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Do National Cultures Impact Mortgage and Financial Well-Being Levels? Evidence from Europe

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Abstract

This study explores the influence of national culture on mortgage and financial well-being levels in the European context. The paper employs regression analysis using mainly Hofstede's cultural dimensions and the EU-SILC dataset from Eurostat to provide a better understanding of the determinants of the decision to hold secured debts and a better explanation of the states of financial well-being. To the best of our knowledge, no study has addressed the influence of culture on mortgage and financial well-being levels in the European setting using samples from different countries and controlling for household characteristics. We conclude that power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with the likelihood of holding a mortgage. The results also show that masculinity, uncertainty avoidance, long-term orientation, and indulgence are negatively associated with the amount of mortgage. Moreover, individualism and long-term orientation (power distance and uncertainty avoidance) are positively (negatively) associated with being in a state of financial well-being. Collectively, our research shows that national cultures play a crucial role in household finance.

Keywords: culture; Hofstede dimensions; mortgage; financial well-being; Europe.

JEL classification: D10; G40; G51.

1. INTRODUCTION

The research on culture has been considered in the field of financial economics recently but still more limited, especially in the country-attributes or individual countries, without examining the household characteristics (Diez-Esteban *et al.*, 2019; Gaganis *et al.*, 2020). Hofstede (1983) defined culture as "the collective programming of mind" that leads to patterned ways of thinking, feeling, and acting, that differentiate the members of one nation, region, or group of people from others (p. 76). Also, a more recent definition for culture is "those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation"(Guiso *et al.*, 2006, p. 23). Kanagaretnam *et al.*

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(2015) indicated that culture includes many dimensions such as language, education, ethnic background, and religion.

Households use financial instruments in all stages of life. Moreover, nowadays the households are more directly engaged and more easily involved in complex financial decisions than in the past, due partly to financial innovation that led to extending the set of financing and investment choices available to households. Therefore, households should have certain know-how regarding payment choices, debt financing, saving, and insurance contracts (Guiso and Sodini, 2013). Social science has long been interested in the determinants of the financial well-being of individuals. However, past studies found a substantial cross-sectional variation that is not described by demographic or economic variables. Therefore, it is essential to better identify the source of individual variation in financial behavior and outcomes to better determine the extent of potential change by behavioral and policy interventions to enhance financial well-being (Xu *et al.*, 2015). To the best of our knowledge, there are no earlier studies that explored the effects of culture on a mortgage and financial well-being in the European setting using samples from different countries and using household characteristics. Therefore, this research seeks to fill that gap by investigating the influence of culture on the decision to hold secured debts and to be in a state of financial well-being in the European context.

Our research examines 31 European countries, and we hypothesize that power distance, long-term orientation, uncertainty avoidance will be negatively, and individualism and indulgence positively associated with the decision to hold secured debt. Also, we conjecture that individualism will be positively associated, whereas power distance, masculinity, and uncertainty avoidance will be negatively associated with financial well-being.

This study finds that power distance, masculinity, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with the likelihood of holding a mortgage. Masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are positively (negatively) associated with the amount of mortgage. Furthermore, we discover that power distance and uncertainty avoidance (individualism and long-term orientation) are negatively (positively) associated with being in a state of financial well-being.

This paper is structured as follows. Section 2 presents and discusses the related literature review and develops the hypotheses to be tested. Section 3 describes the data and methodology. Section 4 reports and discusses the empirical results. Section 5 presents the discussions and Section 6 the main conclusions.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Literature Review

Previous studies have explored the non-cultural determinants of mortgage levels and financial well-being levels. For example, Nyhus and Webley (2001) and S. Brown and Taylor (2014) examined the personality traits for the mortgage levels, while Donnelly *et al.* (2012) and Xu *et al.* (2015) investigated the personality traits for the financial well-being levels. Also, Wolswijk (2006) found that financial deregulation measures, stock market growth, house price, and after-tax mortgage interest costs are associated with real mortgage debt. Badev *et al.* (2014) found the GDP, policies connected with financial system development, the

development of the insurance sector and the stock market, and sources of long-term funding are associated with the mortgage market development. In addition, Mahdzan *et al.* (2019) showed that financial behavior, locus of control, financial stress, and financial knowledge have a significant relationship with subjective financial well-being. Chatterjee *et al.* (2019) demonstrated that income security, unemployment, and overt materialism affect financial well-being.

Some studies have examined the influence of culture on household financial decisions. For example, Chang and Lin (2015) examined the national cultural factors that impact herding behavior, and they concluded that power distance, individualism, and masculinity have more dominant effects than others. Gogolin *et al.* (2017) focused on individual cultural values and demonstrated that self-expression values are positively associated with households' financial decisions. Besides, they showed that happiness, trust, and playing an active role in society are significant predictors of household financial decisions. M. Brown *et al.* (2018) concluded that financial socialization is an important driver of the cultural divide in financial literacy. Therefore, they found that students from the German-speaking area who receive pocket money at an early age and have independent access to a bank account are having a higher level of financial literacy than students in the French-speaking area. Fuseini *et al.* (2019) explored using Ghanaian data that culture largely shapes gender power relations in household decision-making and serves as the basis for justifying the status quo.

Other studies investigated the effects of culture on mortgage levels. For example, R. Aggarwal *et al.* (2012) found in foreign portfolio investment (FPI) destination countries that individualism, masculinity, and power distance are positively associated with debt and equity holdings by similar amounts. Whereas they found in FPI originating countries, the degree of masculinity positively impacts debt holdings more than twice as much as equity FPI, the degree of individualism positively impacts equity holdings almost three times as much as debt, and the degree of power distance has a greater effect on debt than equity holdings. Raj Aggarwal and Goodell (2014) discovered that masculinity and uncertainty avoidance are negatively associated with access to loan financing. Breuer *et al.* (2015) explored using survey data from 5912 economics university students in 45 countries that culture is a significant predictor of households' borrowing decisions. Additionally, they showed that the countries with high scores on long-term orientation are having shorter household debt maturity. Tajaddini and Hassan (2017) discovered that borrowers from societies with high individualism are more likely to have defaulted on their mortgages in both a relatively stable economic period and during a period of crisis. While they showed that borrowers from societies with low pragmatism and high indulgence default more on their mortgages in a stable economic period. Also, Rodriguez-Planas (2018) found that social norms in the country of ancestry are a significant predictor of determining immigrants' mortgage finance in the host country. Moreover, he found cultural attitudes regarding property rights are most important for explaining individuals' decisions to get a mortgage. However, those regarding credit information matter most to explain the amount of mortgage debt. In the recent study, Gaganis *et al.* (2020) found using cross-country data from 30 countries during 2001–2015, the national culture dimensions and interpersonal trust are significant determinants of the measurements of the housing mortgage such as mortgage depth, mortgage density, mortgage penetration, and mortgage affordability. Specifically, Gaganis *et al.* (2020) demonstrated that power distance, uncertainty avoidance, and long-term orientation are negatively associated, while

individualism and indulgence are positively associated with mortgage debt. However, they did not find relationship between masculinity and mortgage debt.

