rules do not work with housing, however due to a significantly different reason. Glaeser, et al (2005) wrote in their research that housing should work as a normal market. However due to regulations it does not according to them. The example they give is that prices in New York increased more due to the regulation that buildings could not have more than 20 levels. Which of course could trigger shortages in housing, however the increase in prices that comes with building higher houses should also be considered. Furthermore, the fact that you would have to build +20 level buildings shows us two things. One the scarcity of land and secondly as effect of that the price of land. Because if land would have been cheaper developers would not need to build 20+ level buildings as buying another plot of land would then be cheaper to increase housing.

Which brings us to the main point. The reason that land values are often high is not because of regulations, as the effect of regulations can differ. The reason that land values are high is that more people want to life at some plots of land because for example it's good location. Which then increases

the price (Peiser, 1989). Which leads to higher prices of land, and this contributes to higher Housing expenditures. Building regulations can be very strict in a country, but this doesn't matter until the point that people want to live there in big numbers. As such the main reason for high housing expenditures is not the regulations in a city of a country, the main reason for high housing expenditures is population density. Which means that in general countries with higher densities should also have higher housing expenditures. As higher densities could be an indicator for higher demand.

H3: increases in Population density lead to increases in Housing expenditures.

2.1.4. Housing shortages

Supply and demand are two important terms within economics. Mostly supply and demand are used to explain prices and quantities of goods. An economist who would view housing as an undistorted market would argue that prices are determined by three variables: economic growth, inflation and supply and demand.

As in previous section the conclusion was made that population density matters when explaining housing expenditures, we saw there was also slight evidence that regulations might matter. The reason regulation might matter is because it affects the supply of residential dwellings. Because where population density could be an indicator of demand for dwellings in a specific country. The same could be said that regulations influence the supply. As the supply can be affected by regulations as regulations can make it harder to build.

Olsen (1969) discusses in his paper how shortages should affect Housing expenditures, as he tried to come up with a model that could define the housing market. He stated that shortages should increase the housing expenditures. He argued for example that landlord would increase than rents for the short run to increase profits. On the other hand, he also argued houses themselves become more expensive as people will have to outbid each other. Therefore, it is expected that housing expenditures will increase when shortages grow.

H4: Housing shortages increase housing expenditures.

2.1.5. Summary hypothesized direct effects

In the table here below the different effects are summarized that are believed to influence the dependent variable Housing expenditures.

Hypothesis	Expected effects	Arguments & Literature
H1: Financialization increases housing expenditures	+	Financialization leads to more investors that seek profits, and more money is available which increases housing expenditure due to higher mortgages. (Andrews et al, 2011; Ryan-Collins, 2019)
H2: Inflation decreases housing expenditures	-	Inflation decreases housing expenditures. As it lowers demand for housing on the long-term (Schwab, 1982). Furthermore, Inflation decreases housing expenditures as investors are more likely to invest in housing in times of low inflation. (Dougherty & van Order, 1982; Porteba, 1984).
H3: Population density increases housing expenditures	+	In more densely populated areas housing expenditures are higher. Because this density

		shows us a demand for that specific plot of land. (Peiser, 1989).
H4: Housing shortages increase housing expenditures	+	A shortage should lead to higher prices in a market. This shortage should incentivize investors to build more dwellings. Furthermore, shortages lead to people overbidding which leads to even higher expenditures for housing (Olsen, 1969)

As is visible in above table I expect that higher degrees of financialization, population densities and housing shortages increase housing expenditures and that higher degrees of inflation decrease housing expenditures.

2.2. The effects of institutions on the housing market

2.2.1. Institutions

We know from Varieties of Capitalism theories (Hall & Soskice, 2001) and institutional theories (Williamson, 2000) that institutions often matter in how markets work. Fernandez (2016) and Schwartz & Seabrooke (2009) already used institutional approaches in order to describe the housing market. Both found evidence that those backgrounds matter in how the housing market works in specific countries.

The Anglo-Saxon Liberal Market is such a group of economies with a specific institutional background. What is important here is that the main reason for housing expenditures to increase according to Ryan-Collins (2019) is not that there has not been build enough but rather that the money creation in respect to mortgage has exploded since there was financial liberalization at these markets.

However, this conclusion was made based on mostly Anglo-Saxon economies, so can we say that financial liberalization for instance is also important in different types of economies for determining housing expenditures. As The institutional difference between Liberal Market Economies (LME) and for instance Coordinated Market Economies (CME) are significant, as in a CME the emphasize is put more on collaboration whilst in an LME the emphasize is put more on competition. Which could affect whether the outcome of the book of Ryan-Collins (2019) can also be used to explain housing costs in other types of economies. Because in an LME housing is often seen as a self-regulating market due to competition. However, in Coordinated market economies the government tries to facilitate markets by setting up regulations and rules to prevent market failures. This is important as it could hint that housing prices can be explained by different variables in countries with different institutional backgrounds.

