



Three Essays on Household Finance

By

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Biographical Note

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"This thesis is dedicated to my late beloved dad Prof. Isam Ashqar"

Abstract

This thesis is composed of three research essays aimed at investigating the influence of personality, culture, and religion on household financial dimensions in the European setting. All the empirical studies conducted in this thesis recur to the European Union Statistics on Income and Living Conditions (EU-SILC) dataset from Eurostat.

The second chapter examines the impact of personality traits (Neuroticism, Extraversion, and Agreeableness) on some dimensions of household finance in 31 European countries. We employ regression analysis to provide a better understanding of the determinants of the decision to hold secured debts and the likelihood of being in a state of financial distress and financial well-being. Our main findings suggest that the levels of neuroticism and extraversion are negatively associated with the likelihood of holding a mortgage; and that the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with the likelihood of being in a state of financial distress.

The third chapter explores the influence of Hofstede's national cultures (Power Distance, Masculinity, Individualism, Uncertainty avoidance, Long-term Orientation, and Indulgence) on the likelihood of holding a mortgage and likelihood of being in a state of financial well-being in the same group of 31 European countries. This chapter employs regression analysis using mainly Hofstede's cultural dimensions to conclude that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with the likelihood of holding a mortgage. The findings also show the higher the levels of masculinity, uncertainty avoidance, long-term orientation, and indulgence of the national culture in question, the lower the amount of mortgage owned by individuals. Moreover, the levels of individualism and long-term orientation (power distance and uncertainty avoidance) are positively (negatively) associated with the likelihood of being in a state of financial well-being.

The fourth chapter investigates the effect of religious backgrounds (Catholic, Orthodox, and Protestant) and religiosity on the likelihood of holding a mortgage and being in a state of financial distress and financial well-being in 32 European countries. We recur to regression analysis of the information on religions to find that belonging to a mainly Catholic or Orthodox (Protestant)

country is negatively (positively) associated with the likelihood of holding a mortgage. Moreover, belonging to a Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress. The results also depict that the levels of religiosity observed in a country are negatively associated with the likelihood of holding a mortgage and the likelihood of being in a state of financial distress.

Collectively, our research suggests that variables related to personality, culture, and religion are crucial to understand several financial dimensions in the field of household finance. Moreover, our results offer recommendations to households, policymakers, and academia on the determinants of the likelihood of holding secured debts and a better explanation of the likelihood of being in the states of financial distress and financial well-being.

Keywords: Household Finance, Personality, Culture, Religion, Mortgage, Financial distress, Financial well-being, Europe.

JEL Classification: G40, G50, G51.

Resumo

Esta tese é composta por três ensaios que prosseguem o objetivo de investigar a influência da personalidade, cultura e religião nas dimensões financeiras das famílias no contexto europeu. Todos os estudos empíricos realizados nesta tese recorrem à base de dados “European Union Statistics on Income and Living Conditions” (EU-SILC) criada pelo Eurostat.

O segundo capítulo da tese examina o impacto dos traços de personalidade (neuroticismo, extroversão e amabilidade) em algumas dimensões das finanças domésticas em 31 países europeus. Empregamos a análise de regressão para proporcionar uma melhor compreensão dos determinantes da decisão de assumir dívidas da probabilidade de se estar numa situação de dificuldade financeira e numa situação de bem-estar financeiro. Os nossos resultados principais sugerem que os níveis de neuroticismo e extroversão estão negativamente associados à probabilidade de se ter uma hipoteca; e que os níveis de neuroticismo e extroversão (amabilidade) estão positivamente (negativamente) associados à probabilidade de se estar em situação de dificuldade financeira.

O terceiro capítulo da tese explora a influência das dimensões culturais na aceção de Hofstede (distância ao poder, masculinidade, individualismo, aversão à incerteza, orientação de longo prazo e indulgência) sobre a probabilidade de se ter uma hipoteca e sobre a probabilidade de se estar numa situação de bem-estar financeiro no mesmo grupo de 31 países europeus. Neste capítulo recorreremos à análise de regressões para concluir que os níveis de distância ao poder, masculinidade, aversão à incerteza e orientação de longo prazo estão negativamente associados à probabilidade de se ter uma hipoteca. Os resultados também mostram que quanto mais altos os níveis de masculinidade, aversão à incerteza, orientação de longo prazo e indulgência das culturas nacionais em questão, menor a quantidade de hipotecas detidas pelos indivíduos. Além disso, os níveis de individualismo e orientação de longo prazo (distância ao poder e aversão à incerteza) estão positivamente (negativamente) associados à probabilidade de se estar numa situação de bem-estar financeiro.

O quarto capítulo investiga o efeito das características religiosas dos países (católicas, ortodoxas e protestantes) e do seu nível de religiosidade sobre a probabilidade de se ter uma hipoteca e de se estar numa situação de dificuldade financeira ou numa situação de bem-estar financeiro num conjunto de 32 países europeus. Recorreremos à análise de regressões para mostrar que pertencer a

um país predominantemente católico ou ortodoxo (protestante) está negativamente (positivamente) associado à probabilidade de se ter uma hipoteca. Além disso, pertencer a um país católico (protestante) está negativamente (positivamente) associado à probabilidade de se estar numa situação de dificuldade financeira. Os nossos resultados também indicam que os níveis de religiosidade observados num dado país estão negativamente associados à probabilidade de se ter uma hipoteca e à probabilidade de se estar numa situação de dificuldade financeira.

Em termos globais, a nossa investigação sugere que as variáveis relacionadas à personalidade, cultura e religião são cruciais para a compreensão das várias dimensões financeiras no campo das finanças domésticas. Além disso, nossos resultados permitem oferecer recomendações para famílias, decisores políticos e membros da academia sobre os determinantes da probabilidade de se terem dívidas, permitindo ainda uma melhor explicação da probabilidade de se estar num estado de dificuldade financeira ou de bem-estar financeiro.

Palavras-chave: Finanças Domésticas, Personalidade, Cultura, Religião, Hipoteca, Dificuldade financeira, Bem-estar financeiro, Europa.

Classificação JEL: G40, G50, G51.

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Abbreviations

Chapter One

CAPI- Computer-assisted personal interviewing

CATI- Computer-assisted telephone interviewing

CPI- Corruption Perception Index

EMF- European Mortgage Federation

EU- European Union

EU-SILC- European Union Statistics on Income and Living Conditions

GMM- Generalized Method of Moments

LTV- Existence of a Loan to Value

MBTI- Myer-Briggs

OECD- Organization for Economic Co-Operation and Development

PAPI- Pen-and-paper personal interviewing

16PF- 16 Personality Factors

Chapter Two

AIC- Akaike's Information Criteria

Arrears HPI/LP- Arrears on hire purchase installments or other loan payments

Arrears M/RP- Arrears on a mortgage or rental payments

BHPS- British Household Panel Survey

BIC- Bayesian Information Criteria

Burden THC- Burden of total housing cost

CAPI- Computer-assisted personal interviewing

CATI- Computer-assisted telephone interviewing

EU- European Union

EU-SILC- European Union Statistics on Income and Living Conditions

GLM- Generalized Linear Model

MBTI- Myer-Briggs
PAPI- Pen-and-paper personal interviewing
Unexpected FE- Capacity to face financial expenses
16PF- 16 Personality Factors

Chapter Three

AIC- Akaike's Information Criteria
BIC- Bayesian Information Criteria
CAPI- Computer-assisted personal interviewing
CATI- Computer-assisted telephone interviewing
CPI- Corruption Perception Index
EMF- European Mortgage Federation
EU- European Union
EU-SILC- European Union Statistics on Income and Living Conditions
FPI- Foreign Portfolio Investment
GMM- Generalized Method of Moments
IND- Individualism
INDUL- Indulgence
LTO- Long-Term Orientation
LTV- Existence of a Loan to Value
MAS- Masculinity
OECD- Organization for Economic Co-Operation and Development
PAPI- Pen-and-paper personal interviewing
PD- Power Distance
UA- Uncertainty Avoidance

Chapter Four

AIC- Akaike's Information Criteria

Arrears HPI/LP- Arrears on hire purchase installments or other loan payments

Arrears M/RP- Arrears on a mortgage or rental payments

BIC- Bayesian Information Criteria

CAPI- Computer-assisted personal interviewing

CATH- Catholic

CATI- Computer-assisted telephone interviewing

EU- European Union

EU-SILC- European Union Statistics on Income and Living Conditions

GMM- Generalized Method of Moments

ORTH- Orthodox

PAPI- Pen-and-paper personal interviewing

PROT- Protestant

Unexpected FE- Capacity to face financial expenses

Chapter Five

EU-SILC- European Union Statistics on Income and Living Conditions

Papers Published from the Thesis

- **Chapter Two of the thesis was presented as a paper** titled “The Effect of Personality Traits on Household Finance: Evidence from Europe” in the Scientific Publishing Workshop on 07/Dec/2020 of the “**Revista Brasileira de Gestão de Negócios / Review of Business Management**” (RBGN) and it was **presented in the Global Finance Conference**, University of Minho, Braga, Portugal, on June 20 - 22, 2022. Also, it was submitted in the “**Review of Accounting and Finance**” (journal indexed by Clarivate Analytics Web of Science Core Collection – Emerging Sources Citation Index and Scopus, among others) since 23/July/2022.
- **Chapter Three of the thesis was published as a paper** titled “Do National Cultures Impact Mortgage and Financial Well-Being Levels? Evidence from Europe” in the “**Scientific Annals of Economics and Business**” (journal indexed by Clarivate Analytics Web of Science Core Collection – Emerging Sources Citation Index and Scopus, among others) on 27/Sep/2021.
Ashqar, R. I., & Lobão, J. (2021). Do National Cultures Impact Mortgage and Financial Well-Being Levels? Evidence from Europe. *Scientific Annals of Economics and Business*, 68(3), 263–284. <https://doi.org/10.47743/saeb-2021-0021>.
- **Chapter Four of the thesis was submitted as a paper** titled “Does Religion Influence the Household Finance? Evidence from Europe” in the “**Studies in Economics and Finance**” (journal indexed by Clarivate Analytics Web of Science Core Collection – Emerging Sources Citation Index and Scopus, among others) since 18/Feb/2022. Also, it was **presented in the TAKE 2022 Theory and Applications in the Knowledge Economy**, Universidade Portucalense, Porto, Portugal on July 6 - 8, 2022.

Chapter One

General Introduction

1 General Introduction

After receiving significant attention from the academic community, the field of household finance was well established by Campbell (2006)'s work. The author considered it as a new field in financial economics that can explain the practices of family units when they use financial instruments and markets to complete their goals and aspirations in life. Nowadays, household finance has become a thriving, vibrant, self-standing field of research (Guiso and Sodini, 2013). Households use financial instruments in all stages of life; for instance, they use cash, checks, and credit cards when purchasing goods and services. They transfer their resources temporally to invest in durable goods and human capital or to fund present and future consumption. They need liquidity to deal with the different risks that are beyond their control concerning their health and properties.

The financial economy has expanded beginning in the mid-1980s, partly due to selling more products to individuals and households. Therefore, new forms of assets and debts and new funding methods have become more accessible to households (Fligstein and Goldstein, 2015). Moreover, nowadays the households are more directly engaged and more easily involved in complex financial decisions than in the past, due partly to the privatization of pension systems, the liberalization of loan markets, and the recent credit expansion (Guiso and Sodini, 2013). Also, financial innovation has led to extending the set of financing and investment choices available to households (Guiso and Sodini, 2013). Consequently, households should possess financial literacy skills regarding payment choices, debt financing, saving, and insurance contracts.

1.1 Statement of the Problem

The research on culture and religion has only recently been considered in the field of financial economics recently, but in general, the research in the field only takes into account the attributes of individual countries, without examining the household characteristics (Díez-Esteban *et al.*, 2019; Gaganis *et al.*, 2020). Furthermore, most of the studies have been focusing on the United States (e.g., Green and Elliott, 2010; Jang and Johnson, 2004) and China (e.g., Chunping *et al.*, 2016). Some studies have been examining the relationship

between personality traits and household finance but have been mainly focused on unsecured debt and financial assets in the United Kingdom such as Brown and Taylor (2014), or limited to the young adults in the United States such as Xu *et al.* (2015).

For those reasons, more research on household finance is needed to know how personality, culture, and religion influence the dimensions of household finance.

1.2 General Purpose of the Thesis

The purpose of this thesis is to examine the effect of the personality traits (Neuroticism, Extraversion, and Agreeableness), national cultures (Power Distance, Masculinity, Individualism, Uncertainty avoidance, Long-term Orientation, and Indulgence), religious backgrounds (Catholic, Orthodox, and Protestant), and religiosity on household finance based on three distinct dimensions: 1) the decision to hold a mortgage, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being in the European setting. The choice of this geography is motivated by its cultural diversity according to Hofstede (2011)'s cultural dimensions. Moreover, the European Union is such a large economic space in the global context that knowing more about the household financial dimensions that take place here is important in itself. The economic importance of household finance in Europe cannot be understated. For example, the total amount of the mortgages owned by households in the Euro area reached at 2020 the staggering figure of 55.49 trillion euros (Euro Area Statistics, 2022). In comparison, the household mortgages in 2020 in the United States are 16.78 trillion U.S. dollars (Statista, 2021).

1.3 Research Questions

This thesis aims to address the following three research questions:

1. Do the personality traits (Neuroticism, Extraversion, and Agreeableness) and demographic characteristics of the individuals impact the three dimensions of household finance concerning: 1) the decision to hold a mortgage, 2) the likelihood of being in

a state of financial distress, and 3) the likelihood of being in a state of financial well-being?

2. Do the national cultures (Power Distance, Masculinity, Individualism, Uncertainty avoidance, Long-term Orientation, and Indulgence) influence the two dimensions of household finance regarding 1) the decision to hold secured debts and 2) the likelihood of being in a state of financial well-being?
3. Do religious backgrounds (Catholic, Orthodox, and Protestant), religiosity, and demographic characteristics of the individuals affect the dimensions of household finance based on three aspects: 1) the decision to hold a mortgage, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being?

1.4 Contributions of the Thesis

There are two prominent studies that investigated the relationship between personality and household finance dimensions. First, Brown and Taylor (2014) examined the influence of personality on the financial decisions that focused on unsecured debt and financial assets in the United Kingdom. They found that the level of extraversion (conscientiousness) is positively (negatively) associated with the probability of holding credit card debt. Second, Xu *et al.* (2015) addressed the relationship between personality traits and financial distress for young adults (24-34 years old) in the United States. They found that the level of neuroticism (conscientiousness) is positively (negatively) correlated with the likelihood of being in a state of financial distress. To the best of our knowledge, no other study has addressed the relationship between personality traits and the three dimensions of household finance concerning: 1) the decision to hold secured debts, 2) the likelihood of being in the state of financial distress, and 3) the likelihood of being in the state of financial well-being in a European setting. Therefore, chapter two fills the gap in the literature by investigating the impact of personality traits and demographic characteristics of the individuals on the three dimensions of household finance in 31 European countries using the EU-SILC dataset

from Eurostat. To the best of our knowledge, this is the first research that uses these data in this context.

The research on culture has been considered in the field of financial economics recently, but it is limited to the country-attributes or individual countries without examining the household characteristics (Díez-Esteban *et al.*, 2019; Gaganis *et al.*, 2020). To the best of our knowledge, there are no earlier studies that explored the effects of national cultures on the decision of holding a mortgage and the likelihood of being in a state of financial well-being in the European setting using samples from different countries and examining household characteristics. Therefore, chapter three fills that gap by investigating this relationship in 31 European countries using mainly Hofstede's cultural dimensions and the EU-SILC dataset from Eurostat.

Moreover, the research on religion has been studied in the field of financial economics recently but is still limited to countries such as the United States (e.g., Green and Elliott 2010; Jang and Johnson 2004) and China (e.g., Chunping *et al.*, 2016). To the best of our knowledge, no study has addressed the relationship between religion and dimensions of household finance in the European setting, that is, using samples from different countries and controlling for household characteristics. Therefore, chapter four fills the gap in the literature by examining the impact of religious backgrounds, religiosity, and demographic characteristics of the individuals on three dimensions of household finance concerning 1) the decision to hold secured debts, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being in 32 European countries.

1.5 Data of the Thesis

Chapter two examines the relationship between personality traits and the dimensions of household finance. For that purpose, we used data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, from the Eurostat Database. EU-SILC is an instrument aiming at collecting timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion, and living conditions that cover objective and subjective aspects of these themes in both monetary and non-monetary terms for both households and individuals. In addition, the data provide some variables about

personality traits in 2013. These data are extracted from registers or collected from interviews by five modes of data collection are possible: 1 - Pen-and-paper personal interviewing (PAPI). 2 - Computer-assisted personal interviewing (CAPI). 3 - Computer-assisted telephone interviewing (CATI). 4 - Self-administered by respondent. 5 - Proxy interview. The data cover the personality traits of the individuals, individuals' demographic characteristics, and the dimensions of household finance at the household level¹. The individuals in this data are aged 16 and above in 2013 for 31 European countries including 26 member countries of the European Union (EU) and five other European countries. The number of observations of the individuals and households in our sample is 502,017.

Chapter three investigates the impact of national culture on the decision of holding a mortgage and the likelihood of being in a state of financial well-being. We recur to the data from the EU-SILC dataset from the Eurostat Database. These data cover the dimensions of household finance at the household level from 2004 to 2018 for 31 European countries, including 26 member countries of the European Union (EU) and five other European countries. Also, we obtained the cross-country data for six dimensions of national culture from Hofstede Insights (2021). We collected the urban population from the World Development Indicators of the World Bank (2021c). In addition, data on inflation, interest rates, nominal house price indices, and GDP growth were gathered from the European Mortgage Federation (EMF) of Hypostat (2021). We control for bank concentration from the Global Financial Development Database of the World Bank (2021b). Data on construction permits are from the Doing Business Report of the World Bank (2021a). We obtained data on tax property from the Organization for Economic Co-operation and Development (OECD, 2021). We used Corruption Perception Index (CPI) from Transparency International (2021) to measure governmental effectiveness. We also control our results for 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 of the households in our sample is 3,433,259.

In chapter four we investigate the impact of religious backgrounds and religiosity on the three dimensions of household finance mentioned above. For that purpose, we used data from the

¹ The household respondent for the dimensions of household finance is choosing according to the following priorities: 1) the person responsible for the accommodation. 2) a household member aged 16 and over who is the best place to give this information.

EU-SILC dataset from the Eurostat Database. These data cover the dimensions of household finance at the household level from 2004 to 2018 for 32 European countries, including 27 member countries of the European Union (EU) and five other European countries. Also, we obtained the cross-country data for the denominations of the Christian religion (Catholic, Orthodox, and Protestant) from the World Factbook (2020). Moreover, we used the index of religious observance (religiosity) from surveys conducted by the Pew Research Center (2018) between 2015 and 2017 among nearly 56,000 adults (ages 18 and older). This index is proxied by the average of the four individual measures - the importance of religion, worship attendance, frequency of prayer, and belief in God. Our data combines time series with cross-sectional data that allow the formation of panel data, the number of observations of the households in our sample is 3,125,891

1.6 Significance of the Thesis

This thesis investigates the implications of personality traits, national culture, and religion on the dimensions of household finance to households, policymakers, and academia. Our inferences suggest a need for behavioral interventions based on personality traits to diagnose people that are considered to be at financial risk. To reduce the financial risk effects, governments and financial institutions should better design the financial products and offer them in a more organized manner, that could help households save, invest, and get a mortgage. Moreover, our results recommend that individuals should be aware of their own personalities' influence on their financial dimensions. Also, we provide the households with the needed knowledge to understand the way culture affects their decisions to hold a mortgage. This would help the individuals and households to make effective decisions that might have a positive impact on their life. Such knowledge may enhance their skills thus helping them make balanced financial decisions and avoid financial problems.

On another level, we suggest that policies should be designed to integrate the following: 1) issue public programs that can enhance the welfare of households, 2) raise household awareness about financial literacy and deal with financial issues by organizing workshops and publishing necessary information on social media, 3) offering more promotions and facilitating the procedures to encourage the societies with high power distance, masculinity,

uncertainty avoidance, and long-term orientation to hold more mortgages, and 4) offering different strategies and facilitating procedures to encourage Catholics and Orthodoxes to hold more mortgages and improve the welfare of the households.

Additionally, we add to the academic research on the determinants of the decision to hold secured debts and a better explanation of the likelihood of being in a state of financial distress and financial well-being.

1.7 General Literature Review

In this section, we present the current literature on the influence of personality traits, national culture, and religion on the dimensions of household finance.

1.7.1 Personality Traits and Household Finance

Over the last two decades, many researchers have argued that personality is a motivator for human behavior (Davidson *et al.*, 2003; Durand *et al.*, 2008). Larsen and Buss (2009) defined personality as “the set of psychological traits and mechanisms within the individual that are organized and relatively enduring, and that influence his or her interactions with, and adaptations to the environments (including the intrapsychic, physical, and social environments)” (p. 4). Moreover, the analysis of individual personality started appearing in social psychology research and then migrated to behavioral finance research (Oehler *et al.*, 2018).

The literature on behavioral finance includes certain factors like personality traits and demographic characteristics, which can affect the way individuals decide. Households tend to make hard decisions when facing uncertain conditions. According to the prospect theory, the deviation of real decision-making from perfect rationality is based on the psychological factors of individuals (Tversky and Kahneman, 1979).

Personality traits are defined as the set within the individual of those perceptual, cognitive, emotional, and motivational systems, which can affect the way people respond to their environment when making decisions (Stagner, 1948). There have been some efforts in the literature to measure personality traits. For example, the framework of Myer-Briggs (MBTI)

divides personality types into four fields: 1) judging versus perceiving, 2) sensing versus intuition, 3) thinking versus feeling, and 4) extrovert versus introvert. Carl Jung established the MBTI in 1921 as an indicator that assumes personality as a preference rather than a personal characteristic when making decisions (Leary *et al.*, 2009).

Some researchers developed personality models based on the MBTI; for example, Cattell *et al.* (1970) established the 16 Personality Factors (16PF) model that includes five global factors and 16 primary traits. Additionally, Costa and McCrae (1992) developed the Big Five personality traits, which have been widely used to classify personality traits in the psychology literature and are being increasingly used in economics (Brown and Taylor, 2014). The Big Five personality traits include the traits of extraversion, openness, agreeableness, conscientiousness, and neuroticism.

In this thesis, we focus on three personality traits (neuroticism, agreeableness, and extraversion) from the Big Five Personality Model due to a lack of data in EU-SILC for openness and conscientiousness. Table 1.1 presents the definitions of the personality traits used in the thesis.

Table 1.1: Definitions of the Personality Traits

Personality Trait	Definition
Neuroticism	The individual tends to experience excessive worry, depression, anger, and psychological distress (Costa and McCrae, 1992). Therefore, it is usually associated with anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (Costa <i>et al.</i> , 1995).
Agreeableness	It is the primary dimension of interpersonal behavior such as the tendency to act cooperatively and unselfishly (Costa and McCrae, 1992). Hence, it is associated with trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness (Costa <i>et al.</i> , 1995).
Extraversion	It is the general tendency to experience positive emotions such as joy and pleasure, as well as certain traits such as being sociable, lively, and active (Costa and McCrae, 1992). Therefore, it is associated with cheerfulness, warmth, gregariousness, assertiveness, activity, and excitement seeking (Costa <i>et al.</i> , 1995).

Source: Costa and McCrae (1992) and Costa *et al.* (1995)

Although household finance has been considered an emergent field of research (Guiso *et al.*, 2002), there is a lack of studies on the relationship between personality traits and household

finance. Given the importance of household decisions in the modern economy, it is essential to know how they formulate their decisions. Previous studies show that personality traits can be a significant predictor of economic behavior (Nyhus and Webley, 2001; Almlund *et al.*, 2011). Most of the literature investigated the influence of personality traits on different financial dimensions such as saving and borrowing behaviors (Nyhus and Webley, 2001), money management (Donnelly *et al.*, 2012), the holding of unsecured debts and assets (Brown and Taylor, 2014), and financial behaviors in the asset market (Oehler *et al.*, 2018). One study examined the influence of personality traits on the likelihood of being in a state of financial distress but was limited to the young adults (24-34 years old) in the United States (Xu *et al.*, 2015).

1.7.2 National Culture and Household Finance

The research on culture has been considered in the field of financial economics recently, but it is limited to the country-attributes or individual countries without examining the household characteristics (Díez-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.* (2015) indicated that culture includes many dimensions such as language, education, ethnic background, and religion.

Previous studies show that national culture dimensions are significant determinants of the dimensions of household finance, on the level of country-attributes such as Gaganis *et al.* (2020) or individual countries such as Gogolin *et al.* (2017), without examining the household characteristics. In this thesis, we use the Hofstede (2011) model of national culture which includes six dimensions as follows (Power Distance Index, Individualism versus Collectivism, Masculinity versus Femininity, Uncertainty Avoidance Index, Long Term Orientation versus Short Term Orientation, and Indulgence versus Restraint). Table 1.2 presents the definitions of national cultures.

Table 1.2: Definitions of National Cultures

Dimensions of National Culture	Definition
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).
Individualism versus Collectivism	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 <i>et al.</i> , 2005).
Masculinity versus Femininity	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.
Uncertainty Avoidance Index	Expresses the degree to which the members of a society feel uncomfortable with unknown situations and ambiguity (Hofstede <i>et al.</i> , 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 <i>et al.</i> , 2005).
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.
Indulgence versus Restraint	Relates to the gratification versus control of basic human desires related to enjoying life (Hofstede, 2011). Indulged 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.

Source: Hofstede *et al.* (2005), Hofstede (2011), and Hofstede Insights (2021).

1.7.3 Religion and Household Finance

In the past few years, studies have shown that religion plays a significant role in individual financial decisions. Recent research has explained the vital role of religion on the macro-level (Renneboog and Spaenjers, 2012). At the same time, the research paid less attention to exploring the influence of religion on the micro-level, that is, on individuals or households (Renneboog and Spaenjers, 2012). The relationship between religious beliefs and an individual's prospect of borrowing appears ambiguous (Chunping *et al.*, 2016). However, religious beliefs could impact the decision to borrow money by exerting an effect on these individuals and their families' tolerance and time preference (Chunping *et al.*, 2016).

Moreover, believers of a particular religion are more likely to be patient than other believers and resist the temptation of short-term benefits. Therefore, they may take a longer perspective when making economic decisions (Chunping *et al.*, 2016). Social science has long been interested in the determinants of the financial well-being of individuals. However, previous studies found a substantial cross-sectional variation, not described by demographic or economic variables (Xu *et al.*, 2015). Hence, it is crucial to determine the source of individual variation in financial behavior and the outcomes to improve financial well-being.

Previous studies show that religion is a significant determinant of the dimensions of household finance, on the level of countries such as the United States (Green and Elliott 2010; Jang and Johnson 2004) and China (Chunping *et al.*, 2016).

In this thesis, we use three denominations of the Christian religion from the World Factbook (2020): Catholicism, Protestantism, and Orthodoxy. Also, we use the index of religious observance from Pew Research Center (2018) proxied by the average of the four individual measures - the importance of religion, worship attendance, frequency of prayer, and belief in God.

1.8 Structure of the Thesis

This thesis is structured as follows. Chapter Two presents the study titled "The Effect of Personality Traits on Household Finance: Evidence from Europe". The first section introduces the chapter. The second section presents and discusses the related literature

review and hypotheses development on personality traits and households' financial dimensions. The third section describes the data and methodology. Section four reports and discusses the empirical results. Section five presents the discussions and Section six concludes the chapter.

Chapter Three presents the study " Do National Cultures Impact Mortgage and Financial Well-Being Levels? Evidence from Europe". The first section introduces the chapter. The second section presents and discusses the related literature review and hypotheses development on national culture and households' financial dimensions. The third section describes the data and methodology. Section four reports and discusses the empirical results. Section five presents the discussions and Section six concludes the chapter.

