Europa-Universität Flensburg

Financial Literacy – An Empirical Comparison of German and American Undergraduate Students

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Dedication

To my best friends and parents, Gaby and Günter, who have been always there for me. Thank you for all the love, support and encouragement. This work is dedicated to you.

ABSTRACT

We compare German and American undergraduate students´ financial literacy. Employing a questionnaire-based survey and controlling for gender and age, we find significant differences and surprising similarities in the areas of (1) knowledge about the financial system, (2) cognitive skills on how to apply this knowledge to practical problems, (3) experience and (4) confidence in financial abilities. We recommend a strategy to improve German financial literacy.

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Abbreviations

ANZ Bank	Australia and New Zealand Banking Group
ATM	Automated Teller Machine
Box's M Test	Testing Homogeneity of Covariance Matrices
CHAID	Chi-square Automatic Interaction Detectors
EU	European Union
FL	Financial Literacy
FLS	Financial Literacy Score
FLS1	Financial Knowledge Score
FLS2	Financial Cognition Score
GDP	Gross Domestic Product
GER	Germany
IRA	Individual Retirement Arrangement
INFE	International Network for Financial Education
401(k) Plan	Tax-qualified defined-contribution Pension Account defined in Subsection 401(k) of the Internal Revenue Code
MEA	Munich Center for the Economics of Aging

OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
Texas A&M	Agricultural and Mechanical College of Texas
UK	United Kingdom
US	United States of America

1 Introduction

1.1 Motivation

We are interested in students´ *financial literacy*, because it affects their overall *happiness*. A person is financially literate when he can fully meet current and ongoing financial obligations, can feel secure in their financial future, and is able to make choices that allow enjoyment of life (Consumer Financial Protection Bureau, 2015).

It has been suggested in literature that the major determinants of *financial literacy are*: (1) factual knowledge about the "financial system" (financial products, markets and institutions), as well as (2) cognition which is the ability to make use of financial knowledge (Taft, Hosein, Mehriz, & Roshan, 2013). The better students are equipped in financial literacy, the closer they will get to reach their individual financial goals (Fox, 2012). The other element influencing happiness is *financial context* and its two components (1) experience, which describes the personal environment, as well as (2) judgment which summarizes attitudes and confidence of respondents. Figure 1 on page 2 shows the basic concept of this dissertation.

In order to be able to investigate financial literacy we will have to measure all of its components in detail. In our case, we will compare German and American undergraduate students to find similarities and differences, because we believe that this enables policy-makers to come up with ideas about methods on how to improve overall financial literacy. From a German perspective this comparison is interesting, because the US can be viewed as the best representative of the OECD countries (OECD, 2012). We expect to find and explain significant similarities and differences between these two groups.

