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DO VALUES AFFECT INDIVIDUALS' PROPENSITY TO SAVE? CROSS-COUNTRY STUDY USING WVS DATA

Master's Thesis

Programme: Finance and Accounting, specialisation in Finance

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I declare that I have compiled the paper independently
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ABSTRACT

The objective of the master thesis is to explain which individual preferences, beliefs and traits might influence individuals' propensity to save. For being able to measure individual level influencers, the empirical study was done among individuals, who are assumed to have the financial resources available to make savings. The empirical research is done with World Value Survey data.

To meet the aim of the thesis, four hypothesis were set up, stating that individuals who have future-oriented time preferences, who have internal locus of control, who are more optimistic or more independent, conscientious and value material things less, are more likely to save.

The model created was logit binary with country fixed effects and robust standard errors. The dependent variable was whether the household made savings during past year. Independent variables were chosen based on the hypothesis developed from previous literature.

In the final model, there were 8955 observations from 55 different countries around the world. Statistically significant variables were *Income, Education, Gender* and proxies for optimism – *Happiness* and *Life Satisfaction* level. The model concluded, that the higher the level of income and education, the more likely the savings are made. Moreover, the more optimistic the individual, the more likely he or she makes savings.

Key words: savings, time-preferences, optimism, locus of control, personality traits.

INTRODUCTION

Household financial decisions, compared to traditional finance, that is focusing on stock market investing and asset prices, has come to the interest of researchers rather recently. According to Campbell, the welfare benefits of financial markets depend in largely on how effectively households use these markets (Campbell, 2006). In the last 10-15 years, a new stream of literature (referred as either behavioral finance or more specifically household finance) has identified the number of costly mistakes that affect individuals, financial markets and economic outcomes. The literature suggests, that households undersave, do not participate in stock market and hold insufficiently diversified portfolio; while they also tend to take on too much debt and manage debt obligations inefficiently. (Illiashenko, 2017) Among these mistakes, undersaving is one of the most consequential as it influences directly total financial well-being, starting from the ability to cover the basic unexpected costs to investing the funds saved for the future.

Previous research based on US individuals states, that today's workers face major retirement income challenge, even if the household works to age 65 and annuitizes all their accumulated financial assets. Still more than half are at risk of being unable to maintain their previous standard of living while retired. (Munnell, et al., 2012) Moreover, typical working household has basically no retirement savings. That is 62% of working households in age 55-64 have retirement savings less than one time their annual income, which is not enough to maintain their standard of living in retirement. (Rhee & Boivie, 2015) Moreover, Report on the Economic Well-Being of U.S. households done states that 46% of adults confessed that, if they had an emergency cost in amount of USD 400, they either could not settle it or they would cover it by selling something or borrowing money (Federal Reserve Board, 2016). This shows some serious facts, that there are households, who are not financially prepared nether for rainy days nor for retirement.

In Estonia, 25% of households do not own any savings or the savings are less than one month expenses, 32% of households have savings in amount of 1-2 month expenses and 23% of households 2-6 months respectively. In addition, 39% of households stated that they have been in a position where

income does not cover expenses. (Konjunktuuriinstituut, 2017) According to the research done by the Bank of Estonia, 66% of households (in 2014 it was 59% and 2012 53%) own savings in bank or in cash. However the savings are rather small, only half of the respondents that made available their savings amount, stated that the savings were more than EUR 1000. In addition, only 6% of households own financial assets. (Estonia, 2016) This confirms the statement that households have few savings accumulated.

To conclude, the problem of undersavings is relevant, both in Estonia and abroad.

There are different things that might influence the savings and undersavings. The most logical one, is different constraints influencing the saving decisions, starting from financial constraints to different availability of financial services. Also, it is reasonable to assume, that education or specifically financial education influences the saving habit. However, there might be different preferences, beliefs and traits, that also influence the saving propensity, but are not that obviously related to savings.

The aim of the graduation thesis is to explain which individual preferences, beliefs and traits might influence individual's propensity to save. For being able to measure individual level influencers, the empirical study is done among individuals, who are assumed to have the financial resources available to make savings.

To follow the aim of the thesis, four hypothesis have been set up:

1. Individuals, who have future-oriented time preferences, are more likely to save.
2. Individuals, who have internal locus of control, are more likely to save.
3. Individuals, who are more optimistic, are more likely to save.
4. Individuals, who are more independent, conscientious and value material things less, are more likely to save.

The aim of the thesis is to extend the literature by giving further insight on what individual level factors drive households saving propensity. Empirical study will be done with data gathered in World Value Survey wave 6. Data from Word Value Survey allows to include additional set of explanatory variables that measure person's values and individual characteristics that are less explored in the previous literature. Previously, based on author's knowledge, there have not been any studies about saving propensity done with World Value Survey Wave 6.

The model created is logit binary as the dependent variable is binary i.e. whether individual saved during last year or not. Logit regression is run with cluster robust errors with country fixed effects. Custer robust errors are because the observations might not be independent as individuals in each country are similar to each other. Fixed effects for countries were used, in order to compare individuals within different countries.

In the first chapter of the thesis an overview of the previous literature is given, based on what the hypothesis were developed. The description of previous theoretical as well as empirical research is analyzed. An overview is given about life-cycle hypothesis of savings and a bit advancement of this, a behavioral life-cycle hypothesis, which considers individual beliefs. Then, a description about base model variables – *Income, Education, Age and Gender* and their influence, based on previous literature, is described. Furthermore, an overview is given about previous studies about values, preferences and beliefs influencing saving decisions based on what the hypothesis were set up.

The second chapter describes the methodology on how the aim of the thesis will be met. The data analysis, restructuring and model description is also made. Moreover, the description of variables as proxies for hypothesis is given. The model created is logit binary as the dependent variable is binary i.e. whether individual saved during last year or not.

In the third chapter, an general overview of the saving results is given, then what were the significant predictors of saving propensity from the base model and what were the significant variables from proxies used to confirm or reject hypothesis.

The forth chapter is describing the results of the empirical work, whether the hypothesis were confirmed and what could be concluded based on the model developed. The chapter discusses conclusions made based to data analysis and empirical research, about the individual propensity to save. Furthermore, some suggestions for further research is discussed.

1. PREVIOUS LITERATURE OVERVIEW

1.1. Theoretical background of saving

The main question asked in household finance is how financial instruments, used in households, attain their objectives i.e. how they are used. Moreover, there are some special features that give the field of household finance its special character. Households must plan over long horizons, they have non-traded assets – their human capital, they have illiquid assets – their houses and other real estate, there are constraints to borrow and they are subject to personal taxation. (Campbell, 2006)

The research in finance (also in other parts of economics) could be positive or normative. This means that positive research describes what is actually done in practice and normative research prescribes what should be done, what is rational. This leads to where the behavioral finance theory describes the choices that households make, whereas standard finance theory describes the choices that households should do in order to maximize the total well-being. (Campbell, 2006) In some cases, individuals and households make decisions, that actually do not maximize their total well-being. Reasons for this might be that individuals have emotions, preferences, (biased) beliefs etc.

The discussion about savings goes back to centuries. According to John Maynard Keynes's fundamental psychological law' of savings, the marginal and average propensities to save grow as income rises. J. M. Keynes also lists eight motives for people to save: 1. "To build up a reserve against unforeseen contingences" (the precautionary motive) 2. "To provide for an anticipated future relationship between the income and the needs of the individual" (the life-cycle motive) 3. "To enjoy interest and appreciation" (the intertemporal substitution motive) 4. "To enjoy a gradually increasing expenditure" (the improvement motive) 5. "To enjoy a sense of independence and the power to do things, though without a clear idea or definite intention of specific action" (the independence motive) 6. "To secure a masse de manoeuvre to carry out speculative or business projects" (the enterprise motive) 7. "To bequeath a fortune" (the bequest motive) 8. "To satisfy pure miserliness. i.e.

unreasonable but insistent inhabitations against acts of expenditure as such" (the avarice motive). (Keynes, 1936) (Baranzini , 2005) M. Browning and A. Lusardi added one feature to the list 9. "To accumulate deposits to buy houses, cars and other durables" (the down payment motive). (Browning & Lusardi, 1996)

In the early 1950s F. Modigliani with R.Brumberg and A. Ando came up with the life-cycle theory of consumption and savings that states, that the level of savings depends on the age of individuals and on the demographic structure of society. This differs from Keynes statement, that more is saved, when income rises. Modigliani et. al. claim instead, that the income saved is independent from total income. They had two suggestions – the most important purpose of saving is to provide resources when there are changes in income and the savings are proportional to average earning ability. (Modigliani, 2005) This means, that individuals save during life with the aim of providing themselves the ability to purchase in their final stages of their life, when they no longer receive income (Canova, et al., 2003). In 1957 M. Friedman introduced permanent income hypothesis, which states that individuals spend money in line with their expected long-term income and they will save money in case the income today is higher, than expected income in the future (Friedman, 1957).

According to Shefrin and Thaler "the attempts to test the life-cycle hypothesis have met with mixed success" and there have been suggestions to adjust the model in order to accommodate it with real data. Shefrin and Thaler came up with the Behavioral Life Cycle (BLC) hypothesis model, to make the life-cycle theory more "behaviorally realistic". The problem of self-control and temptation is incorporated in the model, because spending today is always more attractive option, than saving for future needs. The self-control element involves three components usually excluded from economic analyses: internal conflicts, temptation and willpower. Will-power is costly and painful. because this reduces consumption, however the cost declines with income. They also proposed a solution, such as external or internal constraints. External constraints could be pre commitments to restrict future choices and internal ones as self-enforced to use mental accounting to divide income. (Sherfin & Thaler, 1988) "Mental accounting is a set of cognitive operations used by individuals and households to organize, evaluate and keep track on financial activities" (Thaler, 1999). In the BLC, the marginal propensity to consume wealth is assumed to be account specific (Sherfin & Thaler, 1988). The idea of the BLC is that it is possible to shift income to different mental accounts, where there is less possibility to use them, in order to save more. (Thaler, 1999)

The life-cycle theory of savings suggests, that individuals save in each life stage accordingly and plan their savings and consumption during their life-time. The behavioral life-cycle hypothesis suggests, that in real life, it might be the case that individuals do not behave as the theory suggests. In practice, individuals have different preferences, beliefs and personality traits, that influence their expected rational decision making. Therefore, it is important to understand what are the different preferences, beliefs and personality traits, that influence individuals saving decisions and to which direction the decisions are influenced to, in order to come up with further suggestions that could be implemented, for individuals to have more well-being in their finances and other aspects of their life.