Chapter Four presents the study titled "Does Religion Influence the Household Finance? Evidence from Europe". The first section introduces the chapter. The second section presents and discusses the related literature review and hypotheses development on religion and households' financial dimensions. The third section describes the data and methodology. Section four reports and discusses the empirical results. Section five presents the discussions and Section six concludes the chapter.

Chapter Five presents the general conclusions and recommendations for further research.

1.9 Comparison between the Three Chapters

Table 1.3 compares the three chapters explaining their purpose, data sources, method of estimation, main empirical findings, main research contributions, and policy implications.

Table 1.3: Comparison between the three chapters

	Chapter 2 “The Effect of Personality Traits on Household Finance: Evidence from Europe”	Chapter 3 ”Do National Cultures Impact Mortgage and Financial Well-Being Levels? Evidence from Europe”	Chapter 4 “Does Religion Influence the Household Finance? Evidence from Europe”
Purpose	This chapter examines the impact of personality traits on the likelihood of holding a mortgage and the likelihood of being in a state of financial distress and financial well-being in the 31 European countries in 2013.	This chapter explores the influence of national culture on the likelihood of holding a mortgage and the likelihood of being in a state of financial well-being in the 31 European countries between 2004 and 2018.	This chapter investigates the effect of religious backgrounds and religiosity on the likelihood of holding a mortgage and the likelihood of being in a state of financial distress and financial well-being in the 32 European countries between 2004 and 2018.
Data Sources	EU-SILC dataset.	EU-SILC dataset, Hofstede Insights (2021), World Bank (2021a), World Bank (2021b), World Bank (2021c), Hypostat (2021), OECD (2021), Transparency International (2021), and Cerutti <i>et al.</i> (2017).	EU-SILC dataset, the World Factbook (2020), and the Pew Research Center (2018).
Method of Estimation	Logit models and Generalized linear models with Gaussian distribution.	Logit models, Random effects models, and GMM models.	Logit models, and GMM models.
Main Empirical Findings	Suggest that the levels of neuroticism and extraversion are negatively associated with the likelihood of holding a mortgage; and that the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with the likelihood of being in a state of financial distress.	Suggest that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with the likelihood of holding a mortgage; the levels of masculinity, uncertainty avoidance, long-term orientation, and indulgence are negatively associated with the amount of mortgage, and the levels of individualism and long-term orientation (power distance and uncertainty avoidance) are positively (negatively) associated with the likelihood of being in a state of financial well-being.	Suggest that belonging to a mainly Catholic or Orthodox (Protestant) country is negatively (positively) associated with the likelihood of holding a mortgage; belonging to a Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress, and the levels of religiosity observed in a country are negatively associated with the likelihood of holding a mortgage and the likelihood of being in a state of financial distress.
Main Research Contributions	To the best of our knowledge, no other study has addressed the relationship between personality traits and the three dimensions of household finance in the European setting. Also, this is the first research that uses the EU-SILC dataset in this context.	To the best of our knowledge, there are no earlier studies that explored the effects of national cultures on the decision of holding a mortgage and the likelihood of being in a state of financial well-being in the European setting using samples from different countries and examining household characteristics. Moreover, this is the first research that uses the EU-SILC dataset in this context.	To the best of our knowledge, no study has addressed the relationship between religion and dimensions of household finance in the European setting, that is, using samples from different countries and controlling household characteristics. Additionally, this is the first research that uses the EU-SILC dataset in this context.
Policy Implications	Issue public programs that can enhance the welfare of households. Also, raise household awareness about financial literacy, and deal with their financial issues through organizing workshops and publishing information on social media.	Offering more promotions and facilitating 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.	Offering different strategies and facilitating procedures to encourage Catholics and Orthodox to hold more mortgages and improve the welfare of the households.

Source: own elaboration

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Chapter Two

The Effect of Personality Traits on Household Finance: Evidence from Europe

2 The Effect of Personality Traits on Household Finance: Evidence from Europe

Abstract

A large theoretical literature has evolved to explain the process of financial decision-making among households. This topic is important because households have to make financial decisions to carry out their life projects and avoid getting into financial trouble. This chapter examines the impact of personality traits of individuals on dimensions of household finance at the household level in the European context. We employ logistic regressions analysis using the European Union Statistics on Income and Living Conditions (EU-SILC) dataset from Eurostat to provide a better understanding of the determinants of the decision to hold secured debts and the likelihood of being in the state of financial distress and financial well-being. To the best of our knowledge, this is the first study that uses these data in this context, and no study has addressed the relationship between personality traits and dimensions of household finance in 31 European countries. The choice of this geography is motivated by its cultural diversity according to Hofstede's cultural dimensions. Moreover, the European Union is such a large economic space in the global context that knowing more about the household financial dimensions that take place here is important in itself. Our findings suggest that the levels of neuroticism and extraversion are negatively associated with the likelihood of holding a mortgage; and that the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with the likelihood of being in a state of financial distress. This chapter offers inferences for policymakers to issue public policies that can enhance the welfare of households and raises the awareness of households to deal with financial issues.

Keywords - Household Finance, Personality, Secured debts, Financial distress, Financial well-being, Europe.

JEL Classification: G40, G50, G51.

2.1 Introduction

Over the last two decades, many researchers have argued that personality is a motivator for human behavior (Davidson *et al.*, 2003; Durand *et al.*, 2008). Larsen and Buss (2009) defined personality as “the set of psychological traits and mechanisms within the individual that are organized and relatively enduring, and that influence his or her interactions with, and adaptations to the environments (including the intrapsychic, physical, and social environments)” (p. 4). Moreover, the analysis of individual personality started appearing in social psychology research and then migrated to behavioral finance research (Oehler *et al.*, 2018).

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 in financial well-being that is not captured by demographic or economic variables (Xu *et al.*, 2015). 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).

Household finance is important because agents have to make their decision regarding their savings and financing. Campbell (2006) considered household finance to be a new field in financial economics that may explain the practices of family units when they use financial instruments and markets to complete their goals and aspirations in life.

Although household finance has been considered an emergent field of research (Guiso *et al.*, 2002), there is a lack of studies on the relationship between personality traits and household finance. Given the importance of household decisions in the modern economy, it is essential to know how they formulate their decisions. There are two prominent studies that investigated this relationship. First, Brown and Taylor (2014) examined the influence of personality on the financial decisions that focused on unsecured debt and financial assets in the United Kingdom. They found that the level of extraversion (conscientiousness) is positively (negatively) associated with the probability of holding credit card debt. Second, Xu *et al.* (2015) addressed the relationship between personality traits and financial distress for young adults (24-34 years old) in the United States. They found that the level of

neuroticism (conscientiousness) is positively (negatively) correlated with the likelihood of being in a state of financial distress.

To the best of our knowledge, no other study has addressed the relationship between the personality traits and the three dimensions of household finance concerning: 1) the decision to hold secured debts, 2) the likelihood of being in the state of financial distress, and 3) the likelihood of being in the state of financial well-being. This chapter fills the gap in the literature by investigating the impact of personality on the three dimensions of household finance in 31 European countries using the EU-SILC dataset from Eurostat. To the best of our knowledge, this is the first study that uses these data in this context. The choice of this geography is motivated by its cultural diversity according to Hofstede (2011)'s cultural dimensions. Moreover, the European Union is such a large economic space in the global context that knowing more about the household financial dimensions that take place here is important in itself. The economic importance of household finance in Europe cannot be understated. For example, the total amount of the mortgages owned by households in the Euro area reached at 2020 the staggering figure of 55.49 trillion euros (Euro Area Statistics, 2022). In comparison, the household mortgages in 2020 in the United States are 16.78 trillion U.S. dollars (Statista, 2021).

This chapter finds that the levels of neuroticism and extraversion are negatively associated with the likelihood of holding a mortgage. The level of extraversion (agreeableness) is negatively (positively) associated with the amount of mortgage. Furthermore, we discover that the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with the likelihood of being in a state of financial distress. On the other hand, the neurotic and extraverted (agreeable) individuals are less (more) likely to be in a state of financial well-being.

This chapter is structured as follows. Section two presents the related literature and develops the hypotheses to be tested. Section three describes the data and methodology. Section four reports the empirical results. Section five presents the discussions and Section six concludes the chapter.

2.2 Literature Review and Hypotheses Development

2.2.1 Literature Review

The literature on behavioral finance includes certain factors like personality traits and demographic characteristics, which can affect the way individuals decide. Households tend to make hard decisions when facing uncertain conditions. According to the prospect theory, the deviation of real decision-making from perfect rationality is based on the psychological factors of individuals (Tversky and Kahneman, 1979).

Personality traits are defined as the set within the individual of those perceptual, cognitive, emotional, and motivational systems, which can affect the way people respond to their environment when making decisions (Stagner, 1948). There have been some efforts in the literature to measure personality traits. For example, the framework of Myer-Briggs (MBTI) divides personality types into four fields: 1) judging versus perceiving, 2) sensing versus intuition, 3) thinking versus feeling, and 4) extrovert versus introvert. Carl Jung established the MBTI in 1921 as an indicator that assumes personality as a preference rather than a personal characteristic when making decisions (Leary *et al.*, 2009).

Some researchers developed personality models based on the MBTI; for example, Cattell *et al.* (1970) established the 16 Personality Factors (16PF) model that includes five global factors and 16 primary traits. Additionally, Costa and McCrae (1992) developed the Big Five personality traits, which have been widely used to classify personality traits in the psychology literature and are being increasingly used in economics (Brown and Taylor, 2014). The Big Five personality traits include the traits of extraversion, openness, agreeableness, conscientiousness, and neuroticism.

Following significant academic attention for household finance, Campbell (2006) addressed it in his research. Nowadays, household finance has become a thriving, vibrant, self-standing field of research (Guiso and Sodini, 2013). Households use financial instruments in all stages of life, for instance, they use cash, checks, and credit cards when purchasing goods and services. They transfer their resources temporally to invest in durable goods and human capital, or to fund present and future consumption. They need liquidity to deal with the

different risks that are beyond their control concerning their health and properties. Therefore, households should have certain know-how regarding payment choices, debt financing, saving, and insurance contracts (Guiso and Sodini, 2013).

Some studies have examined the impact of personality traits and earning uncertainty on saving and borrowing behaviors. For example, Nyhus and Webley (2001) found, using a Dutch dataset, the levels of agreeableness and neuroticism are positively associated with the likelihood of holding a mortgage, while the level of extraversion is negatively associated with the amount of mortgage. Also, Guariglia (2003) showed that earning uncertainty has a robust effect on households' saving decisions, and explained that if families expect their financial situation to deteriorate, they will save extra money for times of distress. Some other studies examined the influence of personality on the types of unsecured debts and assets. For example, Brown and Taylor (2014) used the British Household Panel Survey (BHPS), and they found that the level of extraversion (conscientiousness) is positively (negatively) associated with the probability of holding credit card debt. Also, they found that the level of extraversion (openness to experience) is negatively (positively) related to the likelihood of holding shares. The findings of Nyhus and Webley (2001) and Brown and Taylor (2014) disagree with Donnelly *et al.* (2012)'s finding that suggests personality traits are a weak predictor of debts such as credit card debt.

Another body of the literature investigated the influence of personality traits on money management skills, financial decision-maker, and financial behaviors. For example, Donnelly *et al.* (2012) found that the level of neuroticism (conscientiousness) is negatively (positively) correlated with money management skills. Furthermore, Johnston *et al.* (2016) found a significant impact of personality traits on the financial decision-maker in the Australasian market. More recently, Oehler *et al.* (2018) showed a significant influence of the levels of extraversion and neuroticism on individuals' financial behaviors in the experimental asset market. For example, they found that extraverted individuals are more likely to pay higher prices for financial assets and buy more financial assets when assets are overpriced. Also, they found neurotic individuals are more likely to hold less risky assets in their financial portfolios.

Other research examined the effect of personality traits on the likelihood of being in a state of financial distress. For example, Donnellan *et al.* (2009) found that self-reports of low

neuroticism during adolescence predict less economic pressure in adulthood. This result is similar to Gillen and Kim (2014)'s that found neurotic and agreeable individuals are more likely to need financial assistance. The results of Donnellan *et al.* (2009) and Gillen and Kim (2014) are consistent with Xu *et al.* (2015) that found the levels of neuroticism and agreeableness are positively correlated with the likelihood of being in a state of financial distress. Also, Xu *et al.* (2015) found that the levels of conscientiousness and extraversion are negatively associated with the likelihood of being in a state of financial distress for the young adults in the United States.

On the other hand, other studies investigated the influence of personality traits on the likelihood of being in a state of financial and social well-being. For example, Hill *et al.* (2012) found that the levels of agreeableness and extraversion (neuroticism) are positively (negatively) correlated with the likelihood of being in a state of social well-being. On the contrary, Donnelly *et al.* (2012) claim that there is no relationship between personality traits and the likelihood of being in a state of financial well-being.

We control our results for the most important individuals' demographic characteristics. Some researchers examined the impact of these characteristics on financial aspects. For example, younger people are more likely to engage in riskier behavior (Barber and Odean, 2001; Dorn and Huberman, 2005) and there is evidence that males are more likely to invest in projects with a higher risk than females (Barber and Odean, 2001; Mayfield *et al.*, 2008). Similarly, some studies showed that females are less confident and hold less risk when making a decision (Fisher, 2010). Moreover, women exhibit less interest in financial subjects, and they tend to spend more than invest (Lai, 2010). Likewise, females are less likely to save money in the short-term (Fisher, 2010). Also, Brown and Taylor (2008) found that the poorest and the youngest households are the most vulnerable to adverse changes in their financial circumstances. Moreover, other studies discovered that married females are more likely to invest in risky assets than single females (Bertocchi *et al.*, 2014).

To conclude, previous studies show that personality traits can be a significant predictor of economic behavior (Nyhus and Webley, 2001; Almlund *et al.*, 2011). Most of the literature investigated the influence of personality traits on different financial dimensions such as saving and borrowing behaviors (Nyhus and Webley, 2001), money management (Donnelly *et al.*, 2012), unsecured debts and assets (Brown and Taylor, 2014), and financial behaviors

in the asset market (Oehler *et al.*, 2018). One study examined the influence of personality traits on the likelihood of being in a state of financial distress but was limited to the young adults (24-34 years old) in the United States (Xu *et al.*, 2015). All in all, there is a scarcity of studies on the relationship between personality traits and household finance. To the best of our knowledge, there are no earlier studies that explored the impact of personality traits on dimensions of household finance, pertaining to 1) the decision to hold secured debts, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being. Therefore, this chapter fills that gap by investigating the influence of personality traits on those three dimensions of household finance in the European context.

2.2.2 Hypotheses Development

Costa and McCrae (1992) developed the Big Five personality traits, and they suggested the measurement of each personality trait in terms of six specific facets per trait. This model includes five personality traits of extraversion, openness, agreeableness, conscientiousness, and neuroticism. Table 2.1 presents the definitions of the personality traits and the six facets defining each trait.

Table 2.1: Big Five personality traits

Big Five traits	Definition	Facet (and Correlated Trait Adjective)
Extraversion	It is the general tendency to experience positive emotions such as joy and pleasure, as well as certain traits such as being sociable, lively, and active.	Gregariousness (Sociable) Assertiveness (Forceful) Activity (Energetic) Excitement-seeking (Adventurous) Positive emotions (Enthusiastic) Warmth (Outgoing)
Agreeableness	It is the primary dimension of interpersonal behavior such as the tendency to act cooperatively and unselfishly.	Trust (Forgiving) Straightforwardness (Not demanding) Altruism (Warm) Compliance (Not stubborn) Modesty (Not show-off) Tender-mindedness (Sympathetic)
Conscientiousness	It is a dimension that contrasts scrupulous, well-organized, and diligent people with lax, disorganized, and lackadaisical individuals.	Competence (Efficient) Order (Organized) Dutifulness (Not careless) Achievement striving (Thorough) Self-discipline (Not lazy) Deliberation (Not impulsive)
Neuroticism	The individual tends to experience excessive worry, depression, anger, and psychological distress.	Anxiety (Tense) Angry hostility (Irritable) Depression (Not contented) Self-consciousness (Shy) Impulsiveness (Moody) Vulnerability (Not self-confident)
Openness	High-Openness individuals are imaginative and sensitive to art and beauty and have a rich and complex emotional life; they are intellectually curious, behaviorally flexible, and nondogmatic in their attitudes and values.	Ideas (Curious) Fantasy (Imaginative) Aesthetics (Artistic) Actions (Wide interests) Feelings (Excitable) Values (Unconventional)

Source: Costa *et al.* (1995) and Costa and McCrae (1992)

In this chapter, we just focus on three personality traits (neuroticism, agreeableness, and extraversion) from the Big Five personality traits due to a lack of data in EU-SILC for openness and conscientiousness. The scarcity of data limits the possibility to explore all the personality traits simultaneously. There are other authors that only analyzed some personality traits. For example, Oehler *et al.* (2018) focused their analysis just on the levels of extraversion and neuroticism.

There are some authors who established the relationship between some personality traits and the decision to hold different types of debt. For example, Nyhus and Webley (2001) found that levels of agreeableness and neuroticism were positively associated with the likelihood of holding a mortgage, while the level of extraversion was negatively associated with the amount of mortgage. Brown and Taylor (2014) found that the level of extraversion is positively associated with the probability of holding credit card debt. Most neurotic people are emotional when facing a financial challenge. Thus, it can diminish a neurotic's ability to think clearly, make decisions, and cope effectively with stress, hence that leads them to run the risk of taking irrational actions (Rizvi and Fatima, 2015). Therefore, we expect that neurotic individuals will be more likely to hold debt. On the other hand, extraverted people are more likely to experience positive emotions such as joy and pleasure (Costa and McCrae, 1992). They tend to avoid any distress. Thus, we predict that extraverted individuals will be less likely to hold debt. On the contrary, agreeable individuals tend to be influenced by others and can doubt their decisions (Erjavec *et al.*, 2019). Hence, we expect that agreeable individuals can follow their peers and be more likely to hold debt.

Based on Nyhus and Webley (2001), we hypothesize that the level of agreeableness and neuroticism (extraversion) will be positively (negatively) associated with the decision to hold secured debt. The three hypotheses we formulate regarding the decision to hold secured debt are the following:

Hypothesis 1: There is a positive relationship between the level of the agreeableness of the individual and the likelihood of his household to hold debt.

Hypothesis 2: There is a positive relationship between the level of the neuroticism of the individual and the likelihood of his household to hold debt.

Hypothesis 3: There is a negative relationship between the level of extraversion of the individual and the likelihood of his household to hold debt.

There are some authors who investigated the relationship between some personality traits and the likelihood of being in a state of financial distress. For example, Donnellan *et al.*

(2009) found that self-reports of low neuroticism during adolescence predict less economic pressure in adulthood. This finding is constant with Gillen and Kim (2014) that found the levels of neuroticism and agreeableness are positively correlated with the need for financial assistance. The results of Donnellan *et al.* (2009) and Gillen and Kim (2014) are similar to Xu *et al.* (2015) that found the levels of neuroticism and agreeableness are positively associated with the likelihood of being in a state of financial distress. Donnelly *et al.* (2012) found the level of neuroticism is negatively correlated with money management skills. Also, Xu *et al.* (2015) found that levels of conscientiousness and extraversion are negatively associated with the likelihood of being in a state of financial distress in young adults in the United States. However, extraverted people tend to seek instant gratification, which means they spend more and save less because they are less sensitive to the potential risks of future financial shocks (Hirsh, 2015). Therefore, we expect that it can increase the likelihood of extraverted individuals being in a state of financial distress. On the other hand, neurotic people are more likely to experience excessive worry and they live in psychological distress (Costa and McCrae, 1992). Hence, we predict that it can increase the likelihood of neurotic individuals being in a state of financial distress. Moreover, agreeable individuals tend to have less confidence in their decisions as they might become indecisive in decisions (Erjavec *et al.*, 2019). Thus, we expect that it can increase the likelihood of agreeable individuals being in a state of financial distress.

Based on Gillen and Kim (2014) and Xu *et al.* (2015), we hypothesize that the levels of neuroticism and agreeableness will be positively associated with the likelihood of being in a state of financial distress. Also, based on Hirsh (2015), we conjecture that the level of extraversion will be positively associated with the likelihood of being in a state of financial distress. The three hypotheses we formulate regarding the likelihood of being in a state of financial distress are the following:

Hypothesis 4: There is a positive relationship between the level of the agreeableness of the individual and the likelihood of his household being in a state of financial distress.

Hypothesis 5: There is a positive relationship between the level of the neuroticism of the individual and the likelihood of his household being in a state of financial distress.

Hypothesis 6: There is a positive relationship between the level of extraversion of the individual and the likelihood of his household being in a state of financial distress.

There are also some authors who examined the relationship between some personality traits and the likelihood of being in a state of financial or social well-being. For example, Hill *et al.* (2012) found that the levels of agreeableness and extraversion (neuroticism) are positively (negatively) correlated with the likelihood of being in a state of social well-being. On the contrary, Donnelly *et al.* (2012) claim that there is no association between personality traits and the likelihood of being in a state of financial well-being. However, neurotic people are more likely to experience excessive anger, and they live in psychological distress (Costa and McCrae, 1992). Therefore, we expect that it can decrease the likelihood of neurotic individuals being in a state of financial well-being. On the other hand, extraverted people tend to seek instant gratification, which means they spend more and save less because they are less sensitive to the potential risks of future financial shocks (Hirsh, 2015). So, we expect that it can decrease the likelihood of extraverted individuals being in a state of financial well-being. Furthermore, agreeable individuals tend to have less confidence in their decisions as they might become indecisive in decisions (Erjavec *et al.*, 2019). Thus, we expect that it can decrease the likelihood of agreeable individuals being in a state of financial well-being. Following this exploratory reasoning, we hypothesize that the levels of neuroticism, agreeableness, and extraversion will be negatively associated with the likelihood of being in a state of financial well-being. Therefore, the three hypotheses we formulate regarding the likelihood of being in a state of financial well-being are the following:

Hypothesis 7: There is a negative relationship between the level of the agreeableness of the individual and the likelihood of his household being in a state of financial well-being.

Hypothesis 8: There is a negative relationship between the level of the neuroticism of the individual and the likelihood of his household being in a state of financial well-being.

Hypothesis 9: There is a negative relationship between the level of extraversion of the individual and the likelihood of his household being in a state of financial well-being.

Following the existing literature such as Donnelly *et al.* (2012), Brown and Taylor (2014), and Xu *et al.* (2015), we control our results for some individual's demographic characteristics which include gender, age, income, health, education, marital status, activity status, tenure status, and the countries. Also, we include the squared age in order to account for the non-linear effects of individuals' personalities in their life based on Oehler and Horn (2020).

2.3 Data and Methodology

2.3.1 Data

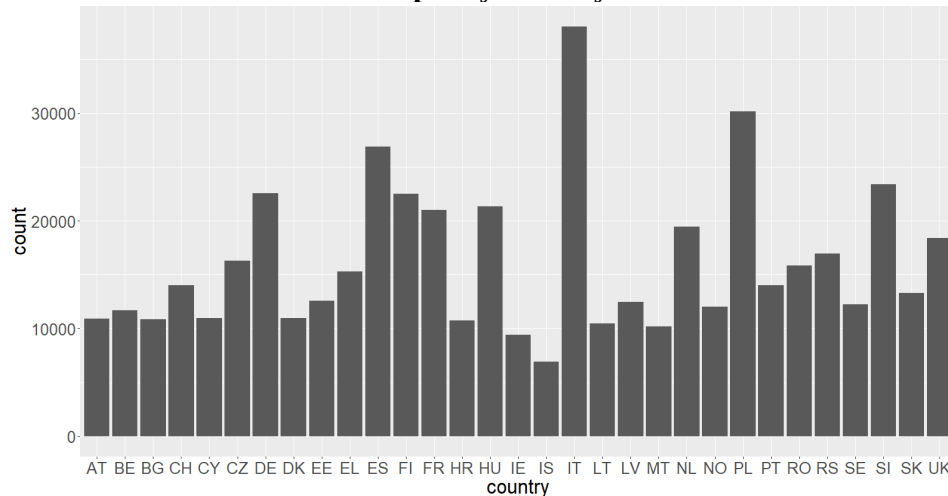
To examine the relationship between personality traits and the dimensions of household finance, we used data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, from the Eurostat Database (See Appendix 2.1 Supplementary data).

EU-SILC is an instrument aiming at collecting timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion, and living conditions that cover objective and subjective aspects of these themes in both monetary and non-monetary terms for both households and individuals. In addition, the data provide some variables about personality traits in 2013. These data are extracted from registers or collected from interviews by five modes of data collection are possible: 1 - Pen-and-paper personal interviewing (PAPI). 2 - Computer-assisted personal interviewing (CAPI). 3 - Computer-assisted telephone interviewing (CATI). 4 - Self-administered by respondent. 5 - Proxy interview.

The data cover the personality traits of the individuals, individuals' demographic characteristics, and the dimensions of household finance at the household level. The household respondent for the dimensions of household finance is choosing according to the following priorities: 1) the person responsible for the accommodation. 2) a household member aged 16 and over who is the best place to give this information.

The individuals aged 16 and above in 2013 for 31 European countries including 26 member countries of the European Union (EU) and five other European countries². The number of observations of the individuals and households in our sample is 502,017. Figure 2.1 presents the number of observations of the individuals and households for each country in our sample.

Figure 2.1: Distribution of the observations of the individuals and households in the sample by country



Source: own elaboration.

As shown in Figure 2.1, the lowest number of observations in our sample corresponds to Iceland and Ireland, with 6,943 observations and 9,442 observations, respectively. The highest number of observations belongs to Poland and Italy, with 30,162 observations and 38,039 observations, respectively. The average number of observations for our sample is 16,194 among the 31 countries.

This chapter investigates the individual's personality traits based on the Big Five personality traits (Costa *et al.*, 1995). Due to the lack of data in EU-SILC for openness and conscientiousness personality traits, we just examine neuroticism, agreeableness, and extraversion as main independent variables.

Regarding personality traits, it is worthy to mention that neuroticism is measured in a scale based on Nyhus and Webley (2001), Brown and Taylor (2014), and Gillen and Kim (2014).

² The 26 member countries of the EU are the following: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Greece, Croatia, Spain, France, Ireland, Italy, Cyprus, Latvia, Lithuania, Hungary, Malta, Netherlands, Slovakia, Poland, Portugal, Romania, Slovenia, Finland, and Sweden; and the other five European countries considered are Iceland, Norway, Serbia, Switzerland, and the United Kingdom.

This scale consists of the average for the following indicators: how much time in which individual felt: i) nervous; ii) down in the dumps; iii) downhearted, and iv) calm and peaceful (reversed) over the past four weeks. This scale is a five-point start from never, takes the value of 1, to all the time, takes the value of 5.

We measured agreeableness in a scale based on Costa *et al.* (1995), which consists of to what extent does an individual trusts other people. This scale starts from 0 to 10, where 0 means that the individual does not trust anyone, and 10 which means that the individual feels that most people can be trusted.

Extraversion is measured in a scale based on Costa and McCrae (1992). This scale captures how much time in which individuals felt happy over the past four weeks. This scale is a five-point start from never, takes the value of 1, to all the time, takes the value of 5.

Given the availability of EU-SILC data regarding the three dimensions of household finance concerning: 1) the decision to hold secured debts, 2) the likelihood of being in the state of financial distress, and 3) the likelihood of being in the state of financial well-being, we consider these three-dimensions as our dependent variables. The measurements of these variables are shown in Table 2.2.