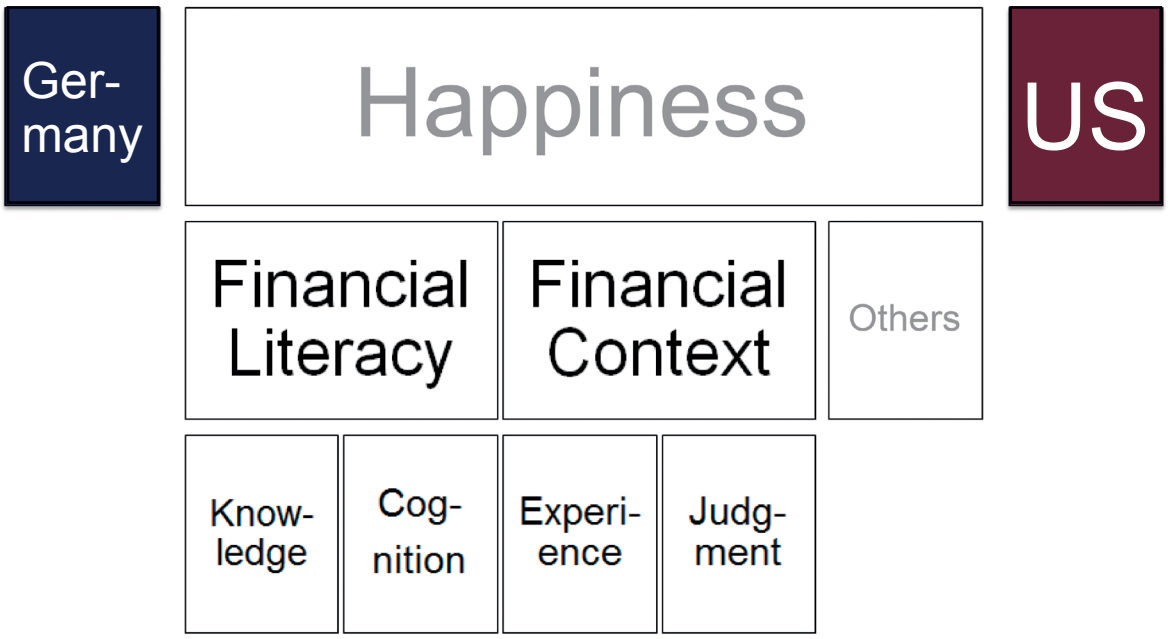


Figure 1: Happiness, Financial Literacy and Financial Context

On the one hand, a close relationship between financial educational achievement and GDP growth is remarkably stable across extensive sensitivity analyses (Hanushek & Woessmann, 2012). On the other hand, the financial crisis has demonstrated that financial illiteracy can negatively impact economic stability. This has triggered demand for financial literacy programs around the world as well as more comprehensive strategic approaches. These aim at a wider access to financial products, increased awareness as well as improved financial literacy and financial consumer protection. (Russia's G20 Presidency and OECD, 2013) Though financial literacy might not be a panacea, it can reduce the magnitude of future crises by empowering people to make more effective financial decisions which stimulates economic growth and decreases poverty.

The Organisation for Economic Co-operation and Development (OECD) supports the development of financial literacy strategies to improve financial literacy worldwide and defines a financial literacy strategy as a coordinated approach to recognize the importance of financial education, involvement of different stake holders and the identification of a national leader (OECD, 2012). Furthermore, it includes the establishment of a roadmap to achieve predetermined objectives and guidance via individual programs which contribute to the strategy to improve financial literacy (OECD, 2012). Due to the complexity of financial literacy there is no effective one-size-fits-all process for the development of a strategy (OECD, 2012).

The progress of national strategies which have been designed in countries with different economic and social conditions and with varying levels of financial market development is shown in Figure 2 on page 4. Countries which already have implemented a national financial strategy are marked in black. Countries which are at an advanced state of their national strategy are marked in grey and countries which are considering the design of a national strategy are marked in green. The US already has a national financial literacy strategy in place (Russia's G20 Presidency and OECD, 2013). In contrast, Germany, marked with a red circle has neither participated in any kind of international research efforts nor national strategies.