Other studies explored the impacts of culture on financial and subjective well-being (SWB). For example, Arrindell *et al.* (1997); Arrindell (1998) observed the poorer countries that are more masculine were more likely to experience higher well-being. Hofstede (2001) and Hofstede *et al.* (2005) showed that uncertainty avoidance culture is negatively associated with well-being, they also found a higher percentage of the population claim to be unhappy in the societies that have high uncertainty avoidance. Ahuvia (2002) observed that people in individualistic countries tend to be happier than people living in collectivist societies. Diener *et al.* (2003) discovered that cultural variables clarify differences in mean levels of SWB, and they found culture can moderate which variables most influence SWB. Diener *et al.* (2009) concluded that individualism is positively associated with well-being across 55 countries. Fischer and Boer (2011) indicated that individualism is a better determinant of well-being than wealth, largely because it better enables to increase autonomy. Fazli Sabri *et al.* (2012) showed the childhood consumer experiences such as savings habits contribute to students' financial well-being. They also found the financial socialization through parents and religious sources might raise students' financial well-being. In a meta-analysis, Steel *et al.* (2018) observed an important role for the moderating effect such as wealth for the positive relationship between Individualism and SWB. They also suggested that power distance's relationship with SWB should be mediated by a combination of GDP per capita and governance. Additionally, they predicted that uncertainty avoidance and masculinity are negatively associated with SWB.

2.2 Hypotheses Development

In this study, we use the Hofstede (2011) model of national culture which includes six dimensions as following (Power Distance Index, Individualism versus Collectivism, Masculinity versus Femininity, Uncertainty Avoidance Index, Long-Term Orientation versus Short Term Orientation, and Indulgence versus Restraint). We also consider two types of household financial decisions: first, the decision to hold secured debt based on S. Brown *et al.* (2008, 2013) and S. Brown and Taylor (2014) through holding a mortgage that measured as a binary variable takes the value of 1 if the individual is holding a mortgage, otherwise, the value is 0; and log of the total mortgage[1] calculated as the logarithm of mortgage principal repayment plus interest mortgage in Euro currency. Second, financial well-being is measured as the ability to make ends meet which takes the values as follows (ordinal variable): 1: with great difficulty, 2: with difficulty, 3: with some difficulty, 4: fairly easily, 5: easily, 6: very easily; and the capacity to afford to pay a one-week annual holiday away from home as measured as a binary variable which takes the value of 1 if the answer yes, and 0 if it is no.

Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. In contrast, collectivism pertains to societies in which people from birth onward are integrated into strong and cohesive in-groups, which throughout people's lifetimes continue to protect them in exchange for unquestioning loyalty (Hofstede *et al.*, 2005). Therefore, the decisions of the individuals in individualistic societies are more independent and autonomous that lead them to hold secured debt more than others. Especially, that in individualist cultures that supposed the children to move out of their parent's home and live on their own when they start

higher education (Hofstede *et al.*, 2005). Breuer *et al.* (2014) found the individualism is positively associated with financial risk-taking. Chang and Lin (2015) showed that individualism is positively associated with herding behavior. Chui *et al.* (2016) observed the positive relationship between individualism and the cost of debt. Gaganis *et al.* (2020) found that individualism is positively associated with mortgage debt. Therefore, we predict,

Hypothesis 1: There is a positive relationship between individualism and the likelihood to hold debt.

The masculinity versus femininity dimension refers to the distribution of emotional roles between the genders (Hofstede, 2011). The masculine side represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Femininity as its opposite stands for a preference for cooperation, modesty, caring for the weak, and quality of life. Society at large is more consensus-oriented. Hofstede *et al.* (2005) indicated that status purchases are in general more frequent in masculine cultures, whereas feminine cultures spend more on products for the home. Raj Aggarwal and Goodell (2014) explored that masculinity is negatively associated with access to loan financing. Gaganis *et al.* (2020) found no relationship between masculinity and mortgage debt. We expect that masculine peoples are willing to have a higher amount of mortgage for their symbol of status to finance buying an expensive house.

Hypothesis 2: There is a positive relationship between masculinity and the likelihood to hold debt.

The Power Distance Index presents the degree to which the less powerful members of a society accept and expect that power is distributed unequally (Hofstede, 2011). Christen and Morgan (2005) found that income inequality is positively associated with all components of total household debt such as mortgage debt, credit card debt, and car loans. They also showed that rising income inequality has forced households with smaller income gains to using debt to keep up their consumption level more than households with larger income gains. Chang and Lin (2015) showed that power distance is negatively associated with herding behavior. Fligstein *et al.* (2017) found in the areas where income inequality was higher, all movers went deeper into debt and increased their monthly housing costs to live in more desirable neighborhoods. The richer people were able to take on less debt to keep their position in the status queue, while other people who made a move to buy a house took on more debt to keep up and maintain their social status and lifestyle. Gaganis *et al.* (2020) found that power distance is negatively associated with mortgage debt. Thus, the society members with less power distance that are equals and more likely to hold mortgage with higher amount.

Hypothesis 3: There is a negative relationship between power distance and the likelihood to hold debt.