Table 2.2: Measurement of the dimensions of household finance

Dimensions of household finance	Measurement	References
1- The decision to hold secured debt	This decision will be captured by the following two variables that will be used as dependent variables in two separate regressions: 1 - Holding a mortgage that is calculated from the tenure status variable measured as a binary variable which takes the value of 1 if the household is holding a mortgage, otherwise, the value is 0. 2 - The log of the total mortgage ³ calculated as the logarithm of mortgage principal repayment plus interest mortgage of the households in Euro currency.	Brown <i>et al.</i> (2008, 2013), and Brown and Taylor (2014).
2- The likelihood of being in a state of financial distress	This dimension will be captured by the following five variables that will be used as dependent variables in five separate regressions: 1 - Arrears on a mortgage or rental payments. 2 - Arrears on hire purchase installments or other loan payments ⁴ . 3 - Arrears on bills. These three arrears variables are measured by asking the households that in the last twelve months have been in arrears and unable to pay on time due to financial difficulties. Ordinal variables take the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. 4 - The financial burden of the repayment of debts from hire purchases or loans. 5 - The financial burden of the total housing cost. These two financial burden variables are measured by asking the households to what extent is the repayment of such loans and total housing costs a financial burden. Ordinal variables take the values as follows: 1 - Not a burden at all, 2 - A slight burden, 3 - A heavy burden.	Xu <i>et al.</i> , (2015), and Xu <i>et al.</i> , (2017).
3- The likelihood of being in a state of financial well-being	This dimension will be captured by the following three variables that will be used as dependent variables in three separate regressions: 1 - The ability to make ends meet is measured by asking the households if their total income is able to make ends meet, namely, to pay for its usual necessary expenses. The ordinal variable takes the values as follows: 1 - with great difficulty, 2 - with difficulty, 3 - with some difficulty, 4 - fairly easily, 5 - easily, 6 - very easily. 2 - The capacity to face unexpected financial expenses. 3 - The capacity to afford to pay for a one-week annual holiday away from home. These two capacity variables are measured by asking the households if they can afford an unexpected financial expense and to go for a week's annual holiday. Binary variables take the value of 1 if the answer is yes, otherwise 0 if it is no.	Garðarsdóttir and Dittmar (2012), and Philippas and Avdoulas (2020).

(See Appendix 2.2 Definitions of variables). Source: own elaboration.

³ To deal with the zero values of total mortgage, following the standard approach in the existing literature (Brown and Taylor, 2014), we add one to each series. Also, all the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate of 2013.

⁴ "Other loans" include all type of commercial credits, for instance for decoration, maintenance, refurbishment, credit cards/ store cards, catalog mail order, loans of any kind of for technical equipment (i.e. cars, motorcycles), housing equipment, education loans, holidays (holiday packages plus time-sharing holidays).

We control our results for the most important individuals' demographic characteristics which are the following:

- Age (Continuous variable).
- Squared age.
- Gender (Binary variable that is measured in the following categories: 0 - Female, 1- Male).
- Marital status (Nominal variable that is measured in five categories: 1 - Separated, 2 - Widowed, 3 - Divorced, 4 - Never married, 5 - Married).
- The level of education (Ordinal variable that is measured in six categories: 0 - Pre-primary, 1 - Primary, 2 - Lower secondary, 3 - Upper secondary, 4 - Post-secondary non-tertiary, 5- First stage of the tertiary education).
- Basic activity status (Nominal variable that is measured in four categories: 1 - Inactive persons, 2 - At work, 3 - Unemployed, 4 - In retirement).
- Total household income⁵ (Continuous variable that is measured in Euro currency).
- General health (Ordinal variable is measured in five categories: 1 - Very bad, 2 - Bad, 3 - Fair, 4 - Good, 5 - Very good).
- Tenure status (Nominal variable that is measured in five categories: 1 - Rented at a reduced rate, 2 - Rented at a market rate, 3 - Provided free, 4 - The owner is outright, 5 - Paying a mortgage).
- The countries (Nominal variable that is measured in 31 categories).

Summary statistics for the dependent, independent, and control variables are shown in Table 2.3.

⁵ All the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate in 2013.

Table 2.3: Summary statistics

Variable	Mean	Median	S.D.	Min.	Max.	Skewness	Kurtosis
Dependent Variables							
Holding mortgage	0.25	0.00	0.43	0.00	1.00	1.16	-0.67
Log of total mortgage	5.39	6.39	2.99	0.00	11.34	-0.58	-1.09
Arrears on hire purchase installments or other loan payments	1.20	0.00	0.57	1.00	3.00	2.68	5.46
Arrears on a mortgage or rental payments	1.13	1.00	0.46	1.00	3.00	3.55	11.16
Arrears on bills	1.20	1.00	0.58	1.00	3.00	2.62	5.14
Burden of total housing cost	2.20	2.00	0.72	1.00	3.00	-0.31	-1.03
Burden of repayment debts	2.10	2.00	0.76	1.00	3.00	-0.17	-1.25
Capacity afford to pay for a one-week annual holiday	0.59	1.00	0.49	0.00	1.00	-0.37	-1.86
Capacity to face financial expenses	0.61	1.00	0.49	0.00	1.00	-0.45	-1.80
Ability to make ends meet	3.15	3.00	1.37	1.00	6.00	0.16	-0.67
Independent Variables							
Neuroticism	2.22	2.00	0.82	1.00	5.00	0.76	0.27
Agreeableness	4.21	5.00	3.26	0.00	10.00	-0.11	-1.39
Extraversion	2.63	2.00	1.32	1.00	5.00	2.42	9.19
Control Variables							
Age	56.50	57.00	18.31	23.00	88.00	-0.03	-1.03
Squared Age	3,527.75	3,249.00	2,084.75	529.00	7,744.00	0.43	-0.85
Education	3.08	3.00	1.27	0.00	5.00	0.15	-0.73
Health	3.70	4.00	0.98	1.00	5.00	-0.58	-0.06
Total household income	0.00	-0.30	1.00	-3.19	54.67	6.62	168.54

Note: Data is cross-sectional in 2013 at individuals' and households' level from EU-SILC's dataset. We standardized total household income using Z-score standardization. Log of total mortgage and total household income are expressed in Euro currency. Age is expressed in the number of years. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

As shown in Table 2.3, the individuals in our sample are between 23-88 years old, and the average age of the individuals is 56.50 years. There are 25 % of the households in our sample holding mortgages, and 59% of the households can afford to pay for a one-week annual holiday.

Table 2.4 presents the frequency distribution of nominal control variables as follows: gender, marital status, activity status, and tenure status.

Table 2.4: Frequency distribution of nominal control variables

Variable		No. observations	Percent	Cumulative Percent
Gender	Female	262,904	52.4%	52.4%
	Male	239,106	47.6%	100.0%
	Total	502,010	100.0%	
Marital status	Separated	5,814	1.2%	1.2%
	Widowed	41,951	8.4%	9.6%
	Divorced	31,257	6.3%	15.8%
	Never married	144,240	28.9%	44.7%
	Married	275,777	55.3%	100.0%
	Total	499,039	100.0%	
Activity status	Inactive	93,231	18.6%	18.6%
	Working	240,510	48.0%	66.6%
	Unemployed	37,919	7.6%	74.2%
	Retirement	129,218	25.8%	100.0%
	Total	500,878	100.0%	
Tenure status	Rented a at reduced rate	20,276	4.0%	4.0%
	Rented at a market rate	60,450	12.1%	16.1%
	Provided free	23,099	4.6%	20.7%
	Owner is outright	271,751	54.2%	75.0%
	Paying a mortgage	125,359	25.0%	100.0%
	Total	500,935	100.0%	

(See Appendix 2.2 Definitions of variables). Source: own elaboration.

As shown in Table 2.4, 52.4% of the individuals in our sample are females. Moreover, married people represent 55.3% of our sample and almost half of the individuals in the sample were working people.

2.3.2 Methodology

We employ a logistic regression approach (Logit models) for the dependent variables that are binary as follows: i) holding the mortgage, ii) pay a one-week holiday, and iii) facing unexpected financial expenses. On the other hand, we used the ordered logistic regression for each one of the dependent variables that are ordinal ones as follows: i) arrears on hire

purchase installments or other loan payments, ii) arrears on mortgage or rental payments, iii) arrears on bills, iv) ability to make ends meet, v) the burden of total housing cost, and vi) the burden of repaying debts. Also, we used generalized linear models with Gaussian distribution for the log of the total mortgage. To avoid the multicollinearity issues, we introduce the personality traits in the regressions one by one. We employ the baseline regression, where we control for age, squared age, gender, and country. Also, we employ additional estimates while controlling for other individuals' demographic characteristics. The following three main regressions are used to test the research hypotheses:

$$\text{logit}(p) = \beta_0 + \beta_1 \text{Neuroticism} + \beta_2 \text{Agreeableness} + \beta_3 \text{Extraversion} + \beta_4 \text{Age} + \beta_5 \text{Gender} + \beta_6 \text{Squared Age} + \beta_7 \text{Marital status} + \beta_8 \text{Education level} + \beta_9 \text{Activity status} + \beta_{10} \text{Income} + \beta_{11} \text{Health} + \beta_{12} \text{Country} \dots (2.1)^6$$

where $p = P(\text{Holding secured debt} = 1)$.

As displayed in Table 2.2., the decision to hold secured debt is captured by two different dependent variables: i) holding the mortgage (binary variable) and, ii) log of the total mortgage (continuous variable).

$$\text{logit}(p) = \beta_0 + \beta_1 \text{Neuroticism} + \beta_2 \text{Agreeableness} + \beta_3 \text{Extraversion} + \beta_4 \text{Age} + \beta_5 \text{Gender} + \beta_6 \text{Squared Age} + \beta_7 \text{Marital status} + \beta_8 \text{Education level} + \beta_9 \text{Activity status} + \beta_{10} \text{Income} + \beta_{11} \text{Health} + \beta_{12} \text{Tenure status} + \beta_{13} \text{Country} \dots (2.2)$$

where $p = P(\text{The likelihood of being in a state of financial distress} = 1)$.

As shown in Table 2.2., the likelihood of being in a state of financial distress is captured by five different dependent variables (ordinal variables): i) arrears on mortgage or rental payments, ii) arrears on hire purchase installments or other loan payments, iii) arrears on bills, iv) the financial burden of debt repayment from hire purchases or loans, and v) the financial burden of the total housing cost.

⁶ We did not consider the tenure status variable in this equation to avoid the multicollinearity issues because the holding mortgage variable in equation (2.1) is calculated from the tenure status variable as mentioned in Table 2.2.

$$\text{logit}(p) = \beta_0 + \beta_1 \text{Neuroticism} + \beta_2 \text{Agreeableness} + \beta_3 \text{Extraversion} + \beta_4 \text{Age} + \beta_5 \text{Gender} + \beta_6 \text{Squared Age} + \beta_7 \text{Marital status} + \beta_8 \text{Education level} + \beta_9 \text{Activity status} + \beta_{10} \text{Income} + \beta_{11} \text{Health} + \beta_{12} \text{Tenure status} + \beta_{13} \text{Country} \dots$$

(2.3)

where $p = P(\text{The likelihood of being in a state of financial well-being} = 1)$.

As shown in Table 2.2., the likelihood of being in a state of financial well-being is measured by three variables: i) the ability to make ends meet (ordinal variable), ii) the capacity to face unexpected financial expenses (binary variable), and iii) the capacity to afford to pay a one-week annual holiday away from home

2.4 Empirical Results

2.4.1 The decision to hold secured debt

Table 2.5 presents the results of the baseline logistic regressions (logit models) for holding the mortgage and generalized linear models with Gaussian distribution for the log of the total mortgage, where we control for age, squared age, gender, and country.

Table 2.5: Personality and Mortgage: Baseline regression

		Dependent variables					
		Holding mortgage			Log of the total mortgage		
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	Neuroticism	-0.141*** (0.006)			-0.044*** (0.008)		
	Agreeableness		-0.002 (0.001)			0.003** (0.001)	
	Extraversion			-0.059*** (0.005)			-0.028*** (0.007)
	Gender[Male]	0.050*** (0.009)	0.058*** (0.008)	0.072*** (0.009)	0.048*** (0.011)	0.029*** (0.009)	0.053*** (0.011)
	Age	0.153*** (0.002)	0.133*** (0.001)	0.150*** (0.002)	0.056*** (0.002)	0.055*** (0.002)	0.056*** (0.002)
	Squared age	-0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
	(Intercept)	-3.774*** (0.056)	-3.532*** (0.044)	-3.877*** (0.056)	6.224*** (0.067)	6.158*** (0.050)	6.196*** (0.068)
	Country	Yes	Yes	Yes	Yes	Yes	Yes
	Num. Obs.	356,542	500,928	364,888	70,094	107,279	70,666
	AIC	293,694	422,216	297,876	248,980	383,884	251,312
	BIC	294,071	422,605	298,254	249,292	384,210	251,623
	Log.Lik.	-146,812	-211,073	-148,903	-124,456	-191,908	-125,622

Notes: This table reports the results of determinants of the decision to hold secured debt through two dependent variables: Holding mortgage, and Log of the total mortgage respectively on the personality traits, male, age, squared age, and country listed in the first column. We used logistic regressions (logit models) for holding the mortgage and generalized linear models (GLM) with Gaussian distribution for a log of the total mortgage. We used Robust Standard Errors with GLM regression to rectify the existence of heteroscedasticity. Standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

From the regressions (1 to 3) in Table 2.5, we found that the levels of two personality traits (neuroticism, and extraversion) are negatively associated with the likelihood of holding a mortgage (the results are statistically significant at 1% level). Furthermore, the results show that males and older individuals are more likely to hold a mortgage (the results are statistically significant at the 1% level).

In the regressions (4 to 6) in Table 2.5, we deduced the levels of two personality traits (neuroticism and extraversion) are negatively associated with the amount of mortgage (the results are statistically significant at the 1% level). The level of agreeableness is positively associated with the amount of mortgage and statistically significant at the 1% level. Also, the results show that males and older individuals are more likely to hold a mortgage of a higher amount. These findings corroborate Nyhus and Webley (2001) and go against Donnelly *et al.* (2012)'s claim that these personality traits are not a significant predictor of debts.

Considering the abovementioned results, we cannot reject our hypotheses (1) and (3) related to the impact of the extraversion and agreeableness on the decision to hold secured debt. On

the other hand, we are led to reject our hypothesis (2) since our results suggest that there is a negative impact of neuroticism on the decision to hold secured debt.

Table 2.6 presents the additional estimates for the determinants of the decision to hold secured debt while controlling for other individuals' demographic characteristics, namely income, health, education, marital status, and activity status.

Table 2.6: Personality and Mortgage: Controlling for demographic characteristics

		Dependent variables					
		Holding mortgage			Log of the total mortgage		
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	Neuroticism	-0.013* (0.007)			-0.003 (0.008)		
	Agreeableness		0.007*** (0.002)			0.006*** (0.002)	
	Extraversion			-0.023*** (0.005)			-0.021*** (0.007)
	Income	0.269*** (0.007)	0.250*** (0.006)	0.273*** (0.007)	0.110*** (0.006)	0.107*** (0.005)	0.109*** (0.006)
	Gender[Male]	0.051*** (0.010)	0.058*** (0.009)	0.052*** (0.010)	0.049*** (0.011)	0.031*** (0.010)	0.048*** (0.011)
	Age	0.051*** (0.003)	0.037*** (0.002)	0.050*** (0.003)	0.029*** (0.003)	0.026*** (0.003)	0.029*** (0.003)
	Squared age	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
	Health	0.086*** (0.007)	0.084*** (0.006)	0.087*** (0.006)	0.018** (0.008)	0.016** (0.007)	0.016** (0.007)
	Education	0.104*** (0.004)	0.096*** (0.004)	0.104*** (0.004)	0.074*** (0.005)	0.073*** (0.005)	0.075*** (0.005)
	Marital status[Widowed]	0.250*** (0.047)	0.320*** (0.045)	0.255*** (0.047)	0.270*** (0.061)	0.297*** (0.059)	0.267*** (0.061)
	Marital status[Divorced]	0.035 (0.044)	0.062 (0.042)	0.040 (0.043)	0.100* (0.053)	0.103** (0.052)	0.098* (0.053)
	Marital status[Never married]	-0.513*** (0.042)	-0.518*** (0.040)	-0.506*** (0.042)	0.003 (0.051)	0.001 (0.050)	0.001 (0.051)
	Marital status[Married]	0.410*** (0.041)	0.441*** (0.039)	0.416*** (0.040)	0.148*** (0.049)	0.154*** (0.048)	0.147*** (0.049)
	Activity status[At work]	0.315*** (0.015)	0.283*** (0.013)	0.316*** (0.015)	0.107*** (0.018)	0.104*** (0.017)	0.107*** (0.018)
	Activity status[Unemployed]	-0.122*** (0.022)	-0.170*** (0.020)	-0.127*** (0.022)	-0.057** (0.028)	-0.056** (0.026)	-0.053* (0.028)
	Activity status[Retirement]	0.049** (0.021)	-0.007 (0.020)	0.049** (0.021)	0.082*** (0.028)	0.075*** (0.027)	0.078*** (0.028)
	(Intercept)	-2.445*** (0.090)	-2.055*** (0.080)	-2.431*** (0.087)	6.231*** (0.107)	6.290*** (0.097)	6.274*** (0.104)
	Country	Yes	Yes	Yes	Yes	Yes	Yes
	Num.Obs.	347,433	406,705	355,443	69,074	79,749	69,620
	AIC	277,235	325,134	280,571	243,995	283,679	246,186
	BIC	277,719	325,625	281,056	244,398	284,088	246,589
	Log.Lik.	-138,572	-162,522	-140,240	-121,953	-141,795	-123,049

Notes: This table reports the results of determinants of the decision to hold secured debt through two variables: Holding mortgage, and Log of the total mortgage respectively on the personality traits, male, age, squared age, income, health, activity status, education, marital status, and country listed in the first column. We used logistic regressions (logit models) for holding the mortgage and generalized linear models (GLM) with Gaussian distribution for a log of the total mortgage. We used Robust Standard Errors with GLM Regression to rectify the existence of heteroscedasticity. Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

From the regressions (1 to 3) in Table 2.6, we can conclude that the levels of neuroticism and extraversion continue to be negatively associated with the likelihood of holding a mortgage after controlling the demographic characteristics. Also, we found strong evidence regarding the level of agreeableness is positively associated with the likelihood of holding mortgages and statistically significant at the 1% level.

The regressions (4 to 6) in Table 2.6 show that the level of agreeableness (extraversion) continues to be positively (negatively) associated with the amount of mortgage. However, the level of neuroticism is no longer statistically significant at the conventional significance levels.

Furthermore, the results reveal that males and older individuals with higher levels of income, education, and better health are more likely to hold a mortgage of a higher amount. Moreover, we found that married and widowed individuals are more likely to hold mortgages than those who never married. Also, individuals who are working or retired are more likely to hold a mortgage of a higher amount than unemployed individuals.

To conclude, we cannot reject our hypotheses (1) and (3) related to the effect of extraversion and agreeableness on the decision to hold secured debt. On the other hand, we continue to reject our hypothesis (2) since our results suggest that there is a negative impact of neuroticism on the decision to hold secured debt.

2.4.2 The likelihood of being in a state of financial distress

Table 2.7 presents the results of the baseline logistic regressions of the determinants of the likelihood of being in a state of financial distress, where we control for age, squared age, gender, and country. We used ordered logistic regressions for the following five dependent variables: 1) financial burden of the total housing cost, 2) the financial burden of the repayment of debts from hire purchases or loans, 3) arrears on bills, 4) arrears on hire purchase installments or other loan payments, and 5) arrears on mortgage or rental payments.

Table 2.7: Personality and Financial Distress: Baseline regression

		Dependent variables														
		Burden THC			Burden repayment debts			Arrears bills			Arrears HPI/LP			Arrears M/RP		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Independent variables	Neuroticism	0.554*** (0.005)			0.576*** (0.009)			0.641*** (0.007)			0.636*** (0.012)			0.686*** (0.012)		
	Agreeableness		-0.042*** (0.001)			-0.042*** (0.002)			-0.051*** (0.002)			-0.052*** (0.003)			-0.056*** (0.003)	
	Extraversion			0.088*** (0.003)			0.110*** (0.007)			0.046*** (0.004)			0.060*** (0.009)			0.062*** (0.009)
	Gender[Male]	-0.073*** (0.007)	-0.117*** (0.006)	-0.146*** (0.007)	-0.035*** (0.013)	-0.078*** (0.011)	-0.117*** (0.013)	-0.011 (0.011)	-0.053*** (0.009)	-0.066*** (0.011)	0.046** (0.021)	-0.028 (0.017)	-0.015 (0.020)	0.064*** (0.021)	-0.037** (0.017)	-0.033* (0.020)
	Age	-0.207*** (0.023)	-0.036*** (0.018)	-0.042* (0.022)	0.066 (0.050)	0.216*** (0.037)	0.271*** (0.049)	0.223*** (0.038)	0.478*** (0.030)	0.523*** (0.037)	0.011 (0.076)	0.388*** (0.060)	0.375*** (0.074)	0.167** (0.077)	0.420*** (0.060)	0.463*** (0.075)
	Squared Age	0.016 (0.022)	-0.126*** (0.018)	-0.125*** (0.022)	-0.244*** (0.052)	-0.350*** (0.040)	-0.423*** (0.051)	-0.702*** (0.038)	-0.860*** (0.031)	-0.936*** (0.037)	-0.338*** (0.082)	-0.623*** (0.065)	-0.637*** (0.079)	-0.596*** (0.084)	-0.757*** (0.067)	-0.822*** (0.081)
	Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Num. Obs.	356,200	499,954	364,489	89,106	133,093	90,466	354,007	497,164	362,249	100,461	149,155	102,111	148,991	216,511	151,361
	AIC	622,971	890,067	652,256	159,705	244,667	166,356	266,165	383,390	283,209	76,378	111,813	80,759	84,359	122,945	89,241
	BIC	623,359	890,467	652,645	160,043	245,019	166,695	266,553	383,790	283,597	76,721	112,170	81,102	84,716	123,315	89,599
	Log.Lik.	-311,449	-444,997	-326,092	-79,816	-122,297	-83,142	-133,046	-191,659	-141,568	-38,153	-55,870	-40,343	-42,143	-61,436	-44,584

Notes: This table reports the results of ordered logistic regression for the likelihood of being in a state of financial distress through five variables: financial burden of the total housing cost, the financial burden of the repayment of debts from hire purchases or loans, arrears on bills, arrears on mortgage or rental payments, and arrears on hire purchase installments or other loan payments respectively on the personality traits, male, age, squared age, and country listed in the first column. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

From the regressions (1 to 15) in Table 2.7, we found the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with all five measurements of the likelihood of being in a state of financial distress (the findings are statistically significant at the level of 1%).

Our result regarding neuroticism is similar to the Xu *et al.* (2015). However, our evidence regarding the agreeableness and extraversion contradict Xu *et al.* (2015) that found the level of agreeableness (extraversion) is positively (negatively) associated with the likelihood of being in a state of financial distress.

Considering the abovementioned results, we reject our hypothesis (4) since our results show that the level of agreeableness is negatively associated with the likelihood of being in a state of financial distress. On the other hand, we cannot reject hypotheses (5) and (6) related to the impact of neuroticism and extraversion on the likelihood of being in a state of financial distress.

In Table 2.8, we present additional estimates for the determinants of the likelihood of being in a state of financial distress, while controlling for other individuals' demographic characteristics, namely income, health, education, marital status, activity status, and tenure status.

Table 2.8: Personality and Financial Distress: Controlling for demographic characteristics

		Dependent variables														
		Burden THC			Burden repayment debts			Arrears bills			Arrears HPI/LP			Arrears M/RP		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Independent variables	Neuroticism	0.401*** (0.005)			0.429*** (0.010)			0.454*** (0.007)			0.461*** (0.013)			0.466*** (0.013)		
	Agreeableness		-0.048*** (0.001)			-0.053*** (0.002)			-0.052*** (0.002)			-0.053*** (0.004)			-0.062*** (0.004)	
	Extraversion			0.065*** (0.003)			0.083*** (0.007)			0.025*** (0.004)			0.036*** (0.009)			0.031*** (0.010)
	Income	-0.302*** (0.006)	-0.331*** (0.005)	-0.313*** (0.006)	-0.301*** (0.011)	-0.334*** (0.010)	-0.319*** (0.011)	-0.843*** (0.020)	-0.869*** (0.017)	-0.890*** (0.020)	-0.642*** (0.028)	-0.686*** (0.026)	-0.686*** (0.028)	-0.784*** (0.029)	-0.812*** (0.026)	-0.819*** (0.029)
	Gender[Male]	-0.007 (0.007)	-0.041*** (0.007)	-0.045*** (0.007)	0.005 (0.014)	-0.041*** (0.013)	-0.044*** (0.014)	0.047*** (0.012)	0.019* (0.011)	0.027** (0.012)	0.079*** (0.022)	0.022 (0.020)	0.048** (0.022)	0.088*** (0.022)	0.016 (0.020)	0.038* (0.021)
	Age	0.182*** (0.030)	0.317*** (0.027)	0.291*** (0.030)	0.594*** (0.070)	0.707*** (0.063)	0.762*** (0.069)	0.593*** (0.051)	0.763*** (0.045)	0.838*** (0.049)	0.476*** (0.108)	0.725*** (0.098)	0.806*** (0.105)	0.949*** (0.107)	1.097*** (0.094)	1.258*** (0.105)
	Squared age	-0.512*** (0.030)	-0.658*** (0.028)	-0.651*** (0.030)	-0.873*** (0.075)	-0.989*** (0.068)	-1.079*** (0.074)	-1.193*** (0.053)	-1.370*** (0.047)	-1.467*** (0.051)	-0.856*** (0.117)	-1.113*** (0.107)	-1.219*** (0.114)	-1.554*** (0.119)	-1.720*** (0.106)	-1.916*** (0.117)
	Health	-0.229*** (0.005)	-0.314*** (0.004)	-0.337*** (0.004)	-0.182*** (0.009)	-0.275*** (0.008)	-0.300*** (0.009)	-0.181*** (0.007)	-0.289*** (0.007)	-0.316*** (0.007)	-0.149*** (0.014)	-0.263*** (0.012)	-0.288*** (0.013)	-0.158*** (0.014)	-0.285*** (0.012)	-0.312*** (0.013)
	Education	-0.148*** (0.003)	-0.152*** (0.003)	-0.157*** (0.003)	-0.141*** (0.006)	-0.141*** (0.006)	-0.155*** (0.006)	-0.236*** (0.006)	-0.244*** (0.005)	-0.249*** (0.005)	-0.200*** (0.010)	-0.209*** (0.009)	-0.215*** (0.010)	-0.213*** (0.010)	-0.220*** (0.009)	-0.234*** (0.010)
	Marital status[Widowed]	-0.032 (0.033)	-0.052* (0.031)	-0.059* (0.032)	-0.109 (0.071)	-0.135** (0.067)	-0.166** (0.070)	-0.086* (0.047)	-0.109** (0.044)	-0.120*** (0.046)	-0.108 (0.101)	-0.166* (0.096)	-0.169* (0.099)	0.012 (0.088)	0.008 (0.083)	-0.015 (0.087)
	Marital status[Divorced]	0.068** (0.033)	0.032 (0.031)	0.046 (0.032)	0.014 (0.066)	-0.044 (0.063)	-0.039 (0.066)	0.018 (0.046)	-0.033 (0.043)	-0.016 (0.045)	-0.048 (0.094)	-0.126 (0.089)	-0.104 (0.092)	0.034 (0.075)	-0.016 (0.071)	-0.005 (0.074)
	Marital status[Never married]	-0.294*** (0.032)	-0.325*** (0.030)	-0.340*** (0.031)	-0.287*** (0.064)	-0.343*** (0.061)	-0.363*** (0.064)	-0.335*** (0.044)	-0.421*** (0.041)	-0.402*** (0.043)	-0.249*** (0.091)	-0.350*** (0.086)	-0.326*** (0.089)	-0.203*** (0.072)	-0.292*** (0.068)	-0.267*** (0.071)
	Marital status[Married]	-0.231*** (0.031)	-0.285*** (0.029)	-0.282*** (0.030)	-0.283*** (0.062)	-0.357*** (0.059)	-0.368*** (0.062)	-0.287*** (0.043)	-0.377*** (0.040)	-0.369*** (0.042)	-0.285*** (0.088)	-0.388*** (0.083)	-0.386*** (0.086)	-0.157** (0.070)	-0.234*** (0.065)	-0.233*** (0.069)
	Activity status[At work]	-0.227*** (0.011)	-0.217*** (0.010)	-0.236*** (0.011)	-0.192*** (0.022)	-0.197*** (0.020)	-0.198*** (0.022)	-0.152*** (0.017)	-0.139*** (0.016)	-0.169*** (0.017)	-0.107*** (0.033)	-0.087*** (0.030)	-0.113*** (0.032)	-0.155*** (0.031)	-0.146*** (0.028)	-0.173*** (0.030)
	Activity status[Unemployed]	0.417*** (0.017)	0.503*** (0.015)	0.506*** (0.016)	0.277*** (0.032)	0.386*** (0.029)	0.380*** (0.031)	0.468*** (0.021)	0.574*** (0.018)	0.573*** (0.020)	0.448*** (0.039)	0.565*** (0.035)	0.577*** (0.038)	0.466*** (0.035)	0.552*** (0.032)	0.569*** (0.035)
	Activity status[Retirement]	-0.091*** (0.014)	-0.105*** (0.013)	-0.122*** (0.014)	-0.137*** (0.033)	-0.166*** (0.030)	-0.153*** (0.032)	-0.273*** (0.024)	-0.284*** (0.022)	-0.303*** (0.023)	-0.272*** (0.051)	-0.265*** (0.047)	-0.284*** (0.050)	-0.265*** (0.054)	-0.232*** (0.050)	-0.265*** (0.053)