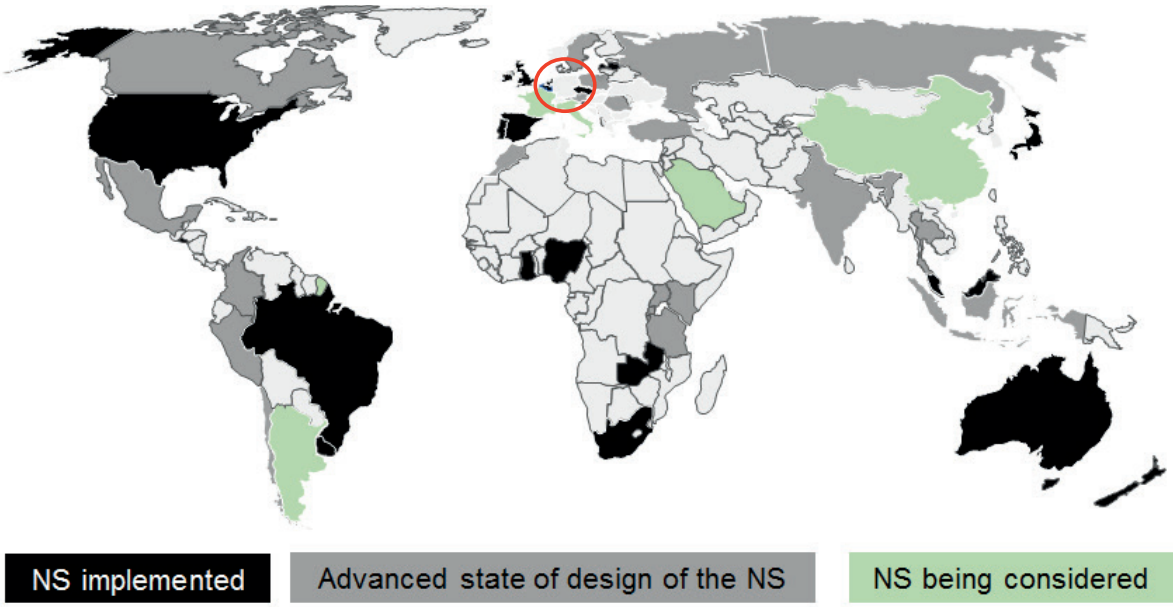


Figure 2: National Strategies for Financial Education as of September 2013

Source: Own Illustration based on data from Russia's G20 Presidency and the OECD 2013

In 2012, the International Network for Financial Education (INFE) developed a general framework, the High-level Principles on National Strategies for Financial Education (OECD, 2012). These Principles support the development of nationally coordinated and tailored approaches to financial literacy (Russia's G20 Presidency and OECD, 2013).

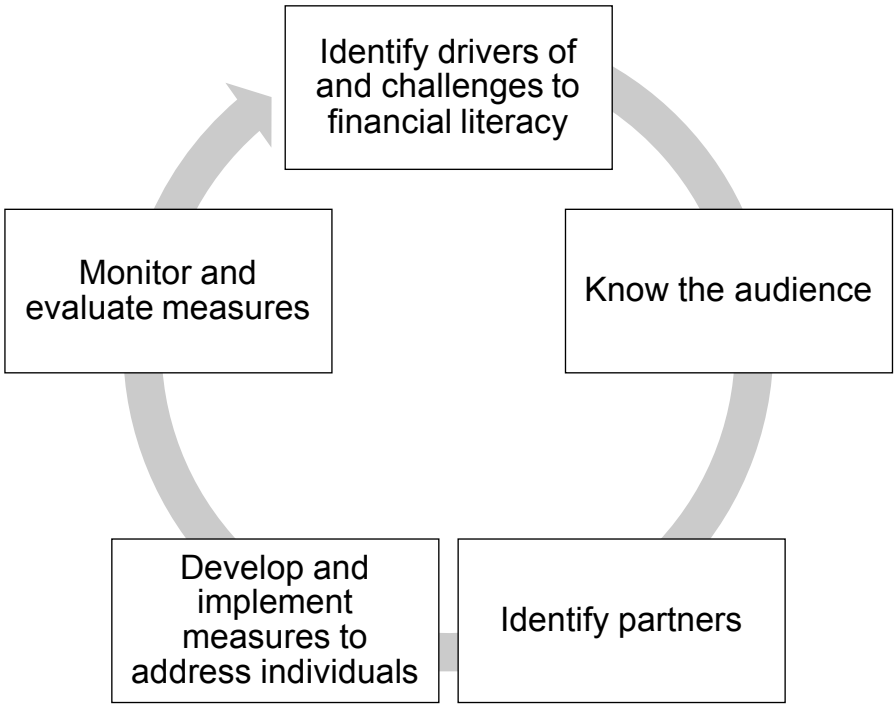


Figure 3: Effective Approach to Improve Financial Literacy

Source: ADBI-Japan-OECD High-Level Global Symposium January 2015 own representation

The process of an effective preparation of a national financial literacy strategy is described in Figure 3 on page 5. First, there is a need to identify and take account of financial challenges. Second, the exact audience needs to be defined. Third, trusted and trained partners need to be identified who will be key organizers and communicators of the initiative. Fourth, individuals in their specific environments need to be addressed with the right contents. Fifth, measures need to be monitored and evaluated on a regular basis regarding soundness and effectiveness (Messy, 2015). At the end of this research in chapter 5, we will come back to this approach to describe what we have accomplished and what still needs to be done in future research.