These institutional differences could have significant effects on how available housing is and how expensive. For example, a CME is more organized and government intervention is more expected and accepted. Moreover, one of the most important goals for a government in more CME styled countries is to have a stable economy. Which is visible in that CME governments often have lower income inequality (Hall&Soskice, 2001) which could be an effect of government intervening when inequality becomes too big. This often results in governments intervening when plants get closed for example (CME example: Mining in Limburg¹). The effects of these policies often are that supply of work is more evenly distributed in these countries one could argue. Which will eventually lead to a more evenly distributed demand for housing in such countries in comparison to countries where the government is less inclined to intervene such as more LME styled countries (Detroit, USA²). Which again could perhaps indicate that housing markets work differently in different economies and prices are affected differently.

Which is an important distinction as in most Anglo-Saxon countries neoclassical influence was growing and dominating. In Continental Europe however, it was a different story and neoclassical thought (although it had a significant influence) was less dominating in continental Europe with the

¹ When the mines closed in Limburg (Netherlands) the dutch government decided that money should be invested in Limburg which resulted in a university and some government branches.

² Detroit had a successful automotive industry, however due to outsourcing and economic backlashes the city fell into decline.

might of the German Historical School in the late 19th century and later Keynesian and Neo-Keynesian Economic School in the 20th century. Which is still visible in Hall and Soskice (2001) categorization of Economies. Continental Europe was categorized as Common Market Economies (CME) and Anglo-Saxon economies where mostly categorized as Liberal Market Economies (LME).

This difference could make a huge impact for decisions makers on how to handle land, and therefore how to handle land possession and land rent as the starting point of economic thought is different. Which may be important as land prices explain for 80% the increase in value of housing (Knoll, Schularick and Steger, 2017) and therefore also the housing rent and housing costs most people must pay. Which makes it quite important for economic outcomes how policymakers for example look at land values and economy of the land.

The problem with the categorization of Hall and Soskice (2001) with respect to the housing market is that the dual structure of the Hall and Soskice model does not represent housing in developed economies well. Which is often a critique on the Hall and Soskice model the dual structure. Because there are more than two flavors to choose from when we are discussing institutional structures. The housing market for example in south European countries is significantly different than the housing market in north western European countries such as the Netherlands and Germany (Allen, 2006). In the southern European countries home ownership rates are much higher and affordable housing is much lower than in countries such as German and the Netherlands whilst the housing being significantly cheaper as a percentage of disposable income (Schwartz and Seabrooke, 2009). While both groups of countries are in Hall & Soskice (2001) Coordinated Market Economies.

With that line of reasoning they came to four types of what they called Varieties of Residential Capitalism (VoRC). Which could be divided in a two-dimensional model with four blocks, with on the Y-axis Mortgage debt as percentage of GDP. The X-axis shows owner occupation rate which resembles the percentage renters versus percentage buyers.

Figure 1: Schwartz & Seabrooke (2009)

(#s in each box are unweighted average % level for group for the indicator)		Owner-occupation Rate (average of 1992 and 2002)	
		Low	High
<i>Mortgages as a % of GDP (average of 1992 and 2002)</i>	High	Corporatist Market Mortgage::GDP %: 58.3 Owner-occupation %: 47.0 Social rental %: 20.7	Liberal Market Mortgage::GDP %: 48.5 Owner-occupation %: 70.1 Social rental %: 9.4
	Low	Statist-developmental Mortgage::GDP %: 28.2 Owner-occupation %: 58.3 Social rental %: 16.8	Familial Mortgage::GDP %: 21.6 Owner-occupation %: 75.5 Social rental %: 5.5

As we see in figure 1 Schwartz and Seabrooke (2009) made four subgroups: Familial (southern European countries), Statist-developmental (Scandinavian countries), Liberal Market (Anglo-Saxon countries) and Corporatist Market (North-western European countries).

However, as Fernandez (2016) argued the divide made by looking at outputs is not perfect. He stated that there is a divergence between economies in the same direction, and that it is far more important to look at institutional differences than outcome differences. Which brings us back to the original VoC literature. However, the problem that Schwartz and Seabrooke (2009) had with the huge variety in between CME countries still must be solved as eastern and southern European countries can have significantly different market structures.

Amable (2003), Coates (1999), Boyer (2001) all wanted to add more varieties of capitalism which is a still ongoing debate within VoC literature. While they have different opinions about which groups of Market Economies should be commonly accepted, they all seem to agree upon that Mediterranean Market Economies (MME) at least should be one of them.

One of the arguments often used is that Mediterranean countries are far more familiar organized than other CME's, which should lead to an extra group of Market economies. Which could mean that there is a different effect from institutions from that more familiar standpoint. As houses are often kept within families, which then would explain the higher ownerships rates and the lower LTV ratios. Which could mean that in MME financialization has less effect on housing expenditures as most houses are sold to family and friends, for example. Therefore, I argue that there is a significant difference in

outcomes of housing expenditures depending on the institutional background of a country being LME, CME or MME.