		Dependent variables														
		Burden THC			Burden repayment debts			Arrears bills			Arrears HPI/LP			Arrears M/RP		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Tenure status[Rented at a market rate]	0.242*** (0.021)	0.226*** (0.019)	0.233*** (0.020)	-0.073** (0.037)	-0.069** (0.033)	-0.091** (0.036)	-0.222*** (0.030)	-0.233*** (0.027)	-0.241*** (0.030)	-0.137** (0.053)	-0.106** (0.048)	-0.156*** (0.053)	-0.154*** (0.034)	-0.149*** (0.030)	-0.167*** (0.033)
	Tenure status[Free]	-0.611*** (0.025)	-0.625*** (0.022)	-0.629*** (0.024)	-0.429*** (0.047)	-0.449*** (0.042)	-0.455*** (0.046)	-0.536*** (0.035)	-0.594*** (0.031)	-0.567*** (0.034)	-0.449*** (0.064)	-0.474*** (0.058)	-0.479*** (0.063)	-1.185*** (0.226)	-1.076*** (0.197)	-1.235*** (0.226)
	Tenure status[Owner]	-0.405*** (0.019)	-0.452*** (0.017)	-0.441*** (0.019)	-0.550*** (0.035)	-0.575*** (0.031)	-0.595*** (0.035)	-0.773*** (0.028)	-0.858*** (0.024)	-0.817*** (0.027)	-0.787*** (0.051)	-0.827*** (0.046)	-0.827*** (0.050)	-1.139*** (0.071)	-1.239*** (0.065)	-1.188*** (0.069)
	Tenure status [Paying a mortgage]	0.337*** (0.020)	0.301*** (0.018)	0.303*** (0.020)	-0.144*** (0.035)	-0.148*** (0.031)	-0.181*** (0.034)	-0.277*** (0.030)	-0.327*** (0.026)	-0.299*** (0.029)	-0.523*** (0.052)	-0.527*** (0.046)	-0.547*** (0.051)	-0.383*** (0.035)	-0.416*** (0.031)	-0.401*** (0.034)
	Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Num.Obs.	346,383	405,492	354,342	86,912	102,033	88,222	344,283	402,930	352,190	97,929	114,681	99,523	146,244	167,720	148,513
	AIC	584,540	689,937	604,141	151,664	181,120	155,840	246,577	298,132	257,629	71,584	84,789	74,327	77,981	94,383	80,637
	BIC	585,077	690,483	604,680	152,132	181,597	156,309	247,115	298,677	258,168	72,058	85,272	74,803	78,475	94,885	81,133
	Log.Lik.	-292,220	-344,918	-302,020	-75,782	-90,510	-77,870	-123,238	-149,016	-128,764	-35,742	-42,344	-37,113	-38940	-47,141	-40,268

Notes: This table reports the results of ordered logistic regression for the likelihood of being in a state of financial distress through five variables: financial burden of the total housing cost, the financial burden of the repayment of debts from hire purchases or loans, arrears on bills, arrears on mortgage or rental payments, and arrears on hire purchase installments or other loan payments respectively on the personality traits, male, age, squared age, income, health, activity status, education, marital status, and country listed in the first column. Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

From the regressions (1 to 15) in Table 2.8, we can infer that the levels of neuroticism and extraversion (agreeableness) continue to be positively (negatively) associated with the likelihood of being in a state of financial distress.

Also, our findings reveal that individuals with higher levels of income, education, and better health are less likely to be in a state of financial distress. In addition, older individuals are more likely to be in that state. Moreover, males are more likely to be in arrears on debts, namely the arrears on utility bills, mortgage or rental payments, and hire purchase installments or other loan payments. On the other hand, males were less likely to be under the financial burden of the total housing cost and repayment of debts from hire purchases or loans. Furthermore, we noticed that the individuals who are married or never married are less likely to be in a state of financial distress. The individuals who are working or retired are less likely to be in that state than unemployed individuals. Also, the individuals who are outright owners of accommodation or who are provided free accommodation are less likely to be in a state of financial distress.

To conclude, we continue to reject our hypothesis (4) since our results show that the level of agreeableness is negatively associated with the likelihood of being in a state of financial distress. On the other hand, we cannot reject hypotheses (5) and (6) related to the influence of neuroticism and extraversion on the likelihood of being in a state of financial distress.

2.4.3 The likelihood of being in a state of financial well-being

In this section, we examine whether personality traits are associated with the likelihood of being in a state of financial well-being. Table 2.9 shows the results of the baseline logistic regressions of the determinants of the likelihood of being in a state of financial well-being, where we control for age, squared age, gender, and country. We used logit models for the dependent variables: capacity to pay for the one-week annual holiday, and the capacity to face unexpected financial expenses and used the ordered logit model for the dependent variable: ability to meet ends.

Table 2.9: Personality and Financial Well-being: Baseline regression

		Dependent variables								
		Afford to pay			Unexpected FE			Ends Meet		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Independent variables	Neuroticism	-0.633*** (0.005)			-0.622*** (0.005)			-0.696*** (0.004)		
	Agreeableness		0.056*** (0.001)			0.040*** (0.001)			0.048*** (0.001)	
	Extraversion			-0.105*** (0.003)			-0.087*** (0.003)			-0.105*** (0.003)
	Gender[Male]	0.101*** (0.008)	0.120*** (0.006)	0.178*** (0.007)	0.161*** (0.008)	0.163*** (0.006)	0.235*** (0.007)	0.067*** (0.006)	0.119*** (0.005)	0.157*** (0.006)
	Age	0.054*** (0.001)	0.038*** (0.001)	0.040*** (0.001)	0.046*** (0.001)	0.023*** (0.001)	0.033*** (0.001)	0.452*** (0.021)	0.206*** (0.016)	0.243*** (0.020)
	Squared Age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.288*** (0.020)	-0.087*** (0.016)	-0.111*** (0.020)
	(Intercept)	1.467*** (0.048)	0.260*** (0.039)	0.679*** (0.046)	1.247*** (0.046)	0.353*** (0.037)	0.428*** (0.044)			
	Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Num. Obs.	356,248	499,905	364,560	356,746	500,785	365,049	356,930	501,101	365,233
	AIC	401,196	569,951	427,795	421,052	604,721	448,767	1,031,876	1,485,543	1,083,465
	BIC	401,574	570,341	428,173	421,430	605,110	449,145	1,032,296	1,485,977	1,083,886
	Log.Lik.	-200,563	-284,940	-213,862	-210,491	-302,325	-224,348	-515,899	742,732	-541,693

Notes: This table reports the results of logistic regression for the likelihood of being in a state of financial well-being through three variables: the capacity to afford to pay for a one-week annual holiday away from home, the capacity to face unexpected financial expenses, and the ability to make ends meet respectively on the personality traits, male, age, squared age, and country listed in the first column. We used logit models for the afford to pay, and unexpected FE and used ordered logit models for ends meet. Standard errors in parentheses. *** $p < 0.01$. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

The regressions (1 to 9) in Table 2.9 show that the levels of neuroticism and extraversion (agreeableness) are negatively (positively) associated with the three measurements of the likelihood of being in a state of financial well-being (the coefficients are statistically significant at a level of 1%). Our finding regarding agreeableness is consistent with Hill *et al.* (2012) that found that personality traits are positively correlated with the likelihood of being in a state of social well-being. On the contrary, Donnelly *et al.* (2012) suggest that there is no significant relationship between personality traits and the likelihood of being in a state of financial well-being. Instead, they found a positive relationship between money management skills and the likelihood of being in a state of financial well-being based on wealth accumulation.

Moreover, the results reveal that males and older individuals are more likely to be in a state of financial well-being. This finding is similar to Donnelly *et al.* (2012).

Considering the abovementioned results, we have to reject our hypothesis (7) since our results show that the level of agreeableness is positively associated with the likelihood of being in a state of financial well-being. On the other hand, we cannot reject our hypotheses (8) and (9) related to the effects of neuroticism and extraversion on the likelihood of being in a state of financial well-being.

It is important to examine our results by controlling for other individuals' demographic characteristics, namely income, health, education, marital status, activity status, and tenure status. Table 2.10 shows additional estimates for the determinants of the likelihood of being in a state of financial well-being.

Table 2.10: Personality and Financial Well-being: Controlling for demographic characteristics

		Dependent variables								
		Afford to pay			Unexpected FE			Ends Meet		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Independent variables	Neuroticism	-0.400*** (0.006)			-0.398*** (0.006)			-0.485*** (0.004)		
	Agreeableness		0.059*** (0.001)			0.053*** (0.001)			0.059*** (0.001)	
	Extraversion			-0.072*** (0.004)			-0.051*** (0.003)			-0.074*** (0.003)
	Income	1.002*** (0.012)	1.035*** (0.010)	1.026*** (0.012)	1.202*** (0.012)	1.229*** (0.011)	1.223*** (0.012)	0.627*** (0.006)	0.657*** (0.005)	0.639*** (0.006)
	Gender[Male]	0.013 (0.009)	0.033*** (0.008)	0.049*** (0.009)	0.063*** (0.009)	0.075*** (0.008)	0.097*** (0.008)	-0.032*** (0.007)	0.018*** (0.006)	0.015*** (0.006)
	Age	-0.009*** (0.002)	-0.016*** (0.002)	-0.016*** (0.002)	-0.015*** (0.002)	-0.025*** (0.002)	-0.021*** (0.002)	-0.418*** (0.027)	-0.584*** (0.025)	-0.543*** (0.027)
	Squared age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.790*** (0.028)	0.971*** (0.025)	0.951*** (0.027)
	Health	0.325*** (0.006)	0.406*** (0.005)	0.432*** (0.005)	0.307*** (0.006)	0.385*** (0.005)	0.415*** (0.005)	0.295*** (0.004)	0.394*** (0.004)	0.425*** (0.004)
	Education	0.378*** (0.004)	0.368*** (0.004)	0.384*** (0.004)	0.321*** (0.004)	0.317*** (0.004)	0.327*** (0.004)	0.258*** (0.003)	0.258*** (0.003)	0.268*** (0.003)
	Marital status[Widowed]	0.127*** (0.013)	0.168*** (0.012)	0.126*** (0.013)	0.138*** (0.013)	0.145*** (0.012)	0.138*** (0.013)	0.008 (0.010)	0.030*** (0.009)	0.013 (0.010)
	Marital status[Divorced]	-0.186*** (0.037)	-0.191*** (0.035)	-0.232*** (0.036)	-0.364*** (0.037)	-0.396*** (0.035)	-0.409*** (0.036)	-0.378*** (0.028)	-0.410*** (0.027)	-0.435*** (0.028)
	Marital status[Never married]	-0.147*** (0.020)	-0.152*** (0.018)	-0.170*** (0.019)	-0.324*** (0.019)	-0.353*** (0.018)	-0.343*** (0.019)	-0.268*** (0.015)	-0.285*** (0.014)	-0.289*** (0.015)
	Marital status[Married]	-0.273*** (0.020)	-0.259*** (0.019)	-0.294*** (0.019)	-0.440*** (0.019)	-0.445*** (0.018)	-0.462*** (0.019)	-0.424*** (0.015)	-0.424*** (0.014)	-0.450*** (0.015)
	Activity status[At work]	-1.015*** (0.017)	-1.047*** (0.016)	-1.105*** (0.017)	-0.841*** (0.017)	-0.890*** (0.015)	-0.930*** (0.016)	-0.979*** (0.013)	-1.050*** (0.012)	-1.089*** (0.013)
	Activity status[Unemployed]	-0.161*** (0.015)	-0.123*** (0.014)	-0.141*** (0.015)	-0.099*** (0.015)	-0.063*** (0.014)	-0.075*** (0.015)	-0.123*** (0.012)	-0.091*** (0.011)	-0.096*** (0.011)
	Activity status[Retirement]	-0.298*** (0.013)	-0.247*** (0.012)	-0.299*** (0.013)	-0.204*** (0.013)	-0.173*** (0.012)	-0.207*** (0.013)	-0.336*** (0.010)	-0.310*** (0.009)	-0.341*** (0.010)
	Tenure status[Rented at a market rate]	-0.385*** (0.013)	-0.380*** (0.012)	-0.395*** (0.013)	-0.641*** (0.013)	-0.647*** (0.012)	-0.643*** (0.013)	-0.564*** (0.010)	-0.563*** (0.009)	-0.570*** (0.010)
	Tenure status[Free]	-0.597***	-0.614***	-0.621***	-1.182***	-1.207***	-1.193***	-0.660***	-0.694***	-0.687***

		Dependent variables								
		Afford to pay			Unexpected FE			Ends Meet		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Tenure status[Owner]	(0.015) -0.684***	(0.014) -0.726***	(0.015) -0.707***	(0.015) -1.237***	(0.014) -1.255***	(0.015) -1.249***	(0.011) -0.659***	(0.010) -0.718***	(0.011) -0.701***
	Tenure status [Paying a mortgage]	(0.023) -0.197***	(0.020) -0.202***	(0.022) -0.203***	(0.023) -0.480***	(0.020) -0.501***	(0.022) -0.484***	(0.017) -0.189***	(0.016) -0.228***	(0.017) -0.204***
	Country	(0.020) Yes	(0.018) Yes	(0.019) Yes	(0.019) Yes	(0.017) Yes	(0.019) Yes	(0.015) Yes	(0.014) Yes	(0.015) Yes
	Num.Obs.	346,458	405,598	354,434	346,902	406,068	354,869	347,079	406,267	355,048
	AIC	344,167	413,824	357,852	353,179	420,980	367,536	955,390	1,129,810	989,866
	BIC	344,694	414,359	358,380	353,706	421,515	368,064	955,874	1,130,301	990,351
	Log.Lik.	-172,034	-206,863	-178,877	-176,540	-210,441	-183,719	-477,650	-564,860	-494,888

Notes: This table reports the results of logistic regression for the likelihood of being in a state of financial well-being through three variables: the capacity to afford to pay for a one-week annual holiday away from home, the capacity to face unexpected financial expenses, and the ability to make ends meet respectively on the personality traits, male, age, squared age, income, health, activity status, education, marital status, and country listed in the first column. We used logit models for afford to pay, and unexpected FE. and used ordered logit models for ends meet. Standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$. (See Appendix 2.2 Definitions of variables). Source: own elaboration.

From the regressions (1 to 9) in Table 2.10, our main conclusions regarding the impact of personality traits on the likelihood of being in a state of financial well-being are the same. Also, we noticed that individuals with higher levels of income, education, and better health are more likely to be in a state of financial well-being. Older individuals are less likely to be in that state. Furthermore, most of the regressions reveal that widowed individuals are more likely to be in a state of financial well-being than other individuals. In addition, the individuals who are working or retired or unemployed are less likely to be in that state. All in all, we continue to reject our hypothesis (7) since our findings suggest the level of agreeableness is positively associated with the likelihood of being in a state of financial well-being. On the other hand, we cannot reject our hypotheses (8) and (9) related to the impact the neuroticism and extraversion on the likelihood of being in a state of financial well-being.

2.5 Discussion

Our results regarding the influence of some personality traits on a decision to hold a mortgage are consistent with Nyhus and Webley (2001). For example, the level of extraversion is negatively associated with the amount of mortgage, and the level of agreeableness is positively associated with the likelihood of holding a mortgage. Our inferences refer to the negative (positive) influence of neuroticism and extraversion (agreeableness) on the decision to hold a mortgage. These inferences go against Donnelly *et al.* (2012) that showed in the United States that extraversion, agreeableness, and neuroticism are not significant predictors of debts. However, Donnelly *et al.* (2012) found that conscientiousness (openness) is positively (negatively) associated with debts. One possible reason for this discrepancy may lie in the fact that our sample includes data about 502,017 individuals and households whereas Donnelly *et al.* (2012) used a convenience sampling strategy with only 993 students. Given their limited sample, they were not able to find significant results.

Furthermore, our finding indicates that neuroticism is positively associated with the likelihood of being in a state of financial distress. This is similar to Xu *et al.* (2015). However, our evidence shows a negative (positive) impact of agreeableness (extraversion) on the likelihood of being in a state of financial distress. These results are inconsistent with the conclusion of Xu *et al.* (2015) that inferred the signs of the coefficients of agreeableness

and extraversion are opposite to our evidence. One possible explanation for this discrepancy is that our study showed statistically significant results for all the five measurements of the likelihood of being in a state of financial distress. On the contrary, Xu *et al.* (2015) found out that two of seven measurements of the likelihood of being in that state are statistically significant. Also, another possible explanation is that Xu *et al.* (2015)'s sample was limited to the young adults (24-34 years old) in the US. On the other hand, the sample of our research is significantly larger including individuals in all age groups in a European context.

Moreover, our evidence implies the positive effect of agreeableness on the likelihood of being in a state of financial well-being. This evidence is consistent with Hill *et al.* (2012). Also, our findings reveal a negative (positive) influence of extraversion and neuroticism (agreeableness) on the likelihood of being in a state of financial well-being. These findings contradict Donnelly *et al.* (2012) that suggest there is no significant relationship between personality traits and the likelihood of being in a state of financial well-being. One possible reason for these conflicting conclusions is that Donnelly *et al.* (2012) used a convenience sampling strategy with only 355 US individuals whereas our sample includes a much large number of individuals as mentioned above. The results of Donnelly *et al.* (2012) may not be generalized to other cultures because their sample was collected by the internet targeting younger and better-educated individuals. Also, Donnelly *et al.* (2012) did not focus basically on the relationship between personality traits and financial well-being. Instead, they investigated the independent effect of money management (controlling for personality traits) to predict financial well-being by wealth accumulation.

2.6 Conclusion

This research expands the literature on household finance by strengthening the knowledge about the determinants of some dimensions in this field in 31 European countries. We investigated the impact of personality traits on the dimensions of household finance based on three aspects: 1) the decision to hold secured debts, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being. To the best of our knowledge, this is the first study that uses the EU-SILC dataset from Eurostat in this context.

Our main conclusions include that neurotic and extraverted (agreeable) individuals are less (more) likely to hold a mortgage, and they are less (more) likely to pay a higher amount of mortgage. Also, the results show a positive (negative) impact of neuroticism and extraversion (agreeableness) on the likelihood of being in a state of financial distress. On the contrary, the findings reveal that neurotic and extraverted (agreeable) individuals are less (more) likely to be in a state of financial well-being. Our results are robust when controlling demographic characteristics, namely age, gender, education, health, income, marital status, activity status, and tenure status.

When discussing household finance, it is important to understand the financial issues of the households, and to explore the reasons for poor or good financial outcomes so that individuals can improve their financial well-being. Our inferences suggest a need for behavioral interventions based on personality traits to diagnose people that are considered at financial risk. To reduce the financial risk effects, governments and financial institutions should better design the financial products and offer them in a more organized manner, that could help households save, invest, and get a mortgage.

Regulators should make rules for the financial institutions that issue financial products to increase the user's awareness of his or her conduct and personality. Also, the regulatory agencies should assist the users with a financial planning program to help overcome any negative financial behavior. Moreover, our results recommend that individuals should be aware of their own personalities' influence on their financial dimensions. This would help the individuals to make effective decisions that might have a positive impact on their life. Such knowledge may enhance their skills thus, helping them make balanced financial decisions and avoid financial problems.

On another level, we suggest the policies should be designed to integrate the following: 1) issue public programs that can enhance the welfare of households and 2) raise household awareness about financial literacy and deal with financial issues by organizing workshops and publishing necessary information on social media. Therefore, our research provides policymakers with valuable information to enhance the welfare of households. Also, we add to the academic research on the determinants of the decision to hold secured debts and a better explanation of the likelihood of being in a state of financial distress and financial well-being.

Our research suffers from some limitations. For example, there are no data of openness and conscientiousness personality traits in the EU-SILC dataset in Eurostat and the measures of the personality traits are not strong due to the restricted available data in EU-SILC dataset in Eurostat. Future research can investigate the impact of additional personality traits on the dimensions of household finance in different settings on the national or international level over the years.

Appendices

Appendix 2.1 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>.

Appendix 2.2 Definitions of variables

Variable	Definition
Dependent Variables	
Holding mortgage	Measured as a binary variable takes the value of 1 if the household 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 of the households in Euro currency. (Source: EU-SILC dataset, Eurostat).
Ability to make ends meet	The financial well-being indicator is measured by asking the households if their total income is able to make ends meet, namely, to pay for its usual necessary expenses. The ordinal variable 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 by asking the households if they can afford to go for a week's annual holiday. The binary variable takes the value of 1 if the answer is yes, otherwise 0 if it is no. (Source: EU-SILC dataset, Eurostat).
Capacity to face unexpected financial expenses	The financial well-being indicator is measured by asking the households if they can afford an unexpected financial expense. The binary variable takes the value of 1 if the answer is yes, otherwise 0 if it is no. (Source: EU-SILC dataset, Eurostat).
Arrears on a mortgage or rental payments	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears on a mortgage or rental payments and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
Arrears on hire purchase installments or other loan payments	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears on hire purchase installments or other loan payments and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
Arrears on bills	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears bills and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
The financial burden of the repayment of debts from hire purchases or loans	The financial distress indicator is measured by asking the households to what extent is the repayment of such loans a financial burden. The ordinal variable takes the values as follows: 1 - Not a burden at all, 2 - A slight burden, 3 - A heavy burden. (Source: EU-SILC dataset, Eurostat).

The financial burden of the total housing cost	The financial distress indicator is measured by asking the households to what extent is the total housing costs a financial burden. The ordinal variable takes the values as follows: 1 - Not a burden at all, 2 - A slight burden, 3 - A heavy burden. (Source: EU-SILC dataset, Eurostat).
Independent Variables	
Neuroticism	It is a personality trait that is measured in a scale based on Nyhus and Webley (2001), Brown and Taylor (2014), and Gillen and Kim (2014). This scale consists of the average for the following indicators: how much time in which individual felt: i) nervous; ii) down in the dumps; iii) downhearted, and iv) calm and peaceful (reversed) over the past four weeks. This scale is a five-point start from never, takes the value of 1, to all the time, takes the value of 5. (Source: EU-SILC dataset, Eurostat).
Agreeableness	It is a personality trait that is measured in a scale based on Costa <i>et al.</i> (1995), which consists of to what extent does an individual trusts other people. This scale starts from 0 to 10, where 0 means you do not trust anyone, and 10 means you feel that most people can be trusted. (Source: EU-SILC dataset, Eurostat).
Extraversion	It is a personality trait that is measured in a scale based on Costa and McCrae (1992). This scale captures how much time in which individuals felt happy over the past four weeks. This scale is a five-point start from never, takes the value of 1, to all the time, takes the value of 5. (Source: EU-SILC dataset, Eurostat).
Control Variables	
Age	The continuous variable. (Source: EU-SILC dataset, Eurostat).
Squared age	Squared of the age variable. (Source: EU-SILC dataset, Eurostat).
Total household income	Total household income in Euro currency. (Source: EU-SILC dataset, Eurostat).
Gender	The binary variable (0- Female, 1- Male). (Source: EU-SILC dataset, Eurostat).
Marital status	The nominal variable is measured in five categories: 1- Separated, 2- Widowed, 3- Divorced, 4- Never married, 5- Married. (Source: EU-SILC dataset, Eurostat).
The level of education	The ordinal variable is measured in six categories: 0- Pre-primary, 1- Primary, 2- Lower secondary, 3- Upper secondary, 4- Post-secondary non-tertiary, 5- First stage of the tertiary education. (Source: EU-SILC dataset, Eurostat).
General health	The ordinal variable is measured in five categories: 1- Very bad, 2- Bad, 3- Fair, 4- Good, 5- Very good. (Source: EU-SILC dataset, Eurostat).
Tenure status	The nominal variable is measured in five categories: 1- Rented at a reduced rate, 2- Rented at a market rate, 3- Provided free, 4- The owner is outright, 5- Paying a mortgage). (Source: EU-SILC dataset, Eurostat).
Activity status	The nominal variable is measured in four categories: 1- Inactive persons, 2- At work, 3- Unemployed, 4- In retirement. (Source: EU-SILC dataset, Eurostat).

Source: own elaboration.

References of Chapter Two

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Chapter Three

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

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

Abstract

This chapter explores the influence of national cultures on the dimensions of household finance in 31 European countries. We employ regression analysis using mainly Hofstede's cultural dimensions and the European Union Statistics on Income and Living Conditions (EU-SILC) dataset from Eurostat to provide a better understanding of the determinants of the decision to hold secured debts and the likelihood of being in a state of financial well-being. To the best of our knowledge, this is the first study that uses these data in this context, and no study has addressed this relationship in the European setting using samples from different countries and examining household characteristics. We conclude that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation are negatively associated with the likelihood of holding a mortgage. The results also show the levels of masculinity, uncertainty avoidance, long-term orientation, and indulgence are negatively associated with the amount of mortgage. Moreover, the levels of individualism and long-term orientation (power distance and uncertainty avoidance) are positively (negatively) associated with the likelihood of being in a state of financial well-being. Collectively, our research shows that national cultures play a crucial role in household finance.

Keywords: Household Finance, Culture, Hofstede dimensions, Mortgage, Financial well-being, Europe.

JEL Classification: G40, G50, G51.

3.1 Introduction

The research on culture has been considered in the field of financial economics recently, but it is limited to the country-attributes or individual countries without examining the household characteristics (Díez-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.* (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 households are more directly engaged and more easily involved in complex financial decisions than in the past. This is 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 (Xu *et al.*, 2015). 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 national cultures on the decision of holding a mortgage and the likelihood of being in a state of financial well-being in the European setting using samples from different countries and examining household characteristics. Therefore, this chapter fills that gap by investigating this relationship in 31 European countries using mainly Hofstede's cultural dimensions and the EU-SILC dataset from Eurostat. Also, to the best of our knowledge, this is the first research that uses the EU-SILC dataset in this context.

This chapter finds that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with the

likelihood of holding a mortgage. In addition, the levels of masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are positively (negatively) associated with the amount of mortgage. Furthermore, we conclude that the levels of power distance and uncertainty avoidance (individualism and long-term orientation) are negatively (positively) associated with the likelihood of being in a state of financial well-being. This chapter is structured as follows. Section two presents the related literature and develops the hypotheses to be tested. Section three describes the data and methodology. Section four reports the empirical results. Section five presents the discussions and Section six concludes the chapter.