In general, the dissertation is organized as described in Table 1 on page 6: In chapter 1, the introduction, we will become more specific on key definitions and the reasons why this discipline is so important. Chapter 2 is dedicated to past research. It shows what other researchers have discovered so far as well as the need for our international comparison. Our own empirical study is represented in chapter 3 and consists of a detailed description of our data set and the analytical

methods used. Chapter 4 provides the results and interpretation. Chapter 5 offers recommendations for a strategy to improve financial literacy of German students.

Table 1: Organization of the Dissertation

1 Introduction	1.1 Motivation 1.2 Terminology
2 Past Research	2.1 Financial Literacy 2.2 Financial Context 2.3 International Comparison
3 Methodology	3.1 Survey Execution 3.2 Questionnaire Design 3.3 Data Preparation
4 Results	4.1 Status of Financial Literacy 4.2 Explanation 4.3 Comparison and Interpretation of Results
5 Strategy	5.1 Partner 5.2 Measures

1.2 Terminology

A person is financially literate when he can fully meet current and ongoing financial obligations, can feel secure in their financial future, and is able to make choices that allow enjoyment of life. Financial literacy can be categorized into 1) having control over daily finances, 2) having the capacity to absorb a financial shock, 3) being on track to meet financial goals, and 4) having the financial freedom to make the choices that allow to enjoy life (Consumer Financial Protection Bureau, 2015).

A variety of definitions of financial literacy exist in the literature. They fall into five categories: 1) knowledge of financial concepts, 2) ability to communicate about financial concepts, 3) aptitude in managing personal finances, 4) skill in making appropriate financial decisions and 5) confidence in planning effectively for future financial needs (Remund, 2010). In 22 out of 71 research papers financial knowledge and financial literacy are used interchangeably (Huston, 2010).

In this dissertation the term financial literacy is defined as knowledge and cognition. The term “knowledge” can be interpreted as the understanding of key financial concepts such as saving, investing, inflation, time value of money, risk, diversification, compounding of interest, insurance as well as the ability to handle simple monetary transactions such as everyday payments, spending, bank cards, checks and bank accounts.

“Cognition” is the personal aptitude towards identification, analysis, evaluation and application of relevant financial information, abilities that require certain levels of mathematical proficiency (OECD, 2014). Furthermore, cognition includes the interpretation, comparison, contrasting, synthesizing and extrapolation of information provided. It enables the individual to access sources of financial information and to recognize their relevance. In summary, cognition is the ability to apply the previously accumulated knowledge of finance appropriately.

Besides these two aspects of financial literacy, the quality of financial decisions is affected by the decision maker´s Financial Context: his experience, his judgment. The term “experience” is used here as a descriptor of the respondents´ origin and the environment surrounding them. In a narrower sense of this dissertation, experience relates to financial matters that originate from different areas of activity such as education, work, home and family as well as society which are influencing the individual’s perception of finance.

The term “judgment” is understood as the mental ability to understand something, form an opinion and ultimately reach a decision. A decision involves judgment. In more detail, judgment describes the students’ attitude regarding financial decisions. It captures the intensity of feelings as well as the personal properties such as individuality, motivation, or confidence, which may be indicative of the personal judgment towards accumulating higher levels of financial literacy. We will not measure feelings in this research because of the difficulty of quantifying emotions.

2 Past Research

2.1 Financial Literacy

There has been minor progress of financial literacy skills over the past decade in Germany and the US which shows the need for systematic research on financial literacy as a basis for effective decision and policy making to foster financial literacy (OECD, 2014). Individuals making sound financial decisions have a collective impact on financial stability at the national, as well as global level (OECD, 2012). The lack of financial knowledge has a negative impact on pension planning as well as the usage of capital markets products, which leads to poor asset allocation (Lusardi & Mitchell, 2007a). In order to avoid making mistakes individuals need substantial knowledge and a large analytical toolkit (Ferguson, 2002). Financial advisors even tend to provide a relevant advice only to customers who already have a high level of financial literacy; given this fact, less financially literate customers do not ask for advice although they are the most in need of financial guidance (Debbich, 2015).