2.2.2 Variety of capitalism as a moderator of the effect of housing shortages on housing expenditures

Shortages should as discussed earlier influence housing expenditures, which is basic economics. However, a CME might be more willingly to intervene when housing expenditures increases due to shortages for example. Which a government can do by using different policy tools. Because we know for example that CME countries are more inclined to provide certain certainties for their population. Within MME countries it might be more common for people to live with their parents when shortages of housing are high. Because an MME is often more familiar. Which would than mean that shortages should have less of an effect as demand elastic. While LME countries are more inclined to let the invisible hand of the market do their work, which means on the short-term higher housing expenditures to create more supply.

Figure 2

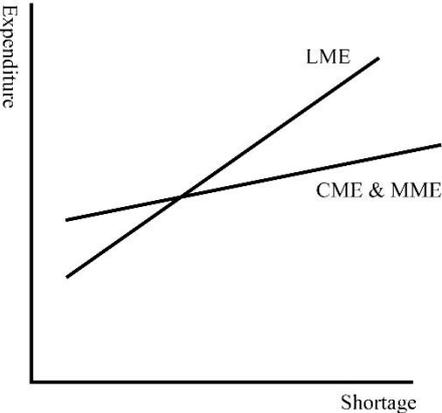


Figure 2 shows us how these relationships could look in theory. Which means that in the instance of shortages LME countries start of at a lower point on the Y-axis, but the curve will have a sharper slope in price if shortages exist at the housing market. As it can be expected that the efficient market theory can be more directly applied at LME, because the market can do its job. For CME countries it

can be expected that the curve crosses the x-axis at a higher point, but the line will have a less sharp slope than LME countries. Due to the government trying to intervene and control housing expenditures. The same slope I roughly expect with MME countries but then due to institutions which makes it more easily accepted for family to live in one house at times of shortages at the housing market.

H5: Institutions moderate the effect that housing shortages has on housing expenditures

2.2.3 Variety of capitalism as a moderator of the effect of financialization on housing expenditures

Institutions could matter for financialization, for the simple reason that institution even could direct in which level a country can get financialized. Which could mean that institution could lead to a kind of level effect. Van der Zwan (2014) argued for instance that institutions matter for how financialization evolves. Seabrooke & Schwartz (2009) argued that mortgages should be seen differently in Liberal economies and Common economies such as the Netherlands and Denmark. As in the Netherlands and Denmark the high mortgage levels are the effect of policy intended to increase homeownership amongst the population by giving tax cuts and allow high LTV-ratios. It could therefore be possible that in the Netherlands and in Denmark higher mortgages levels do not directly translate into higher housing expenditures due to tax cuts. As tax cuts can make house ownership more accessible for groups of people as was already argued by Porteba (1984). These tax cuts are an example on how institutions might moderate the effect of mortgages.

Institutions matter also on other ways on financialization, for example Carnevale & Mazucca (2014) found in their research evidence that institutions affect the level of Sustainability reports significantly. They argued that this was the case due to those reports being more relevant in CME's than in MME's and LME's. Which does not directly translate to how housing expenditures might be affected differently but it does show us that institutions have at least an effect on the level and kind of financialization in a country.

However, as institutions might matter for how financialization has an impact on housing expenditures. The question that still must be answered is how these different groups of institutions might matter for the effect of financialization. What might matter for the effects is with which goals mortgages are used in the housing market. As stated earlier in some CME's mortgages are used to increase homeownership. Which means from a standard economic viewpoint that more buyers are put into the market which leads to a higher demand, while supply does not change in the short term. Which means therefore that higher mortgages levels in CME's should also lead to higher housing expenditures in comparison to other institutional groups.

H6: Institutions moderate the effect that Financialization has on housing expenditures

Looking at the other measurement for financialization the question is how this can be moderated by institutions. One clear explanation could be that MME's might be less affected by financialization. Reason for this is as Seabrooke & Schwartz (2009) argued that in MME's housing is often a family property, which means that houses are often only sold to family and good friends in order to keep the house into the family. Which then means that when the financial sector grows and with it the power of investors, that these investors have less of a grip on the housing market than they would have in other countries with a more CME or LME signature. Because in LME's and CME's these groups of investors can move more freely with their capital in the housing market compared to MME's.

CHAPTER 3: DATA AND METHOD

3.1. Data and samples

In this research I will explain housing expenditure with different variables. These main variables will be financialization, inflation, population density and housing shortages. With this data I will do two regressions, one with all the countries as one group to find the direct effects. The second regressions

with institutions as moderator to divide the countries in several groups, as such the effects of different variables can be discussed per institutional group.