3.2 Literature Review and Hypotheses Development

3.2.1 Literature Review

Previous studies have investigated the non-cultural determinants of the decision to hold secured debts. For example, Nyhus and Webley (2001) and Brown and Taylor (2014) examined the influence of personality traits on mortgage 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. Moreover, 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. On the other hand, other studies have examined the non-cultural determinants of the likelihood of being in a state of financial well-being. For example, Mahdzan *et al.* (2019) showed that financial behavior, locus of control, financial stress, and financial knowledge have a significant relationship with the likelihood of being in a state of financial well-being. In addition, Chatterjee *et al.* (2019) demonstrated that income security, unemployment, and overt materialism affect the likelihood of being in a state of financial well-being.

Some research has studied the influence of culture on household financial dimensions. For example, 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. Also, 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. Furthermore, 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 research investigated the effects of culture on debt levels. For example, Aggarwal *et al.* (2012) found in foreign portfolio investment that individualism, masculinity, and power distance are positively associated with debt holdings. On the contrary, Aggarwal and Goodell (2014) discovered that masculinity and uncertainty avoidance are negatively associated with access to loan financing. Also, Breuer *et al.* (2015) conclude that culture is a significant predictor of households' borrowing decisions, and they showed that long-term orientation countries tend to have shorter household debt maturity. Moreover, Tajaddini and Gholipour (2017) discovered that borrowers from societies with high individualism and high indulgence are more likely to have defaulted on their mortgages. Furthermore, Rodríguez-Planas (2018) found that social norms in the country of ancestry are a significant predictor of determining immigrants' mortgage finance in the host country. Also, Rodríguez-Planas (2018) showed that 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.

The results of Aggarwal *et al.* (2012), Aggarwal and Goodell (2014), Breuer *et al.* (2015), Tajaddini and Gholipour (2017), and Rodríguez-Planas (2018) are consistent with Gaganis *et al.* (2020) that found the national culture dimensions are significant determinants of the housing mortgage. Specifically, Gaganis *et al.* (2020) showed that power distance, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with mortgage depth measured by the log of the ratio of total outstanding residential loans value to GDP. Additionally, Gaganis *et al.* (2020) found that power distance, masculinity, uncertainty avoidance, and long-term orientation (indulgence) are negatively (positively) associated with mortgage penetration measured by the percentage of homeowners with an outstanding mortgage.

Another body of the literature explored the impacts of culture on financial and subjective well-being. For example, Arrindell *et al.* (1997,1998) observed that masculinity for rich countries is negatively correlated with the likelihood of being in a state of well-being. This finding is consistent with Steel *et al.* (2018). Also, Hofstede (2001) and Hofstede *et al.* (2005) showed that uncertainty avoidance is negatively associated with the likelihood of being in a state of well-being. This result is similar to Steel *et al.* (2018).

On the other hand, Ahuvia (2002) observed that people in individualistic countries tend to be happier than people living in collectivist societies. The finding of Ahuvia (2002) is similar to Diener *et al.* (2009) and Steel *et al.* (2018) that concluded that individualism is positively associated with the likelihood of being in a state of well-being. These findings are consistent with Fischer and Boer (2011) that indicated that individualism is a better determinant of the likelihood of being in a state of well-being than wealth, largely because it better enables to increase autonomy. In addition, Diener *et al.* (2003) discovered that cultural variables clarify differences in mean levels of subjective well-being, and they found culture can moderate which variables most influence subjective well-being. Moreover, Sabri *et al.* (2012) showed that childhood consumer experiences such as savings habits contribute to the likelihood of students being in a state of financial well-being. Sabri *et al.* (2012) also found that financial socialization through parents and religious sources might raise the likelihood of students being in a state of financial well-being.

To conclude, previous studies show that national culture dimensions are significant determinants of the dimensions of household finance, on the level of country-attributes such as Gaganis *et al.* (2020) or individual countries such as Gogolin *et al.* (2017), without examining the household characteristics. To the best of our knowledge, there are no earlier studies that investigated the relationship between the national culture and the dimensions of household finance using samples from different countries and examining household characteristics. Therefore, this research fills that gap by examining the influence of the national culture on the decision of holding a mortgage and the likelihood of being in a state of financial well-being in 31 European countries.

3.2.2 Hypotheses Development

In this chapter, we use the Hofstede (2011) model of national culture which includes six dimensions as follows: 1) Power distance index, 2) Individualism versus Collectivism, 3)

Masculinity versus Femininity, 4) Uncertainty avoidance index, 5) Long term orientation versus Short term orientation, and 6) Indulgence versus Restraint.

To establish the relationship between individualism and the likelihood of holding debt, it is worthy to define that individualism is related to societies in which the ties between individuals are loose. The individuals are expected to look after themselves and their immediate family (Hofstede *et al.*, 2005). In contrast, collectivism is related 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).

Previous studies agreed that individualism is positively associated with the following dimensions: financial risk-taking (Breuer *et al.*, 2014), cost of debt (Chui *et al.*, 2016), debt holdings (Aggarwal *et al.*, 2012), defaulted on mortgages (Tajaddini and Gholipour, 2017), and mortgage depth (Gaganis *et al.*, 2020). Therefore, we expect the decisions of the households in individualistic societies to be more independent which should lead them to hold secured debt more than others. Based on these findings, we predict,

Hypothesis 1. The levels of individualism of the country to which the household belongs are positively associated with the likelihood of holding debt.

To establish the relationship between masculinity and the likelihood of holding debt, it is important to distinguish the masculinity versus femininity dimension that refers to the distribution of emotional roles between 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 (Hofstede Insights, 2021). 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 Insights, 2021).

Previous studies have mixed results regarding the relationship between masculinity and the likelihood of holding debt. For example, Aggarwal *et al.* (2012) found that masculinity is positively associated with debt holdings. On the contrary, Aggarwal and Goodell (2014) concluded that masculinity tends to be negatively associated with access to loan financing. Also, Gaganis *et al.* (2020) found that masculinity is negatively associated with mortgage penetration measured by the percentage of homeowners with an outstanding mortgage.

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. Therefore, we expect that households in masculine countries are more willing to have a higher amount of mortgage because of their symbol of status to finance buying an expensive house. So, we predict,

Hypothesis 2. The levels of masculinity of the country to which the household belongs are positively associated with the likelihood of holding debt.

To establish the relationship between power distance and the likelihood of holding debt, we define the power distance index which presents the degree to which the less powerful members of a society accept and expect that power is distributed unequally (Hofstede, 2011).

Previous studies found that income inequality is positively associated with debt holdings. For example, Christen and Morgan (2005) concluded that income inequality is positively associated with all components of total household debt such as mortgage debt, credit card debt, and car loans. Also, Christen and Morgan (2005) 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. Moreover, Fligstein *et al.* (2017) revealed that 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. Also, 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 (Fligstein *et al.*, 2017).

Other studies have mixed results regarding the relationship between power distance and the likelihood of holding debt. For example, Aggarwal *et al.* (2012) found that power distance is positively associated with debt holdings. On the contrary, Gaganis *et al.* (2020) showed that power distance tends to be negatively associated with mortgage depth measured by the log of the ratio of total outstanding residential loans value to GDP.

Based on Christen and Morgan (2005), Aggarwal *et al.* (2012), and Fligstein *et al.* (2017), we expect that the households in societies with high power distance are more likely to hold mortgages with higher amounts. Thus, we predict,

Hypothesis 3. The levels of power distance of the country to which the household belongs are positively associated with the likelihood of holding debt.

To establish the relationship between long-term orientation and the likelihood of holding debt, we define the long-term orientation versus short-term orientation dimension that relates the choice of focus for people's efforts: the future or the present and past (Hofstede, 2011). Short-term orientation societies show a preference to maintain time-honored traditions and norms, and they view societal change with suspicion (Hofstede Insights, 2021). On the contrary, long-term orientated societies take a more pragmatic approach, and they encourage thrift and efforts in modern education to prepare for the future (Hofstede Insights, 2021).

Long-term orientated cultures are cash or debit card cultures, not credit card cultures (De Mooij and Hofstede, 2002), and they tend to have large savings quotes and funds available for investments (Hofstede *et al.*, 2005). These findings are similar to Gaganis *et al.* (2020) that argues the long-term orientation tends to be negatively associated with mortgage depth measured by the log of the ratio of total outstanding residential loans value to GDP. Also, Breuer *et al.* (2015) showed that long-term orientation countries are shorter household debt maturity. Based on these findings, we expect,

Hypothesis 4. The levels of the long-term orientation of the country to which the household belongs are negatively associated with the likelihood of holding debt.

To establish the relationship between uncertainty avoidance and the likelihood of holding debt, we consider the uncertainty avoidance index that 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 have more worries about money when it comes to financial matters (Hofstede *et al.*, 2005). Previous studies agreed that uncertainty avoidance is negatively associated with the following dimensions: access to loan financings (Aggarwal and Goodell, 2014) and mortgage depth (Gaganis *et al.*, 2020). Based on these findings, we predict,

Hypothesis 5. The levels of uncertainty avoidance of the country to which the household belongs are negatively associated with the likelihood of holding debt.

To establish the relationship between indulgence and the likelihood of holding debt, we consider the indulgence versus restraint dimension that relates the gratification versus control of basic human desires related to enjoying life (Hofstede, 2011). Indulgent societies are characterized by relatively free gratification of basic and natural human drives related to enjoying life and having fun (Hofstede Insights, 2021). In contrast, restrained societies tend to suppress the gratification of needs and regulate them using strict social norms (Hofstede Insights, 2021).

Previous studies agreed that indulgent societies are more likely to hold debt. For example, Peñaloza and Barnhart (2011) concluded that indulgent societies tend to expend high levels of credit in relation to their resources in pursuing their desires and pleasures. Also, Tajaddini and Gholipour (2017) showed that indulgent societies are more likely to default on their mortgage. Additionally, Gaganis *et al.*, (2020) found that indulgence is positively associated with mortgage depth measured by the log of the ratio of total outstanding residential loans value to GDP. Based on these findings, we expect,

Hypothesis 6. The levels of indulgence of the country to which the household belongs are positively associated with the likelihood of holding debt.

Previous studies confirmed that individualism is positively associated with the likelihood of being in a state of well-being. For example, Ahuvia (2002) observed that people in individualistic countries tend to be happier than people living in collectivist societies, *ceteris paribus*. Diener *et al.* (2009) reported that individualism is positively correlated with well-being across 55 nations. Also, Steel *et al.* (2018) showed a positive impact of individualism on the likelihood of being in a state of social well-being. Moreover, Fischer and Boer (2011) found that individualism is a better determinant of well-being than wealth, largely because it better enables to increase autonomy. Based on these findings, we predict,

Hypothesis 7. The levels of individualism of the country to which the household belongs are positively associated with the likelihood of being in a state of financial well-being.

There are some authors who examined the relationship between power distance and the likelihood of being in a state of well-being. For example, Oishi *et al.* (2011) reported that inequality promotes feelings of injustice or envy and erodes trust and belongingness. Also, Steel *et al.* (2018) found a negative influence of the power distance on the likelihood of being in a state of social well-being. We expect that the societies that accept the inequality are less likely to experience financial well-being due to the wealth and money will be limited to the small group in these societies. Accordingly, we predict,

Hypothesis 8. The levels of power distance of the country to which the household belongs are negatively associated with the likelihood of being in a state of financial well-being.

Some authors showed a negative impact of masculinity on the likelihood of being in a state of well-being. For example, Arrindell *et al.* (1997,1998) concluded that masculinity for rich countries is negatively correlated with the likelihood of being in a state of well-being. In addition, Steel *et al.* (2018) indicated a negative influence of masculinity on the likelihood of being in a state of social well-being. As masculine societies tend not to care so much about the quality of life, we expect that individuals in those societies should be less likely to experience a state of financial well-being. Based on these findings, we predict,

Hypothesis 9. The levels of masculinity of the country to which the household belongs are negatively associated with the likelihood of being in a state of financial well-being.

Previous studies agreed that uncertainty avoidance is negatively associated with the likelihood of being in a state of well-being. For example, Hofstede (2001) and Hofstede *et al.* (2005) noticed that uncertainty avoidance culture is negatively associated with well-being. Moreover, Steel *et al.* (2018) observed a negative effect of uncertainty avoidance on the likelihood of being in a state of social well-being. Based on these findings, we expect,

Hypothesis 10. The levels of uncertainty avoidance of the country to which the household belongs are negatively associated with the likelihood of being in a state of financial well-being.

Some authors investigated the relationship between long-term orientation and the likelihood of being in a state of well-being. For example, Chen (2013) and Galor and Özak (2016) concluded that long-term orientation encourages saving and technological development. Therefore, it is likely to be related to higher levels of long-term economic prosperity. Moreover, Bukowski and Rudnicki (2019) revealed that long-term orientation is a strong cultural predictor of the intensity of national innovation. The rise in savings and economic prosperity will lead to improved quality of housing and an increase in the number of jobs created (Graafland, 2020). Additionally, Graafland (2020) found that long-term orientation is positively correlated with the likelihood of being in a state of well-being. Based on these findings, we predict,

Hypothesis 11. The levels of the long-term orientation of the country to which the household belongs are positively associated with the likelihood of being in a state of financial well-being.

One study focused on the influence of indulgence on the likelihood of being in a state of well-being. Cui *et al.* (2018) showed that low and moderate indulgence groups reported significantly lower levels of depressive and anxiety symptoms and alcohol use. Based on this finding, we expect,

Hypothesis 12. The levels of indulgence of the country to which the household belongs are positively associated with the likelihood of being in a state of financial well-being.

Following the existing literature such as Wolswijk (2006), Badev *et al.* (2014), and Gaganis *et al.* (2020), we control our results of the decision to hold secured debts for different country-specific attributes, namely 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 the likelihood of being in a state of financial well-being based on Steel *et al.* (2018) for GDP growth, total income household, and governance effectiveness.

3.3 Data and Methodology

3.3.1 Data

To examine the influence of national culture on the decision of holding a mortgage and the likelihood of being in a state of financial well-being, we used data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset, from the Eurostat Database (See Appendix 3.1 Supplementary data). These data cover the dimensions of household finance at the household level from 2004 to 2018 for 31 European countries, including 26 member countries of the European Union (EU) and five other European countries⁷. These data are extracted from registers or collected from interviews by five modes of data collection are possible: 1 - Pen-and-paper personal interviewing (PAPI). 2 - Computer-assisted personal interviewing (CAPI). 3 - Computer-assisted telephone interviewing (CATI). 4 - Self-administered by respondent. 5 - Proxy interview. The household respondent for the dimensions of household finance is choosing according to the following priorities: 1) the person responsible for the accommodation. 2) a household member aged 16 and over who is the best place to give this information.

Also, we obtained the cross-country data for six dimensions of national culture from Hofstede Insights (2021). We collected the urban population from the World Development Indicators of the World Bank (2021c). In addition, data on inflation, interest rates, nominal house price indices, and GDP growth were gathered from the European Mortgage Federation (EMF) of Hypostat (2021). We control for bank concentration from the Global Financial Development Database of the World Bank (2021b). Data on construction permits are from the Doing Business Report of the World Bank (2021a). We obtained data on tax property from the Organization for Economic Co-operation and Development (OECD, 2021). We used Corruption Perception Index (CPI) from Transparency International (2021) to measure governmental effectiveness. We also control the existence of a loan to value (LTV) macroprudential instrument from Cerutti *et al.* (2017).

⁷The 26 member countries of the EU are the following: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Greece, Croatia, Spain, France, Ireland, Italy, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, and Sweden; and other five European countries considered are Iceland, Norway, Serbia, Switzerland, and the United Kingdom.

Our data combines time series with cross-sectional data that allow the formation of panel data, the number of observations of the households in our sample is 3,433,259. As shown in Appendix 3.2, the lowest number of observations in our sample corresponds 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.

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 are 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.

We consider two dimensions of household finance: first, the decision to hold secured debt based on Brown *et al.* (2008, 2013) and Brown and Taylor (2014). This decision will be captured by the following two variables that will be used as dependent variables in two separate regressions: 1 - Holding a mortgage that is calculated from the tenure status variable⁸ measured as a binary variable which takes the value of 1 if the household is holding mortgage, otherwise, the value is 0.

2 - The log of the total mortgage⁹ calculated as the logarithm of mortgage principal repayment plus interest mortgage of the households in Euro currency.

Second, the likelihood of being in a state of financial well-being is measured based on Garðarsdóttir and Dittmar (2012) and Philippas and Avdoulas (2020). This dimension will be captured by the following two variables that will be used as dependent variables in two separate regressions: 1 - The ability to make ends meet is measured by asking the households if their total income is able to make ends meet, namely, to pay for its usual necessary expenses. Ordinal variable takes the values as follows: 1 - with great difficulty, 2 - with difficulty, 3 - with some difficulty, 4 - fairly easily, 5 - easily, 6 - very easily.

2 - The capacity to afford to pay for a one-week annual holiday away from home. This variable is measured by asking the households if they can afford to go for a week's annual holiday. The binary variable takes the value of 1 if the answer is yes, otherwise 0 if it is no.

Summary statistics for the dependent, independent, and control variables are presented in Table 3.1.

⁸ Tenure status is a nominal variable that is measured in five categories: 1- Rented at a reduced rate, 2- Rented at a market rate, 3- Provided free, 4- The owner is outright, 5- Paying a mortgage). (Source: EU-SILC dataset, Eurostat).

⁹All the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate for each specified year.

Table 3.1: 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							
Power distance (PD)	50.28	50.00	18.75	11.00	100.00	0.35	-0.08
Individualism (IND)	60.50	63.00	17.92	17.00	89.00	-0.84	-0.08
Masculinity (MAS)	47.33	47.00	23.96	5.00	100.00	-0.07	-0.88
Uncertainty avoidance (UA)	70.91	75.00	20.40	23.00	100.00	-0.59	-0.49
Long-term orientation (LTO)	56.32	58.00	15.95	24.00	83.00	-0.04	-0.81
Indulgence (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
Corruption perception index (CPI)	65.27	64.00	17.28	33.30	97.00	0.04	-1.29
Loan-to-value ratio (LTV)	0.34	0.00	0.47	0.00	1.00	0.67	-1.56
Total household 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 households' levels from EU-SILC's dataset. We standardized GDP and total household income using Z-score standardization. Log of total mortgage and total household income are expressed in Euro currency. Holding mortgage, and log of total mortgage variables refer to the decision to hold secured debt. Capacity affords to pay for a one-week annual holiday and the ability to make ends meet variables refer to the likelihood of being in a state of financial well-being. Age is expressed in the number of years. Holding mortgage, capacity affords to pay for a one-week annual holiday, and Loan-to-value ratio variables are binary variables. Ability to make ends meet, power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence are ordinal variables. Log of total mortgage, GDP, inflation, interest rates, house price, urbanization, bank concentration, construction permits, tax property, corruption perception index, and total household income are continuous variables. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

As shown in Table 3.1, there are 20 % of the households in our sample hold mortgages, and 64% of the households can afford to pay for a one-week annual holiday. The average degree of the cultural dimensions of power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence in our sample are the following: 50.28, 60.50, 47.33, 70.91, 56.32, and 44.34, respectively.

Appendix 3.4 presents the correlations matrix between the national cultural dimensions. We noticed some of these correlations have moderate to high correlation coefficients. For example, 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).

3.3.2 Methodology

We estimate the appropriate panel data methodology for binary and ordered response models based on Wooldridge (2010). Therefore, we employ a logistic regression approach (Logit models) for the binary dependent variables as follows: i) holding the mortgage and ii) pay a one-week holiday. Also, we used the ordered 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 Díez-Esteban *et al.* (2019). Additionally, following Gaganis *et al.* (2020), we introduce only one cultural dimension per regression to avoid the multicollinearity issues (See Appendix 3.4 Correlation coefficients of cultural dimensions). We also employ the baseline regression for the first model (holding secured debt), where we control for inflation, and urban population. 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:

$$\text{Holding secured debt} = \beta_0 + \beta_1 \text{PD} + \beta_2 \text{IND} + \beta_3 \text{MAS} + \beta_4 \text{UA} + \beta_5 \text{LTO} + \beta_6 \text{Indulgence} + \beta_7 \text{Inflation} + \beta_8 \text{Urbanization} \dots (3.1)$$

The decision to hold secured debt is captured by two different dependent variables: i) holding the mortgage (binary variable) and, ii) log of the total mortgage (continuous variable).

$$\text{Financial well being} = \beta_0 + \beta_1 \text{PD} + \beta_2 \text{IND} + \beta_3 \text{MAS} + \beta_4 \text{UA} + \beta_5 \text{LTO} + \beta_6 \text{Indulgence} + \beta_7 \text{CPI} + \beta_8 \text{GDP} + \beta_9 \text{Income} \dots (3.2)$$

The likelihood of being in a state of financial well-being is measured by two variables: i) the ability to make ends meet (ordinal variable), and ii) the capacity to afford to pay a one-week annual holiday away from home (binary variable).

3.4 Empirical Results

3.4.1 The decision to hold secured debt

Table 3.2 presents the results of the baseline logistic regressions of the determinants of holding the mortgage, where we control for urbanization and inflation.

Table 3.2: Culture and Holding Mortgage: Baseline model

		Dependent variable: Holding Mortgage					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.000)	0.052*** (0.000)	0.048*** (0.000)	0.057*** (0.000)	0.050*** (0.000)	0.030*** (0.000)
	Inflation	-0.007*** (0.000)	-0.008*** (0.000)	-0.010*** (0.000)	-0.007*** (0.000)	-0.010*** (0.000)	-0.008*** (0.000)
	(Intercept)	-5.995*** (0.011)	-5.008*** (0.013)	-3.922*** (0.013)	-5.623*** (0.011)	-4.115*** (0.013)	-4.995*** (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	2,928,873.6	2,874,635.7	2,940,187.2	2,889,291.7	2,877,824.1
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 individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, urbanization, and inflation listed in the first column. Standard errors in parentheses. *** p < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

The regressions (1 to 6) in Table 3.2 show that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with the likelihood of holding a mortgage (findings statistically significant at the 1% level). Also, we found the urban population (inflation) to be positively (negatively) associated with the likelihood of holding a mortgage.

Table 3.3 presents additional estimates for the determinants of holding the mortgage while controlling for other country-specific attributes, namely inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and the loan-to-value ratio.

Table 3.3: Culture and Holding Mortgage: Inclusion of control variables

		Dependent variable: Holding Mortgage					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.000)	0.049*** (0.000)	0.050*** (0.000)	0.048*** (0.000)	0.050*** (0.000)	0.034*** (0.000)
	Inflation	-0.018*** (0.000)	-0.019*** (0.000)	-0.018*** (0.000)	-0.018*** (0.000)	-0.018*** (0.000)	-0.018*** (0.000)
	Interest rates	-0.064*** (0.002)	-0.045*** (0.002)	-0.045*** (0.002)	-0.048*** (0.002)	-0.047*** (0.002)	-0.029*** (0.002)
	House price	-0.004*** (0.000)	-0.005*** (0.000)	-0.002*** (0.000)	-0.005*** (0.000)	-0.003*** (0.000)	-0.005*** (0.000)
	Construction permits	-0.089*** (0.001)	-0.091*** (0.001)	-0.089*** (0.001)	-0.091*** (0.001)	-0.089*** (0.001)	-0.069*** (0.001)
	Property taxation	-0.238*** (0.003)	-0.214*** (0.003)	-0.172*** (0.003)	-0.205*** (0.003)	-0.221*** (0.003)	-0.350*** (0.003)
	Bank concentration	0.005*** (0.000)	0.004*** (0.000)	0.001** (0.000)	0.005*** (0.000)	0.001*** (0.000)	-0.003*** (0.000)
	GDP	0.119*** (0.003)	0.132*** (0.003)	0.095*** (0.003)	0.139*** (0.003)	0.121*** (0.003)	0.237*** (0.003)
	LTV	0.264*** (0.006)	0.285*** (0.006)	0.273*** (0.006)	0.327*** (0.006)	0.258*** (0.006)	0.473*** (0.006)
	(Intercept)	-3.600*** (0.033)	-3.289*** (0.039)	-2.912*** (0.032)	-3.243*** (0.033)	-2.948*** (0.034)	-3.328*** (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 individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and loan-to-value ratio (LTV) listed in the first column. Standard errors in parentheses. ** p < 0.05, *** p < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

From the regressions (1 to 6) in Table 3.3, we can conclude that the relationship between cultural dimensions and holding a mortgage continue to be strong with the same evidence of the baseline model (Table 3.2). These findings of the dimensions of national culture are consistent with Gaganis *et al.* (2020), except for individualism. Our result regarding the negative impact of individualism on the likelihood of holding the mortgage goes against Gaganis *et al.* (2020) that did not find a

significant relationship between individualism and holding a mortgage. Moreover, the finding of long-term orientation is consistent with De Mooij and Hofstede (2002) that suggests that long-term orientated cultures are cash or debit card cultures, not credit card cultures.

Also, we found that interest rates, house prices, construction permits, and property taxation are negatively associated with holding the mortgage. Bank concentration, GDP, and loan-to-value ratio were positively associated with the likelihood of holding a mortgage. Our result regarding the influence of interest rates on holding the mortgage is consistent with Wolswijk (2006). As explained in Wolswijk (2006), low mortgage interest rates enhance the ability of households to borrow while keeping debt servicing costs, as a percentage of their income, stable. Also, Wolswijk (2006) indicated that high house prices may decrease mortgage demand of starters on the housing ladder but may have the opposite effect on current owners.

Considering the abovementioned results, we cannot reject our hypotheses (1), (4), (5), and (6) related to the effects of individualism, indulgence, uncertainty avoidance, and long-term orientation on the likelihood of holding a mortgage. On the other hand, we have to reject our hypotheses (2) and (3) since our results show a negative impact of masculinity and power distance on the likelihood of holding a mortgage.

Table 3.4 presents the results of the baseline random effects estimation for the log of mortgage, where we control for urbanization and inflation.

Table 3.4: Culture and Log of Mortgage: Baseline model

		Dependent variable: Log of Mortgage					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.000)	0.022*** (0.000)	0.020*** (0.000)	0.026*** (0.000)	0.022*** (0.000)	-0.011*** (0.000)
	Inflation	-0.032*** (0.001)	-0.032*** (0.001)	-0.037*** (0.001)	-0.032*** (0.001)	-0.032*** (0.001)	-0.039*** (0.001)
	(Intercept)	5.266*** (0.025)	5.085*** (0.030)	5.630*** (0.029)	5.927*** (0.026)	5.015*** (0.030)	5.816*** (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 a mortgage on the individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, urbanization, and inflation listed in the first column. Standard errors in parentheses. * $p < 0.1$, *** $p < 0.01$. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

The regressions (1 to 6) in Table 3.4 reveal that the levels of masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are positively (negatively) associated with the amount of mortgage (results statistically significant at the 1% level with exception of masculinity that is at the 10% level). Moreover, we can infer that the urban population (inflation) is positively (negatively) associated with the amount of mortgage.

Table 3.5 presents additional estimates for the determinants of the log of the mortgage while controlling for other country-specific attributes, namely inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and the loan-to-value ratio.