Long-Term Orientation versus Short-Term Orientation relates to the choice of focus for people's efforts: the future or the present and past (Hofstede, 2011). Societies with a score low on this dimension show a preference to maintain time-honored traditions and norms, and they view societal change with suspicion. Whilst societies with a high score take a more pragmatic approach; they encourage thrift and efforts in modern education to prepare for the future. Long-term orientated cultures are cash or debit card cultures, not credit card cultures (de Mooij and Hofstede, 2002), and they have large savings quotes and funds available for investments (Hofstede *et al.*, 2005). Breuer *et al.* (2015) discovered that countries with higher

scores on long-term orientation led to having shorter household debt maturity. Gaganis *et al.* (2020) found that long-term orientation is negatively associated with mortgage debt. Hence, we expect,

Hypothesis 4: There is a negative relationship between long-term orientation and the likelihood to hold debt.

Uncertainty Avoidance Index expresses the degree to which the members of a society feel uncomfortable with unknown situations and ambiguity (Hofstede *et al.*, 2005). This dimension is related to the view of society in dealing with the unknown future. Societies with high uncertainty avoidance take fewer risks and more worries about money when it comes to financial matters (Hofstede *et al.*, 2005). Raj Aggarwal and Goodell (2014) discovered that uncertainty avoidance is negatively associated with access to loan financing. Gaganis *et al.* (2020) found that uncertainty avoidance is negatively associated with mortgage debt. Hence, we expect,

Hypothesis 5: There is a negative relationship between uncertainty avoidance and the likelihood to hold debt.

Indulgence versus Restraint relates to the gratification versus control of basic human desires related to enjoying life (Hofstede, 2011). Indulgenced societies are characterized by relatively free gratification of basic and natural human drives related to enjoying life and having fun. In contrast, restrained societies suppress the gratification of needs and regulate them using strict social norms. Penaloza and Barnhart (2011) explored that indulgence in expending relatively high levels of credit relative to their resources in pursuing their desires and pleasures. Gaganis *et al.* (2020) found that indulgence is positively associated with mortgage debt. Thus, we expect,

Hypothesis 6: There is a positive relationship between indulgence and the likelihood to hold debt.

Ahuvia (2002) observed that people in individualistic countries tend to be happier than people living in collectivist societies. Diener *et al.* (2009) reported that individualism is positively correlated with well-being across 55 nations. Fischer and Boer (2011) found that individualism is a better determinant of well-being than wealth, largely because it better enables to increase autonomy. Steel *et al.* (2018) showed the negative significant influence of individualism on life, family, and job satisfaction at the individual level. While at the national level, they observed an important role for the moderating effect such as wealth for the positive relationship between Individualism and SWB. Therefore, we expect,

Hypothesis 7: There is a positive relationship between individualism and the likelihood of being in a state of financial well-being.

Oishi *et al.* (2011) reported that inequality promotes feelings of injustice or envy and erodes trust and belongingness. Steel *et al.* (2018) suggested that power distance's relationship with SWB should be mediated by a combination of GDP per capita and governance. Hence, they discovered the power distance can make lower SWB. We expect that the societies that accept the inequality are less likely to experience financial well-being because the wealth and money will be limited to the small group in the society. Accordingly, we predict,

Hypothesis 8: There is a negative relationship between power distance and the likelihood of being in a state of financial well-being.

Arrindell *et al.* (1997); Arrindell (1998) discovered the poorer countries that are more masculine were more likely to experience higher well-being. In contrast to the richer countries that are more feminine were associated with more well-being. Steel *et al.* (2018) predicted that masculinity is negatively associated with SWB. As masculine societies are not preferencing the quality of life, we expect they are less likely to experience financial well-being. Accordingly, we predict,

Hypothesis 9: There is a negative relationship between uncertainty avoidance and the likelihood of being in a state of financial well-being.

Hofstede (2001) and Hofstede *et al.* (2005) discovered that uncertainty avoidance culture is negatively associated with well-being, they also found a higher percentage of the population claim to be unhappy in the societies that have high uncertainty avoidance. Steel *et al.* (2018) predicted that uncertainty avoidance is negatively associated with SWB. Therefore, we expect,

Hypothesis 10: There is a negative relationship between masculinity and the likelihood of being in a state of financial well-being.

To the best of our knowledge, there is no evidence regarding the influence of long-term orientation and indulgence on financial well-being. However, we examined these two dismissions to find new evidence.

Wolswijk (2006) found that financial deregulation measures, stock market growth, and house price increases are positively associated with real mortgage debt, while after-tax mortgage interest costs were negatively associated. Badev *et al.* (2014) found the high levels of GDP, policies connected with financial system development such as (price stability and the efficiency of contractual and information frameworks), the development of the insurance sector and the stock market, and sources of long-term funding are associated with the mortgage market development. Therefore, following the existing literature (e.g., Wolswijk, 2006; Badev *et al.*, 2014; Gaganis *et al.*, 2020), we control our results of mortgage levels for different country-specific attributes such as inflation, urban population, GDP growth, dummy for Loan-to-Value (LTV) ratio, nominal house price indices, interest rates, tax property, bank concentration, and construction permits. Also, we control our results of financial well-being based on Steel *et al.* (2018) for GDP growth, income, and governance effectiveness.

3. DATA AND METHODOLOGY

3.1 Data

To examine the influence of culture on a **mortgage and financial well-being**, we used data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, from the Eurostat database (See Annex 1). This data covers the households' interviews about their financial decisions from 2004 to 2018 for 31 European countries, including 26 member countries of the European Union (EU) and 5 other European countries[2]. Also, we obtained the cross-country data for six dimensions of national culture from Hofstede Insights. We collected urban population from World Development Indicators of the World Bank. In addition, data on inflation, interest rates, nominal house price indices, and GDP growth was gathered from European Mortgage Federation (EMF) Hypostat. We control for bank concentration from the Global Financial Development Database of the World Bank. Data on construction permits from

the Doing Business Report of the World Bank. Data on tax property is from the Organization for Economic Co-Operation and Development (OECD). We used Corruption Perception Index (CPI) from Transparency International to measure governmental effectiveness. We also control the existence of a Loan-To-Value (LTV) macroprudential instrument from Cerutti *et al.* (2017).

Our data combines time series with cross-sectional data that allow the formation of panel data, the number of observations is 3,433,259, which included individuals aged 16 and above. As shown in Annex 2, the lowest number of observations in our sample correspond to Serbia and Iceland, with 34,265 observations and 38,250 observations, respectively, while the highest number of observations are from Spain and Italy, with 196,498 observations and 309,187 observations, respectively.