I obtained data from three sources. First, from the European Mortgage Federation (EMF) I take data of Housing expenditures, shortages, mortgages levels, number of dwellings, population above 18, GDP and ownership rates. Which is available on yearly basis from 2001 to 2017. The data contained 28 European countries. Second, from the OECD I take Value added by the financial sector which is available on yearly basis from 2001 to 2017. The data contained 25 overlapping countries, three countries were missing here which were Bulgaria, Croatia and Cyprus. However, as value added by the financial sector is only used as a robustness test the countries were kept in the database. Third, from the Worldbank I take data of population density and consumer price index. Which is available on yearly basis from 2001 to 2017 for the 28 countries I use in my research.

Fourth, from research of Hall & Soskice (2001) I take the classification they use for the institutional groups. This is a stationary classification to which most countries could be divided into one of the institutional groups (LME, CME or MME), the countries that could not be classified will be put in a fourth group “others”.

3.2 Variables

To explain housing expenditures in this research I will use four main variables. These are: Financialization, Inflation, Population density and Housing shortages. In this section I will explain which measures I used to explain the different variables.

To measure the main dependent variables housing expenditures (P) I will use the percentage of annual disposable income. Income spent on housing involves all sorts of expenditures, including rent and mortgages payments. However, excluding energy bills and internet expenditures.

The first main independent variable concerns the degree of financialization (F). I use two different measures for financialization. First Mortgage levels as a percentage of GDP. Higher levels of mortgages show us then the level of involvement of the financial sector within the housing market. I expect lagged explanatory power of mortgage levels on housing expenditures, because housing

expenditures do not adjust as frequently as mortgage levels. Second, for robustness, I will use as measure for financialization value added by the financial sector. This depicts the relative size of the financial sector in comparison to a countries GDP. This measure is also used in a paper of Assa (2012) to depict the level of financialization in a country. As countries that are more financialized will have higher levels of value added by the financial sector.

My second main independent variable captures inflation (I) over the years. Inflation is measured with the consumer price index which measures the changes of prices of a basket of goods at specified intervals as is commonly used in economic research. The third main independent variable captures population density (D). Population density is measured by taking the total population of a country and dividing per square kilometer of a country (excluding water).

The fourth main independent variable to measure shortages (S). A measure was constructed using population data and dwellings per country data. The construction is done as follows: total dwellings in 2008 divided by the population above 18 in 2008. The year 2008 is chosen as it is the

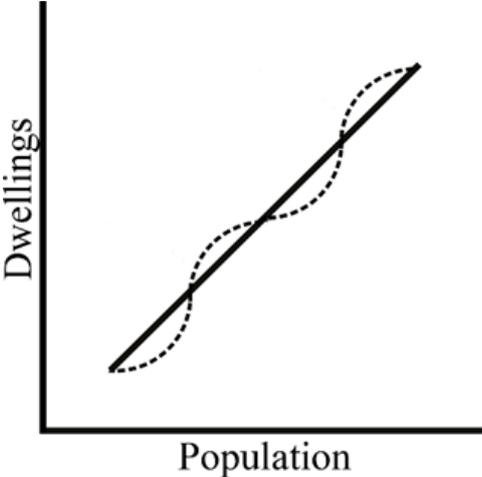


Figure 3

median of the year in our time series. Which gives us a benchmark to which we can compare how much has been build and whether that was more or less than should have been expected. This is visible in Figure: 3 at the points where the dotted line which shows us how number of dwellings there where in reality is below the line which gives us the expected number of dwellings. Then we can speak of a shortage, is it above that line than there is an abundance of dwellings. The population data was defined by population above 18, as it is believed that people below 18 will not be looking for their own homes is significant numbers. The dwelling data was defined by total buildings in a country where people can

legally life, so excluding offices and other complexes where one cannot legally life. Both measures where extracted from the European Mortgage Federation. This measure will also be alternatively used as a dependent variable for a robustness check.

Housing expenditures are likely affected by some variables that are not captured by the above-mentioned measures. In order to control for these effects some extra variables will be added. The first control variable added will be GDP per capita. As it is likely that housing expenditures will be affected by economic growth. Because as people are becoming more wealthier, there taste for what they want in a dwelling can also change. Which then could lead to more expensive dwellings.

The second control variable that will be added is home ownerships rates. Because home ownership rates can influence how expensive housing is as renting is often more expensive than buying. The measure for home ownership rates shows us the percentage of people who bought a house relatively to people who rent a house. With higher levels meaning that more houses are bought than rented.

Robustness will be tested with the alternative financialization measure as earlier explained, and with an alternative variable for housing shortages. The alternative approach I use for measuring housing shortages is by using total population of a country divided by the mean household size, which gives us the number of dwellings supposedly needed to give each household a home. Then to determine whether there is a housing shortage I will subtract the number of dwellings needed of the total amount of dwellings in a country. Which means that a plus means a shortage and a minus means an abundance of dwellings. The reason this is not the main variable for housing shortages is that the data contains several different sources which could lead to selection biases.