1.2. Socio-economic factors influencing propensity to save

It is reasonable to think, that the outcomes of financial decisions on how much to save or borrow, where to invest etc. are linked with each individual financial resources as well as knowledge or lack of knowledge on how to make financial decisions. There could be serious consequences in case individuals fail to understand for example high costs of borrowing, the concept of compound interest or the necessity to save. The linkage between financial decisions and financial literacy and education is widely researched by scientists. Moreover, the life-cycle hypothesis suggests, that individuals save accordingly during their lifetime (Modigliani, 2005).

A survey done with more than 140 economies around the world about financial literacy, found that one out of three adults is financially literate and 57% globally save money, but 27% of them use financial institution to do so. Furthermore, 42% of account holders use their accounts to save and 45% of them are financially literate. Moreover, there are big gaps between different groups – women, the poor and less educated are more likely to have less financial knowledge. This also holds in different economies, not just only in the poor countries. On the other hand, adults who use financial services (bank account, credit card) tend to have more financial knowledge, independent from their income. (Klapper, et al., 2015)

Financial mistakes follow the U-shaped pattern, where middle-aged individuals make fewer financial mistakes than younger and older counterparts, is stated in the study done about life-cycle patterns of financial mistakes (Agarwal, et al., 2009).

The study that implemented the context of The Health and Retirement Study (HRS), a dataset of Americans over the age of 50, also used three further questions, two of them about compound interest and inflation and third about stock risk taking and diversification, to measure financial knowledge. The questions were as follows:

- "Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than $102, exactly $102, less than $102?"
- "Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as or less than today with the money in this account?"
- "Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund.""

The financial literacy was connected with general education, where more educated individuals, were more likely to respond correctly to financial literacy questions. Authors found that there is a lack of knowledge about compound interest and financial literacy is strongly and positively related with retirement planning. Furthermore, financial illiteracy is strong with those who have low income, education and wealth holdings. Financial literacy is positively related with wealth at the bottom of the wealth distribution, this gives some insight, that individuals with better financial knowledge are able to save more. (Lusardi & Mitchell, 2011)

Financial literacy and retirement study done in Netherlands suggests that financial literacy is important factor for being ready for retirement (Alessie, et al., 2011). The authors of the study used the same three questions about interests, inflation and risk/diversification than the research referred above. The results were also similar, from the USA study it was found, that two-thirds understands compound interests, three-quarters understands inflation and half of the respondents understands diversification (Lusardi & Mitchell, 2011). From the study in Netherlands, the 85% of respondents understood interest rate, about 77% answered inflation questions correctly and 50% gave correct answers to risk diversification question. However, similar to previous studies, there are large gender differences in financial literacy in Netherlands, women have less knowledge than men. Also,

knowledge in financial literacy increases with education levels, majority (70%) of individuals with university degree answered correctly to financial literacy questions. (Alessie, et al., 2011).

Choi, Laibson and Madrian concluded field experiment in certain company to gain insight on why employees are contributing not optimally to their 401(k) plan. They survey sample consisted of 689 employees who were contributing less than the matching threshold and 200 randomly picked employees contributing at or above the matching threshold. The authors found evidence that these employees, who contribute below the matching threshold, are more exposed to procrastinate and are less financially literate than those, who are at or above the match threshold. The study also stresses the problem. that monetary incentives are not enough to increase savings. (Choi, et al., 2011) The exposure to procrastinate might also be related to the relevance of time-preference in saving decision making.

Study made in Denmark, that divides individuals as “active” and “passive” savers found that active savers are generally more wealthier as well as more financially sophisticated and respond to tax subsidies for retirement accounts. Individuals with economic, accounting or finance degree are more likely to respond to subsidies. The paper states, those policies that insist on individuals to take action to rise savings, have smaller effect on total savings, than policies that rise savings automatically without individual’s action. Moreover, the automatic contributions have larger effect on total wealth than price subsidies, because they change total savings of the passive savers. This is because, most people in the study were defined as passive savers. (Chetty, et al., 2014) This shows that individuals, who are more wealthier and more educated, are more likely to save more and reach as well as maintain financial wellbeing.

Generally, financial literacy is a choice on how much to invest in learning financial knowledge, taking into account consumers trade-off costs and benefits. The financial literacy could be defined as a form of human capital accumulation, where mathematical ability early in life influences future knowledge in financial literacy. Furthermore, the financial skills are developed during life cycle and depreciate over life at a different rate for each individual. Even though the process of learning financial knowledge takes time, money and effort, having more financial literacy increases the net returns of it. Financial literacy and wealth both are endogenous and positively correlated over the life cycle. As in previous studies, education is strongly related with financial literacy. Furthermore, based on microeconomic and aggregated data, there is evidence that developing mathematical skills early in

life will increase the financial knowledge and therefore wealth accumulation. (Jappelli & Padula, 2013)

Based on above, the previous literature suggests, that gender, age, education and income are related with the propensity to save. Having the financial resources to save money, is the most straight-forward influencer of the saving propensity. Some evidence is presented, where men are more likely to make better financial decisions. Also, there is evidence that individuals lack general knowledge on how to handle financial decisions, among them, a decision to save. More educated individuals, make better saving decisions. Furthermore, there is evidence that more educated individuals tend to have more knowledge in general basic finance.

1.3. Preferences, beliefs and traits influencing propensity to save

Household decisions are more complex and have more nuances, that standard textbook models take into account (Campbell. 2006). Standard economic models predict, that individuals choose to save based on their preferences, expectations and the costs and benefits of the saving. However, there is a growing body of work about psychology influence on saving behavior. (Stango & Zinman. 2009) Therefore, there are suggestions on how time preference, locus of control, optimism and different personality traits, might influence individuals saving decisions.

As mentioned in the behavioral life-cycle hypothesis, it is easier for individuals to consume now than to budget and save for tomorrow, as savings usually require at least some kind of self-control and will-power. Taking into account, that there are limited resources, individuals have choices to make on how to use the resources today. Two challenges are allocated to individuals: to make good decisions and to stick to them. Rational economists assume, that individuals are good decision makers and carry out their plans accordingly. However, the assumption rises some questions, especially regarding saving for retirement. (Laibson, et al., 1988)

Generally, individuals are impatient – they would like to receive the benefits now and delay costs until later. It is assumed, that such preferences are time-consistent i.e. individuals preferences at any time are the same. (O'Donogue & Rabin , 1999) However, it turns out, individuals do not discount all future enjoyments with a constant rate of interest (Strotz, 1956).

Moreover, research has concluded, that individuals short-cut discount rates are higher than longer period discount rates. Such preferences are modelled with discount functions that are hyperbolic. (Laibson, et al., 1988) Therefore, the assumption of time consistency might not hold as it ignores the human tendency to receive benefits now and delay costs until later. Such tendencies are called present-biased preferences, that means individuals "give stronger weight to the earlier moment as it gets closer". In other words, it is a tendency to underweight future consumption to today's consumption in a irregular way. Individuals with present-biased preferences may aim to save more in the future, however the rarely do. Present-biased preferences could be relevant in predicting individual's behavior and even relatively slight self-control challenges might lead to welfare loss. (O'Donogue & Rabin , 1999)

On average, the population is time consistent, however there is a large fraction of the population, who is present biased as it was found in a study done in USA with a sample of 2317 individuals. The same study found that time preferences is statistically and economically significant determinant of retirement savings. Moreover, the authors established connection between self-awareness of the bias and retirement savings. Overconfidence regarding exponential assessment has an additional negative effect on retirement savings. (Goda, et al., 2015)

Recent study done in USA, that studied individual's present beliefs with self-reported patience, will-power, ability to resist junk food, health-related discount factor and responses for cognitive reflection test. They found, that individuals with lower present bias are likely to have more savings. (Bradford, et al., 2017)

Another paper approaches somewhat different side, stating that individuals are affected by "future value bias that is considered as a systematic tendency to underestimate a future value given a present value, time horizon and rate of return". Individuals are tested with question about tying up their money for future returns. The bias is strongly correlated with savings, which means that individuals underestimate the benefits of long-term savings. (Stango & Zinman, 2009)

There are several suggestions, that individuals would benefit for having commitment mechanisms to save more. For example (Strotz, 1956), suggesting use pre-commitment to future tasks and (Thaler, 1994) suggesting to make joining the pension plan as default. The empirical evidence supports the suggestions. Study done in USA comparing the situation before, where individuals had to select

participation of 401(k) savings plan and after, where individuals had the opt-out option i.e. they were automatically enrolled to 401(k) plan. They found, that participation in savings plan is significantly higher after the change i.e. individuals used saving account more, therefore saved more. As there were no changes in the economic features of the 401(k) plan after the automatic enrolment, there is a question about why individuals procrastinate before to make the saving decision. Since individuals had to make some choices on how much to contribute and which funds to choose, they had indirect costs in order to learn the 401(k) system. They evaluate the costs and benefits for making the decisions today vs tomorrow and this leads to procrastination, which is related to time-preference. The individuals think that they will decide on the 401(k) features tomorrow, however when tomorrow comes, they put it off until another tomorrow. (Madrian & Shea, 2001)

Finally, based on theoretical model, it is found that saving as an incentive to increase consumption in the future and bring retirement closer is wealth dependent, where as the individual reaches the critical wealth threshold, the option to retire earlier becomes progressively more important and it gives an individual more motivation to save (Farhi & Panageas, 2005).

Individuals, who have future-oriented time-preferences, therefore are able to delay consumption today for tomorrow are aimed to make better financial decisions. While individuals come from different backgrounds, families, societies, cultures etc., they might have different views and beliefs in life. Therefore, it might be the case that individual's different beliefs are influencing their saving behavior.

The Locus of Control (LOC) is generally explained as a tendency to see the world in a particular way. In the process of obtaining different skills and knowledge and using them, the role of reinforcement, reward and gratification is generally acknowledged. However, individuals regard the events differently. One of the determinants of the reaction is whether an individual believes that the reward is from or upon oneself or is controlled with forces that occur independently. Individuals with external control, tend to believe that happening events are due to luck, chance, fate or other independent forces. On the other hand, individuals, with internal control believe, that their own actions are the causes of the events. (Rotter, 1966) Moreover, research shows that individual's consumption decisions are influenced by the self-concept on how individual sees himself/herself (Onkvisit & Shaw, 1987). Therefore, internals are more action oriented and motivated, whereas externals are less likely to put in the effort to manage their finances responsibly (Perry & Morris, 2005).