3.2 Methodology

National culture is measured using six Hofstede cultural dimensions: power distance (PD), individualism (IND), masculinity (MAS), uncertainty avoidance (UA), long-term orientation (LTO), and indulgence (INDUL). These variables have been expressed on a scale that runs from 0 to 100, with higher scores indicating a greater influence of a certain variable in a certain country. Summary statistics for the dependent, independent, and control variables are presented in Table no. 1.

Table no. 1 – Summary statistics

Variable	Mean	Median	S.D	Min	Max	Skewness	Kurtosis
Dependent Variables							
Holding mortgage	0.20	0.00	0.40	0.00	1.00	1.54	0.37
Log of total mortgage	6.93	7.05	1.33	0.02	13.04	-0.58	0.56
Ability to make ends meet	3.33	3.00	1.36	1.00	6.00	0.04	-0.68
Capacity affords to pay for a one-week annual holiday	0.64	1.00	0.48	0.00	1.00	-0.56	-1.68
Independent Variables							
PD	50.28	50.00	18.75	11.00	100.00	0.35	-0.08
IND	60.50	63.00	17.92	17.00	89.00	-0.84	-0.08
MAS	47.33	47.00	23.96	5.00	100.00	-0.07	-0.88
UA	70.91	75.00	20.40	23.00	100.00	-0.59	-0.49
LTO	56.32	58.00	15.95	24.00	83.00	-0.04	-0.81
INDUL	44.34	44.00	17.66	13.00	78.00	0.07	-1.12
Control Variables							
GDP	0.00	-0.46	1.00	-0.81	3.33	1.47	1.15
Inflation	3.04	2.87	7.89	-37.20	49.50	0.46	4.66
Interest rates	3.81	3.49	1.86	0.81	13.15	1.56	3.70
House price	101.02	100.00	17.29	41.75	166.43	0.23	1.55
Urbanization	73.27	73.70	11.44	51.53	98.00	-0.03	-0.72
Bank concentration	67.58	65.26	17.18	30.62	98.87	-0.02	-0.81
Construction permits	14.10	14.00	4.09	7.00	24.00	0.28	-0.72
Tax property	1.76	1.43	1.17	0.22	17.37	2.61	27.12
CPI	65.27	64.00	17.28	33.30	97.00	0.04	-1.29
LTV	0.34	0.00	0.47	0.00	1.00	0.67	-1.56
Income	0.00	-0.26	1.00	-25.98	332.36	46.50	10,432.07

Note: Data is panel data from 2004 to 2018 at individuals and household levels from EU-SILC's dataset. We standardized GDP and income using Z-score standardization. Log of total mortgage and income are expressed in Euro currency. Holding mortgage, and Log of total mortgage refer to the mortgage levels. Capacity affords to pay for a one-week annual holiday and the ability to make ends meet refer to financial well-being. Age is expressed in the number of years. Holding mortgage, Capacity affords to pay for a one-week annual holiday, and LTV are binary variables. Ability to make ends meet, PD, IND, MAS, UA, LTO, and INDUL are category variables. Log of total mortgage, GDP, Inflation, Interest rates, House price, Urbanization, Bank concentration, Construction permits, Tax property, CPI, and Income are continuous variables. (See Annex 3. Definitions of variables)

The correlation matrix for the national cultural indicators is shown in Annex 4. We show some of the correlations between the national cultural dimensions have moderate to high correlation coefficients. Such as, PD is positively correlated with UA (0.663), negatively correlated with IND (-0.556), and INDUL (-0.543), while the correlation between IND and UA is -0.559, and between INDUL and UA is -0.508. (See Annex 4)

We estimate the appropriate panel data methodology for binary response models based on Wooldridge (2010). Therefore, we employ a logistic regression approach (Logit models) for all the binary dependent variables, that is, holding the mortgage and pay a one-week holiday. We used the ordinal logistic regression for the ability to make ends meet which is an ordinal variable. On the other hand, based on Gaganis *et al.* (2020), we used the estimation of the random effects for the log of the total mortgage that is a continuous variable. Besides, we address the endogeneity problem using a generalized method of moments (GMM) models based on Diez-Esteban *et al.* (2019). Additionally, following Gaganis *et al.* (2020), we introduce only one cultural dimension per regression to avoid the multicollinearity issues (See Annex 4), we also employ the baseline regression for the first model (Holding secured debt), where we control for inflation, urban population, and country. Moreover, we employ additional estimates while controlling for other country-specific attributes. Furthermore, following Steel *et al.* (2018), we control the second model (Financial well-being) for governance effectiveness, GDP, and income. The following two main models are used to test the research hypotheses:

$$\text{Holding secured debt} = \beta_0 + \beta_1 \text{PD} + \beta_2 \text{IND} + \beta_3 \text{MAS} + \beta_4 \text{UA} + \beta_5 \text{LTO} + \beta_6 \text{Indulgence} + \beta_7 \text{Inflation} + \beta_8 \text{Urbanization} \ldots (1)$$

Holding secured debt is measured based on two variables: holding the mortgage, and log of the total mortgage, hence, we have two regressions related to holding secured debt.

$$\text{Financial well} - \text{being} = \beta_0 + \beta_1 \text{PD} + \beta_2 \text{IND} + \beta_3 \text{MAS} + \beta_4 \text{UA} + \beta_5 \text{LTO} + \beta_6 \text{Indulgence} + \beta_7 \text{CPI} + \beta_8 \text{GDP} + \beta_9 \text{Income} \ldots (2)$$

Financial well-being is going to be proxied by two variables: the ability to make ends meet, and the capacity to afford to pay a one-week annual holiday away from home. Thus, we have two regressions related to financial well-being.

4. EMPIRICAL RESULTS

4.1 Analysis of the decision to hold secured debt

Table no. 2 present the results of the baseline logistic regressions of the determinants of holding the mortgage, where we control for urbanization and inflation.