3.3 Empirical model

In this section the two different models will be explained that are tested for in this research. First the main model with direct effects will be discussed, thereafter a model will be discussed with moderating effects of institutions.

3.3.1 Direct Effects model

To test the hypothesis, I will use Linear Regression model to measure the direct effect. As I expect that the four mentioned measures: Inflation, Financialization, Population Density and Shortages significantly affects housing costs. As equation (1) shows:

$$(1) P_t = \beta_0 + \beta_1 S_{t-1} - \beta_2 I_t + \beta_3 F_{t-1} + \beta_4 D_t + FE_c + FE_t + \epsilon$$

(P) describes housing expenditures, (S) captures shortages, (I) captures Inflation, (F) captures Financialization and (D) captures population Density. The model will be controlled for Fixed effects of time and countries (FE), with a country and time dummy.

The expectation is that Shortages and Financialization both will have a lag of 1 period. This is due to that housing expenditures are often put in contracts, and contracts can often not be changed directly. Which means that if there is a shock in the market it will take sometimes for prices to adjust. Therefore, I expect a small lag of 1 year, to control for these slow adjustments.

The minus in front of the Inflation predictor shows the negative relationship that I hypothesized in section 2. The plusses show the positive relationship predicted for Shortages, Financialization and Population density.

In this model I will furthermore have the following two control variables as they can have significant impact on the outcome if not held constant. GDP per capita will be controlled for as it is arguable that housing expenditures are affected by economic development. Ownership rates are also tested for as it is an important part of the housing market.

3.3.2 Model for testing moderating effects

In order to test the moderating effects of institutions with different measures on housing expenditures as has been hypothesized in the theoretical section a model had to be build. The challenge here is that the model must represent the institutional groups well, and it has the represent

the measures that should affect housing expenditures. These two requirements can be achieved by using dummies for institutions in the model. Which brings us to equation (2):

$$(2) P_t = \beta_0 + \beta_1 S_{t-1} + \beta_3 F_{t-1} + VoC + d_1(VoC * S_{t-1}) + d_2(VoC * F_{t-1}) + \epsilon$$

This equation shows the different moderating effects that institutions can have. Varieties of Capitalism approach (Hall & Soskice, 2001) is used here to create different categorical dummies. The categorical dummies are LME, CME, MME and others. This formula will be controlled for time and country fixed effects.

This model is also controlled for GDP per capita and ownership rates, and in addition it is also tested for inflation and population density, as these two measures were used in the direct effects model.

CHAPTER 4: RESULTS

4.1. Baseline results

Table 1 presents the results of my test of the direct effects of different country-level factors on housing expenditures. In this section the results will be discussed of the two different models used in this research. First, I will discuss the direct effects model, thereafter the moderating effects model will be discussed.

Table 1: Direct effects on Housing Expenditures

	(1)	(2)	(3)	(4)
Inflationrate <i>As a %</i>	-0.117 (0.088)	-0.111 (0.064)	-0.040 (0.203)	-0.110 (0.166)
Mortgage as %GDP <i>Lagged with 1 year</i>	0.028 (0.015)	0.027* (0.013)	0.027** (0.009)	0.029*** (0.009)
Housing shortage <i>Lagged with 1 year</i>	-6.898* (2.776)	-5.309* (2.251)	5.580 (3.134)	0.567 (4.018)
Population Density <i>per km²</i>	-0.147*** (0.040)	-0.148*** (0.036)	0.011*** (0.002)	0.011*** (0.002)
GDP per capita <i>x1000</i>	-0.087 (0.051)	-0.063 (0.042)	-0.059* (0.023)	-0.070** (0.023)
Owner occupation rate <i>Rate between 1-100</i>	-0.147*** (0.040)	-0.121** (0.045)	0.001 (0.031)	-0.010 (0.030)
Country fixed effects	Yes	Yes	No	No
Year fixed effects	Yes	No	Yes	No
Constant	47.950*** (5.897)	42.332*** (4.763)	14.262*** (3.927)	21.108*** (2.784)
No. of Observations	289	289	289	289
R^2	0.879	0.871	0.154	0.130
Adjusted R^2	0.855	0.854	0.091	0.112

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1 shows us significant effects of housing shortages and population density on housing expenditures. The table shows us a decreasing effect of housing shortage on housing expenditures. Which stays negative when not controlled for time fixed effects. This result indicates that when housing shortages increase, the housing expenditures decrease. This is not the decreasing relationship as

hypothesized. Reason for this might be when we take a closer look at the data that there are countries with permanent shortages and abundances on the number of dwellings. Which could mean that shortages are perhaps the effect of something that is happening within a country. An explanation could be that housing shortages are rather an effect of the low housing expenditures. As low housing expenditures could of course increase the demand in dwellings.