Study done in USA shows some evidence that externals have less financial knowledge, moreover they are less likely to be engaged in responsible financial behavior. There is found a positive relationship between income and responsible financial behavior, that means individuals with higher income are more likely to be responsible with their money. In conclusion, the study found some evidence that locus of control meditates the effects of financial knowledge and income on behavior, this means that individuals who feel that they control their financial outcomes are more likely to take full advantage of their financial knowledge and income. (Perry & Morris, 2005)

Another study done in USA measuring the locus of control in college students. The locus of control variable was the most important variable in the model, being significant predictor of financial behavior. Students with external locus of control performed worse financial behavior in managing their budget of food, clothing, housing and paying bills. (Britt, et al., 2013)

Research done in Australia, to explore wealth accumulation as a measure of savings in households, found that, over the 4 reviewed years, household, whose head of household is with internal locus of control, save significantly more than the external locus of control households. The results show, that over the 4 years, poor households with internal head of household accumulated USD 55 229 more wealth, while the rich household with internal household head accumulated USD 85 770 more wealth. That is the overall locus of control effect for the households. (Cobb-Clark, et al., 2016)

As stated previously, internal beliefs on outcomes of individual behavior could influence saving decisions. Optimism could be seen as an internal belief or a view to life, therefore, it might be the case, that this also is a significant determinant for influencing saving decisions.

Measure is developed based on Survey from Consumer Finances (SCF) for understanding how optimism relates to significant life choices. The paper found, that more optimistic people work longer hours, anticipate longer age-adjusted work careers and are more likely to think that they will never retire. Furthermore, the optimism is related to saving decisions and portfolio choice – more optimistic individuals save more and report that it is good thing to do, pay their credit card balances have long planning horizons and are more likely to be stock-pickers i.e. have more individual stocks. On the other hand, the paper also analyzed the differences between moderate and extreme optimists and found that extreme optimists, however, have shorter planning horizons and less likely think that saving is a good thing to do. Therefore, the paper concludes, that optimism in moderate doses could be a good

thing in decision making process. However, this could not be the case with extreme optimists. (Puri & Robinson, 2007)

On the other hand, study done with World Value survey, found that there is some evidence, that more optimistic individuals save less. However, the measure of optimism was taken in the context of confidence and optimism was measured with an response "I usually count on being successful in everything I do." The author claims that this is somewhat expected and in line with precautionary saving motive in life-cycle theory. As state above, the precautionary saving motive suggests, that individuals save for unexpected expenses. But more optimistic individuals might underestimate the likelihood, that something unexpected would happen to them, that would require some financial reserve. Therefore, they do not save a part of their financial resources. (Pirinsky, 2013)

Moreover, individuals tend to be unrealistically optimistic and overconfident. They tend to believe that future income is certain, which shows extreme form of overconfidence. Moreover, individuals think that they consume less in the future than they actually do. (Brunnermeier & Parker, 2005)

Therefore, it might be the case that individuals who are overly optimistic about the future, think that they do not need savings for rainy days, because nothing unfortunate will never happen to them. On the other hand, more optimistic individuals see their life and opportunities ahead and they might think that they live longer, therefore they must have some kind of financial reserve for the retirement.

Individual personality traits influence more or less every aspect of one's life. Also, taken into account that individual beliefs about optimism and outcome of one's actions, that might influence the financial decisions, it might be the case that personality traits can also be an indication to saving decisions.

Firstly, to give an overview of five most relevant personality factors, that influence individuals (Digman, 1990): extraversion/introversion. friendliness/hostility or agreeableness. conscientiousness or will, neuroticism/emotional stability and intellect/openness/independence.

A survey done within 734 households and 1266 individuals with special data collecting technique, found that liquid savings were higher were the head of the household was more educated and they had higher income. Having an emotionally stable head of household is related with increased liquid savings. More inflexibility by the head of the household is related with higher savings, whereas higher autonomy and extraversion is related with less savings. In single households, tough-mindedness is

positively correlated with liquid savings, while agreeableness is negatively related. (Nyhus & Webley, 2001)

Another study done with self-reported data measuring money management and personality traits through 4 different regressions, found that believing that material values are important and will guide to happiness and personality trait of conscientiousness are important factors in money management. Individuals who tend to be more conscientious manage their finances better as well as those who are less materialistic. (Donnelly, et al., 2012)

To conclude, time-preferences, locus of control, optimism and personality traits are significant influencers of saving propensity. Individuals, who acknowledge their future needs for financial resources and are able to delay the consumption today for tomorrow are able to save more. Individuals, having the internal beliefs, that their own actions drive their future are able to make better financial decisions. Moreover, optimism in life, could result in better well-being. Analyzing previously done researched, the personality trait of conscientiousness could also be related to time-preferences, as individuals who are more conscientiousness, it might be the case that they manage their finances better and are able to delay gratification better. The research about links between personality traits and saving is rather thin, however there are basis to believe that personality traits might influence saving decisions.

2. METHODOLOGY

2.1. Data and sample construction

The data for empirical investigation comes from the World Value Survey (WVS), a global network of social scientists studying changing values and their impact on social and political life. WVS consists of surveys conducted in different countries covering almost 90% of world's population, using a common questionnaire. It is the largest non-commercial, cross-national, time series investigation of human beliefs and values ever executed and the only academic study covering both very rich and very poor countries and all major cultures. (Inglehard, et al., 2014)

The thesis uses the data from the 6th wave of WVS, which was done in years 2010-2014. Only the most recent wave was considered as cross-sectional design is sufficient for the purpose of the study. Moreover, it is not possible to construct panel data set out of WVS data since respondents are not tracked in time, which reduces the benefits of combining data from several waves.

The initial sample consists of contains 86 273 respondents from 60 countries.

Before the regression analysis, the data was sampled and cleaned for better interpretation purposes. The aim of the graduation thesis is to explain which individual preferences, beliefs and traits might influence individual's propensity to save. In order to analyze the individual level influencers of saving propensity, the elimination of the income constraint must be made. This means that individuals, who are able to save due to having the financial resources are analyzed. Otherwise, the results could be biased towards the constraint of income and the inability to save money because the lack of financial resources. Previous literature has found that individuals who earn more, are able to save more. For example, study done in the US shows, that there is a strong positive relationship between income and savings (Browning & Lusardi, 1996). Therefore, it is reasonable to believe, that individual, who have the financial resources, should be able to save money and it is possible to analyze their preferences, values and beliefs towards saving propensity.

To restrict the sample to households that were actually able to save. Firstly, the sample is limited to household, who are in a higher scale of incomes and who report themselves in higher social class. From variable "V239 Scale of incomes", only individuals from the top of the scale 6-10 were included in the regression. From the "variable V238 Social class (subjective)", only individuals who reported themselves being "Upper class". "Upper middle class" and "Lower middle class" were included in the regression. By this, it is reasonable to think, that the households who are not able to save because of financial resources, are excluded from the final dataset for regression.

Finally, to ensure that the person who responded the survey questions, is also the one, who is making household saving decisions, the sample was further restricted to the individuals who are chief earners of the household. It is assume, that the chief earner of the household also makes the financial decisions necessary. The variable "V235 Are you the chief wage earner in your house" was used and the sample was limited with household whose head was responding the survey. The final sample consists of 9160 respondents from 54 countries.

Table 1. Sample characteristics: number of observations and average propensity to save

Country	N	Savings	Country	N	Savings	Country	N	Savings
Armenia	46	0.28	India	195	0.38	Poland	64	0.42
Argentina	139	0.34	Iraq	155	0.58	Palestine	120	0.38
Australia	247	0.56	Jordan	115	0.25	Romania	181	0.31
Azerbaijan	158	0.22	Japan	190	0.43	Russia	223	0.52
Bahrain	201	0.43	S. Korea	200	0.48	Rwanda	230	0.47
Brazil	87	0.39	Kuwait	231	0.57	Sweden	245	0.77
Chile	138	0.59	Kazakhstan	238	0.46	Singapore	344	0.59
China	210	0.75	Lebanon	192	0.43	Slovenia	156	0.56
Colombia	77	0.40	Libya	255	0.62	Thailand	214	0.20
Cyprus	139	0.33	Morocco	47	0.49	Tunisia	102	0.49
Germany	371	0.83	Mexico	105	0.41	Turkey	303	0.24
Algeria	99	0.60	Malaysia	218	0.65	Taiwan	97	0.56
Ecuador	123	0.46	Nigeria	170	0.56	US	395	0.63
Estonia	147	0.55	Netherlands	272	0.77	Uruguay	76	0.50
Egypt	119	0.13	N. Zealand	124	0.65	Uzbekistan	177	0.42
Georgia	45	0.13	Peru	81	0.53	Yemen	52	0.50
Ghana	162	0.65	Philippines	115	0.24	S. Africa	358	0.55
H. Kong	114	0.70	Pakistan	145	0.48	Zimbabwe	153	0.44

Source: Compiled by the author based on data from WVS

2.2. Measure of propensity to save

The dependent variable *Savings* is binary i.e. whether the household saved during past year or not. The original WVS variable used to construct *Savings* is "V237. Family savings during past year", where individuals were asked whether "during the past year did your family" 1) "Save money". 2) "Just get by". 3) "Spent some savings and borrowed money". 4) "Spent savings and borrowed money". The variable *Savings* takes value of 1 if respondent answered "Save money" and 0 if a respondent made any of the following responses: "Just get by". "Spent some savings and borrowed money". "Spent savings and borrowed money".

Despite the restriction of the sample with the individuals who are aimed to have the financial resources to save, the average saving rate in the sample is roughly 50%. This might give some insight about other variables, besides income, might influence the saving propensity, like beliefs, preferences and personality traits.

It should be noted, that there are different time horizons for different saving goals. But as the aim of the graduation thesis is to explain which individual preferences, beliefs and traits might influence individual's propensity to save, there is no distinction made between long term and short term saving goals. Only the fact that the individual has saved, has been considered. Furthermore, there is no calculation of saving amount, only the fact that individual has reported that the household has saved or not during last year.

The question whether the proxy taken for propensity to save is also relevant i.e. whether the proxy actually measures the propensity to save. However, based on previous literature, the same proxy has used to measure savings in a paper published in American Economic Review, therefore it is reasonable to assume that the proxy is validates for the graduations thesis (Chen, 2013).

2.3. Controls and measures of individuals' values

The control variables, used in the base model, are *Income. Education. Gender* and *Age.* Variable *Income* is reported in different scales, asking individuals in what income group their household is located. *Education* is also reported in a scale, where the highest educational level attained is asked,

where the lowest is no education and the highest is university education. *Gender* is coded as binary – 1 if male and 0 if female and *Age* is how old the individual is. The control variables, based on previous literature, are also influencers of saving propensity.