Table no. 2 – Culture and holding mortgage: Baseline model

	(1)	(2)	(3)	(4)	(5)	(6)
IND	0.011***					
	(0.000)					
MAS		-0.008***				
		(0.000)				
PD			-0.025***			
			(0.000)			
LTO				-0.001***		
				(0.000)		
UA					-0.016***	
					(0.000)	
INDUL						0.028***
						(0.000)
Urbanization	0.051***	0.052***	0.048***	0.057***	0.050***	0.030***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	-0.007***	-0.008***	-0.010***	-0.007***	-0.010***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Intercept)	-5.995***	-5.008***	-3.922***	-5.623***	-4.115***	-4.995***
	(0.011)	(0.013)	(0.013)	(0.011)	(0.013)	(0.011)
Num. Obs.	3,167,412	3,167,412	3,167,412	3,167,412	3,167,412	3,167,412
AIC	2,930,830.0	2928873.6	2,874,635.7	2,940,187.2	2,889,291.7	2877,824.1
BIC	2,930,881.9	2,928,925.4	2,874,687.5	2,940,239.1	2,889,343.5	2,877,876.0
Log.Lik.	-1,465,411.0	-1,464,432.8	-1,437,313.8	-1,470,089.6	-1,444,641.8	-1,438,908.1

Notes: This table reports the results of logit models for the determinants of the Holding mortgage on the list of national culture, urbanization, and inflation listed in the first column. Std. Error in parentheses.
** p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

From Table no. 2, we found that power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with holding a mortgage and they are statistically significant at the 1% level. Results on these four dimensions mean that individuals are less likely to have a mortgage. In contrast to the individualism and indulgence that were positively associated with holding the mortgage and they are statistically significant at the 1% level. Regarding the control variables, we found the urban population positively associated with holding a mortgage, while inflation was negatively associated. Table no. 3 presents the estimations of holding the mortgage that includes all the control variables.

Table no. 3 – Culture and holding mortgage: Inclusion of control variables

	(1)	(2)	(3)	(4)	(5)	(6)
IND	0.007***					
	(0.000)					
MAS		-0.001***				
		(0.000)				
PD			-0.013***			
			(0.000)			
LTO				-0.001***		
				(0.000)		
UA					-0.006***	
					(0.000)	
INDUL						0.029***
						(0.000)
Urbanization	0.046***	0.049***	0.050***	0.048***	0.050***	0.034***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	-0.018***	-0.019***	-0.018***	-0.018***	-0.018***	-0.018***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Interest rates	-0.064***	-0.045***	-0.045***	-0.048***	-0.047***	-0.029***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
House price	-0.004***	-0.005***	-0.002***	-0.005***	-0.003***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Construction permits	-0.089***	-0.091***	-0.089***	-0.091***	-0.089***	-0.069***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Property taxation	-0.238***	-0.214***	-0.172***	-0.205***	-0.221***	-0.350***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Bank concentration	0.005***	0.004***	0.001**	0.005***	0.001***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.119***	0.132***	0.095***	0.139***	0.121***	0.237***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LTV	0.264***	0.285***	0.273***	0.327***	0.258***	0.473***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
(Intercept)	-3.600***	-3.289***	-2.912***	-3.243***	-2.948***	-3.328***
	(0.033)	(0.039)	(0.032)	(0.033)	(0.034)	(0.031)
Num. Obs.	1,401,831	1,401,831	1,401,831	1,401,831	1,401,831	1,401,831
AIC	1,206,342.5	1,207,043.9	1,202,359.7	1,206,467.0	1,205,015.6	1,181,622.4
BIC	1,206,476.2	1,207,177.6	1,202,493.4	1,206,600.7	1,205,149.3	1,181,756.1
Log.Lik.	-603,160.2	-603,510.9	-601,168.8	-603,222.5	-602,496.8	-590,800.2

Notes: This table reports the results of logit models for the determinants of the Holding mortgage on the list of national culture, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and LTV listed in the first column. Std. Error in parentheses.
** p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

The results show that even after controlling the variables the relationship between cultural dimensions and holding a mortgage is still strong with the same evidence of the baseline model (Table no. 2). Regarding the control variables, we found the interest rates, house price, construction permits, and property taxation are negatively associated with holding the mortgage, while bank concentration, GDP, and LTV were positively associated. We accept our hypotheses (1 and 3 to 6) related to the "decision to hold secured debt" that suggests that individualism and indulgence will be positive, while that power distance,

uncertainty avoidance, and long-term orientation will be negative with the decision to hold secured debt. Also, we reject the hypothesis (2) that suggests there is a positive relationship between masculinity and the decision to hold secured debt, contrary to what we found a negative relationship between masculinity and holding a mortgage. Similarly, the findings of national culture are consistent with Gaganis *et al.* (2020), except for masculinity. Our result (A masculinity is negatively associated with holding the mortgage) contradicts other studies such as Gaganis *et al.* (2020) that suggest there is no relationship between masculinity and holding a mortgage. Moreover, the finding of long-term orientation corresponds with de Mooij and Hofstede (2002) that suggests that long-term orientated cultures are cash or debit card cultures, not credit card cultures. Table no. 4 presents the results of the baseline random effects estimation for the log of mortgage, where we control for urbanization and inflation.

Table no. 4 – Culture and log of mortgage: Baseline model

	(1)	(2)	(3)	(4)	(5)	(6)
IND	-0.010***					
	(0.000)					
MAS		0.000*				
		(0.000)				
PD			-0.008***			
			(0.000)			
LTO				-0.021***		
				(0.000)		
UA					0.001***	
					(0.000)	
INDUL						0.038***
						(0.000)
Urbanization	0.029***	0.022***	0.020***	0.026***	0.022***	-0.011***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	-0.032***	-0.032***	-0.037***	-0.032***	-0.032***	-0.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Intercept)	5.266***	5.085***	5.630***	5.927***	5.015***	5.816***
	(0.025)	(0.030)	(0.029)	(0.026)	(0.030)	(0.025)
Num. Obs.	374,446	374,446	374,446	374,446	374,446	374,446
R2	0.180	0.177	0.179	0.197	0.177	0.217

*Notes: This table reports the results of random effects models for the determinants of the log of mortgage on the list of national culture, urbanization, and inflation listed in the first column. Std. Error in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

The results show from Table no. 4, that masculinity, uncertainty avoidance, and indulgence are positively associated with the amount of mortgage and statistically significant at the 1% level (with exception of masculinity that is statistically significant at the 10% level). This means the individuals that having these cultural dimensions are more likely to pay a higher amount of mortgage. On the contrary, power distance, individualism, and long-term orientation were negatively associated with the amount of mortgage, and they are statistically significant at the 1% level. Regarding the control variables, we found the urban population positively associated with holding a mortgage, while inflation was negatively associated. Table no. 5 presents the estimations of the log of the mortgage that includes all the control variables.