Population density has a decreasing effect on housing expenditure. Which implies that countries that are more densely populated per square kilometer are having relative lower housing expenditures. This seems counterintuitive however, a reason for this could be that high population density on a country-level could result in policies from the government. Something that we see happen in Singapore as research of Phang (2001) shows us. Differences on population density within a country could however still have an increasing effect on housing expenditures as I hypothesized.

What furthermore is visible in table 3 is that inflation rates and mortgages as a % of GDP seem to have no significant effect on determining housing expenditures. This result is unexpected, and a reason for this is unclear. Which perhaps might indicate that not the right measures have been used to operationalize the variables inflation and financialization.

Furthermore, there is a difference in the r-squared depending on which fixed-effects are considered. This is not unexpected as it is common for fixed effects dummies to have such a significant impact. The differences in significance for mortgages as % of GDP might be due to that what was earlier explained by the country dummy or time dummy now is explained by the mortgage levels.

Table 2 shows the moderating effects. Shortages have a significant decreasing effect here on housing expenditures. These effects are even more significantly stronger than in the direct effects model. As the fitted values between CME's (0,410-0,838) and LME's (0,081-0,341) do not overlap each other at a 95% margin for LME's. MME's do not significantly differ from LME or but do differ significantly from CME's (0.212-0.792). The conclusion can be made that institutions have a moderating effect on the effect of housing shortages on housing expenditures.

Table 2: Moderating effects of institutions on Housing Expenditures

	(1)	(2)	(3)	(4)
LME*Housing shortage <i>Lagged with 1 year</i>	-0.674*** (0.132)	-0.444** (0.135)	-0.354 (0.262)	-0.424 (0.225)
CME*Housing shortage <i>Lagged with 1 year</i>	-0.211** (0.065)	-0.107 (0.065)	0.038 (0.087)	0.055 (0.074)
MME*Housing shortage <i>Lagged with 1 year</i>	-0.502*** (0.145)	-0.475*** (0.141)	-0.354 (0.418)	-0.391 (0.400)
Housing shortage <i>Lagged with 1 year</i>	0.081 (0.056)	0.041 (0.060)	-0.049 (0.076)	-0.076 (0.067)
LME*Mortgage level <i>As a % of GDP</i>	-0.111* (0.051)	-0.090* (0.042)	-0.095* (0.042)	-0.094* (0.040)
CME*Mortgage level <i>As a % of GDP</i>	0.049 (0.040)	0.062 (0.040)	0.137*** (0.023)	0.139*** (0.022)
MME*Mortgage level <i>As a % of GDP</i>	-0.024 (0.043)	-0.000 (0.043)	-0.043 (0.043)	-0.041 (0.041)
Mortgage level <i>As a % of GDP</i>	0.049 (0.043)	0.018 (0.037)	-0.061** (0.022)	-0.062** (0.022)
Consumer Price Index <i>As a %</i>	-0.257** (0.084)	-0.168* (0.067)	-0.135 (0.157)	-0.047 (0.131)
Population Density <i>per km²</i>	-0.221*** (0.045)	-0.207*** (0.039)	0.004* (0.002)	0.004* (0.002)
GDP per capita <i>x1000</i>	-0.152*** (0.045)	-0.131*** (0.039)	-0.185*** (0.032)	-0.185*** (0.029)
Home ownership rate <i>Rate between 1-100</i>	-0.107* (0.048)	-0.083 (0.048)	-0.007 (0.034)	-0.018 (0.033)
LME	3.266 (4.479)	4.740 (3.876)	21.336*** (4.872)	21.026*** (4.545)
CME	1.099 (1.567)	1.415 (1.345)	-1.551 (1.571)	-1.936 (1.463)
MME	1.705 (1.822)	1.908 (1.921)	6.952* (3.272)	6.749* (3.211)
Country fixed effects	Yes	Yes	No	No
Year fixed effects	Yes	No	Yes	No
Constant	56.675*** (6.179)	45.831*** (5.416)	23.647*** (4.106)	26.459*** (2.757)
NO. of Observations	289	289	289	289
R ²	0.899	0.888	0.430	0.422
Adjusted R ²	0.877	0.871	0.366	0.390

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When we look at mortgage levels the measure used for depicting financialization the effects of institutions are smaller. Only in LME's (0,09-0,213) mortgage levels seem to have an effect. Which hints at a moderating effect on the effect for mortgage levels on housing expenditures in LME's.

However, for the other institutional groups the level of mortgages seems not to matter for housing expenditures.

4.2 Robustness

In order to test whether the results were robust robustness checks are made. Robustness was tested by changing dependent and independent variables. The independent variables that were changed are for financialization and housing shortages. The dependent variable that was changed to test robustness was housing expenditure which was changed for housing shortage.