For testing the first hypothesis, two proxies as independent variables were used. The first independent variable for time-preferences was “V17 important child qualities: Thrift saving money and things”, were individuals were asked whether they consider that it is important to encourage children to learn at home “Thrift, saving money and things”. The variable “V17” was coded as binary, where answer “mentioned” was coded as 1 and “not mentioned” as 0. The variable V73 “It is important to this person to have a good time; to “spoil” oneself” in a scale from 1 very much like me, 2 like me, 3 somewhat like me, 4 little like me, 5 not like me, 6 not at all like me. The variable “V73” remained in the same scale.

The independent variables for the second hypothesis to control for locus of control were as follows. “V55 How much freedom of choice and control over own life”, the individuals were asked, that “Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out”. The variable “V55” remained in the same scale. Another variables was “V100 Hard work brings success” were individuals were asked, “how would you place your views on this scale? 1 means you agree completely with the statement that hard work brings success in the long run and 10 means hard work doesn´t generally bring success - it´s more a matter of luck and connections.” The variable “V100” scale was reversed, because then the two variables for locus of control could be interpreted the same way.

The third hypothesis was regarding optimism, therefore two proxies for optimism were chosen. The independent variable for optimism, was “V10 Feeling of happiness”, were individuals were asked that “taking all things together, would you say you are on a scale 1 to 4, where 1 is very happy to, 2 is rather happy, 3 is not very happy and 4 is not at all happy”. The variable “V10” scale was reversed, for the purpose of interpreting the two variables of optimism the same way. And “V23 Satisfaction with your life” were individuals were asked to “all things considered, how satisfied are you with your life as a whole these days? On which 1 means you are “completely dissatisfied” and 10 means you are “completely satisfied” where would you put your satisfaction with your life as a whole?”.

For the forth hypothesis, the personality traits, the variables used were as following. For being autonomous, the "V216 I see myself as an autonomous individual", the individuals were asked. "People have different views about themselves and how they relate to the world. In a scale of 1 being strongly agree, 2 being agree, 3 being disagree and 4 being strongly disagree, where do you see yourself as an autonomous individual?". The variable V216" was scale was reversed, for the purpose of interpreting the variables. For the proxy for independence. "V12 Important child qualities: independence", individuals were asked, whether they consider that it is important to encourage children to learn at home independence". The variable "V12" was coded as binary, where response "1 mentioned" was coded as 1 and response "2 not mentioned" as 0. The proxy for conscientiousness. "V14 Important child qualities: Feeling of responsibility", individuals were asked, whether they consider that it is important to encourage children to learn at home responsibility. The variable "V14" was coded as binary, where response "1 mentioned" was coded as 1 and response "2 not mentioned" as 0. And for valuing material things "V71 it is important to this person to be rich; to have a lot of money and expensive things", the individuals were asked on a scale whether "it is important to this person to be rich; to have a lot of money and expensive things" 1 being very much like me, 2 being like me, 3 being somewhat like me, 4 being a little like me, 5 being not like me and 6 being not at all like me. The variable "V71" was reversed, for the purpose of interpreting the variables the same way.

The scales of the following variables were normalized to being 0-1: V73 *Spoil oneself*, V55 *Choice of Control* and V100 *Work success*, V10 *Happiness* and V23 *Life Satisfaction*, V216 *Autonomous* and V71 *Rich*. Variables *Gender, Saving Money, Independence and Responsivity* were coded as binary, therefore no normalization was necessary to make. V248 *Education* and V239 *Income*, remained in the same scale.

Table 2. Controls and measures of values

Variable	WVS	Explanation of the variable
Base model		
Age	V242	Continuous
Gender	V240	Binary, 0 - female, 1 - male
Education	V248	1-9, higher level means higher level of education
Income	V239	1-5, higher level means higher level of income
H1: time-preferences		
Saving money	V17	Binary, 0 - no, 1 - yes
Spoil oneself	V73	1-6, higher level means forward-looking behavior
H2: locus of control		
Choice control	V55	1-10, higher level means higher control over life
Work success	V100	1-10, higher level - hard work brings better life
H3: optimism		
Happiness	V10	1-4, higher level means higher level of happiness
Life satisfaction	V23	1-10, higher level means higher life satisfaction
H4: personality traits		
Autonomous	V216	1-4, higher level corresponds to higher autonomy
Independence	V12	Binary, 0 - no, 1 - yes
Rich	V71	1-4, higher level means valuing material things more
Responsibility	V14	Binary, 0 - no, 1 - yes

Source: Compiled by the author based on data from WVS

Below is table about descriptive statistics of all the variables tested in the models. More specifically, the variable, its mean, standard deviation, minimum, maximum and number of observations is indicated.

Table 3. Descriptive statistics

Variable	Mean	St.Dev.	Min	Max	N
Savings	0.51	0.50	0.00	1.00	9 160
Age	45.49	14.52	18.00	98.00	9 141
Gender	0.74	0.44	0.00	1.00	9 152
Education	6.74	2.24	1.00	9.00	9 101
Income	2.07	1.08	1.00	5.00	9 160
Saving money	0.39	0.49	0.00	1.00	9 159
Spoil oneself	0.52	0.24	0.17	1.00	9 039
Choice control	0.76	0.19	0.10	1.00	9 087
Work success	0.69	0.27	0.10	1.00	9 070
Happiness	0.82	0.17	0.25	1.00	9 122
Life satisfaction	0.70	0.20	0.10	1.00	9 133
Autonomous	0.75	0.23	0.25	1.00	8 821
Independence	0.54	0.50	0.00	1.00	9 159
Rich	0.58	0.25	0.17	1.00	9 040
Responsibility	0.70	0.46	0.00	1.00	9 160

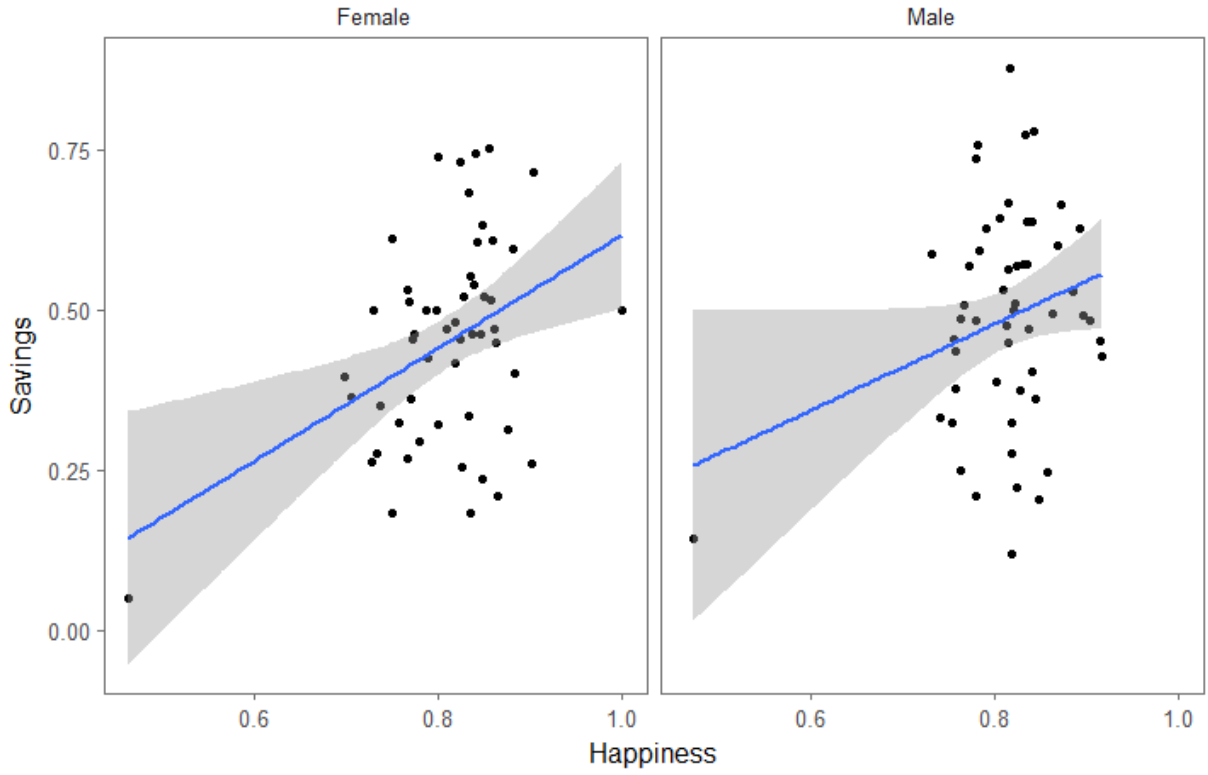
Source: Compiled by the author based on data from WVS

2.4. Model and regression analysis

Robust standard errors clustered by countries is used for the logit binary model, because the observations might not be independent as individuals in each country are similar to each other. Fixed effects for countries were used, in order to compare individuals within countries. Fixed effects were reached with adding country dummies into the regression analysis. The alternative to this approach requires to control for the country-level differences with a set of country-level variables such as GDP per capita, unemployment rate, financial market development etc. However, as indicated by the Figure 1. (see Annex 1. For a wide range of correlates) the difference between countries in the average *Savings* are substantial and likely to be influenced by an array of factors that are difficult to control for. For example, the lowest level of *Savings* and *Happiness* for female participants in the Figure 1, corresponds to Egypt (0.05 and 0.46 correspondingly; 0.14 and 0.47 for male respondents). This difference (to other countries) seems to too striking to be explained with a standard set of country's economic and development characteristics. Therefore, in order to properly control for differences between countries it is necessary to rely on a rich set of country-level controls, including cultural

factors and, probably, take into account recent political developments. Since the data on many potential important country-level characteristics is not available, the decision to use country fixed-effects appears to be the only reasonable option.

Figure 1. Country-average levels of Savings and Happiness



Source: WVS. author's calculations

Multi-collinearity was tested with variance inflation factor (VIF) and none of the independent variables indicate collinearity problem, therefore the variables are independent. The model and regression analysis are done and run in software Gretl.

The variables were entered into the model as follows:

1) Control variables for base model: *Age. Gender, Education, Income,* accommodated with country dummies as fixed effects (Model 1).
2) Variables for time-preferences (Model 2), locus of control (Model 3), optimism (Model 4) and personality traits (Models 5-7), accommodated with country dummies as fixed effects.

Model 8 combines Model 1 with predictors that are found to be significant predictors of *Savings* in Models 2-7.