Table 3.5: Culture and Log of Mortgage: Inclusion of control variables

		Dependent variable: Log of Mortgage					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.001)	0.009*** (0.001)	-0.008*** (0.001)	0.034*** (0.001)	-0.011*** (0.001)	-0.045*** (0.001)
	Inflation	-0.151*** (0.001)	-0.156*** (0.001)	-0.152*** (0.001)	-0.079*** (0.001)	-0.155*** (0.001)	-0.117*** (0.001)
	Interest rates	-0.233*** (0.005)	-0.373*** (0.005)	-0.191*** (0.005)	-0.165*** (0.005)	-0.260*** (0.005)	-0.115*** (0.005)
	House price	0.032*** (0.001)	0.036*** (0.001)	0.050*** (0.001)	0.045*** (0.001)	0.028*** (0.001)	0.045*** (0.001)
	Construction permits	0.103*** (0.003)	0.092*** (0.003)	0.126*** (0.003)	-0.031*** (0.003)	0.099*** (0.003)	0.201*** (0.003)
	Property taxation	0.552*** (0.011)	0.455*** (0.010)	0.628*** (0.010)	-0.179*** (0.011)	0.533*** (0.010)	0.357*** (0.010)
	Bank concentration	0.053*** (0.001)	0.065*** (0.001)	0.051*** (0.001)	0.012*** (0.001)	0.054*** (0.001)	0.049*** (0.001)
	GDP	0.681*** (0.009)	0.496*** (0.009)	0.616*** (0.009)	0.805*** (0.009)	0.680*** (0.009)	0.936*** (0.009)
	LTV	-0.964*** (0.018)	-0.766*** (0.017)	-1.216*** (0.017)	-1.379*** (0.016)	-0.925*** (0.018)	-0.778*** (0.016)
	(Intercept)	-0.438*** (0.121)	-4.034*** (0.118)	-1.513*** (0.112)	4.173*** (0.113)	-0.515*** (0.113)	-3.423*** (0.108)
Num. Obs.		130,851	130,851	130,851	130,851	130,851	130,851
R ²		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 a mortgage on the individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and loan-to-value ratio (LTV) listed in the first column. Standard errors in parentheses. *** p < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

From the regressions (1 to 6) in Table 3.5, our main conclusions regarding the impact of national cultures on the amount of mortgage are similar to those obtained with the baseline model (Table 3.4). In the case of masculinity, the level of statistically significant increased to the 1% level. In addition, we deduced that the interest rates, urban population, loan-to-value ratio, and inflation are negatively associated with the amount of mortgage. On the contrary, we found that bank concentration, GDP, house price, construction permits, and property taxation were positively

associated with the amount of mortgage. The results of our coefficients of inflation, interest rates, house price, and property taxation are consistent with Wolswijk (2006) and Gaganis *et al.* (2020). As explained in Wolswijk (2006), higher house prices increase the amounts of mortgages to be financed by new buyers. At the same time, buyers may have incentives to buy now if they anticipate a future increase in prices. Moreover, Wolswijk (2006) concluded that higher taxation on a property may affect both the decision to purchase a house and its financing, as the buyers will have to consider both current and future payable taxes.

3.4.2 Endogeneity

In this section, we re-estimate the specifications of Table 3.5 using a generalized method of moments (GMM) to treat with possible endogeneity of the variables and verify the results of random effects. Following Díez-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 3.6. Table 3.6 presents the additional estimates for the determinants of the log of the mortgage using GMM models, while controlling for other country-specific attributes, namely inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and the loan-to-value ratio.

Table 3.6: Culture and Log of Mortgage: GMM models

		Dependent variable: Log of Mortgage					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	Mortgage(t-1)	0.323* (0.176)	0.440*** (0.114)	-3.393*** (0.449)	0.751*** (0.057)	3.203*** (0.314)	-0.303* (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*** (0.027)	0.055*** (0.009)	-0.121*** (0.015)	0.004*** (0.001)	0.184*** (0.021)	-0.321*** (0.048)
	Inflation	0.001* (0.001)	-0.001*** (0.000)	0.001* (0.001)	-0.001*** (0.000)	-0.004*** (0.001)	-0.000 (0.000)
	Interest rates	0.003** (0.001)	-0.000 (0.001)	-0.016*** (0.002)	-0.001*** (0.000)	0.025*** (0.003)	-0.003*** (0.001)
	House price	0.002*** (0.001)	-0.005*** (0.001)	-0.012*** (0.001)	-0.000 (0.000)	0.006*** (0.001)	-0.000 (0.000)
	Construction permits	0.063*** (0.021)	-0.017*** (0.004)	0.027*** (0.008)	-0.003* (0.002)	0.184*** (0.023)	-0.051 (0.034)
	Property taxation	-0.000 (0.000)	0.004*** (0.001)	0.053*** (0.006)	-0.001*** (0.000)	-0.043*** (0.005)	0.007** (0.003)
	Bank concentration	-0.001 (0.000)	0.008*** (0.001)	0.009*** (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)
	GDP	0.005*** (0.001)	0.002*** (0.001)	0.028*** (0.003)	0.002*** (0.000)	-0.013*** (0.002)	-0.021*** (0.003)
	LTV	0.287*** (0.105)	-0.213*** (0.052)	-1.465*** (0.163)	-0.038 (0.025)	1.596*** (0.213)	0.093 (0.170)
	(Intercept)	3.034*** (0.882)	-2.136** (0.840)	46.479*** (5.058)	1.586*** (0.437)	-45.030*** (5.548)	0.000 (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 a mortgage on the individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, urbanization, inflation, interest rates, house price, construction permits, property taxation, bank concentration, GDP, and loan-to-value ratio (LTV) listed in the first column. Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

The results of GMM models for a log of a mortgage in Table 3.6 are consistent with those obtained with the random effect models (Table 3.5). Consequently, we can conclude that belonging to a

country that mainly masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are positively (negatively) associated with the amount of mortgage. Our findings regarding the influence of power distance, long-term orientation, and indulgence on the amount of mortgage are similar to Gaganis *et al.* (2020).

Considering the abovementioned results, we cannot reject our hypotheses (2), (4), and (6) related to the impact of masculinity, long-term orientation, and indulgence on the amount of mortgage. On the other hand, we are led to reject hypotheses (1), (3), and (5) since our findings reveal a negative (positive) impact of individualism and power distance (uncertainty avoidance) on the amount of mortgage.

3.4.3 The likelihood of being in a state of financial well-being

In this section, we examine whether dimensions of national culture are associated with the likelihood of being in a state of financial well-being. Tables 3.7 and 3.8 present the results of the estimations of the determinants of the likelihood to be in that state by two variables: affords to pay for the one-week annual holiday, and the ability to make ends meet respectively, where we control for the governance effectiveness (CPI), GDP, and total household income.

Table 3.7: Culture and Financial Well-Being by Afford to Pay

		Dependent variable: Afford to Pay					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.002)	-0.009*** (0.002)	-0.022*** (0.001)	-0.007*** (0.002)	-0.022*** (0.001)	-0.024*** (0.001)
	CPI	0.023*** (0.000)	0.023*** (0.000)	0.023*** (0.000)	0.022*** (0.000)	0.020*** (0.000)	0.027*** (0.000)
	Household income	2.094*** (0.004)	2.095*** (0.004)	2.092*** (0.004)	2.126*** (0.004)	2.100*** (0.004)	2.135*** (0.004)
	(Intercept)	-0.531*** (0.007)	-0.369*** (0.009)	-0.394*** (0.011)	-0.363*** (0.008)	0.109*** (0.012)	-0.493*** (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 individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, GDP, corruption perception index (CPI), and total household income listed in the first column. Standard errors in parentheses. *** p < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.

Table 3.8: Culture and Financial Well-Being by Ends Meet

		Dependent variable: Ends Meet					
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	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*** (0.000)	0.060*** (0.000)	0.055*** (0.000)	0.061*** (0.000)	0.052*** (0.000)	0.057*** (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 ordered logit models for the determinants of the ability to make ends meet on the individualism, masculinity, power distance, long-term orientation, uncertainty avoidance, indulgence, GDP, corruption perception index (CPI), and total household income listed in the first column. Standard errors in parentheses. *** $p < 0.01$. (See Appendix 3.3 Definitions of variables).
Source: own elaboration.

Tables 3.7 and 3.8 suggest that the levels of individualism and long-term orientation (power distance and uncertainty avoidance) are positively (negatively) associated with the likelihood of being in a state of financial well-being (based on the two measurements: afford to pay for a one-week annual holiday, and ability to make ends meet that is statistically significant at a 1% level). Our findings of power distance and individualism are consistent with Steel *et al.* (2018), and the uncertainty avoidance is similar to Hofstede (2001) and Steel *et al.* (2018).

We found mixed results regarding the impact of masculinity and indulgence on the likelihood of being in a state of financial well-being by the two measurements. Moreover, we noticed that governance effectiveness and income (GDP) are positively (negatively) associated with the likelihood of being in a state of financial well-being based on two measurements.

Considering the abovementioned results, we cannot reject our hypotheses (7), (8), (10), and (11) related to the effect of individualism, power distance, uncertainty avoidance, and long-term orientation on the likelihood of being in a state of financial well-being. Furthermore, we cannot

decide regarding hypotheses (9) and (12) due to mixed results of the influence of masculinity and indulgence on the likelihood of being in a state of financial well-being.

3.5 Discussion

Our findings regarding the impact of national cultures on the decision to hold secured debt are consistent with Gaganis *et al.* (2020). For example, 1) the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation (indulgence) are negatively (positively) associated with the likelihood of holding a mortgage, and 2) the levels of power distance and long-term orientation (indulgence) are negatively (positively) associated with the amount of mortgage. Moreover, our conclusion related to the negative influence of long-term orientation on the decision to hold secured debt is similar to De Mooij and Hofstede (2002) that indicates that long-term orientated cultures are cash or debit card cultures, not credit cards cultures.

On the other hand, some results go against Gaganis *et al.* (2020). For example, 1) we showed a negative impact of individualism on the likelihood of holding the mortgage in contract to Gaganis *et al.* (2020) that did not find a significant relationship, and 2) we found that masculinity and uncertainty avoidance (individualism) is positively (negatively) associated with the amount of mortgage. Instead of that, Gaganis *et al.* (2020) inferred the signs of the coefficients of uncertainty avoidance and individualism are opposite to our evidence. In addition, Gaganis *et al.* (2020) did not find a significant relationship between masculinity and mortgage debt. One possible explanation for this discrepancy is that our study examined the decision to hold secured debt at the households' levels, while Gaganis *et al.* (2020) focused on country attributes. It is plausible to admit that this option might have an important influence on the results.

Also, our evidence implies the positive (negative) effect of individualism (power distance) on the likelihood of being in a state of financial well-being. This evidence is similar to Steel *et al.* (2018). In addition, our finding indicates a negative influence of uncertainty avoidance on the likelihood of being in a state of financial well-being, which agrees with the Hofstede (2001) and Steel *et al.* (2018) results.

Previous studies conclude that national culture dimensions are significant determinants of the dimensions of household finance, on the level of country-attributes such as Gaganis *et al.* (2020)

or individual countries such as Gogolin *et al.* (2017), without examining the household characteristics. Therefore, our research fills that gap by studying the relationship between the national culture and the dimensions of household finance using samples from 31 European countries and examining household characteristics.

3.6 Conclusion

This research extends the literature on household finance by reinforcing the knowledge on the determinants of the decision to hold secured debts and the likelihood of being in a state of financial well-being. We examined the influence of Hofstede's national cultures on the decision to hold secured debts and the likelihood of being in a state of financial well-being in 31 European countries using the EU-SILC dataset from Eurostat. To the best of our knowledge, this is the first research that uses these data in this context.

Our main conclusions indicate that 1) the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with the likelihood of holding a mortgage, 2) the levels of masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are positively (negatively) associated with the amount of mortgage and 3) the levels of power distance and uncertainty avoidance (individualism and long-term orientation) are negatively (positively) associated with the likelihood of being in a state of financial well-being.

This chapter investigates the implications of national cultures on mortgages and financial welfare to households, policymakers, and academia. The results of this chapter 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, and raise their awareness of how to deal with their national culture to increase their likelihood of being in a state of financial well-being. For example, power distance and uncertainty avoidance societies should plan ahead of time for their financial issues to avoid having any financial distress, and thus increase their likelihood of being in a state of financial well-being.

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. In addition, we offer indications to policymakers about improving the welfare of households in societies with high power distance and uncertainty avoidance. Lastly, this chapter adds to the academic research on the determinants of the decision to hold secured debts and a better explanation of the likelihood of being in a state of financial well-being.

The limitations of our research represent that we used the cross-country data for the dimensions of national culture for the households because there are no data for these variables on households' levels. This methodological option may impact the results due to the generalization of these variables on all the households in each country. Future research can investigate the relationship between national culture and household finance in different settings on other continents using surveys or interviews with the households to observe accurate results.

Appendices

Appendix 3.1 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 Appendix 3.3.

Appendix 3.2 Distribution of the sample by country

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

Source: own elaboration.

Appendix 3.3 Definitions of variables

Variable	Definition
Dependent Variables	
Holding mortgage	Measured as a binary variable takes the value of 1 if the household 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 of the households in Euro currency. (Source: EU-SILC dataset, Eurostat).
Ability to make ends meet	The financial well-being indicator is measured by asking the households if their total income is able to make ends meet, namely, to pay for its usual necessary expenses. The ordinal variable 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 by asking the households if they can afford to go for a week's annual holiday. The binary variable takes the value of 1 if the answer is yes, otherwise 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, 2021).
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, 2021).
Masculinity (MAS)	National culture indicator represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive (Source: Hofstede Insights, 2021).
Uncertainty avoidance (UA)	National culture indicator expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity (Source: Hofstede Insights, 2021).
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, 2021).
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, 2021).
Control Variables	
GDP	GDP growth (annual %). (Source: European Mortgage Federation (EMF) of Hypostat (2021)).
Inflation	Inflation, consumer prices (annual %). (Source: European Mortgage Federation (EMF) of Hypostat (2021)).

Interest rates	Representative interest rates on new residential loans, annual average based on monthly figures (%). (Source: European Mortgage Federation (EMF) of Hypostat (2021)).
House price	Nominal house price indices. (Source: European Mortgage Federation (EMF) of Hypostat (2021)).
Urbanization	Urban population (% of total). (Source: World Development Indicators of the World Bank (2021c)).
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 (2021b)).
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 (2021a)).
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, 2021).
Governmental effectiveness (CPI)	Corruption perception index (CPI). (Source: Transparency International, 2021).
Loan-to-value ratio (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 <i>et al.</i> , 2017).
Income	Total household income in Euro currency. (Source: EU-SILC dataset, Eurostat).

Source: own elaboration.

Appendix 3.4. 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 < 0.01. (See Appendix 3.3 Definitions of variables). Source: own elaboration.						

References of Chapter Three

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Chapter Four

Does Religion Influence the Household Finance? Evidence from Europe

4 Does Religion Influence the Household Finance? Evidence from Europe

Abstract

In the last few years, researchers have been noticing that religion plays an essential role in individual decision-making, including ones of financial nature. This chapter investigates the effect of religious backgrounds and religiosity on the likelihood of holding a mortgage and the likelihood of being in a state of financial distress and financial well-being in 32 European countries. For this purpose, we recur to regression analysis of the information on religions and the European Union Statistics on Income and Living Conditions (EU-SILC) dataset from the Eurostat. To our knowledge, no study has addressed the influence of religion on these variables in the European Continent. Our results show that belonging to a mainly Catholic or Orthodox (Protestant) country is negatively (positively) associated with the likelihood of holding a mortgage. Moreover, belonging to a Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress. The findings also depict that the levels of religiosity observed in a country are negatively associated with the likelihood of holding a mortgage and the likelihood of being in a state of financial distress. This research offers recommendations to households, policymakers, and academia on the determinants of the likelihood of holding secured debts and a better explanation of the likelihood of being in a state of financial distress and well-being.

Keywords: Household Finance, Religion, Mortgage, Financial distress, Financial well-being, Europe.

JEL Classification: G40, G50, G51.

4.1 Introduction

In the past few years, studies have shown that religion plays a significant role in individual financial decisions. Recent research has explained the vital role of religion on the macro-level (Renneboog and Spaenjers, 2012). At the same time, the research paid less attention to exploring the influence of religion on the micro-level, that is, the individuals or the households (Renneboog and Spaenjers, 2012). The relationship between religious beliefs and an individual's prospect of borrowing appears ambiguous (Chunping *et al.*, 2016). However, religious beliefs could impact the decision to borrow money by exerting an effect on these individuals and their families' tolerance and time preference (Chunping *et al.*, 2016).

Moreover, believers of a particular religion are more likely to be patient than other believers and resist the temptation of short-term benefits. Therefore, they may take a longer perspective when making economic decisions (Chunping *et al.*, 2016). Social science has long been interested in the determinants of the financial well-being of individuals. However, previous studies found a substantial cross-sectional variation, not described by demographic or economic variables (Xu *et al.*, 2015). Hence, it is crucial to determine the source of individual variation in financial behavior and the outcomes to improve financial well-being.

The research on religion has been considered in the field of financial economics recently but is still limited to countries (Díez-Esteban *et al.*, 2019), such as the United States (Green and Elliott 2010; Jang and Johnson 2004) and China (Chunping *et al.*, 2016). To the best of our knowledge, no study has addressed the relationship between religion and dimensions of household finance in the European setting, that is, using samples from different countries and controlling household characteristics. Therefore, this chapter fills the gap in the literature by examining the impact of religious backgrounds and religiosity on three dimensions of household finance concerning 1) the decision to hold secured debts, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being in 32 European countries. Also, to the best of our knowledge, this is the first research that uses the EU-SILC dataset in this context.

This chapter finds that belonging to a mainly Catholic or Orthodox (Protestant) country is negatively (positively) associated with the likelihood of holding a mortgage. Belonging to a Protestant (Catholic or Orthodox) country is negatively (positively) associated with

the mortgage amount. Furthermore, we infer that belonging to a Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress. Also, we conclude that levels of religiosity observed in a country are negatively associated with the likelihood of holding a mortgage and the likelihood of being in a state of financial distress. Moreover, the levels of religiosity observed in a country are positively associated with the amount of mortgage and the likelihood of being in a state of financial well-being.

This chapter is structured as follows. Section two presents the related literature and develops the hypotheses to be tested. Section three describes the data and methodology. Section four reports the empirical results. Section five presents the discussions and Section six concludes the chapter.

4.2 Literature Review and Hypotheses Development

4.2.1 Literature Review

Previous studies have investigated the non-religion determinants of mortgage levels, financial distress, and financial well-being levels. For example, Nyhus and Webley (2001) and Brown and Taylor (2014) examined the impact of personality traits on mortgage levels, while Donnelly *et al.* (2012) and Xu *et al.* (2015) investigated the effect of personality traits on financial distress and financial well-being. Steel *et al.* (2018) and Gaganis *et al.* (2020) focused on the influence of national culture on financial well-being levels and mortgage levels, respectively. Also, Ashqar and Lobão (2021) investigated the impact of national culture on the decision of holding a mortgage and the likelihood of being in a state of financial well-being in the European context. These studies show that personality traits and national cultures are significant determinants of the dimensions of household finance.

The literature has also examined the influence of religion on psychological distress and well-being. For example, Ross (1990) found that a person's religious belief is negatively associated with psychological distress. The author showed that individuals with no religious attachment have, in general, low levels of distress. Also, Ross (1990) concluded that

Protestants had the lowest distress levels, followed by Catholics, Jews, and others. These findings are consistent with Guiso *et al.* (2003) that revealed that religious beliefs are associated with "good" economic attitudes, where "good" is defined as conducive to growth and higher income per capita. They demonstrated that Christian backgrounds are more positively associated with attitudes conducive to economic growth. Also, Green and Elliott (2010) observed that religious people had better health and happiness. In addition, Bradshaw and Ellison (2010) explained using North-American data that financial hardship is positively associated with psychological distress, and the role of religious life such as religious attendance and the belief in an afterlife moderate the harmful influences of financial hardship. This evidence is similar to Krause and Hayward (2015) that noticed that individuals who have greater trust in God when faced with chronic financial strain experienced fewer symptoms of depression and higher levels of life satisfaction and rated their health more favorably than individuals with less trust in God. Besides, Sasaki *et al.* (2011) showed that religious Koreans, who are more genetically predisposed toward social sensitivity, have greater psychological well-being than religious European or Americans who had lower psychological well-being. In a recent study, Gharbi *et al.* (2020) conclude that corporate headquarters situated in more religious United States counties are less likely to suffer from financial problems. They observed that this negative relation became more robust in the financial crisis of 2008.

On the other side, Gruber (2005) found that higher religious density based on one's ancestry leads to better outcomes according to several key economic indicators: higher levels of education and income, lower levels of welfare receipt and disability, higher levels of marriage, and lower levels of divorce. Also, Keister (2008) found that religious beliefs can directly influence a believer's economic values and indirectly influence education, fertility, and female labor participation rates.

Other studies focused on the impact of religion on financial decisions. For example, Renneboog and Spaenjers (2012) concluded using Dutch survey data that religious households are more likely to save money, consider themselves more trusting, have a stronger bequest motive, and have a longer planning horizon. Moreover, Catholics show more significance in saving money, are more risk-averse and are less likely to invest in the stock market. In contrast, Protestants combine a more external locus of control with a greater sense

of financial responsibility (Renneboog and Spaenjers, 2012). Kanagaretnam *et al.* (2015) deduced that banks in more religious countries present lower levels of risk in their decision-making. They showed that banks in more religious countries were less likely to face financial difficulty or fail during the 2007–2009 financial crisis. Fletcher and Kumar (2014) uncovered evidence that supports the negative influence of religious activity participation on risky consumption. Furthermore, Chunping *et al.* (2016) showed a negative relationship between the religious beliefs of Chinese households and money-borrowing decisions. They also discovered that Buddhists tend to borrow less than adherents of other religions, while other religious beliefs such as Taoism, Confucianism, and Christianity had no statistically significant impact on that decision. The results of Chunping *et al.* (2016) are consistent with Usman and Lizam (2016) according to which religious perception on a mortgage was the most significant determinant of using a mortgage in financing homeownership. Fisman *et al.* (2017) suggest that the cultural proximity derived from religious beliefs improves the efficiency of dealing with financial resources such as credit allocation. Besides, Ma *et al.* (2018) showed using Chinese data that the saving propensity of believers is higher than that of non-believers. In contrast, their household savings rate is lower than that of non-believers. In addition, Ma *et al.* (2018) found that religious believers have different economic attitudes, have more solid saving awareness, risk aversion, and weaker financial responsibility that makes higher saving propensity. Additionally, Fuseini *et al.* (2019) explored using Ghanaian data that religion largely shapes gender power relations in household decision-making and serves as the basis for justifying the status quo. Moreover, Cai and Shi (2019) reported that companies in more religious areas use less debt financing and receive better credit ratings. To conclude, previous studies show that religion is a significant determinant of the dimensions of household finance, in countries such as the United States (Green and Elliott 2010; Jang and Johnson 2004) and China (Chunping *et al.*, 2016). To the best of our knowledge, there are no earlier studies that investigated the relationship between religion and the dimensions of household finance using samples from different countries and controlling for household characteristics. Therefore, this research fills that gap by examining the influence of religious backgrounds and religiosity on the dimensions of household finance based on three aspects 1) the decision to hold secured debts, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being.

4.2.2 Hypotheses Development

The prevailing religion in Europe is Christianity, and there are historical schisms in this common religious identity: Catholicism, Protestantism, and Orthodoxy. Each of these denominations prevails in specific parts of the continent (Pew Research Center, 2018a).

Table 4.1 presents the distribution of religions in Europe.

Table 4.1: Distribution of religions in Europe

Country	Orthodox	Catholic	Protestant	Muslim	None
Orthodox most prominent Christian tradition					
Greece	90%	0%	3%	3%	4%
Latvia	31%	23%	23%	2%	21%
Romania	86%	5%	6%	2%	1%
Bulgaria	75%	1%	3%	16%	5%
Serbia	88%	4%	1%	3%	4%
Protestantism most prominent Christian tradition					
Denmark	0%	4%	58%	9%	30%
Finland	1%	0%	73%	4%	22%
United Kingdom	0%	19%	53%	5%	23%
Sweden	1%	2%	46%	9%	42%
Norway	0%	1%	47%	9%	43%
Catholicism most prominent Christian tradition					
Austria	1%	75%	5%	4%	16%
Belgium	0%	49%	4%	10%	38%
Czech Republic	1%	21%	3%	3%	72%
Germany	0%	43%	28%	5%	24%
Croatia	4%	84%	2%	3%	7%
Spain	0%	60%	3%	7%	30%
France	1%	60%	3%	8%	28%
Ireland	0%	72%	5%	8%	15%
Italy	0%	78%	1%	6%	15%
Lithuania	3%	75%	15%	2%	6%
Hungary	0%	56%	20%	3%	21%
Poland	1%	87%	3%	2%	7%
Portugal	0%	77%	4%	4%	15%
Switzerland	0%	55%	19%	4%	21%
Slovakia	1%	63%	8%	4%	25%
Christian traditions mixed					
Estonia	25%	1%	25%	4%	45%
Netherlands	0%	19%	18%	14%	48%

Source: Pew Research Center (2018a).

Orthodoxy is the dominant faith in Eastern Europe, namely Greece, Russia, the former Soviet republics of Moldova, Armenia, Georgia, Ukraine, Belarus, and other former Eastern bloc countries such as Serbia, Romania Bulgaria. Most Catholic countries are predominant in the central and Southwestern parts of Europe, including Lithuania, Poland, Slovakia, Hungary, Croatia, Austria, Italy, France, Spain, and Portugal. On the other hand, Protestant countries are prevalent in much of Northern Europe, especially Scandinavia (Pew Research Center, 2018a).

In this chapter, we examine the effects of the three denominations of Christianity (Catholic, Protestant, and Orthodox) and religiosity on three dimensions of household finance by choice of holding a mortgage, and the likelihood of being in a state of financial distress and financial well-being in the European context.

Some studies indicate that Protestants are generally more risk-averse than Catholics (Barsky *et al.*, 1997; Hilary and Hui, 2009; Noussair *et al.*, 2013). Moreover, Renneboog and Spaenjers (2012) show that Catholics attribute more significance to saving money and are less willing to take risks. Conversely, Protestants feel less able to control their life-course, and they have a higher sense of individual financial responsibility. Chunping *et al.* (2016) found evidence from China that only Buddhists borrow less than adherents of other religions, while other religious beliefs such as Taoism, Confucianism, and Christianity had no statistically significant impact on that decision. On the other hand, Kumar *et al.* (2011) revealed that in regions where Catholics prevail over Protestants, investors exhibit a stronger propensity to hold lottery-type stocks, broad-based employee stock option plans are more popular, and the magnitude of the negative lottery-stock premium is larger. Díez-Esteban *et al.* (2019) considered the Catholic and Orthodox are handled equally as their differences set more on theological aspects rather than economic ones. Based on this literature, we conjecture the following:

Hypothesis 1. Households belonging to a country that is predominantly Protestant (Catholic or Orthodox) have a higher (lower) likelihood of holding secured debt.

There are some authors who examined the relationship between religion and the likelihood of being in a state of distress. For example, Petersen and Roy (1985) found that religiosity

measured by church attendance is negatively associated with anxiety. Ross (1990) discovered that Protestants had the lowest distress levels, followed by Catholics. Williams *et al.* (1991) concluded that although religious attendance does not directly decrease psychological distress, it buffers the harmful impacts of stress on mental health. Jang and Johnson (2004) found that religiously committed African Americans are less likely to experience distress than their less religious or non-religious counterparts. Based on this literature, we hypothesize the following:

Hypothesis 2. Households belonging to a Protestant, Catholic, and Orthodox background have a lower likelihood of being in a state of financial distress.

Some authors investigated the relationship between religion and the likelihood of being in a state of well-being. For example, Poloma and Pendleton (1990) discovered that religious orthodoxy is positively correlated with existential well-being. Guiso *et al.* (2003) observed that Christian religions are more positively associated with attitudes conducive to economic growth. Sasaki *et al.* (2011) found that religious European Americans had lower psychological well-being. In a recent study, Wu (2020) showed that a combination of Christian religious beliefs and indigenous spiritual beliefs are positively associated with subjective well-being. Based on these findings, we expect,

Hypothesis 3. Households belonging to a Protestant, Catholic, and Orthodox background have a higher likelihood of being in a state of financial well-being.