4.2.1. Alternative Independent variables

Financialization could be measured in multiple ways. One the ways that it could be measured was by looking at value added of the financial sector as Assa (2012) did. In order to test whether the results of financialization are robust this measure will be replaced in a regression to see if it changes the outcome of the model. The model shows no significant changes to the outcome, as the results were in the main model insignificant and are still insignificant with the alternative independent variable for financialization. Therefore, the results seem to be robust as financialization has no effect on housing expenditure.

Second, housing shortages was tested for robustness. For this the alternative approach was used to measure housing shortages by using data from multiple sources and combining them. The results in table 3 indicate that the decreasing effect of housing shortage on housing expenditures seem robust. As the results are even significantly stronger and stronger decreasing.

Table 3: Robustness check Alternative IV Direct model

	Alternative Financialization	Alternative Shortages	Both Alternativ used
Consumer Price Index <i>As a %</i>	-0.151 (0.091)	-0.119 (0.089)	-0.148 (0.094)
Value added financial sector <i>As a % of GDP</i>	-0.081 (0.223)		-0.044 (0.200)
Housing shortage <i>Distance of mean</i>	-0.056* (0.026)		
Population Density <i>per km²</i>	-0.121** (0.044)	-0.173*** (0.044)	-0.144** (0.046)
GDP per capita <i>*1000</i>	-0.070 (0.049)	-0.085 (0.050)	-0.069 (0.049)
Home ownership rate <i>Rate between 1-100</i>	-0.105** (0.039)	-0.121** (0.040)	-0.081* (0.038)
Mortgage level <i>As a % of GDP</i>		0.026 (0.016)	
Housing shortage <i>(Households- dwellings)/population*1000</i>		-0.347** (0.127)	-0.323* (0.134)
Country fixed effects	Yes	Yes	Yes
Year Fixed effects	Yes	Yes	Yes
Constant	41.665*** (5.737)	42.451*** (4.864)	37.347*** (4.946)
NO. of Observations	268	287	266
R^2	0.872	0.884	0.877
Adjusted R^2	0.847	0.861	0.852

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In table 4 the robustness checks are visible for the moderating model. First, when we look at the alternative measure for financialization we see that there is still no effect of financialization on housing expenditures, and that the result for LME's that yielded in table 2 is not significant when using an alternative measurement. Which means the results in table 2 for financialization is not robust for the effects of LME's. However, the insignificance for financialization seems to be robust.

Table 4: Robustness check Alternative IV Moderating model

	(1)	(2)	(3)
LME*Housing shortage <i>Distance of mean</i>	-0.529*** (0.107)		
CME*Housing shortage <i>Distance of mean</i>	-0.271*** (0.064)		
MME*Housing shortage <i>Distance of mean</i>	-0.586*** (0.169)		
Housing shortage <i>Distance of mean</i>	0.133* (0.054)		
LME*Value added financial sector <i>As a % of GDP</i>	-0.213 (0.617)		-0.698 (0.779)
CME*Value added financial sector <i>As a % of GDP</i>	0.419 (0.509)		0.421 (0.510)
MME*Value added financial sector <i>As a % of GDP</i>	-0.213 (0.527)		-0.823 (0.592)
Value added financial sector <i>As a % of GDP</i>	0.012 (0.438)		-0.031 (0.444)
Consumer Price Index <i>As a %</i>	-0.265** (0.097)	-0.190* (0.089)	-0.194 (0.102)
Population Density <i>per km²</i>	-0.202*** (0.052)	-0.206*** (0.043)	-0.135** (0.044)
GDP per capita <i>*1000</i>	-0.045 (0.046)	-0.183*** (0.054)	-0.077 (0.053)
Home ownership rate <i>Rate between 1-100</i>	-0.071 (0.043)	-0.087* (0.042)	-0.106** (0.037)
LME	-5.641 (6.259)	5.739 (6.389)	-2.635 (7.882)
CME	0.420 (2.676)	-0.498 (1.734)	-2.151 (3.257)
MME	4.341 (2.846)	-13.563 (7.628)	-15.474 (9.929)
LME*Housing shortage <i>(Households-dwellings)/population</i>		-0.630 (0.955)	-1.122 (0.842)
CME*Housing shortage <i>(Households-dwellings)/population</i>		-0.238 (0.311)	-0.534 (0.312)
MME*Housing shortage <i>(Households-dwellings)/population</i>		-0.769 (0.522)	-1.414* (0.679)

Housing shortage <i>(Households-dwellings)/population</i>		-0.057 (0.286)	0.127 (0.272)
LME*Mortgage level <i>As a % of GDP</i>		-0.097 (0.054)	
CME*Mortgage level <i>As a % of GDP</i>		0.097* (0.043)	
MME*Mortgage level <i>As a % of GDP</i>		0.015 (0.042)	
Mortgage level <i>As a % of GDP</i>		0.011 (0.042)	
Country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	50.076*** (6.631)	46.177*** (5.711)	40.731*** (6.106)
Observations	268	287	266
R^2	0.892	0.895	0.883
Adjusted R^2	0.868	0.871	0.856

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Housing shortages seems not to be robust, as the results are insignificant when the alternative variable is used. Which means that the results in table 2 should be used carefully as the results are not to be proven robust.