The reasoning behind this order is to show whether individual specific preference and belief factors show variance in saving behavior after of what was explained by socio-economic factors, such as age, gender, income and education. The base model variables should also show influence in savings, therefore they are not used only because of controls of models accuracy.

The logistic function F, which is a function of a variable z. would be, where e is the exponential under the logit approach (Brooks, 2008): $F\ (z_i)\ =\ \frac{1}{1+e^{-z_i}}$

The logit model estimate is as follows (Brooks, 2008): $P_i\ =\ \frac{1}{1+\ e^{-(\beta 1+\beta 2x2+\cdots+\beta kxk+ui)}}$.

3. EMPIRICAL RESULTS

3.1. Individuals' propensity to save

Empirical research was done with data gathered from World Value Survey to meet the aim of the thesis. The aim of the thesis was to explain which individual preferences, beliefs and traits might influence individual's propensity to save. In the sample, only individuals who were assumed to have the financial resources were included, for being able to better analyze individuals preferences, beliefs and traits. The model developed for estimations was logit binary. The dependent binary variable was savings during past year i.e. 1 if the household saved during last year and 0 if not. Independent variables were inserted to the model as described above – first the control variables for the base model – *Income, Gender, Age* and *Education*. Secondly, the variables of interest as proxies for hypothesis. *Saving money* and S*poil oneself* for the first hypothesis, regarding time preferences. *Choice control* and *Work success* for the second hypothesis, regarding locus of control. *Happiness* and *Life satisfaction* for third hypothesis regarding optimism. *Autonomous, independence, rich* and *responsibility* for forth hypothesis regarding personality traits. The variables of interest were added by one according to the hypothesis, to see whether anything additional is explained after the base model. The results can be seen in Table 5. The link between propensity to save and individual values.

In the base model *Income, Gender and Education* were statistically significant at 1% level. However, the variable *Age* was not statistically significant.

In the second model, *Saving money and Spoil oneself* as a proxy for first hypothesis regarding time preferences were added. The base variables indications were the same – *Income, Gender and Education* were statistically significant at p-value of 1%, but *Age* was not statistically significant. Variable *Saving money* was not significant and variable *Spoil oneself* was significant in a p-value of 10%. The variable *Spoil oneself* has a negative coefficient, that means the more individual considers that it is important to spoil oneself, the more likely he or she is to make savings. The negative coefficient is rather surprising and makes no sense, as the assumption was, that the less individual

believes that it is important to have a good time and to spoil oneself, the more he or she is likely to save money. This means, that the proxy used does not measure time-preferences and forward-looking behavior. Moreover, the level of significance at 10% is not enough to consider this variable in the final model.

In the third model, *Choice control* and *Work success* were added as proxies to the second hypothesis regarding locus-of-control. The base variable significance was similar to previous models: *Income* and *Education* were statistically significant at p-value of 1%. *Gender* was statistically significant at a p-value of 5% and *Age* was not statistically significant. The variables for hypothesis, *Choice control* was significant at a p-value of 1% and variable *Work Success* was not statistically significant.

In the fourth model, *Happiness and Life satisfaction* were added as proxies for forth hypothesis regarding optimism. The base variable significance was the same as in previous models: *Income. Gender and Education* were statistically significant at a p-value of 1%, but *Age* was not statistically significant. Independent variables *Happiness and Life satisfaction* were both statistically significant at p-value of 1%. The coefficients of the both variables were positive, therefore the happier and more satisfied with his or her life the individual is, the more likely is he or she to make savings.

In the firth model, *Autonomous and Independence* were added as proxies for the fifth hypothesis, regarding independence. The base results were the same as in model 3, where *Income and Education were* statistically significant at a p-value of 1%. *Gender* was statistically significant at p-value of 5% and *Age* was not statistically significant. Variable *Autonomous* was statistically significant at p-value of 10% and *Independence* was not statistically significant. The fifth hypothesis also covered the sixth model on how valuing material things influences savings propensity. The proxy for measuring the influence was variable *Rich.* The base variables had the same significance as in previous models: *Income, Gender and Education* were statistically significant at a p-value of 1%, but *Age* was not statistically significant. Variable *Rich* was also not statistically significant. Model 7 that also covered the fourth hypothesis regarding personality traits had variable *Responsibility* for measuring contentiousness in saving behavior. The base variables in the model had the same significance as previous ones': *Income, Gender and Education* were statistically significant at a p-value of 1%, but *Age* was not statistically significant. The variable *Responsibility* was not statistically significant.

To analyze the influence of the variables, the coefficients and slopes from the model 8 are shown in Table 4. Final Model variables for propensity to save. The slopes represent the change in probability in dependent variable, when each individual variable is increased by one unit, while other variables are at their means.

Table 4. Final model variables for propensity to save

Variable	Coefficient β	Standard errors	Slope	Mean
Constant	−2.328	0.297 ***		
Income	0.284	0.032 ***	0.071	2.073
Age	0.003	0.003	0.001	45.49
Gender	0.189	0.074 **	0.048	0.742
Education	0.120	0.016 ***	0.030	6.741
Choice Control	0.214	0.169	0.053	0.765
Happiness	0.632	0.143 ***	0.156	0.816
Life Satisfaction	0.9845	0.1939 ***	0.246	0.0074

Source: composed by author based on data from WVS

Notes: Logit binary model with country fixed effects and robust clustered error. Dependent variable *Savings* during past year. Independent variables based on significance in previous models.

3.2. Results from the base model

In the base model (seen in Annex 2.) *Income, Gender and Education* were statistically significant at 1% level, however, the variable *Age* was not statistically significant at all. Therefore, the null hypothesis is rejected with three out of four base model variables. This means that based on this model *Income, Education* and *Gender* are significant predictors of saving propensity. However. the null hypothesis is confirmed with the variable *Age*, meaning that individuals' age does not influence individuals saving propensity, as the variable is not statistically significant.

The coefficients of the variables were all positive. This means that the more income individual has or more educated the individual is the more likely he or she is to save money. Moreover, the positive coefficient of variable *Gender* indicates, that men are more likely to save. This is logical, makes sense and is in line with previous literature and studies. Therefore, this is one insight stating that the model is logical and trustworthy.

It makes sense, that individuals, who have higher income, are more likely to save more, because they have more financial resources to make savings. This was also confirmed with the previous literature. The model confirms the statement and based on its predictions, if income is increased by one level, the propensity to save rises 8.0%, while all other variables stay at their means. The variable *Age* was not significant. Regarding the variable *Gender,* based on the model predictions, the saving propensity rises, in case the individual is male by 4.9% while all other variables stay at their means. The *Gender* was statistically significant, in different levels, in all other models. suggesting that males are more likely to save money. Since the mean of the variable *Gender* was 0.74, this shows that 74% of the respondents were male. The *Gender* was statistically significant in 1% level in the base model. This has been also confirmed in previous studies that male are more likely to be educated and financially literate. Therefore, they save more as they have the financial resources as well as the knowledge necessary.

Based on previous literature about financial education, it is reasonable to think, that individuals who are higher educated, should more likely have the necessary knowledge, for both understanding the necessity to save and tools on how to. The education was statistically significant at 1% level in all of the models. Therefore, null hypothesis is rejected and it could be said, that education level in the context of World Value Survey is important factor for predicting saving propensity. This is in line with previous studies about savings, financial decision, education and financial literacy. Moreover, as the coefficient is positive, it shows that the more educated the individual, the more he or she is likely to save. This makes sense and is in line with previous studies referred in the chapter 1. Based on model predictions, for increasing the level of education by one unit, the propensity to save rises 3.0% while all other variables stay at their means.

3.3. Results from the final model

In the final model (seen in Annex 3.), the dependent variable was *Savings* and independent variables were *Income, Age, Gender, Education, Choice Control, Happiness and Life Satisfaction* and *Country* dummies for fixed effects. Fixed effects were used to decrease differences in different countries macroeconomic indicators. Standard errors were clustered by countries as otherwise observations might not be independent, because individuals in each country might be similar to each other.

The final model was compiled with all base variables and statistically significant independent variables at the 5% level from previous models, based on hypothesis set up. Therefore, the dependent variable in the final model was *Savings* and independent variables were *Income, Age, Gender, Education, Choice Control, Happiness* and *Life Satisfaction.* The model shows, the variable *Age*, from the base model was not statistically significant. Variable C*hoice Control,* that was a proxy for locus of control, was not statistically significant anymore. This suggest that saving propensity is not influenced by the age of the individual nor by the fact on how much freedom of choice and control the individual feels having over his or her life, based on this model.

In the final model, the observations amount was 8955 from 55 countries around the world. The dependent variable's mean is 0.511 that means 51% of the individuals in the sample saved money during past year. This is roughly half of the total observations. The likelihood test was p=0.000 that is less than 0.01, therefore the null hypothesis is rejected and the model is statistically significant at 1% level. The number of observations correctly predicted was 66.4%. Form the total observations, 3167 individuals were predicted correctly on a 0.5 level, that they had saved during the last year. Similarly, the model predicted correctly on the level 0.5, that 2782 individuals did not save during that last year.

The model confirms the statement and based on its predictions, if income is increased by one level, the propensity to save rises 7.2%, while all other variables stay at their means. In the base model, if the income is increased by one level, the propensity to save rises 8%, while all other variables stay at their means. The variable *Age* was not significant. Regarding the variable *Gender*, based on the model predictions, the saving propensity rises, in case the individual is male by 4.8% while all other variables stay at their means. In the base model, it was 4.9% respectively. The *Gender* was statistically significant, in different levels, in all other models, suggesting that males are more likely to save money. Since the mean of the variable *Gender* was 0.74, this shows that 74% of the respondents, were male. The *Gender* was statistically significant in 5% level in the last model. This has been also confirmed in previous studies, that male are more likely to be educated and financially literate, therefore they save more as they have the financial resources as well as the knowledge necessary. Same with the base model, in the final model, for increasing the level of education by one unit, the propensity to save rises 3.0%.

Regarding the influence of the proxies for hypothesis, for increasing the level of *Happiness* by one unit, the propensity to save rises, based on the model predictions, 15.8%. Rising the level of *Life Satisfaction*, by one unit, the propensity to save rises 24.6% while all other variables stay at their means. The level of *Life Satisfaction* influences the saving propensity the most. The results are logical, because generally thinking, if person is more positive and satisfied with his or her life, he or she is more likely to think about the future well-being.