The origins of research dealing with financial knowledge in the US go back to the 1950's. At the time, the research was limited to reaching consumers with financial products (Jelly, 1958). Later studies focus mostly on (high school) students and find that they are knowledgeable in budgeting but weak in loans, consumer credit, insurance and investments. Students from more affluent class background are better in money management tests compared to students from lower socioeconomic groups (Bakken, 1967). The average score of the students' investment knowledge is 44 percent, stating insufficient knowledge (Volpe, Chen, & Pavlicko, 1996). Freshmen students lack personal and general loan knowledge and have unrealistic expectations of future income after graduation (Simpson, Smith, Taylor, & Chadd, 2012). A survey at Texas A&M University of freshmen reiterates that they are not financially knowledgeable (Avard, Manton, English, & Walker, 2005).

Since 1997 the Jump$tart Coalition survey has been one of the most recognized financial literacy surveys, interviewing high school and college students and

investigating financial literacy performance over time: “Every two years, a stratified, random national sample of thousands of 12th graders sits down to take the Jump$tart Survey of Financial Literacy. Aside from cosmetic changes, such as reordering questions and answers and changing names in problems, the test has been unchanged since 1997 to see what is happening to financial literacy over time” (Mandell, 1997-2008). The Jump$tart survey has been replicated in several other countries and similar studies have been made by other organizations, but no one has yet contradicted the overall findings of low levels of financial literacy (OECD, 2005). “Even more puzzling than low levels of financial literacy is the consistent finding that those who have taken a high school class designed to improve financial literacy tend to do no better than those who have not had such a course” (Mandell & Schmid Klein, 2009). Yet, a “one size fits all” approach to financial education will be less effective than more targeted, tailored approaches (Hogarth, Beverly, & Hilgert, 2003).

Many financial literacy trainings are not effective because people do not actually apply what they know. Another college survey including four US universities supports the view that students are not managing their finances well because students do not apply recommended practices (Cude, et al., 2006). Regarding the application of knowledge, there is a considerable gap between intention and action. Humans in general and especially students have a taste for instant gratification and tend to ignore retirement savings even though they intend to deal with it (Laibson, Repetto, & Tobacman, 2007).

Another problem regarding financial decision-making is the complexity as well as the overload of details, which leads to the very human behavior of going the path of least resistance. “Due to procrastination, anticipated regret and choice overload, individuals follow the path of least resistance, which often leads them to pick the default option” (Pahnke & Honekamp, 2010). The less people are financially educated, the less they are motivated to deal with financial decision-making (Leinert, 2004). This motivational factor makes low educated people even more prone to perform poorly in financial matters. Thus, financial knowledge is important, but other factors such as the way money has been earned and motivation are important as well.

Similarly, a positive impact of financial literacy education on savings behavior has been observed (Bernheim, Garrett, & Maki, 2001). Account data of middle-aged investors provided by Merrill-Lynch shows a positive relationship between financial literacy and saving behavior. Those high-school students who participated in a class on financial literacy tended to save a higher proportion of their incomes than those who were not required to take such a course (Bernheim, Garrett, & Maki, 2001). Effects of curricula in school have long-term rather than immediate effects which points to an implementation lag of financial education (Bernheim, Garrett, & Maki, 2001). The only measures which consistently influence a high score in financial literacy tests are financial knowledge and learning experiences (Hogarth, Beverly, & Hilgert, 2003). There is a heterogeneity in saving account returns which can be partly explained by financial literacy. A one-standard deviation increase in financial literacy is estimated to account for a 13 percent return increase compared to the median interest rate (Deuflhard, Georgarakos, & Inderst, 2015).

The SAVE panel was started in 2001, initiated by the Munich (formerly Mannheim) Center for the Economics of Aging (MEA), to measure how German households apply financial knowledge and react to economic changes. SAVE is a representative, longitudinal study on households' financial behavior with a special focus on savings and old-age provision (MEA - Munich Center for the Economics of Aging, 2015). The data illustrates a "German Saving Puzzle" which states that Germany's savings rate is much higher compared to the US, despite a much more care-taking social welfare system (Börsch-Supan, 2015). SAVE data ascertains that "on average, households in Germany do not seem to have suffered substantially from the financial crisis in 2008 (Bucher-Koenen & Ziegelmeyer, 2011). Additionally, the richer and more educated people are the more precautious they become regarding their pension and retirement planning. One percent more income translated into 12.5 percent higher probability that someone has a pension plan. Nevertheless, 45 percent of all Germans do not have a pension plan (Pahnke & Honekamp, 2010). Another investigation about the application of knowledge asks German students aged 14-17 how simulation calculators on the internet support their financial decision-making. 60 percent of

students are not even capable of using the calculators well to use the results for effective financial decisions (Schürkmann & Schuhen, 2013).