Table no. 5 – Culture and log of mortgage: Inclusion of control variables

	(1)	(2)	(3)	(4)	(5)	(6)
IND	-0.004***					
	(0.001)					
MAS		0.030***				
		(0.000)				
PD			-0.028***			
			(0.001)			
LTO				-0.063***		
				(0.001)		
UA					0.005***	
					(0.000)	
INDUL						0.062***
						(0.001)
Urbanization	-0.009***	0.009***	-0.008***	0.034***	-0.011***	-0.045***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Inflation	-0.151***	-0.156***	-0.152***	-0.079***	-0.155***	-0.117***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Interest rates	-0.233***	-0.373***	-0.191***	-0.165***	-0.260***	-0.115***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
House price	0.032***	0.036***	0.050***	0.045***	0.028***	0.045***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Construction permits	0.103***	0.092***	0.126***	-0.031***	0.099***	0.201***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Property taxation	0.552***	0.455***	0.628***	-0.179***	0.533***	0.357***
	(0.011)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
Bank concentration	0.053***	0.065***	0.051***	0.012***	0.054***	0.049***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	0.681***	0.496***	0.616***	0.805***	0.680***	0.936***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
LTV	-0.964***	-0.766***	-1.216***	-1.379***	-0.925***	-0.778***
	(0.018)	(0.017)	(0.017)	(0.016)	(0.018)	(0.016)
(Intercept)	-0.438***	-4.034***	-1.513***	4.173***	-0.515***	-3.423***
	(0.121)	(0.118)	(0.112)	(0.113)	(0.113)	(0.108)
Num. Obs.	130,851	130,851	130,851	130,851	130,851	130,851
R2	0.308	0.337	0.321	0.378	0.308	0.376

Notes: This table reports the results of random effects models for the determinants of the log of mortgage on the list of national culture, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and LTV listed in the first column. Std. Error in parentheses.
** p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

The results show that even after controlling the variables, there is still a strong relationship between cultural dimensions and the amount of mortgage with the same evidence of the baseline model (Table no. 4). In the case of masculinity, the statistically significant level increased to the 1% level. Regarding the control variables, we found the interest rates, urban population, LTV, and inflation are negatively associated with holding the mortgage, while bank concentration, GDP, house price, construction permits, and property taxation were positively associated.

4.2 Endogeneity

In this section, we re-estimate the specifications of Table no. 5 using a generalized method of moments (GMM) to treat with possible endogeneity of the variables and verify the results of random effects. Following to Diez-Esteban *et al.* (2019), we used system GMM (an enhanced version of the GMM in which variable differences are also used as instruments in levels by equations). The consistency of the GMM estimators depends on the absence of a second-order serial correlation in the error term using an (AR2) test and the validity of the instruments by the Hansen test of over-identifying restrictions. Therefore, we include the model specification tests in Table no. 6. The estimations of the log of the mortgage that includes all the control variables using GMM models are shown in Table no. 6.

Table no. 6 – Culture and log of mortgage: GMM models

	(1)	(2)	(3)	(4)	(5)	(6)
Mortgage(t-1)	0.323*	0.440***	-3.393***	0.751***	3.203***	-0.303*
	(0.176)	(0.114)	(0.449)	(0.057)	(0.314)	(0.159)
IND	-0.118***					
	(0.038)					
MAS		0.050***				
		(0.009)				
PD			-0.274***			
			(0.033)			
LTO				-0.001***		
				(0.000)		
UA					0.216***	
					(0.024)	
INDUL						0.707***
						(0.078)
Urbanization	0.088***	0.055***	-0.121***	0.004***	0.184***	-0.321***
	(0.027)	(0.009)	(0.015)	(0.001)	(0.021)	(0.048)
Inflation	0.001*	-0.001***	0.001*	-0.001***	-0.004***	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Interest rates	0.003**	-0.000	-0.016***	-0.001***	0.025***	-0.003***
	(0.001)	(0.001)	(0.002)	(0.000)	(0.003)	(0.001)
House price	0.002***	-0.005***	-0.012***	-0.000	0.006***	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Construction permits	0.063***	-0.017***	0.027***	-0.003*	0.184***	-0.051
	(0.021)	(0.004)	(0.008)	(0.002)	(0.023)	(0.034)
Property taxation	-0.000	0.004***	0.053***	-0.001***	-0.043***	0.007**
	(0.000)	(0.001)	(0.006)	(0.000)	(0.005)	(0.003)
Bank concentration	-0.001	0.008***	0.009***	0.001***	0.001***	0.000
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
GDP	0.005***	0.002***	0.028***	0.002***	-0.013***	-0.021***
	(0.001)	(0.001)	(0.003)	(0.000)	(0.002)	(0.003)
LTV	0.287***	-0.213***	-1.465***	-0.038	1.596***	0.093
	(0.105)	(0.052)	(0.163)	(0.025)	(0.213)	(0.170)
(Intercept)	3.034***	-2.136**	46.479***	1.586***	-45.030***	0.000
	(0.882)	(0.840)	(5.058)	(0.437)	(5.548)	(0.000)
Num. Obs.	59,918	59,918	59,918	59,918	59,918	59,918

Wald test(g.l.)	1.05e+06*** (11)	1.58e+06 *** (11)	1.36e+08*** (11)	3.27e+06*** (11)	1.17e+07*** (11)	24455.35*** (11)
AR1	-3.44***	-5.54***	-5.21***	-12.32***	-8.33***	-1.08
AR2	0.49	0.28	-1.68	1.03	1.47	-1.67
Hansen test (g.l.)	22.96(17)	1.73(1)	0.10 (1)	23.19(20)	0.66(1)	13.90(16)

Notes: This table reports the results of GMM models for the determinants of the log of mortgage on the list of national culture, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and LTV listed in the first column. Std. Error in parentheses.
** p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

The results of GMM models for a log of mortgage in Table no. 6 confirm with random effect models (Table no. 5). Consequently, we found that masculinity, uncertainty avoidance, and indulgence are positively associated with the amount of mortgage and statistically significant at the 1% level. In contrast, power distance, individualism, and long-term orientation were negatively associated with the amount of mortgage and they are statistically significant at the 1% level. We accept our hypotheses (2 to 4, and 6) related to the "decision to hold secured debt" that suggests that indulgence and masculinity will be positive, while that power distance and long-term orientation will be negative with the decision to hold secured debt. Also, we reject hypotheses (1, and 5) that suggest that individualism will be positive, while that uncertainty avoidance will be negative with the decision to hold secured debt. On the contrary to what we found that uncertainty avoidance is positively associated, while individualism is negatively associated with the amount of mortgage. Our findings regarding power distance, long-term orientation, and indulgence are similar to Gaganis *et al.* (2020).