The most influential predictor of saving propensity, based on the logit model created with World Value Survey Data, is *Life Satisfaction* with increasing the level of life satisfaction by 1 unit, the propensity to save rises 24.6%. The second influencer by size is *Happiness* with increasing the level of happiness by 1 unit the propensity to save rises 15.8%. Both – *Life Satisfaction* and *Happiness* were proxies for optimism. Third most influential predictor of saving propensity is *Income* with increasing the income by 1 unit, the saving propensity rises 7.2%. Next was the variable *Gender*, men are 4.8% more likely to save money. Finally, increasing the education level by 1 unit, the propensity to save rises 3%.

Table 5. The link between propensity to save and individual values

		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Base Model	const	−2.625 (0.225)***	−1.209 (0.213)***	−1.607 (0.245)***	−2.251 (0.291)***	−1.399 (0.234)***	−1.393 (0.311)***	−1.189 (0.206)***	−2.328 (0.297)***
	Income	0.322 (0.032)***	0.319 (0.034)***	0.306 (0.032)***	0.287 (0.033)***	0.322 (0.032)***	0.321 (0.033)***	0.322 (0.032)***	0.284 (0.032)***
	Age	0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
	Gender	0.195 (0.075)***	0.198 (0.075)***	0.189 (0.075)**	0.191 (0.074)***	0.186 (0.078)**	0.201 (0.073)***	0.196 (0.075)***	0.189 (0.074)**
	Education	0.120 (0.016)***	0.124 (0.015)***	0.119 (0.015)***	0.120 (0.016)***	0.016 (0.015)***	0.119 (0.015)***	0.120 (0.016)***	0.120 (0.016)***
H1	Saving Money		0.032 (0.056)						
	Spoil Oneself		−0.230 (0.118)*						
H2	Choice Control			0.556 (0.161)***					0.214 (0.169)
	Work Success			0.167 (0.120)					
H3	Happiness				0.621 (0.146)***				0.632 (0.143)***
	Life Satisfaction				1.0424 (0.1859)***				0.9845 (0.1939)***
H4	Autonomous					0.273 (0.164)*			
	Independence					0.022 (0.060)			
H4	Rich						−0.167 (0.158)		
H4	Responsibility							0.044 (0.066)	
	Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Source: composed by author based on data from WVS

Notes: *p<0.1; **p<0.05; ***p<0.01. The model is logit binary with country fixed effects and robust clustered errors. The dependent variable is saving during past year. The independent variables are for base model and H1 corresponds to hypothesis 1; H2 corresponds to hypothesis 2. H3 corresponds to hypothesis 3. H4 corresponds to hypothesis 4.

4. DISCUSSION

An overview of the hypothesis set up and the conclusions, based on logit binary model and Word Value Survey data, are presented. Moreover, some further discussion is also indicated.

The first hypothesis stated, that individuals who have future-oriented time preferences i.e. they are better able to delay gratification and use will-power to delay consumption today for tomorrow, are more likely to save money. The hypothesis makes sense based on previous literature. Individuals, who think through their consumption needs and do not make as much emotional purchases, should be able to save more as all their income is not consumed. More important is, if this is done deliberately. The proxies that were used to measure time-preferences, the *Saving money* and *Spoil Oneself* were statistically not significant at 1% level in model 2. Therefore the null hypothesis must be recognized and conclude, that based on proxies chosen from World Value Survey, the hypothesis that time-preferences influence individual's propensity to save, is not confirmed.

Based on previous literature, the second hypothesis was that individuals, who have internal locus of control i.e. they think that they are in charge through their action of the outcomes of events and their life well-being, are more likely to make savings. The hypothesis makes sense, because individuals, who feel that their outcomes result in better life, would think that saving money is necessary for future well-being. The proxies used for testing the hypothesis were *Choice of Control* and *Work Success*. The *Choice of Control* was significant in 1% level in the model 3 with a positive coefficient. This implies that the more individual feels that he or she has a great deal of a choice over his or her life, the higher the propensity to make savings. Variable *Work Success* was not significant determinant in the model. When adding, the variable *Choice of Control* to the final model, the variable loses it's significands'. Therefore, based on these proxies from World Value Survey for locus of control, the null hypothesis must be recognized and it could be concluded, that the relationship between locus of control and saving propensity is not proven.

The third hypothesis was, that individuals who are more optimistic, are more likely to save. There are some studies, that confirm the hypothesis, however based on general knowledge, the relationship between optimism on saving behavior, could not be that straight forward to understand. The optimism was measured by individual's self-reported level of *Happiness* and *Life Satisfaction*. Both of the variables were significant at 1% level, in the model 4 as well as in the final model 8. Therefore, the null hypothesis is rejected and it could be said, that based on proxies for optimism from World Value Survey, the propensity to save is influenced by individuals level of optimism. Moreover, since the coefficients for both – *Happiness* and *Life satisfaction* are positive, it shows that the more optimistic the individuals are, the higher is the propensity to save.

The literature behind the influence of personality traits and saving behavior is not that wide, but the relationship between saving behavior and personality traits is rather interesting. The forth hypothesis stated, that individuals who are more independent, conscientious and value material things less, are more likely to save money. However, the proxies that were used based on Word Value Survey to measure independence: *Autonomous* and *Independence*, to measure conscientiousness: *Contentiousness* and proxy for valuing material things *Rich*, were not statistically significant at 5% level. However, the variable *Autonomous* that measured independence, was statistically significant at 10% level in model 5. Still the null hypothesis must be recognized and based on used proxies from World Value Survey, it could be concluded that, the proxies do not indicate the relationship between personality traits of independence, conscientiousness and materialism and between saving propensity. Since, in the thesis, the values of the head of the household were measured, it could be the case that, the actual saving decisions were made by the influence of the spouse. It is found, that personality of the partner is more important to total savings than the personality of the head of the household (Nyhus & Webley. 2001). Therefore, this could be one reason, why the personality traits were not showing statistical significance.

To conclude, based on empirical results from the logit binary model with country fixed effects and robust clustered errors, the main savings propensity influencers were *Income*, *Education*, *Gender*, *Happiness and Life satisfaction*, *Happiness* and *Life Satisfaction* were proxies for optimism.

Despite the fact, that the three out of four hypothesis set up in the thesis were not confirmed, further analysis should be made to determine the propensity to save with more precise data and, if possible, not entirely based on individuals, judgement. Before using the data, it could be beneficial to have

some check questions to determine the accuracy of the responses provided by the individuals. Furthermore, more precise proxies, in some case should be used in further researches to analyze the influence of time preferences, locus of control and personality traits to saving propensity.

Taking one step forward, the field of commitment devices and automatic saving plans should be further analyzed as this might give the benefit of higher savings in general and decrease some of the financial mistakes made by households.

CONCLUSION

Individuals and households have great impact on financial markets. However, the research of household finance decisions has become to the interest of researchers rather recently. Last decade has brought up a number of costly mistakes, that influence individuals, financial markets and economic outcomes. The literature suggests, that individuals do not save enough, do not participate in stock markets and hold undiversified portfolios, take on too much debt and manage their debt obligations inefficiently. (Illiashenko, 2017) Among these mistakes, the undersaving is usually the basis of other costly mistakes made.

Previous research and surveys both in Estonia and abroad confirm that roughly half of the individuals do not have enough savings to maintain their previous standard of living for retirement. (Munnell, et al., 2012; Rhee & Boivie, 2015) Moreover, study done in USA states that 46% could not settle emergency cost of EUR 400 without selling something or borrowing money (Federal Reserve Board, 2016).

Therefore, the problem of undersavings is relevant, both in Estonia and abroad. There could be many different influencers of savings decisions. The aim of the graduation thesis is to explain which individual preferences, beliefs and traits might influence individual's propensity to save. For being able to measure individual level influencers. the study is done among individuals, who are assumed to have the financial resources available to make savings.
To follow the aim of the thesis, four hypothesis are set up:

1. Individuals, who have future-oriented time preferences, are more likely to save.
2. Individuals, who have internal locus of control, are more likely to save.
3. Individuals, who are more optimistic, are more likely to save.
4. Individuals, who are more independent, conscientious and value material things less are more likely to save.

The aim of the thesis was met with running binary logit model based on data gathered from Word Value Survey, the last 6th wave available. To test the hypothesis made, proxies were chosen as per hypothesis. In the final model, there were 8955 observations from 55 different countries around the world. The likelihood test was p=0.00, therefore the model is statistically significant. The number of observations correctly predicted was 66.4%. The 51% of the individuals in the sample saved money during past year.

The dependent variable was binary i.e. whether individuals saved during past year or not. Only one wave data was used and there was no distinction made between long term or short term saving goals, merely the fact that individuals saved, was taken into account. One wave is sufficient, as the aim of the thesis was to explain and predict individual's propensity to save. The independent variables were inserted after the base variables – *Income, Gender, Education, Age*, one by one, to see whether they explain something further, that is not covered by base variables. After removing the variables, that were statistically insignificant, the saving propensity was predicted by base variables- I*ncome, Age, Gender, Education, Age* and level of optimism. Country fixed effects were used to decrease the macroeconomic differences in country level. Moreover, the robust errors clustered by countries, were used, as individuals in different countries might be similar to each other, therefore, this would otherwise influence the results.

The results suggest, that income gender and education are statistically significant predictors for saving propensity. The higher level of income and education, the more individual is predicted to save. Another statistically significant factor to predict savings, was level of optimism. Individuals, who report themselves in higher scales on happiness and life satisfaction, have higher propensity to save money. The level of life satisfaction was the most influential variable to predict saving propensity.

Three out of four hypotheses were rejected, but empirical investigation failed to reject one hypothesis regarding optimism, based on data and proxies used in Word Value Survey. It could be said that time-preferences, locus of control and personality traits chosen did not have a significant influence over the saving propensity. However, education, income and gender as well as level of optimism were significant predictors of saving behavior.

The aim of the graduation thesis to explain which individual preferences, beliefs and traits might influence individual's propensity to save, was met.

KOKKUVÕTE

Leibkonna finantskäitumise uurimine on teadlaste huvi köitnud viimase 10-15 aasta jooksul. Eelnevad uuringud on välja toonud kulukaid vigu inimeste finantskäitumisest, mis mõjutavad nii isikuid ennast kui ka finantsturge. On uuritud, et inimesed ei säästa piisavalt, ei investeeri väärtpaberiturgudel, hoiavad ebapiisavalt hajutatud portfelle, võtavad liiga palju laenu ning ei halda oma laenukohustusi efektiivselt (Illiashenko, 2017).

USAs tehtud uuringute kohaselt, umbes pooled inimesed ei suuda pensionieas oma eelnevat elatustaset säilitada (Munnell, et al., 2012) (Rhee & Boivie, 2015). Veelgi enam, umbes 46% inimestest tunnistab, et ettenägematu kulu katmiseks summas 400 USA dollarit, tuleks neil raha laenata või midagi maha müüa (Federal Reserve Board, 2016).