The application of financial knowledge is also related to loan and debt data. In 2002, the fastest growing group of bankruptcy filers was those aged 25 and younger (U.S. Congress Senate Committee on Banking, Housing, and Urban Affairs, 2002). 69 percent of graduating seniors at American public and private nonprofit universities had student loans in 2013. “These borrowers owed an average of $28,400 in federal and private loans combined, up two percent compared to their peers in 2012” (The Institute for College Access and Success, 2013). In 2006, a poll of 22 to 29 year old Americans said about young adults with debt that 30 percent said they are worried about it frequently, 29 percent had put off or decided against furthering their education because of debt. 55 percent of young adults are not saving into either an Individual Retirement Plan (IRA) or a 401(k) account and 40 percent do not have a savings account that they contribute regularly to (National Endowment for Financial Education, 2006).

The risk which college students encounter is a difficult job market. This can become problematic if students do not find employment but need to start paying back student loans. Students express ambivalence about loans. On the one hand, students favor loans because they enhance their personal life style rather than their career opportunities (Roberts & Jones, 2001). Students perceive that loans have more advantages than disadvantages (Baum & O’Malley, 2003). On the other hand, the majority (54 percent) of students asked would borrow less if they had to decide again. Afterwards, they perceive debt as critical in the long run. Student debt is also called “trainer debt” because students engage with the consumer credit industry for the first time, and mostly enjoy low interest rates due to state supported programs.

2.2 Financial Context

Financial decisions are far from simple. They require students to gather, process, and project data on the asset universe, inflation, compound interest, risk diversification and markets (Lusardi & Mitchell, 2008). Students are likely to face a high degree of complexity regarding markets, financial services and products than their parents. They have to rely on their own expertise or professional advice because markets, in particular pension systems, are changing rapidly. “Current generations are unlikely to be able to learn from past generations” (O’Meara, 2011). Hence, to deal with saving-, investment-, pension- and insurance decisions successfully, students need to be in control. A lack of early exposure to financial education limits financial literacy in the long run (O’Meara, 2011). In addition to training students for their later lives, improved financial literacy can also help to improve their immediate financial situation such as dealing with savings and investment products, debt reduction and insurance contracts.

More knowledgeable students demand more transparent and sophisticated services, thereby enhancing competition and high quality products. Improved financial literacy equips people with the competency to react to varying market conditions in more predictable ways. They are less likely to make unfound complaints and more likely to take appropriate steps to manage risk transferred to them. Financial illiteracy is assumed to be one of the causes of the last financial crises (Pahnke & Honekamp, 2010). Impressively, “one standard deviation in test scores (measured at the OECD student level) is associated with a two percentage points higher average annual growth rate in GDP per capita across 40 years” (Hanushek & Woessmann, 2012).

Several researchers point out that students have more money to spend than ever before but demonstrate poor levels of financial literacy combined with a compulsive buying behavior (Hira & Brinkman, 1992; Danes, Huddleston, & Boyce, 1999). The changing structures of financial markets, growing instability of individual’s working lives, increasing prosperity and increasing personal responsibility are factors that make it more difficult to choose the right answers to financial questions.

Students need to cope with the following risk related to financial illiteracy shown in Figure 4 on page 14. Students might face disadvantages in personal and economic development because they are not able to make the right financial decisions. This could lead to social descent as well as over-indebtedness. Inefficiencies lead to sub optimal market structures and sub optimal growth which entails an additional burden for the social welfare system.