The relationship between religious beliefs and an individual's borrowing looks ambiguous (Chunping *et al.*, 2016). However, Chunping *et al.* (2016) suggested that religious belief can affect the decision to borrow money or not by exerting impact on the patience and time preference of individuals and their families. Some previous studies indicated that religious beliefs make individuals more self-disciplined and prudent, which leads to less borrowing and more patience (Guiso *et al.*, 2003; Renneboog and Spaenjers, 2012; Fletcher and Kumar, 2014; Ma *et al.*, 2018). Also, Miller and Hoffmann (1995) discovered that religiosity is negatively correlated with attitudes towards risk and danger at an individual level. Hilary and

Hui (2009) showed that individuals who attend religious services more often or are primed with religious texts are less likely to accept riskier payouts. Similarly, Noussair *et al.* (2013) found that religious people are more risk-averse. Fletcher and Kumar (2014) found that religious activity participation is negatively associated with risky consumption. Based on these findings, we predict,

Hypothesis 4. The religiosity level of the households is negatively related to the likelihood of holding secured debt.

Some studies found that organizational religious activities such as religious attendance and nonorganizational practices such as prayer and other devotional pursuits are more likely to reduce feelings of distress and depression in different countries (Krause, 2008; Ellison and Flannelly, 2009). These findings agree with Krause and Hayward (2015) that found that individuals who trust in God experience fewer symptoms of depression when faced with chronic financial strain. Also, Ross (1990) showed that religious beliefs are negatively associated with psychological distress. Moreover, Ellison *et al.*, (2001) and Kidwai *et al.*, (2014) revealed that the frequency of religious attendance is negatively associated with psychological distress; this agrees with Bradshaw and Ellison (2010) that indicated the essential role of spiritual life such as religious attendance and belief in an afterlife to moderate the damaging influences of financial hardship. Based on this literature, we hypothesize the following:

Hypothesis 5. The religiosity level of the households is negatively related to the likelihood of being in a state of financial distress.

Previous studies agreed that religiosity level is positively associated with the likelihood of being in a state of well-being. For example, Ellison *et al.* (2001) revealed that the frequency of church attendance and belief in eternal life is positively associated with the level of well-being. Guiso *et al.* (2003) observed that religious beliefs lead to higher per capita income and growth. Gruber (2005) suggested that religious faith improves well-being directly by arguing that those with more faith are less likely to be stressed out in daily problems that impede

success in labor and marriage. Also, Gruber (2005) found the positive impact of religious density on the levels of income. Stavrova *et al.* (2013) noticed that religious individuals are more likely to be happier and satisfied with life than non-religious individuals, primarily in religious countries with dominant-negative attitudes towards non-believers. Krause and Hayward (2015) revealed that individuals who trust in God experience higher levels of life satisfaction when faced with chronic financial strain. In a recent study, Wu (2020) found that religiosity measured by church attendance is positively associated with subjective well-being. Based on this literature, we conjecture the following:

Hypothesis 6. The religiosity level of the households is positively related to the likelihood of being in a state of financial well-being.

Following the existing literature such as Guiso *et al.* (2003) and Chunping *et al.* (2016), we control our results for the following variables: age, squared age, gender, income, education, health, and marital status. We include the squared age to account for the non-linear effects of households' religious backgrounds and religiosity in people's lives (Oehler and Horn, 2020).

4.3 Data and Methodology

4.3.1 Data

To investigate the impact of religious backgrounds and religiosity on the three dimensions of household finance mentioned above, we used data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset from the Eurostat Database. (See Appendix 4.1 Supplementary data). These data cover the dimensions of household finance at

the household level¹⁰ from 2004 to 2018 for 32 European countries, including 27 member countries of the European Union (EU) and five other European countries¹¹.

Also, we obtained the cross-country data for the denominations of the Christian religion from the World Factbook (2020). The largest religion in Europe is Christianity. Overall, in Europe, 47 percent of Christians are Roman Catholic, 18 percent are Protestants, and 35 percent are Orthodox (Pew Research Center, 2011). Based on Díez-Esteban *et al.* (2019), we used three denominations of the Christian religion: Catholicism, Orthodox, and Protestantism.

- CATH is a dummy variable that takes the value of 1 for Catholic countries and 0 otherwise.
- ORTH is a dummy variable that takes the value of 1 for Orthodox countries and 0 otherwise.
- PROT is a dummy variable that takes the value of 1 for Protestant countries and 0 otherwise.

Moreover, we used the index of religious observance (religiosity) from surveys conducted by the Pew Research Center (2018b) between 2015 and 2017 among nearly 56,000 adults (ages 18 and older). This index is proxied by the average of the four individual measures - the importance of religion, worship attendance, frequency of prayer, and belief in God.

Our data combines time series with cross-sectional data that allow the formation of panel data, the number of observations of the households in our sample is 3,125,891. As shown in Appendix 4.2, the lowest number of observations in our sample corresponds to Serbia and Iceland, with 34,205 observations and 36,083 observations, respectively, while the highest number of observations are from Poland and Italy, with 189,120 observations and 236,411 observations, respectively.

¹⁰ These data are extracted from registers or collected from interviews by five modes of data collection are possible: 1 - Pen-and-paper personal interviewing (PAPI). 2 - Computer-assisted personal interviewing (CAPI). 3 - Computer-assisted telephone interviewing (CATI). 4 - Self-administered by respondent. 5 - Proxy interview. The household respondent for the dimensions of household finance is choosing according to the following priorities: 1) the person responsible for the accommodation. 2) a household member aged 16 and over who is the best place to give this information.

¹¹The 27 member countries of the EU are the following: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Greece, Croatia, Spain, France, Ireland, Italy, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Cyprus, and Sweden; and the other five European countries considered are Iceland, Norway, Serbia, Switzerland, and the United Kingdom.

Given the availability of EU-SILC data regarding the three dimensions of household finance concerning: 1) the decision to hold secured debts, 2) the likelihood of being in the state of financial distress, and 3) the likelihood of being in the state of financial well-being, we consider these three-dimensions as our dependent variables. The measurements of these variables are shown in Table 4.2.

Table 4.2: Measurement of the dimensions of household finance

Dimensions of household finance	Measurement	References
1. The decision to hold secured debt	This decision will be captured by the following two variables that will be used as dependent variables in two separate regressions: 1 - Holding a mortgage that is calculated from the tenure status variable ¹² measured as a binary variable which takes the value of 1 if the household is holding a mortgage, otherwise, the value is 0. 2 - The log of the total mortgage ¹³ calculated as the logarithm of mortgage principal repayment plus interest mortgage of the households in Euro currency.	Brown <i>et al.</i> (2008, 2013), and Brown and Taylor (2014).
2. The likelihood of being in a state of financial distress	This dimension will be captured by the following three variables that will be used as dependent variables in three separate regressions: 1 - Arrears on a mortgage or rental payments. 2 - Arrears on hire purchase installments or other loan payments ¹⁴ . 3 - Arrears on bills. These three arrears variables are measured by asking the households that in the last twelve months have been in arrears and unable to pay on time due to financial difficulties. Ordinal variables take the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more.	Xu <i>et al.</i> , (2015), and Xu <i>et al.</i> , (2017).
3. The likelihood of being in a state of financial well-being	This dimension will be captured by the following two variables that will be used as dependent variables in two separate regressions: 1 - The capacity to face unexpected financial expenses. 2 - The capacity to afford to pay for a one-week annual holiday away from home. These two capacity variables are measured by asking the households if they can afford an unexpected financial expense and to go for a week's annual holiday. Binary variables take the value of 1 if the answer is yes, otherwise 0 if it is no.	Philippas and Avdoulas (2020).

(See Appendix 4.3 Definitions of variables). Source: own elaboration.

¹² Tenure status is a nominal variable that is measured in five categories: 1- Rented at a reduced rate, 2- Rented at a market rate, 3- Provided free, 4- The owner is outright, 5- Paying a mortgage). (Source: EU-SILC dataset, Eurostat).

¹³All the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate for each specified year.

¹⁴ "Other loans" include all type of commercial credits, for instance for decoration, maintenance, refurbishment, credit cards/ store cards, catalog mail order, loans of any kind of for technical equipment (i.e. cars, motorcycles), housing equipment, education loans, holidays (holiday packages plus time-sharing holidays).

We control our results for the most important individuals' demographic characteristics which are the following:

- Age (Continuous variable).
- Squared age (Continuous variable).
- Gender (Binary variable that is measured in the following categories: 0 - Female, 1- Male).
- Marital status (Nominal variable that is measured in five categories: 1 - Never married, 2 - Married, 3 - Separated, 4 - Divorced, 5 - Widowed).
- The level of education (Ordinal variable that is measured in six categories: 0 - Pre-primary, 1 - Primary, 2 - Lower secondary, 3 - Upper secondary, 4 - Post-secondary non-tertiary, 5- First stage of the tertiary education).
- Total household income¹⁵ (Continuous variable that is measured in Euro currency).
- General health (Ordinal variable is measured in five categories: 1 - Very bad, 2 - Bad, 3 - Fair, 4 - Good, 5 - Very good).
- The countries (Nominal variable that is measured in 32 categories).

Summary statistics for the dependent, independent, and control variables are shown in Table 4.3.

¹⁵ All the amounts denominated in currencies other than the euro were converted to the euro at the average exchange rate for each specified year.

Table 4.3: Summary statistics

Variable	Mean	Median	S.D	Min	Max	Skewness	Kurtosis
Dependent Variables							
Holding mortgage	0.19	0.00	0.39	0.00	1.00	1.56	0.43
Log of mortgage	6.77	7.02	1.83	-4.61	13.04	-2.81	13.73
Arrears on bills	1.61	1.00	0.90	1.00	3.00	0.86	-1.21
Arrears on hire purchase installments or other loan payments	1.67	1.00	0.92	1.00	3.00	0.69	-1.47
Arrears on a mortgage or rental payments	1.66	1.00	0.92	1.00	3.00	0.73	-1.42
Capacity affords to pay for a one-week annual holiday	0.63	1.00	0.48	0.00	1.00	-0.55	-1.70
Capacity to face financial expenses	0.63	1.00	0.48	0.00	1.00	-0.55	-1.70
Independent Variables							
Catholic	0.67	1.00	0.47	0.00	1.00	-0.70	-1.51
Protestant	0.20	0.00	0.40	0.00	1.00	1.49	0.22
Orthodox	0.13	0.00	0.34	0.00	1.00	2.16	2.65
Religiosity	0.21	0.17	0.13	0.07	0.55	1.09	0.23
Control Variables							
Education	3.08	3.00	1.27	0.00	5.00	0.15	-0.73
Age	63.78	64.00	16.18	18.00	97.00	-0.08	-0.78
Squared age	4329.66	4096.00	2062.13	324.00	9409.00	0.37	-0.75
Total household income	0.00	-0.26	1.00	-26.26	336.08	47.71	10871.16
Health	3.62	4.00	0.97	1.00	5.00	-0.49	-0.13
Note: Data is panel data from 2004 to 2018 at individuals and household levels from EU-SILC's dataset. We standardized 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 decision to hold secured debt. Arrears on bills, arrears on hire purchase installments or other loan payments, and arrears on a mortgage or rental payments refer to the likelihood of being in a state of financial distress. Capacity affords to pay for a one-week annual holiday and the capacity to face financial expenses refer to the likelihood of being in a state of financial well-being. Age and squared age are expressed in the number of years. Catholic, protestant, orthodox, holding mortgage, capacity affords to pay for a one-week annual holiday, and capacity to face financial expenses are binary variables. Arrears on bills, arrears on hire purchase installments or other loan payments, arrears on a mortgage or rental payments, education, and health are ordinal variables. Log of total mortgage and total household income are continuous variables. Religiosity is a ratio variable. (See Appendix 4.3 Definitions of variables). Source: own elaboration.							

As shown in Table 4.3, the percentage of observations categorized as Catholic is 67%, while Orthodox beliefs comprise 13% of the sample, and Protestant corresponds to 20%. Also, there are 19 % of the households in our sample hold mortgages, and 63% of the households can afford to pay for a one-week annual holiday and face unexpected financial expenses.

Table 4.4 presents the frequency distribution of nominal control variables as follows: gender, and marital status.

Table 4.4: Frequency distribution of nominal control variables

Variable		No. observations	Percent	Cumulative Percent
Gender	Female	1,879,476	54.83%	54.83%
	Male	1,548,480	45.17%	100.00%
	Total	3,427,956	100.00%	
Marital status	Never married	662,479	19.34%	19.34%
	Married	1,901,720	55.52%	74.87%
	Separated	62,069	1.81%	76.68%
	Divorced	467,402	13.65%	90.32%
	Widowed	331,374	9.68%	100.00%
	Total	3,425,044	100.00%	

(See Appendix 4.3 Definitions of variables). Source: own elaboration.

As shown in Table 4.4, 54.83% of the individuals in our sample are females. Moreover, married people represent 55.52% of our sample and non-married people represent 19.34% of our sample.

4.3.2 Methodology

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 the binary dependent variables as follows: i) holding the mortgage, ii) the capacity to face unexpected financial expenses, and iii) the capacity to afford a one-week annual holiday. Also, we used the ordered logistic regression for the ordinal dependent variables as follows: i) arrears on mortgage or rental payments, ii) arrears on hire purchase installments or other loan payments, and iii) arrears on bills which are ordinal variables. On the other hand, based on Díez-Esteban *et al.* (2019), we used the generalized method of moments (GMM) models for the log of total mortgage, a continuous variable, to avoid the endogeneity problem. Additionally, we introduce only one religious background per regression to avoid

multicollinearity issues since the level of correlation among the variables is statistically significant at the conventional significance levels (See Appendix 4.4 Correlation coefficients of religious backgrounds). The following three main models are used to test the research hypotheses:

$$\text{Holding secured debt} = \beta_0 + \beta_1\text{CATH} + \beta_2\text{ORTH} + \beta_3\text{PROT} + \beta_4\text{Religiosity} + \beta_5\text{Age} + \beta_6\text{Squared Age} + \beta_7\text{Gender} + \beta_8\text{Marital status} + \beta_9\text{Education level} + \beta_{10}\text{Income} + \beta_{11}\text{Health} + \beta_{12}\text{Country} \dots (4.1)^{16}$$

As displayed in Table 4.2., the decision to hold secured debt is captured by two different dependent variables: i) holding the mortgage (binary variable) and, ii) log of the total mortgage (continuous variable).

$$\text{Financial distress} = \beta_0 + \beta_1\text{CATH} + \beta_2\text{ORTH} + \beta_3\text{PROT} + \beta_4\text{Religiosity} + \beta_5\text{Age} + \beta_6\text{Squared Age} + \beta_7\text{Gender} + \beta_8\text{Marital status} + \beta_9\text{Education level} + \beta_{10}\text{Income} + \beta_{11}\text{Health} + \beta_{12}\text{Country} \dots (4.2)^{16}$$

As shown in Table 4.2., the likelihood of being in a state of financial distress is captured by three different dependent variables (ordinal variables): i) arrears on mortgage or rental payments, ii) arrears on hire purchase installments or other loan payments, and iii) arrears on bills.

$$\text{Financial well being} = \beta_0 + \beta_1\text{CATH} + \beta_2\text{ORTH} + \beta_3\text{PROT} + \beta_4\text{Religiosity} + \beta_5\text{Age} + \beta_6\text{Squared Age} + \beta_7\text{Gender} + \beta_8\text{Marital status} + \beta_9\text{Education level} + \beta_{10}\text{Income} + \beta_{11}\text{Health} + \beta_{12}\text{Country} \dots (4.3)^{16}$$

As displayed in Table 4.2., the likelihood of being in a state of financial well-being is measured by two variables: i) the capacity to face unexpected financial expenses (binary

¹⁶ We introduce only one religious background and the religiosity per regression to avoid multicollinearity issues.

variable), and ii) the capacity to afford to pay a one-week annual holiday away from home (binary variable).

4.4 Empirical Results

4.4.1 The decision to hold secured debt

Table 4.5 presents the results of the logistic regressions of the determinants of holding the mortgage and GMM regressions of the determinants of the amount of mortgage, respectively, focusing on the religious background.

Table 4.5: Religious Background and Mortgage

		Dependent variables					
		Holding Mortgage			Log of Mortgage		
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	(Intercept)	-1.354*** (0.026)	-1.394*** (0.027)	-1.394*** (0.027)	3.042 (7.032)	-18.62*** (4.886)	-5.158 (4.697)
	Mortgage(t-1)				0.244*** (0.085)	0.332*** (0.0623)	0.389*** (0.0859)
	Catholic	-0.039*** (0.011)			1.192*** (0.204)		
	Orthodox		-3.268*** (0.053)			0.600*** (0.154)	
	Protestant			0.039*** (0.011)			-0.890*** (0.212)
	Household income	0.181*** (0.002)	0.181*** (0.002)	0.181*** (0.002)	0.342*** (0.131)	0.278*** (0.093)	0.199*** (0.0773)
	Age	0.008*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	0.320 (0.312)	0.905*** (0.222)	0.424** (0.191)
	Squared age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.002 (0.002)	-0.008*** (0.001)	-0.004** (0.001)
	Health	0.073*** (0.002)	0.073*** (0.002)	0.073*** (0.002)	-1.003** (0.455)	0.112*** (0.025)	0.091*** (0.030)
	Education	0.326*** (0.008)	0.326*** (0.008)	0.326*** (0.008)	-1.104 (1.943)	0.644 (1.162)	-0.506** (0.236)
	Gender[Male]	0.040*** (0.003)	0.040*** (0.003)	0.040*** (0.003)	-1.485 (1.143)	-2.455** (1.039)	-1.536** (0.760)
	Marital status[Married]	0.369*** (0.004)	0.369*** (0.004)	0.369*** (0.004)	0.055 (0.735)	-1.499* (0.909)	0.854 (0.935)
	Marital status[Separated]	0.372*** (0.012)	0.372*** (0.012)	0.372*** (0.012)	-19.745*** (5.167)	-2.342 (7.165)	-21.362*** (5.510)
	Marital status [Divorced]	0.240*** (0.008)	0.240*** (0.008)	0.240*** (0.008)	0.665 (3.727)	3.775 (3.887)	7.101* (3.913)
	Marital status [Widowed]	0.477*** (0.006)	0.477*** (0.006)	0.477*** (0.006)	0.296 (1.542)	-0.193 (1.610)	1.028 (1.221)
	Country (FE)	Yes	Yes	Yes	Yes	Yes	Yes
	Num.Obs.	3,116,472	3,116,472	3,116,472	39,721	39,721	39,721
	AIC	2,502,364	2,502,364	2,502,364			
	BIC	2,502,908	2,502,908	2,502,908			
	Log.Lik.	-1,251,140	-1,251,140	-1,251,140			
Wald test(g.l.)					277,489** *(12)	407,597*** (12)	272,784*** (12)
AR1					-3.68***	-5.50***	-3.30***
AR2					0.16	1.00	0.29
Hansen test (g.l.)					30.29 (23)	27.51(19)	42.58(32)
Notes: This table reports the results of logistic regression (logit models) for the determinants of the holding mortgage listed in the second column and GMM models for the determinants of the log of mortgage listed in the third column on the catholic, orthodox, protestant, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.							

The regressions (1 to 3) in Table 4.5 show that belonging to a mainly Catholic or Orthodox country is negatively associated with the likelihood of holding a mortgage. On the contrary, belonging to a mainly Protestant country is positively related to the possibility of holding a mortgage. Thus, Catholics and Orthodox households are less likely to have a mortgage in contrast to Protestants households. Moreover, we found that income, age, health, education, and males are positively associated with the likelihood of holding a mortgage. Considering the abovementioned results, we cannot reject our hypothesis (1) related to the "decision to hold secured debt" that suggests that belonging to a country predominantly Protestant (Catholic and Orthodox) increases (decreases) the likelihood of holding secured debt.

From the regressions (4 to 6) in Table 4.5, we conclude that belonging to a mainly Catholic or Orthodox country is positively associated with the mortgage amount. While belonging to mainly Protestant countries is negatively associated with the mortgage amount, Catholics and Orthodox households are found more likely to pay a higher mortgage than Protestants households. Moreover, the results indicate that income is positively associated with the amount of the mortgage.

Table 4.6 presents the results of the logistic regressions of the determinants of holding a mortgage and GMM regressions of the determinants of the amount of mortgage that focus on religiosity.

Table 4.6: Religiosity and Mortgage

		Dependent variables	
		Holding Mortgage (1)	Log of Mortgage (2)
Independent variables	(Intercept)	-1.217*** (0.051)	4.192 (3.375)
	Mortgage _(t-1)		0.245*** (0.063)
	Religiosity	-1.416*** (0.354)	4.497** (2.053)
	Household income	0.203*** (0.002)	0.449** (0.183)
	Age	0.010*** (0.001)	0.136** (0.068)
	Squared age	0.000*** (0.000)	-0.001** (0.000)
	Health	0.075*** (0.002)	-0.751 (0.617)
	Education	0.288*** (0.008)	0.892* (0.457)
	Gender[Male]	0.035*** (0.003)	-2.516** (1.060)
	Marital status[Married]	0.337*** (0.005)	0.244 (1.106)
	Marital status[Separated]	0.327*** (0.013)	4.379 (2.810)
	Marital status [Divorced]	0.211*** (0.008)	7.624** (3.135)
	Marital status[Widowed]	0.441*** (0.006)	-1.788 (1.419)
	Country (FE)	Yes	Yes
	Num.Obs.	2,825,964	39,721
	AIC	2,281,806	
	BIC	2,282,281	
	Log.Lik.	-1,140,866	
	Wald test(g.l.)		338792*** (12)
	AR1		-4.91***
	AR2		0.25
	Hansen test (g.l.)		38.25 (29)
Notes: This table reports the results of logistic regression (logit models) for the determinants of the holding mortgage listed in the second column and GMM models for the determinants of the log of mortgage listed in the third column on the religiosity, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard Error in parentheses. ** p < 0.05, *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.			

From the first regression in Table 4.6, we deduced a statistically significant negative relationship between the levels of religiosity observed in a country and the likelihood of holding a mortgage. Considering the abovementioned findings, we cannot reject our

hypothesis (4) related to the "decision to hold secured debt" that suggests the level of religiosity is expected to be negatively associated with the likelihood to hold a secured debt. The second regression in Table 4.6 shows a statistically significant positive relationship between the levels of religiosity observed in a country and the amount of mortgage; this means that religious households are less likely to have a mortgage and in the case of having one, they are more likely to have a higher mortgage amount. In addition, we found that income, age, and education are positively associated with holding a mortgage and the amount of mortgage. Moreover, our results show that males are more likely to have a mortgage and less likely to have a higher amount of mortgage.

4.4.2 The likelihood of being in a state of financial distress

In this section, we investigate whether religious background and religiosity are associated with the likelihood of being in a state of financial distress. Table 4.7 presents the results of the estimations of the influence of religious background on the likelihood to be in that state. We used ordered logistic regressions for the three dependent variables: 1) arrears on hire purchase installments or other loan payments, 2) arrears on mortgage or rental payments, and 3) arrears on bills.

Table 4.7: Religious Background and Financial Distress

		Dependent variables								
		Arrears HPI/LP			Arrears M/RP			Arrears bills		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Independent variables	(Intercept)	-4.322*** (0.036)	-4.652*** (0.036)	-5.416*** (0.036)	-4.906*** (0.028)	-5.104*** (0.028)	-6.086*** (0.028)	-1.613*** (0.021)	-1.887*** (0.021)	-2.511*** (0.021)
	Catholic	-0.442*** (0.004)			-0.574*** (0.004)			-0.326*** (0.003)		
	Orthodox		0.072*** (0.007)			-0.004 (0.009)			-0.023*** (0.004)	
	Protestant			0.487*** (0.005)			0.628*** (0.004)			0.510*** (0.003)
	Age	0.058*** (0.001)	0.056*** (0.001)	0.060*** (0.001)	0.075*** (0.001)	0.069*** (0.001)	0.075*** (0.001)	0.016*** (0.001)	0.014*** (0.001)	0.018*** (0.001)
	Squared age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
	Health	0.099*** (0.003)	0.122*** (0.003)	0.101*** (0.003)	0.094*** (0.002)	0.118*** (0.002)	0.100*** (0.002)	0.034*** (0.001)	0.046*** (0.001)	0.032*** (0.001)
	Education	-0.397*** (0.010)	-0.459*** (0.010)	-0.374*** (0.010)	-0.456*** (0.008)	-0.555*** (0.008)	-0.441*** (0.008)	-0.393*** (0.007)	-0.429*** (0.007)	-0.354*** (0.007)
	Gender[Male]	-0.079*** (0.004)	-0.059*** (0.004)	-0.068*** (0.004)	-0.075*** (0.004)	-0.056*** (0.004)	-0.067*** (0.004)	-0.110*** (0.003)	-0.094*** (0.003)	-0.095*** (0.003)
	Marital status[Married]	-0.269*** (0.006)	-0.306*** (0.006)	-0.232*** (0.006)	-0.185*** (0.005)	-0.223*** (0.005)	-0.160*** (0.005)	-0.147*** (0.004)	-0.155*** (0.004)	-0.108*** (0.004)
	Marital status[Separated]	-0.008 (0.017)	-0.044** (0.017)	0.013 (0.017)	-0.065*** (0.013)	-0.078*** (0.013)	-0.050*** (0.013)	0.006 (0.010)	0.008 (0.009)	0.009 (0.010)
	Marital status [Divorced]	-0.632*** (0.011)	-0.677*** (0.011)	-0.587*** (0.011)	-0.642*** (0.009)	-0.715*** (0.009)	-0.611*** (0.009)	-0.540*** (0.005)	-0.539*** (0.005)	-0.478*** (0.005)
	Marital status[Widowed]	-0.431*** (0.009)	-0.449*** (0.009)	-0.417*** (0.009)	-0.426*** (0.007)	-0.450*** (0.007)	-0.413*** (0.007)	-0.158*** (0.005)	-0.154*** (0.005)	-0.151*** (0.005)
	Household income	-0.136*** (0.003)	-0.119*** (0.003)	-0.155*** (0.003)	-0.168*** (0.002)	-0.140*** (0.002)	-0.185*** (0.002)	-0.133*** (0.002)	-0.130*** (0.002)	-0.169*** (0.002)
	Country (FE)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Num.Obs.	979,686	979,686	979,686	1,444,536	1,444,536	1,444,536	3,078,704	3,078,704	3,078,704
	AIC	1,439,946	1,450,374	1,438,898	2,036,577	2,060,095	2,033,723	4,325,492	4,340,296	4,314,225
	BIC	1,440,100	1,450,528	1,439,052	2,036,735	2,060,253	2,033,881	4,325,660	4,340,464	4,314,393
Notes: This table reports the results of ordered logistic regressions for the financial distress through three variables: arrears on hire purchase installments or other loan payments, arrears on mortgage or rental payments, and arrears on bills respectively on the catholic, orthodox, protestant, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard Error in parentheses. ** p < 0.05, *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.										

Our results in Table 4.7 suggest that belonging to a mainly Catholic country is negatively associated with the likelihood of being in a state of financial distress. The results are based on the three measurements: 1) arrears on hire purchase installments or other loan payments, 2) arrears on mortgage or rental payments, and 3) arrears on bills (results statistically significant at the 1% level). On the other hand, Protestant countries were positively associated with all the measurements regarding the likelihood of being in a state of financial distress (results statistically significant at the 1% level). Regarding the Orthodox countries, we found mixed results between the measurements of the likelihood of being in a state of financial distress. Our evidence indicates that age and health are positively associated with the likelihood of being in a state of financial distress, whereas being a male, having a better education, and having a higher income are negatively related to the likelihood of being in a state of financial distress. To conclude, we cannot reject our hypothesis (2) only in the case of belonging to a mainly Catholic country that is negatively associated with the likelihood of being in a state of financial distress. Conversely, we reject our hypothesis (2) only in the case of belonging to a primarily Protestant country since our results suggest that Protestant countries are positively associated with the likelihood of being in a state of financial distress. Table 4.8 presents the results of the estimations of the impact of religiosity on the likelihood of being in a state of financial distress. We used ordered logistic regressions for the three dependent variables: 1) arrears on hire purchase installments or other loan payments, 2) arrears on mortgage or rental payments, and 3) arrears on bills.