Eelnevast tulenevalt on magistritöö uurimisprobleemiks inimeste ebapiisav säästmine nii ettenägematute kulude katteks kui ka pensioneaks. Magistritöö esmärgiks on analüüsida, millised inimeste eelistused, uskumused ja iseloomujooned mõjutavad nende soodumust säästa. Valimisse võeti vaid need inimesed, kellel eelduslikult on rahalisi vahendeid, et säästa.

Magistritöö eesmärgi täitmiseks, seati üles neli hüpoteesi, vastavalt eelnevatele uuringutele:

1. Inimesed, kellel on tulevikku suunatud aja-eelistused, säästavad suurema tõenäosusega.
2. Inimesed, kellel on sisemine kontrolliallikas, säästavad suurema tõenäousega.
3. Inimesed, kes on optimistlikumad, säästavad suurema tõenäosusega.
4. Inimesed, kes on iseseisvamad, kohusetundlikumad ja vähem materiaalsed, säästavad suurema tõenäosusega.

Magistritöö empiiriline osa on tehtud andmetega World Value Survey kuuendast andmete kogumisest. Kokku pandud mudel on binaarne logit, riikide fikseeritud efektidega ja robustsete standardvigadega. Sõltuv muutuja on, et kas leibkond säästis viimase aasta jooksul. Sõltumatud muutujaid on lisatud mudelisse vastavalt baasmudelile ning seejärel hüpoteesidele.

Viimases mudelis oli 8955 vastajat, 55 erinevast riigist üle maailma. Kõigist vastajatest 51% ütlesid, et nende perekond säästis viimase aasta jooksul. Baasmudelis olid statistiliselt olulised näitajad sissetulek, haridus ning sugu ja vastavalt hüpoteesidele sisestatud muutujatest õnnelikkustunne ning eluga rahulolu, mis olid optimismi muutujad.

Lõputöö tulemusena saab öelda, et vastvalt andmetele World Value Survey andmebaasist, mida suurem on inimese sissetulek ning mida haritum ta on, seda suurem on tõenäosus, et ta säästab raha. Samuti ilmnes, et mehed säästavad suurema tõenäosusega. Hüpoteesidest ei suudetud ümber lükata vaid neljandat hüpotees, et inimesed kes on optimistlikumad säästavad suurema tõenäosusega. Inimesed, kes on õnnelikud ning enda eluga rahul, suurema tõenäosusega säästavad rohkem. Antud töös kasutatud andmete põhjal, ei suudetud tõestada hüpoteese, et inimesed, kellel on tulevikku suunatud aja-eelistused, kellel on sisemine kontrolliallikas, kes on iseseisvamad, kohusetundlikumad ja vähem materiaalsed, säästavad suurema tõenäosusega.

LIST OF REFERENCES

Agarwal, S., Driscoll, J. C., Gabaix, X. & Laibson, D., 2009. *The age of reason: Financial Decisions over the Life Cycle and Implication for Regulation.* s.l.:Broonkings Papers on Economic Activity.

Alessie, R., Van Rooij, M. & Lusardi, A., 2011. Financial literacy and retirement preparation in the Netherlands. *Cambridge University Press.*

Baranzini , M., 2005. Modigliani's life-cycle theory of savings fifty years later. *PSL Quarterly Review. 2005;58 (233-234):109-172.*

Bradford, D. et al., 2017. Time preferences and consumer behavior. *Journal of Risk and Uncertainty*, Volume Vol.55(2), pp. 119-145.

Britt, S., Cumbie, J. A. & Bell, M. M., 2013. The influence of locus of control on student financial behavior. *College Student Journal*, Volume Vol. 47(1), pp. 178-184.

Brooks, C., 2008. *Introductory Econometrics for Finance.* Second edition ed. Cambridge: Cambridge University Press.

Browning, M. & Lusardi, A., 1996. Household Savings: Micro Theories and Micro Facts. *Journal of Economic Literature,* pp. 1797-1855.

Brunnermeier, M. K. & Parker, J. A., 2005. Optimal Expectations. *The American Economic Review, Vol. 95, No. 4,* pp. pp. 1092-1118.

Campbell, J. Y., 2006. Household finance. *The journal of finance, 61(4),* p. pp. 1553–1604.

Canova, L., Manganelli Rattazzi, A. M. & Webley, P., 2003. The hierarchical structure of saving motives. *Journal of Economic Psychology 26*, pp. 21-34.

Chen, K., 2013. The Effect of Language on Economic Behavior:Evidence from Saving Rates, Health Behaviors; and Retirement Assets. *American Economic Review*, p. 103(2): 690–731.

Chetty, R. et al., 2014. Active vs. Passive decisions and crowd-out in retirement savings accounts: Evidence from Denmark. *The Quarterly Journal of Economics, 129(3),* p. pp. 1141–1219.

Choi, J. J., Laibson, D. & Madrian, B. C., 2011. $100 Bills on the sidewalk: suboptimal investment in 401(k) plans. *Review of Economics and Statistics, 93(3),* p. pp. 748–763.

Cobb-Clark, D. A., Kassenboehmer, S. C. & Sinning, M. G., 2016. Locus of control and savings. *Journal of Banking and Finance 73*, pp. 113-130.

Digman, J. M., 1990. Personality structure: emergence of the five-factor model. *Annual Review of Psychology*, Volume Vol. 411(1), pp. 417-440.

Donnelly, G., Iyer, R. & Howell, R. T., 2012. The big five personality traits, material values and financial well-being of self-described money managers. *Journal of Economic Psychology*, Volume 33, pp. 1129-1142.

Estonia, T. b. o., 2016. *Uuring: Eesti perede majanduslik toimetulek ja igakuine säästmisvõime on paranenud*, s.l.: s.n.

Farhi, E. & Panageas, S., 2005. Saving and investing for early retirement: a theoretical analysis. *Journal of Financial Economics 83*, pp. 87-121.

Federal Reserve Board, 2016. *Report on the Economic Well-Being of U.S. Households in 2015*, s.l.: Board of Governors of the Federal Reserve System.

Friedman, M., 1957. The Permanent Income Hypothesis. *Princeton University Press*, Volume 0-691-04182-2, pp. p. 20 - 37.

Goda, G. S. et al., 2015. The role of time preferences and expodential-growth bias in retirement savings. *Natural Bureau of economic research*, pp. Working Paper 21482, http://www.nber.org/papers/w21482.

Illiashenko, P., 2017. Behavioral Finance: Household Investment and Borrowing Decisions. *Visnyk of the National Bank of Ukraine, (242)*, pp. 28-48.

Inglehard, R. C. et al., 2014. *World Value Survey*, Madrid: JD Systems Institute.: World Values Survey: Round Six - Country-Pooled Datafile Version: http://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp..

Jappelli, T. & Padula, M., 2013. Investment in financial literacy and saving decisions. *Journal of Banking & Finance 37*, p. 2779–2792.

Keynes, J. M., 1936. The General Theory fo employment, interest and money.

Klapper, L., Lusardi, A. & Oudheusden, P. v., 2015. Financial literacy around the world: Insights from the standard and poor's ratings services global financial literacy survey.

Konjunktuuriinstituut, E., 2017. *Pere-eelarve ja säästmine (elanike küsitlusuuringu tulemused)*, s.l.: Tellija: Swedbank.

Laibson, D. I. et al., 1988. Self-Control and Saving for Retirement. *Brookings Papers on Economic Activity*, Volume No. 1 (1998), pp. pp. 91-196.

Lusardi, A. & Mitchell, O. S., 2007. Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics 54,* p. 205–224.

Lusardi, A. & Mitchell, O. S., 2011. Financial literacy and planning: implications for retirement wellbeing. *Working Paper 17078, http://www.nber.org/papers/w17078.*

Lusardi, A., Mitchell, O. S. & Oggero, N., 2017. Dept and financial vunerability on the verge of retirement. *NBER Working paper series,* p. Working Paper 23664.

Madrian, B. C. & Shea, D. F., 2001. The power of suggestion: Inertia in 401(k) participation and saving behaviour. *Quaterly Journal of Economics, Vol CXVI, Issue 4.*

Modigliani, F., 2005. The collected papers of Franco Modigliani. *The MIT Press, Cambridge, Massachusetts, London, England.*

Munnell, A. H., Webb, A. & Golub-Sass, F. N., 2012. The national retirement risk index: An update.. *Center for Retirement Research at Boston College, 1,* p. pp. 719–744.

Nyhus, E. K. & Webley, P., 2001. The Role of personality in household saving and borrowing behaviour. *European Journal of Personality Eur. J. Pers. 15:S85-S103,* p. DOI: 10.1002/per.422.

O'Donogue, T. & Rabin , M., 1999. Doing it now or later. *The American Economic Review,* Volume Vol.89(1), pp. 103-124.

Onkvisit, S. & Shaw, J., 1987. Self-concept and image congruence: some research and managerial implications. *Journal of Consumer Marketing,* Vol. 4(1), pp. 13-23.

Perry, V. G. & Morris, M. D., 2005. Who Is in Control? The Role of Self-Perception, Knowledge, and Income in Explaining Consumer Financial Behavior. *The Journal of Consumer Affairs,* 39(2), pp. ISSN 0022-0078.

Pirinsky, C., 2013. Confidence and economic attitudes. *Journal of Economic Behavior & Organization,* Volume Volume 91, pp. Pages 139-158.

Puri, M. & Robinson, D. T., 2007. Optimism and economic choice. *Journal of Financial Economics 86,* p. 71–99.

Rhee, N. & Boivie, I., 2015. The Continuing Retirement Savings Crisis. Available at SSRN: https://ssrn.com/abstract=2785723.

Rotter, J. B., 1966. Gerenalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied,* Vol. 80(No.1).

Sherfin, H. M. & Thaler, R. H., 1988. The behavioral life-cycle hypothesis. *Economic Inquiry,* Volume XXVI, pp. 609-643.