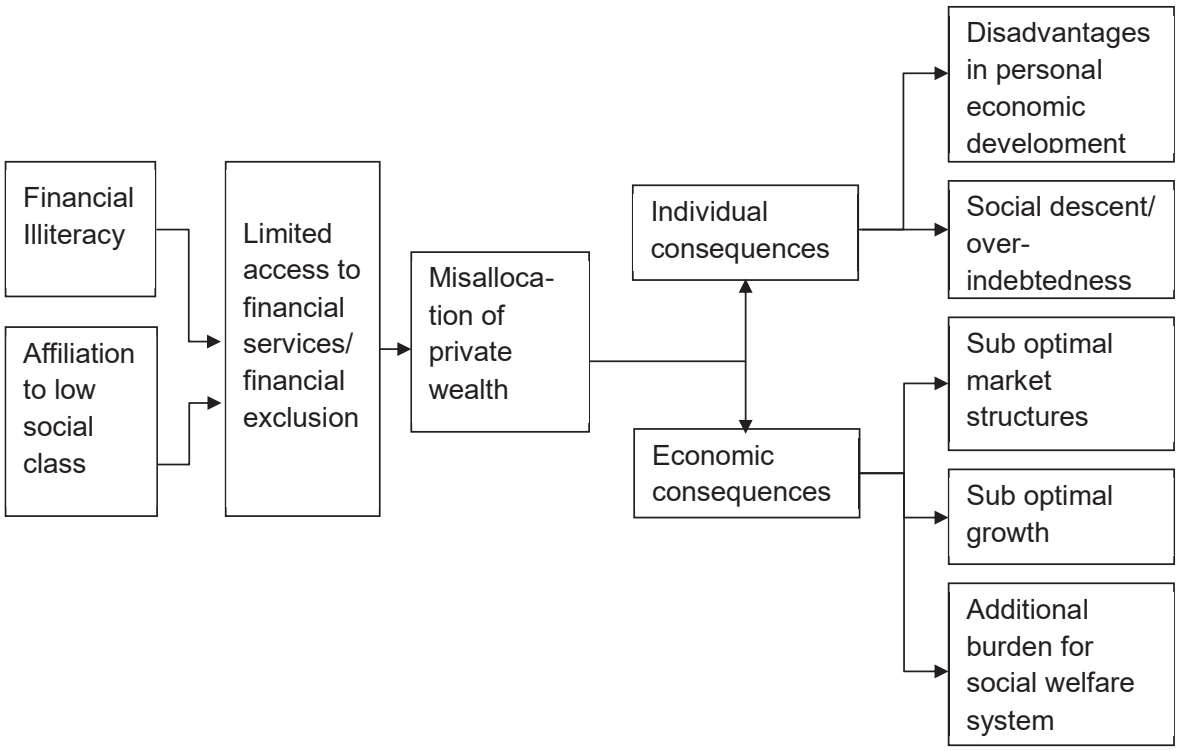


Figure 4: Risks of Financial Illiteracy

Source: Survey of Financial Literacy Schemes in the EU 27, Habschick et al 2007

Many people are not equipped to make sound financial decisions but illiteracy is even more severe in specific sub groups of society (Lusardi & Mitchell, 2008). Groups with very low degrees of literacy are the less educated, women, African-Americans, and Hispanics and the elderly (Lusardi & Mitchell, 2007a). Studies from Europe, Japan, Australia, Korea, the United States and the United Kingdom back the same conclusion about illiteracy on an international level (OECD, 2005). Based on two national studies, men study less and socialize more than female students. However, later during their professional lives, men tend to score higher on financial

literacy tests, are better paid and get promoted mainly because many times they work longer hours, have less career interruptions and responsibility to raise children. Often “the differences between blacks and whites, rich and poor, dwarf even the differences between men and women within any particular group,” (Lewin, 2006). Most studies find that men are more financially literate than women (Chen & Volpe, 1998) but there are also contradicting studies where women outperform men (Lalonde & Schmidt, 2010). In general, the effect of financial seminars tends to be best for low education and low-income groups (Lusardi & Mitchell, 2007a).