Table 4.8: Religiosity and Financial Distress

		Dependent variables		
		Arrears HPI/LP	Arrears bills	Arrears M/RP
		(1)	(2)	(3)
Independent variables	(Intercept)	-4.296*** (0.038)	-1.564*** (0.022)	-4.569*** (0.029)
	Religiosity	-0.585*** (0.021)	-0.830*** (0.011)	-1.391*** (0.022)
	Household income	-0.128*** (0.003)	-0.153*** (0.002)	-0.171*** (0.002)
	Age	0.054*** (0.001)	0.013*** (0.001)	0.067*** (0.001)
	Squared age	0.000*** (0.000)	0.000** (0.000)	0.000*** (0.000)
	Health	0.121*** (0.003)	0.040*** (0.002)	0.103*** (0.002)
	Education	-0.467*** (0.011)	-0.411*** (0.007)	-0.513*** (0.008)
	Gender[Male]	-0.060*** (0.005)	-0.077*** (0.003)	-0.052*** (0.004)
	Marital status[Married]	-0.269*** (0.006)	-0.111*** (0.004)	-0.168*** (0.005)
	Marital status[Separated]	-0.010 (0.018)	0.055*** (0.010)	0.037** (0.014)
	Marital status [Divorced]	-0.634*** (0.011)	-0.477*** (0.006)	-0.670*** (0.009)
	Marital status[Widowed]	-0.455*** (0.009)	-0.157*** (0.005)	-0.435*** (0.007)
	Country (FE)	Yes	Yes	Yes
	Num.Obs.	871,367	2,791,404	1,336,422
	AIC	1,286,163	3,939,509	1,888,790
	BIC	1,286,315	3,939,676	1,888,947
	RMSE	416,499,193	8,595,452	111,155,102
Notes: This table reports the results of ordered logistic regression for the financial distress through three variables: arrears on hire purchase installments or other loan payments, arrears on mortgage or rental payments, and arrears on bills respectively on the religiosity, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard Error in parentheses. ** p < 0.05, *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.				

From the regressions (1 to 3) in Table 4.8, we can infer a statistically significant negative relationship between the levels of religiosity observed in a country and the likelihood of being in a state of financial distress through the three measurements adopted in this study: 1) arrears on hire purchase installments or other loan payments, 2) arrears on mortgage or rental payments, and 3) arrears on bills. These results are consistent with Ross (1990), Ellison *et al.* (2001), Kidwai *et al.* (2014), and Krause and Hayward (2015). Furthermore, we found that

the levels of income and education, and that being a male are negatively associated with the likelihood of being in a state of financial distress, whilst age and health were positively associated with the likelihood of being in a state of financial distress.

To conclude, we cannot reject our hypothesis (5) that suggests the level of religiosity is expected to be negatively related to the likelihood of being in a state of financial distress.

4.4.3 The likelihood of being in a state of financial well-being

In this section, we examine whether religious background and religiosity are associated with the likelihood of being in a state of financial well-being. Table 4.9 presents the results of the estimations of the effect of religious background on the likelihood to be in that state. We used logistic regressions for the two dependent variables: 1) the capacity to afford a one-week annual holiday trip, and 2) the capacity to face unexpected financial expenses.

Table 4.9: Religious Background and Financial Well-Being

		Dependent variables					
		Afford to pay			Unexpected FE		
		(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	(Intercept)	-0.471*** (0.025)	-0.307*** (0.026)	-0.307*** (0.026)	-2.338*** (0.023)	-1.846*** (0.024)	-1.846*** (0.024)
	Catholic	0.164*** (0.012)			0.492*** (0.011)		
	Orthodox		-0.645*** (0.015)			0.156*** (0.015)	
	Protestant			-0.164*** (0.012)			-0.492*** (0.011)
	Household income	2.090*** (0.005)	2.090*** (0.005)	2.090*** (0.005)	1.862*** (0.004)	1.862*** (0.004)	1.862*** (0.004)
	Age	-0.015*** (0.001)	-0.015*** (0.001)	-0.015*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)
	Squared age	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
	Health	0.538*** (0.002)	0.538*** (0.002)	0.538*** (0.002)	0.489*** (0.002)	0.489*** (0.002)	0.489*** (0.002)
	Education	-0.164*** (0.008)	-0.164*** (0.008)	-0.164*** (0.008)	-0.081*** (0.008)	-0.081*** (0.008)	-0.081*** (0.008)
	Gender[Male]	0.219*** (0.003)	0.219*** (0.003)	0.219*** (0.003)	0.262*** (0.003)	0.262*** (0.003)	0.262*** (0.003)
	Marital status[Married]	-0.143*** (0.004)	-0.143*** (0.004)	-0.143*** (0.004)	0.045*** (0.004)	0.045*** (0.004)	0.045*** (0.004)
	Marital status[Separated]	-0.287*** (0.010)	-0.287*** (0.010)	-0.287*** (0.010)	-0.382*** (0.010)	-0.382*** (0.010)	-0.382*** (0.010)
	Marital status [Divorced]	-0.260*** (0.006)	-0.260*** (0.006)	-0.260*** (0.006)	-0.334*** (0.006)	-0.334*** (0.006)	-0.334*** (0.006)
	Marital status[Widowed]	-0.297*** (0.006)	-0.297*** (0.006)	-0.297*** (0.006)	-0.437*** (0.005)	-0.437*** (0.005)	-0.437*** (0.005)
	Country (FE)	Yes	Yes	Yes	Yes	Yes	Yes
	Num.Obs.	3,125,891	3,125,891	3,125,891	3,124,157	3,124,157	3,124,157
	AIC	3,107,211	3,107,211	3,107,211	3,334,081	3,334,081	3,334,081
	BIC	3,107,756	3,107,756	3,107,756	3,334,625	3,334,625	3,334,625
	Log.Lik.	-1,553,563	-1,553,563	-1,553,563	-1,666,998	-1,666,998	-1,666,998
	Notes: This table reports the results of logistic regression (logit models) for the financial well-being through two variables: the capacity to afford to pay for a one-week annual holiday away from home, and the capacity to face unexpected financial expenses respectively on the catholic, orthodox, protestant, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard Error in parentheses. *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.						

Table 4.9 reveals that belonging to a mainly Catholic country is positively associated with the likelihood of being in a state of financial well-being. This is based on two variables: the capacity to afford a one-week annual holiday trip and face unexpected financial expenses (results statistically significant at the 1% level). We also noticed that Protestant countries are negatively associated with two measurements regarding the likelihood of being in a state of financial well-being (results statistically significant at the level of 1%). Regarding Orthodox countries, we found mixed results between two measurements of the likelihood of being in a

state of financial well-being. Moreover, our results indicate that the variables income, health, and males are positively associated with the likelihood of being in a state of financial well-being, while education was negatively associated with the likelihood of being in a state of financial well-being.

All in all, we cannot reject our hypothesis (3) only in the case of belonging to a mainly Catholic country that is positively associated with the likelihood of being in a state of financial well-being. On the other hand, we reject our hypothesis (3) only in the case of belonging to a mainly Protestant country since our results suggest that Protestant countries are negatively associated with the likelihood of being in a state of financial well-being.

Our result regarding the influence of Protestant religious background on the likelihood of being in a state of financial well-being is similar to Wu (2020)'s.

Table 4.10 presents the results of the estimations of the influence of religiosity on the likelihood of being in a state of financial well-being. We used logistic regressions for the two dependent variables: 1) the capacity to afford a one-week annual holiday trip and 2) the capacity to face unexpected financial expenses.

Table 4.10: Religiosity and Financial Well-Being

Dependent variables			
		Afford to pay (1)	Unexpected FE (2)
Independent variables	(Intercept)	-1.111*** (0.056)	-4.257*** (0.052)
	Religiosity	5.382*** (0.401)	16.415*** (0.374)
	Household income	2.145*** (0.006)	1.887*** (0.005)
	Age	-0.014*** (0.001)	0.012*** (0.001)
	Squared age	0.000*** (0.000)	0.000*** (0.000)
	Health	0.538*** (0.002)	0.490*** (0.002)
	Education	-0.149*** (0.009)	-0.054*** (0.008)
	Gender[Male]	0.220*** (0.003)	0.256*** (0.003)
	Marital status[Married]	-0.136*** (0.004)	0.064*** (0.004)
	Marital status[Separated]	-0.268*** (0.011)	-0.345*** (0.011)
	Marital status [Divorced]	-0.255*** (0.006)	-0.328*** (0.006)
	Marital status[Widowed]	-0.290*** (0.006)	-0.431*** (0.006)
	Country (FE)	Yes	Yes
	Num.Obs.	2,835,866	2,834,614
	AIC	2,826,632	3,024,393
	BIC	2,827,108	3,024,869
	Log.Lik.	-1,413,279	-1,512,159
Notes: This table reports the results of logistic regression (logit models) for the financial well-being through two variables: the capacity to afford to pay for a one-week annual holiday away from home, and the capacity to face unexpected financial expenses respectively on the religiosity, household income, age, squared age, health, education, gender, and marital status listed in the first column. Standard Error in parentheses. *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.			

From the regressions (1 and 2) in Table 4.10, we can conclude that there is a statistically significant positive relationship between the levels of religiosity observed in a country and the likelihood of being in a state of financial well-being. These findings are based on two variables: the capacity to afford a one-week annual holiday trip and face unexpected financial expenses. In this regard, the evidence is similar to that obtained by Ellison *et al.* (2001), Stavrova *et al.* (2013), Krause and Hayward (2015), and Wu (2020), for example. Additionally, we show that having a higher income and better health, and that being a male

is positively associated with the likelihood of being in a state of financial well-being, whereas education was found to be negatively associated with the likelihood of being in a state of financial well-being. Considering the abovementioned results, we cannot reject the hypothesis (6) that suggests the level of religiosity is expected to be positively related to the likelihood of being in a state of financial well-being.

4.5 Discussion

Some of our findings are consistent with the existing literature. We name the following: the results regarding a positive (negative) influence on the Protestant countries' likelihood of being in a state of financial well-being (financial distress), which agree with Wu (2020).

Additionally, we deduced a negative influence of the levels of religiosity observed in a country on the likelihood of holding a mortgage. This result is harmonious with previous studies that suggested that religious beliefs make individuals more self-disciplined and prudent, which leads to less borrowing and more patience (Guiso *et al.*, 2003; Renneboog and Spaenjers, 2012; Fletcher and Kumar, 2014; Ma *et al.*, 2018). These inferences are similar to Miller and Hoffmann (1995), Hilary and Hui (2009), and Noussair *et al.* (2013). These studies conclude that religious people are risk-averse and do not accept riskier payouts. Furthermore, we concluded that Protestants households are more likely to have a mortgage in contrast to Catholic households. This agrees with the previous studies that showed that Protestants are generally more risk-averse than Catholics (Barsky *et al.*, 1997; Hilary and Hui, 2009; Noussair *et al.*, 2013). Also, these findings are consistent with Renneboog and Spaenjers (2012) that inferred that Catholics attribute more significance to saving money and are less willing to take risks.

Also, our evidence implies the negative relationship between the levels of religiosity observed in a country and the likelihood of being in a state of financial distress. This evidence is similar to Ross (1990), Ellison *et al.* (2001), Kidwai *et al.* (2014), and Krause and Hayward (2015).

Moreover, our conclusion related to the positive influence of the levels of religiosity observed in a country on the likelihood of being in a state of financial well-being. This inference is

consistent with Ellison *et al.* (2001), Stavrova *et al.* (2013), Krause and Hayward (2015), and Wu (2020).

Previous studies conclude that religion is a significant determinant of the dimensions of household finance, on the level of countries such as the United States (Green and Elliott 2010; Jang and Johnson 2004) and China (Chunping *et al.*, 2016). Therefore, our research fills that gap by studying the impact of religious backgrounds and religiosity on the dimensions of household finance using samples from 32 European countries and controlling for household characteristics.

4.6 Conclusion

To the best of our knowledge, no study has addressed the influence of religion on dimensions of household finance in the European setting using samples from different countries and controlling for household characteristics. Our research extends the literature by investigating the influence of religious backgrounds and religiosity on the decision to hold a mortgage, the likelihood of being in a state of financial distress, and the likelihood of being in a state of financial well-being in 32 European countries. Also, to the best of our knowledge, this is the first research that uses the EU-SILC dataset in this context.

We found that belonging to a Catholic or Orthodox (Protestant) country is negatively (positively) associated with the likelihood of holding a mortgage. Also, we showed that belonging to a Catholic or Orthodox (Protestant) country is positively (negatively) associated with the amount of mortgage. Belonging to a mainly Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress. In contrast, belonging to a Catholic (Protestant) country was found to be positively (negatively) associated with the likelihood of being in a state of financial well-being. This result is consistent with the first conclusion that households in Catholic countries are less likely to experience financial distress, leading them to be less likely to have a mortgage. On the contrary, households-based in Protestant countries are more likely to experience financial distress, which leads them to have a mortgage to ease this distress. Moreover, results reveal that the levels of religiosity observed in a country are negatively associated with the likelihood of holding a mortgage and being in a state of financial

distress but positively associated with the amount of mortgage and the likelihood of being in a state of financial well-being.

Our results have meaningful implications for households, policymakers, and academia. The results of this chapter are beneficial to the households by increasing their awareness of financial decisions, providing them with the ability to plan their financial issues. Thus, they might be able to limit their expenses in the future. Moreover, we offer policymakers crucial information to manage the mortgage process by offering different strategies and facilitating procedures to encourage Catholics and Orthodoxes to hold more mortgages and improve the welfare of the households.

Furthermore, this chapter adds to the academic research on the determinants of the decision to hold secured debts and a better explanation of the likelihood of being in a state of financial distress and well-being.

The limitations of our research represent that we used the cross-country data for the denominations of the Christian religion and the index of religious observance for the households because there are no data for these variables on households' levels. This methodological option may impact the results due to the generalization of these variables on all the households in each country. Future research can be extended to other religions in different locations and other continents using surveys or interviews with the households to observe accurate results.

Appendices

Appendix 4.1 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 Appendix 4.3.

Appendix 4.2 Distribution of the sample by country

Num.	Countries	Num. of obs.	Respective %
1	Austria	88,717	2.84%
2	Belgium	83,434	2.67%
3	Bulgaria	69,262	2.22%
4	Czech Republic	118,841	3.80%
5	Denmark	80,883	2.59%
6	Germany	173,185	5.54%
7	Estonia	78,472	2.51%
8	Greece	127,635	4.08%
9	Croatia	52,158	1.67%
10	Spain	166,584	5.33%
11	France	132,471	4.24%
12	Ireland	77,188	2.47%
13	Italy	236,411	7.56%
14	Latvia	71,145	2.28%
15	Lithuania	69,040	2.21%
16	Hungary	125,139	4.00%
17	Malta	47,410	1.52%
18	Netherlands	116,385	3.72%
19	Poland	189,120	6.05%
20	Portugal	84,391	2.70%
21	Romania	90,387	2.89%
22	Slovenia	88,889	2.84%
23	Finland	130,330	4.17%
24	Sweden	94,406	3.02%
25	Iceland	36,083	1.15%
26	Norway	83,077	2.66%
27	Serbia	34,205	1.09%
28	Switzerland	67,838	2.17%
29	United Kingdom	120,149	3.84%
30	Luxembourg	61,957	1.98%
31	Slovakia	75,013	2.40%
32	Cyprus	55,686	1.78%
	Total	3,125,891	100.00%

Source: own elaboration.

Appendix 4.3 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. This variable is calculated from the tenure status variable that is (ordinal variable measured as reference category: specifically, whether the owner is outright, paying a mortgage, rented at market rate, and rented at a reduced rate or provided free). (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).
Capacity to face unexpected financial expenses	The financial well-being indicator is measured by asking the households if they can face unexpected financial expenses. The binary variable takes the value of 1 if the answer is yes, otherwise 0 if it is no. (Source: EU-SILC dataset, Eurostat).
Capacity to afford to pay a one-week annual holiday away from home	The financial well-being indicator is measured by asking the households if they can afford to go for a week's annual holiday. The binary variable takes the value of 1 if the answer is yes, otherwise 0 if it is no. (Source: EU-SILC dataset, Eurostat).
Arrears on a mortgage or rental payments	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears on a mortgage or rental payments and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
Arrears on hire purchase installments or other loan payments	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears on hire purchase installments or other loan payments and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
Arrears on bills	The financial distress indicator is measured by asking the households that in the last twelve months have been in arrears bills and unable to pay on time due to financial difficulties. The ordinal variable takes the values as follows: 1 - No, 2 - Yes, once, 3 - Yes, twice, or more. (Source: EU-SILC dataset, Eurostat).
Independent Variables	
Catholicism	A dummy variable that takes the value of 1 for Catholic countries and 0 otherwise. (Source: The World Factbook (2020)).
Orthodox	A dummy variable that takes the value of 1 for Orthodox countries and 0 otherwise. (Source: The World Factbook (2020)).
Protestantism	A dummy variable that takes the value of 1 for Protestant countries and 0 otherwise. (Source: The World Factbook (2020)).
Religiosity	Index of religious observance is measured as an average of the four religious observance measures: the importance of religion (A percentage of who say religion is very important in their lives), belief in God (A

	percentage of who say they believe in God with absolute certainty), worship attendance (A percentage of who say they attend worship services at least monthly), and frequency of prayer (A percentage of who say they pray daily). Which is a percentage of adults who are “highly religious”. (Source: Pew Research Center (2018b)).
Control Variables	
Age	The continuous variable. (Source: EU-SILC dataset, Eurostat).
Squared age	Squared of the age variable. (Source: EU-SILC dataset, Eurostat).
Total household income	Total household income in Euro currency. (Source: EU-SILC dataset, Eurostat).
Gender	Binary variable (0- Female, 1- Male). (Source: EU-SILC dataset, Eurostat).
Marital status	The nominal variable is measured in five categories: 1- never married, 2- married, 3- separated, 4- divorced, 5- widowed. (Source: EU-SILC dataset, Eurostat).
The level of education	The ordinal variable is measured in six categories: 0- Pre-primary, 1- Primary, 2- Lower secondary, 3- Upper secondary, 4- Post-secondary non-tertiary, 5- First stage of the tertiary education. (Source: EU-SILC dataset, Eurostat).
General health	The ordinal variable is measured in five categories: 1- Very bad, 2- Bad, 3- Fair, 4- Good, 5- Very good. (Source: EU-SILC dataset, Eurostat).

Source: own elaboration.

Appendix 4.4 Correlation coefficients of religious backgrounds

	Catholic	Protestant	Orthodox
Catholic	1		
Protestant	-0.72***	1	
Orthodox	-0.54***	-0.20***	1
Notes: This table reports the correlation coefficients of religion dimensions. *** p < 0.01. (See Appendix 4.3 Definitions of variables). Source: own elaboration.			

References of Chapter Four

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Chapter Five

General Conclusions

5 General Conclusions

The purpose of this thesis is to investigate the influence of personality traits (Neuroticism, Extraversion, and Agreeableness), national cultures (Power Distance, Masculinity, Individualism, Uncertainty avoidance, Long-term Orientation, and Indulgence), religious backgrounds (Catholic, Orthodox, and Protestant) and religiosity on three dimensions of household finance relating to 1) the decision to hold a mortgage, 2) the likelihood of being in a state of financial distress, and 3) the likelihood of being in a state of financial well-being. All the studies take place in the context of the European continent.

In the second chapter, we examined the impact of personality traits (Neuroticism, Extraversion, and Agreeableness) on three dimensions of household finance. This chapter shows that the levels of neuroticism and extraversion are negatively associated with the likelihood of holding a mortgage. The level of extraversion (agreeableness) is negatively (positively) associated with the amount of mortgage. Moreover, we find that the levels of neuroticism and extraversion (agreeableness) are positively (negatively) associated with the likelihood of being in a state of financial distress. On the other hand, the levels of neuroticism and extraversion (agreeableness) are negatively (positively) associated with the likelihood of being in a state of financial well-being.

Our results regarding the influence of some personality traits on the decision to hold a mortgage are consistent with Nyhus and Webley (2001). Our inferences refer to the negative (positive) influence of neuroticism and extraversion (agreeableness) on the decision to hold a mortgage. These inferences go against Donnelly *et al.* (2012) that showed in the United States that extraversion, agreeableness, and neuroticism are not significant predictors of debts. However, Donnelly *et al.* (2012) found that conscientiousness (openness) is positively (negatively) associated with debts. One possible reason for this discrepancy may lie in the fact that our sample includes data about 502,017 individuals and households whereas Donnelly *et al.* (2012) used a convenience sampling strategy with only 993 students. Given their limited sample, they were not able to find significant results. Furthermore, our study shows that neuroticism is positively associated with the likelihood of being in a state of financial distress. This is similar to Xu *et al.* (2015). However, our evidence shows a negative (positive) impact of agreeableness (extraversion) on the likelihood of being in a state of

financial distress. These results are inconsistent with the conclusion of Xu *et al.* (2015). One possible explanation for this discrepancy is that our study showed statistically significant results for all the five measurements of the likelihood of being in a state of financial distress. On the contrary, Xu *et al.* (2015) found out that two of seven measurements of the likelihood of being in that state are statistically significant. Also, another possible explanation is that Xu *et al.* (2015)'s sample was limited to the young adults (24-34 years old) in the US. On the other hand, the sample of our research is significantly larger including individuals in all age groups in a European context. Moreover, our evidence implies the positive effect of agreeableness on the likelihood of being in a state of financial well-being. This evidence is consistent with Hill *et al.* (2012). Also, our findings reveal a negative (positive) influence of extraversion and neuroticism (agreeableness) on the likelihood of being in a state of financial well-being. These findings contradict Donnelly *et al.* (2012) that suggest there is no significant relationship between personality traits and the likelihood of being in a state of financial well-being. One possible reason for these conflicting conclusions is that Donnelly *et al.* (2012) used a convenience sampling strategy with only 355 US individuals whereas our sample includes a much large number of individuals as mentioned above. The results of Donnelly *et al.* (2012) may not be generalized to other cultures because their sample was collected by the internet targeting younger and better-educated individuals. Also, Donnelly *et al.* (2012) did not focus basically on the relationship between personality traits and financial well-being. Instead, they investigated the independent effect of money management (controlling for personality traits) to predict financial well-being by wealth accumulation.

The third chapter explored the effects of Hofstede's national cultures (Power Distance, Masculinity, Individualism, Uncertainty avoidance, Long-term Orientation, and Indulgence) on the decision of holding a mortgage and the likelihood of being in a state of financial well-being. We showed that the levels of power distance, masculinity, uncertainty avoidance, and long-term orientation (individualism and indulgence) are negatively (positively) associated with the likelihood of holding a mortgage. Also, the levels of masculinity, uncertainty avoidance, and indulgence (power distance, individualism, and long-term orientation) are found to be positively (negatively) associated with the amount of mortgage. Moreover, we infer that the levels of power distance and uncertainty avoidance

(individualism and long-term orientation) are negatively (positively) associated with the likelihood of being in a state of financial well-being.

Our findings regarding the impact of national cultures on the decision to hold secured debt are consistent with Gaganis *et al.* (2020). Moreover, our conclusion related to the negative influence of long-term orientation on the decision to hold secured debt is similar to De Mooij and Hofstede (2002) that indicates that long-term orientated cultures are cash or debit card cultures, not credit cards cultures. On the other hand, some results go against Gaganis *et al.* (2020). For example, 1) we showed a negative impact of individualism on the likelihood of holding the mortgage in contract to Gaganis *et al.* (2020) that did not find a significant relationship, and 2) we found that masculinity and uncertainty avoidance (individualism) is positively (negatively) associated with the amount of mortgage. Instead of that, Gaganis *et al.* (2020) inferred the signs of the coefficients of uncertainty avoidance and individualism are opposite to our evidence. In addition, Gaganis *et al.* (2020) did not find a significant relationship between masculinity and mortgage debt. One possible explanation for this discrepancy is that our study examined the decision to hold secured debt at the households' levels, while Gaganis *et al.* (2020) focused on country attributes. It is plausible to admit that this option might have an important influence on the results. Also, our evidence implies the positive (negative) effect of individualism (power distance) on the likelihood of being in a state of financial well-being. This evidence is similar to Steel *et al.* (2018). In addition, our finding indicates a negative influence of uncertainty avoidance on the likelihood of being in a state of financial well-being, which agrees with the Hofstede (2001) and Steel *et al.* (2018) results.

The fourth chapter investigated the influence of religious backgrounds (Catholic, Orthodox, and Protestant) and religiosity on the decision of holding a mortgage, and on the likelihood of being in a state of financial distress or financial well-being. We found that belonging to a mainly Catholic or Orthodox (Protestant) country is negatively (positively) associated with the likelihood of holding a mortgage. Belonging to a Protestant (Catholic or Orthodox) country is negatively (positively) associated with the mortgage amount. Furthermore, we infer that belonging to a Catholic (Protestant) country is negatively (positively) associated with the likelihood of being in a state of financial distress. Also, we conclude that levels of religiosity observed in a country are negatively associated with the likelihood of holding

a mortgage and the likelihood of being in a state of financial distress. Moreover, the levels of religiosity observed in a country are found to be positively associated with the amount of mortgage and the likelihood of being in a state of financial well-being.

Some of our findings are consistent with the existing literature. We name the following: the results regarding a negative (positive) influence on the Protestant countries' likelihood of being in a state of financial well-being (financial distress), which agree with Wu (2020). Additionally, we deduced a negative influence of the levels of religiosity observed in a country on the likelihood of holding a mortgage. This result is harmonious with previous studies such as Guiso *et al.* (2003), Renneboog and Spaenjers (2012), Fletcher and Kumar (2014), and Ma *et al.* (2018). Furthermore, we concluded that Protestants households are more likely to have a mortgage in contrast to Catholic households, which agrees with Barsky *et al.* (1997), Hilary and Hui (2009), and Noussair *et al.* (2013) findings. Also, our evidence implies the negative relationship between the levels of religiosity observed in a country and the likelihood of being in a state of financial distress. This evidence is similar to Ross (1990), Ellison *et al.* (2001), Kidwai *et al.* (2014), and Krause and Hayward (2015).

On the basis of our results, we recommend that individuals should be aware of their own personalities' influence on their financial dimensions. This would help the individuals to make effective decisions that might have a positive impact on their life. Also, we provide the households with the needed knowledge to understand the way the culture affects their decision to hold a mortgage and financial welfare. For example, societies with higher scores on power distance (e.g., Romania and Slovakia) and uncertainty avoidance (e.g., Portugal and Greece) should plan ahead of time for their financial issues to avoid having any financial distress, and thus increase their likelihood of being in a state of financial well-being. Moreover, we suggest the policies should be designed to integrate the following: 1) issue public programs that can enhance the welfare of households, and 2) raise household awareness about financial literacy and deal with financial issues by organizing workshops and publishing necessary information on social media. Furthermore, we add to the academic research on the determinants of the decision to hold secured debts and a better explanation of the likelihood of being in a state of financial distress and well-being.

Collectively, this research shows that household finance cannot be understood without taking into consideration factors such as personality traits, religion, and national culture. We

demonstrate that these factors can be helpful to predict some household finance dimensions. Besides, we recommend the policies should issue financial education programs that fit the appropriate culture, religion, personality traits in order to be effective programs. This would help the households to improve their knowledge of financial products and concepts using information, instruction, and objective advice. Also, this might assist the households to 1) develop their skills and confidence and 2) become more aware of financial risks and opportunities. Therefore, these lead them to make informed choices and take other effective actions to improve their financial well-being.

This thesis suffers from some following limitations: there are no data of openness and conscientiousness personality traits in the EU-SILC dataset in Eurostat; the measures of the personality traits are not strong due to the restricted available data in EU-SILC dataset in Eurostat, and we used cross-country data for the following variables: the dimensions of national culture, the denominations of the Christian religion, and the index of religious observance for the households because there are no data for these variables on households' levels. This methodological option may impact the results due to the generalization of these variables on all the households in each country.

Future research can investigate the impact of additional personality traits, national culture, and other religions in different locations on the dimensions of household finance in different settings on other continents over the years and use surveys or interviews with the households to observe accurate results.

References of Chapter Five

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