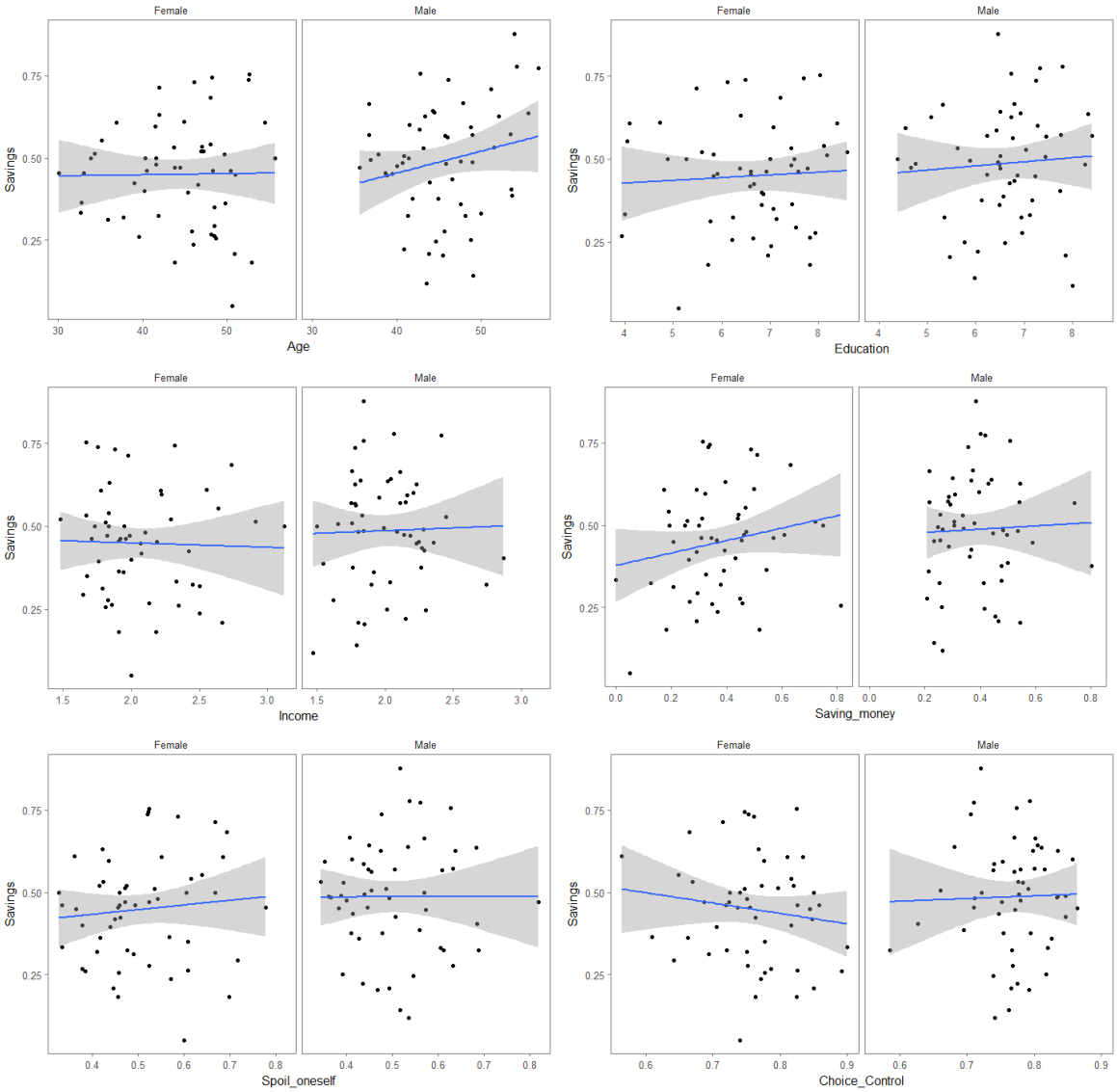
Stango, V. & Zinman, J., 2009. Exponential Growth Bias and Household Finance. *The journal of finance • VOL. LXIV, NO. 6.*

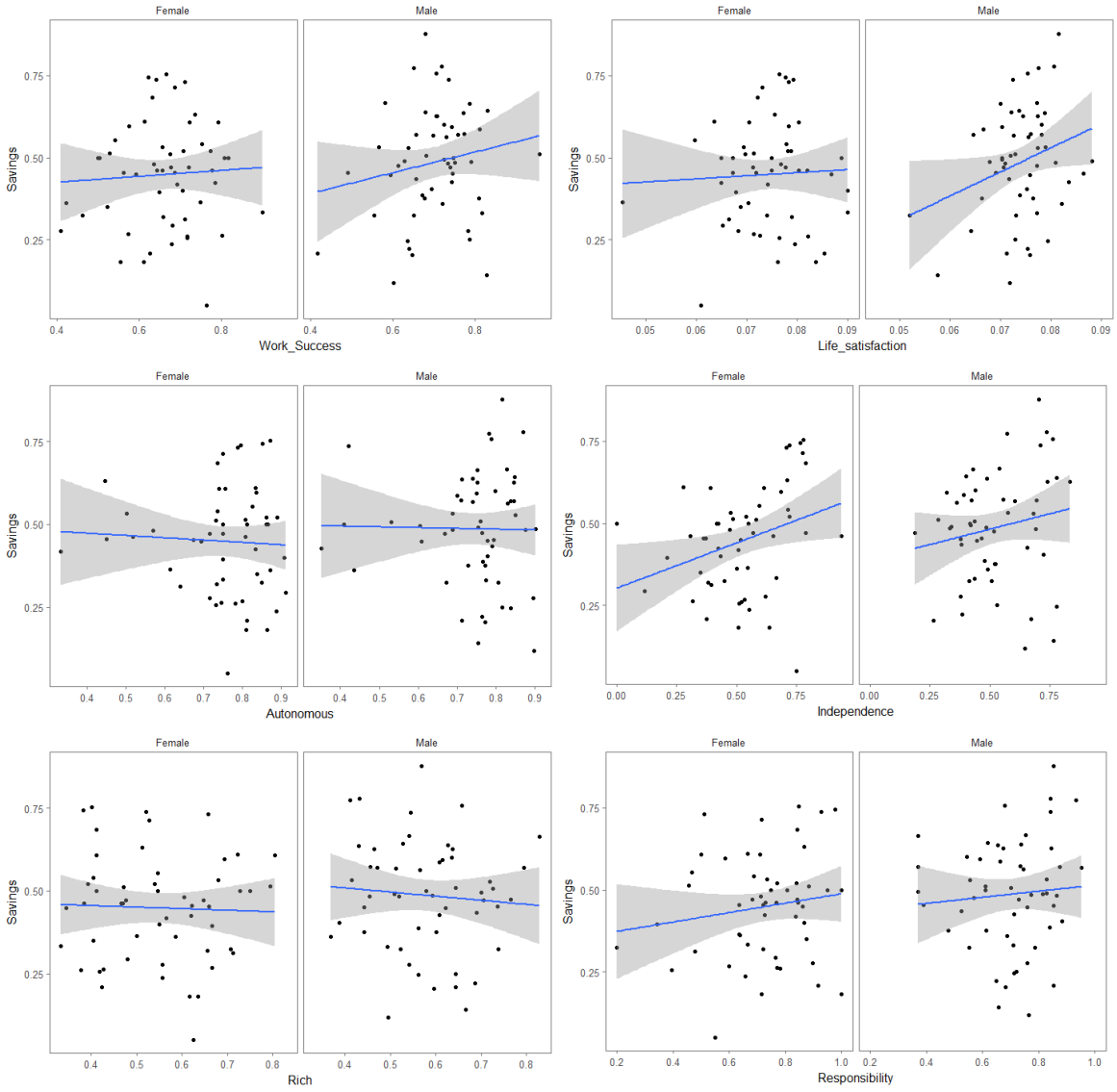
Strotz, R. H., 1956. Myopia and Inconsistency in Dynamic Utility Maximization. *The Review of Economic Studies,* 23(No. 3 (1955 - 1956)), pp. 165-180.

Thaler, R. H., 1994. Psychology and Savings Policies. *The American Economic Review,* Vol 84(No. 2).

Thaler, R. H., 1999. Mental accounting matters. *Journal of Behavioral Decision Making,* pp. 12: 183-206.

ANNEX 1. Correlates of country average Savings




Female
Male
Savings
0.75
0.50
0.25
0.4
0.6
0.8
Work_Success
0.05
0.06
0.07
0.08
0.09
Life_satisfaction
0.9
Autonomous
0.00
0.25
0.50
0.75
Independence
Rich
0.2
1.0
Responsibility

ANNEX 2. The base model

Base model: Logit. using observations 1-9160 (n = 9079)

Missing or incomplete observations dropped: 81

Dependent variable: Savings

Standard errors clustered by 54 values of Cntry

	coefficient	std. error	z	p-value
const	−2.62513	0.225295	−11.65	2.24e-031***
Income	0.32186	0.0322295	9.987	1.74e-023***
Age	0.0034	0.0029046	1.172	0.2412
Gender	0.19549	0.0747872	2.614	0.0090***
Education	0.11999	0.0157442	7.621	2.52e-014***

Mean dependent var	0.509748	S.D. dependent var	0.499933
McFadden R-squared	0.111903	Adjusted R-squared	0.102684
Log-likelihood	−5587.337	Akaike criterion	11290.67
Schwarz criterion	11703.27	Hannan-Quinn	11431.01

Number of cases 'correctly predicted' = 5958 (65.6%)

f(beta'x) at mean of independent vars = 0.250

Likelihood ratio test: Chi-square(57) = 1408.04 [0.0000]

	Predicted	
	0	1
Actual 0	2793	1658
1	1463	3165

Excluding the constant. p-value was highest for variable 5 (Age)

ANNEX 3. The final model

Final Model: Logit. using observations 1-9160 (n = 8955)

Missing or incomplete observations dropped: 205

Dependent variable: Savings

Standard errors clustered by 54 values of Cntry

	coefficient	std. error	z	p-value	
const	−2.32820	0.296815	−7.844	4.37e-015	***
Income	0.283569	0.0322642	8.789	1.51e-018	***
Age	0.00345283	0.00296616	1.164	0.2444	
Gender	0.189472	0.0744484	2.545	0.0109	**
Education	0.120164	0.0159379	7.54	4.72e-014	***
Choice_Control	0.213995	0.168547	1.27	0.2042	
Happiness	0.631681	0.142756	4.425	9.65e-06	***
Life_satisfaction	0.984534	0.193906	5.077	3.83e-07	***

Mean dependent var	0.510776	S.D. dependent var	0.499912
McFadden R-squared	0.121076	Adjusted R-squared	0.111246
Log-likelihood	−5453.768	Akaike criterion	11029.54
Schwarz criterion	11462.63	Hannan-Quinn	11176.95

Number of cases 'correctly predicted' = 5949 (66.4%)

f(beta'x) at mean of independent vars = 0.250

Likelihood ratio test: Chi-square(60) = 1502.57 [0.0000]

	Predicted	
	0	1
Actual 0	2782	1599
1	1407	3167

Excluding the constant. p-value was highest for variable 5 (Age)