4.2.2. Alternative dependent variables

One could argue that with measuring housing expenditures as dependent variable is not depicting the housing market well. Because from an economic perspective one would argue that all those variables that are supposed to affect housing expenditures affect housing shortages. And that housing shortages than affect the price or expenditure of housing. Which means that it would be more straightforward to look how these variables affect housing shortages.

Table 5 shows what happens with a different dependent variable. Consumer price Index has a high significance on housing shortages, something that was not the case in table 1 and 2. Other variables that were significant have lost some or all their explaining power. As such we can say the difference between shortages and housing expenditures are robust. Which means that the market mechanism as we should expect does not work in housing market. Because then the results should

have been roughly the same. When looking at the alternative measurement for shortages it is visible in table 5 that being a CME or an MME directly affects the housing shortage in a country. With CME and MME having significantly lower shortages than other institutional groups of countries.

Table 5: Robustness check Alternative Dependent Variable

	Moderating model		Direct effects model	
	Housing Shortage	Housing Shortage Alternative	Housing Shortage	Housing Shortage Alternative
Housing expenditures <i>As % of disp. Income</i>	-0.147 (0.133)	-0.072* (0.034)	-0.167 (0.143)	-0.063* (0.032)
LME * Mortgage level <i>As % of GDP</i>	0.173 (0.120)	-0.033 (0.022)		
CME * Mortgage level <i>As % of GDP</i>	0.076 (0.090)	-0.006 (0.019)		
MME * Mortgage level <i>As % of GDP</i>	0.150* (0.067)	0.007 (0.019)		
Mortgage level <i>As % of GDP</i>	-0.099 (0.065)	-0.013 (0.019)	0.031 (0.036)	-0.023* (0.009)
Consumer Price Index <i>As a %</i>	0.638*** (0.183)	-0.005 (0.037)	0.590*** (0.160)	0.001 (0.036)
Population Density <i>per km²</i>	0.089 (0.163)	0.002 (0.027)	0.085 (0.179)	0.003 (0.025)
GDP per capita <i>x1000</i>	-0.100 (0.143)	-0.010 (0.023)	-0.171 (0.163)	-0.005 (0.023)
Home ownership rate <i>Rate between 1-100</i>	-0.323* (0.155)	0.012 (0.028)	-0.404* (0.178)	0.010 (0.025)
LME	-8.002 (17.186)	-0.021 (1.948)		
CME	-3.535 (4.215)	-4.835*** (1.100)		
MME	-6.768 (3.452)	-17.003*** (0.964)		
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Constant	66.815* (33.466)	8.572* (3.871)	69.625 (37.563)	3.418 (3.278)
NO. of Observations	278	278	278	278
R ²	0.667	0.980	0.662	0.980
Adjusted R ²	0.593	0.976	0.593	0.976

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CHAPTER 5: DISCUSSION AND CONCLUSION

The outcome of this research is that shortages and population density seem to decrease housing expenditures. These results were robust for the tests that was done with them. An explanation for this counterintuitive outcome could be that housing expenditures affects housing shortages. As the demand for housing could increase as housing expenditures are lower. This argument was tested but did not yield a significant result. Another explanation for the counterintuitive result and which is backed by the data is that there are countries with chronic shortages and abundances. Which perhaps could lead for those countries to set up rules to at least make sure housing expenditures do not increase to relative high levels. Thereby not solving the real problem of housing shortages. However, to test this reasoning additional research should be conducted.

Population density also yielded counterintuitive result. However, here the explanation could be somewhat simpler. Phang (2002) already showed us that countries can adapt their housing regulation to situations such as high population density, in order to keep housing expenditures low. Which can be one explanation, another additional explanation to that argument could be that country level population density is less important for the arguments used in section 2. As the arguments in chapter 2 mainly argued about within country differences, which means that at least the same rules are applied in the housing market. Something that can vary on country-level scales.

Financialization and inflation seem to have no effect on housing expenditures. Which in the case of financialization seemed to be robust. Inflation not being significant can be due to the influence of housing expenditures on consumer price index, as stated in the theory it is reasonable that higher wages are asked when housing rents increase, which leads to higher inflation. This can counter the effects of inflation on housing expenditures that have been found in the eighties.

Institutions seem to affect how different variables affect housing expenditures. Which was expected. However, the results were not always robust. What can be concluded is that institutions at least matter in how much households must pay for their house. Furthermore, slight evidence has been found that institutions also matter for how severe housing shortages are. Which could imply that housing shortages do not reflect the housing market, but rather reflect the institutional background of a country.

Whether this conclusion holds about housing shortages and institutions should be tested in further research. As no definitive conclusions can be made about this with the results of this research.

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