4.3 Analysis of the states of financial well-being

In this section, we examine whether dimensions of national culture are associated with financial well-being. Tables no. 7 and no. 8 present the results of the estimations of the determinants of the households' financial well-being by "afford to pay for the one-week annual holiday", and "the ability to make ends meet" respectively, where we control for the governance effectiveness, GDP, and income.

Table no. 7 – Culture and financial well-being by afford to pay

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
IND	0.001*** (0.000)					
MAS		-0.001*** (0.000)				
PD			-0.001*** (0.000)			
LTO				0.000*** (0.000)		
UA					-0.005*** (0.000)	
INDUL						-0.004*** (0.000)
GDP	-0.026***	-0.009***	-0.022***	-0.007***	-0.022***	-0.024***

	(1)	(2)	(3)	(4)	(5)	(6)
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
CPI	0.023***	0.023***	0.023***	0.022***	0.020***	0.027***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income	2.094***	2.095***	2.092***	2.126***	2.100***	2.135***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(Intercept)	-0.531***	-0.369***	-0.394***	-0.363***	0.109***	-0.493***
	(0.007)	(0.009)	(0.011)	(0.008)	(0.012)	(0.006)
Num. Obs.	3,229,429	3,229,429	3,229,429	3,229,429	3,229,429	3,229,429
AIC	3,329,943.5	3,329,480.9	3,329,872.5	3,328,999.2	3,326,153.7	3,328,506.9
BIC	3,330,008.4	3,329,545.9	3,329,937.4	3,329,064.1	3,326,218.7	3,328,571.8
Log.Lik.	-1,664,966.7	-1,664,735.4	-1,664,931.2	-1,664,494.6	-1,663,071.8	-1,664,248.4

*Notes: This table reports the results of logit models for the determinants of the afford to pay for the one-week annual holiday on the list of national culture, GDP, CPI, and income listed in the first column. Std. Error in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

Table no. 8 – Culture and financial well-being by ends meet

	(1)	(2)	(3)	(4)	(5)	(6)
IND	0.010***					
	(0.000)					
MAS		0.003***				
		(0.000)				
PD			-0.004***			
			(0.000)			
LTO				0.002***		
				(0.000)		
UA					-0.008***	
					(0.000)	
INDUL						0.002***
						(0.000)
GDP	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CPI	0.054***	0.060***	0.055***	0.061***	0.052***	0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Num. Obs.	3,414,075	3,414,075	3,414,075	3,414,075	3,414,075	3,414,075
AIC	10,641,925.5	10,666,014.0	10,666,203.3	10,636,804.2	10,652,871.0	10,669,208.4
BIC	10,642,056.0	10,666,144.5	10,666,333.8	10,636,934.7	10,653,001.5	10,669,338.9
Log.Lik.	-5,320,952.7	-5,332,997	-5,333,091.7	-5,318,392.1	-5,326,425.5	-5,334,594.2

*Notes: This table reports the results of ordinal logit models for the determinants of the ability to make ends meet on the list of national culture, GDP, CPI, and income listed in the first column. Std. Error in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

Tables no. 7 and no. 8 show that individualism and long-term orientation are positively associated with financial well-being based on the afford to pay for a one-week annual holiday, and ability to make ends meet that are statistically significant at a 1% level. Whereas the power distance and uncertainty avoidance were negatively associated with financial well-being based on two measurements and they are statistically significant at a 1% level. Also, we found mixed results in the case of masculinity and indulgence based on two measurements.

Regarding control variables, we found governance effectiveness and income are positively associated with financial well-being based on two measurements, while the GDP was negatively associated.

We accept our hypotheses (7 to 9) related to financial well-being that suggests the power distance and uncertainty avoidance will be negative, while individualism will be positively associated with financial well-being. Moreover, we cannot decide regarding hypothesis (10) due to mixed results. However, we found new evidence regarding long-term orientation that is positively associated with financial well-being. Our findings regarding power distance, and individualism are consistent with Steel *et al.* (2018), while the uncertainty avoidance is similar to Hofstede (2001) and Steel *et al.* (2018).

5. DISCUSSION

Some of our results are consistent with the existing literature e.g., the results of individualism, indulgence, power distance, uncertainty avoidance, and long-term orientation with a decision to hold a mortgage are consistent with Gaganis *et al.* (2020), the findings related to power distance, and individualism with financial well-being are consistent with Steel *et al.* (2018) and the finding related to the uncertainty avoidance with financial well-being is similar to the Hofstede (2001) and Steel *et al.* (2018) argument. Also, the finding of long-term orientation corresponds with de Mooij and Hofstede (2002) that indicates that long-term orientated cultures are cash or debit card cultures, not credit card cultures. Additionally, some results challenge previous findings that suggest there is no significant relationship between masculinity and mortgage debt such as Gaganis *et al.* (2020), instead of that we found a negative relationship between masculinity and the decision to hold a mortgage. Also, our results offer new evidence regarding long-term orientation that is positively associated with financial well-being.

6. CONCLUSION

This research extends the literature on household finance by reinforcing the knowledge on the determinants of mortgage and financial well-being levels. We examined the influence of Hofstede's national culture on a mortgage and financial well-being in 31 European countries. We found that power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with holding a mortgage in contrast to individualism and indulgence. We also found that masculinity, uncertainty avoidance, and indulgence are positively associated with the amount of mortgage in contrast to power distance, individualism, and long-term orientation. Moreover, we discovered that individualism and long-term orientation are positively associated with financial well-being. While the power distance and uncertainty avoidance were negatively associated with financial well-being.

This study investigates the implications of national culture on mortgages and financial welfare to households, policymakers, and academia. The results of this study are beneficial to the households to provide them with the needed knowledge to understand the way the culture affects their decision to hold a mortgage and financial welfare. This might help the households to make effective decisions such as when to hold a mortgage, the amount of this mortgage, raise their awareness of how to deal with their national culture to have a higher level of financial well-being, providing them with the ability to plan ahead of time for their financial

issues, and thus they might be able to avoid having any financial distress. Moreover, we provide policymakers with important information to manage the mortgage process by offering more promotions and facilitating these procedures to encourage the societies with high power distance, masculinity, uncertainty avoidance, and long-term orientation to hold more mortgages and enhance the welfare of households in the societies with high power distance and uncertainty avoidance. Lastly, this study adds to the academic research on the determinants of the decision to hold secured debts and a better explanation of the states of financial well-being. Future research can investigate the relationship between national culture and household finance in different settings on other continents.

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ANNEX 1

Supplementary data

Supplementary data to this article can be found online under official request the Eurostat database at https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions and in other open datasets are shown in Annex 3.

ANNEX 2

Distribution of the sample by country

Countries	Num. of obs.	Respective %	Countries	Num. of obs.	Respective %
Austria	88,817	2.59%	Malta	47,508	1.38%
Belgium	89,004	2.59%	Netherlands	148,100	4.31%
Bulgaria	69,422	2.02%	Poland	189,901	5.53%
Czech Republic	119,535	3.48%	Portugal	103,376	3.01%
Denmark	87,361	2.54%	Romania	91,107	2.65%
Germany	185,285	5.40%	Slovenia	125,528	3.66%
Estonia	79,673	2.32%	Finland	158,965	4.63%
Greece	145,121	4.23%	Sweden	96,787	2.82%
Croatia	57,118	1.66%	Iceland	38,250	1.11%
Spain	196,498	5.72%	Norway	89,614	2.61%
France	163,293	4.76%	Serbia	34,265	1.00%
Ireland	77,492	2.26%	Switzerland	87,471	2.55%
Italy	309,187	9.01%	United Kingdom	142,209	4.14%
Latvia	79,411	2.31%	Luxembourg	62,077	1.81%
Lithuania	69,781	2.03%	Slovakia	75,305	2.19%
Hungary	125,798	3.66%	**Total**	**3,433,259**	**100.00%**

ANNEX 3

Definitions of variables

Variable	Definition
Dependent Variables	
Holding mortgage	Measured as a binary variable takes the value of 1 if the individual is holding a mortgage, otherwise, the value is 0. (Source: EU-SILC dataset, Eurostat).
Log of total mortgage	The logarithm of mortgage principal repayment plus interest mortgage in Euro currency. (Source: EU-SILC dataset, Eurostat).
Ability to make ends meet	Financial well-being Indicator which takes the values as follows: 1 with great difficulty, 2 with difficulty, 3 with some difficulty, 4 fairly easily, 5 easily, 6 very easily. (Source: EU-SILC dataset, Eurostat).
Capacity afford to pay for a one-week annual holiday	The financial well-being Indicator is measured as a binary variable that takes the value of 1 if the answer is yes, otherwise, and 0 if it is no. (Source: EU-SILC dataset, Eurostat).
Independent Variables	
Power distance (PD)	National Culture Indicator expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. (Source: Hofstede Insights).
Individualism (IND)	National Culture Indicator of the degree to which individuals are expected to take care of only themselves and their immediate families. (Source: Hofstede Insights).
Masculinity (MAS)	National Culture Indicator that represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. (Source: Hofstede Insights).
Uncertainty avoidance (UA)	National Culture Indicator that expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. (Source: Hofstede Insights).
Long-term orientation (LTO)	National Culture Indicator that relates to the choice of focus for people's efforts: the future or the present and past. (Source: Hofstede Insights).
Indulgence (INDUL)	National Culture Indicator stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. (Source: Hofstede Insights).
Control Variables	
GDP	GDP growth (annual %). (Source: EMF Hypostat).
Inflation	Inflation, consumer prices (annual %). (Source: EMF Hypostat).

Variable	Definition
Interest rates	Representative Interest Rates on New Residential Loans, annual average based on monthly figures, percent. (Source: EMF Hypostat).
House price	Nominal House Price Indices. (Source: EMF Hypostat).
Urbanization	Urban population (% of total). (Source: World Development Indicators of the World Bank).
Bank concentration	Assets of the three largest commercial banks as a share of total commercial banking assets (%). (Source: Global Financial Development Database of the World Bank).
Construction permits	A number of procedures are required for a business in the construction industry to build a warehouse. (Source: Doing Business Report of the World Bank).
Tax property	Tax on the property as a percentage of GDP. Tax on the property is defined as recurrent and non-recurrent taxes on the use, ownership, or transfer of property. (Source: OECD)
Governmental effectiveness (CPI)	Corruption Perception Index (CPI). (Source: Transparency International).
LTV	Dummy variable that takes the value of 1 if there is a Loan-to-Value Ratio macroprudential instrument and the value of 0 otherwise. (Source: Cerutti *et al.*, 2017).
Income	Total gross household income in Euro currency. (Source: EU-SILC dataset, Eurostat).

ANNEX 4

Correlation coefficients of cultural dimensions

	PD	MAS	IND	INDUL	LTO	UA
PD	1					
MAS	0.168***	1				
IND	-0.556***	0.186***	1			
INDUL	-0.543***	-0.216***	0.312***	1		
LTO	0.005***	0.228***	0.227***	-0.289***	1	
UA	0.663***	0.214***	-0.559***	-0.508***	0.005***	1

*Notes: This table reports the correlation coefficients of cultural dimensions. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Annex 3. Definitions of variables)*

Notes

[1]All the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate for each specified year.

[2] 26 member countries of the EU (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Greece, Croatia, Spain, France, Ireland, Italy, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Finland, and Sweden) and 5 other European countries (Iceland, Norway, Serbia, Switzerland, and the United Kingdom).

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