Parents have often been suspected to be the most influential factor of financial literacy of children (Grohmann & Menkhoff, 2015). However, being in college and away from home it is reasonable to expect that students’ financial literacy will be also influenced by coursework, peers, the media and others. Universities are in a privileged position to support the development of financial literacy (Xiao, Shim, Barber, & Lyons, 2007). Very few studies indicate that college students are not well equipped to make efficient financial decisions and that they are poor managers of their financials (Markovich & De Vaney, 1997; Chen & Volpe, 1998). Some empirical studies argue that financial performance and drop-out probability are related (Lyons, 2007). Students who are receiving at least partial coverage from their parents for college expenses are more likely to fail courses and earn lower grades than self-financed students (Bodvarsson & Walker, 2004).

In contrast, students who are seniors, employed or who are from higher status families show higher credit card knowledge which reiterates that exposure to financial decisions helps students to perform better (Danes, Hira, & Tahira, 1987). Students are more knowledgeable in what they have experienced and on issues with which they are familiar. The highest scores are related to auto insurance. Students are educated about insurance topics because many of them own cars and need to pay high auto insurance rates. Students also score relatively high on questions related to apartment leases. They are knowledgeable about rentals because they need to rent apartments while in college. Students have less expertise about investment, life insurance and tax

matters. Consequently, they earn low scores in these areas (Chen & Volpe, 1998).

Due to their skepticism in regards to financial markets the financially illiterate avoid risky assets and are more likely to sell assets which lost value during the crisis in 2008. Furthermore, there is a correlation between financial attitude and financial planning. There are non-planners, simple planners, serious planners and successful planners but a low level of financial knowledge is more dominant with a large number of non-planners (Lusardi & Mitchell, 2005). The ability to plan financially for the future relates to the complexity of tools used. Planners are more prone to use sophisticated planning tools. “Almost 50 percent of successful planners benefit from a financial planner’s advice against only 39 percent among the simple planners…” (Lusardi & Mitchell, 2005). The decision to plan financials is also related to confidence of the individual.

The subject of overconfidence and financial literacy has been examined and discussed in a wide array of academic papers (Arellano, Cámara, & Tuesta, 2014). “The significance of overconfidence to the conduct of human affairs can hardly be overstated. Although overconfidence is not universal, it is prevalent, often massive, and difficult to eliminate” (Fischhoff, Griffin, & Tversky, 1992). Students with stronger self-confidence score higher in financial literacy assessments (Arellano, Cámara, & Tuesta, 2014). Thus, there is a positive relationship between overconfidence and financial literacy (Hansen, 2015). Another study shows that even though students are financially illiterate, they tend to be more confident in their skills than they should be. A German survey finds that 80 percent of respondents were confident about their understanding of financial topics, but only 42 percent could answer 50 percent of the survey questions correctly (Commerzbank, 2004).

2.3 International Comparisons

International comparisons are rare but a large number of countries have recognized the fact that financial literacy is important and that improved

financial skills prepare more knowledgeable future generations of consumers. But there is a gap in the research of financial literacy “related to the lack of consistency among researchers in how to define and measure program success”. There is a need for researchers to develop an international common understanding of what it means to be “financially knowledgeable” (Schuchardt, et al., 2009).

OECD’s Programme for International Student Assessment (PISA) study is an international large-scale initiative to assess financial literacy among 15-year olds. The 2012 study has pioneered to include 40 questions about the status of financial literacy of 15-year-olds in OECD member countries. The study focuses on financial knowledge and cognitive abilities in various countries. PISA compares international data on financial literacy such as gaps in financial knowledge, quality of financial education in school, comparative measures, education strategies across countries, best practice of financial literacy and comparable data over time (OECD, 2012). The OECD Participation in the financial literacy part of PISA 2012 was optional, and while 13 OECD member countries elected to participate, the remaining 21 countries did not make use of this option for a number of reasons. Among the participants were 1,133 American high-school students but Germany did not participate. The relative performance of US students came closest to the OECD-13 average of any of the participating countries and can therefore be viewed as the best single country representative of financial literacy within the OECD reaching a score of 492 points.

The study shows that students in Shanghai-China score the highest in financial literacy, on average, with a score of 603 points, 103 points above the OECD average. “At the other end of the proficiency spectrum, 15 percent of the students, score below the baseline level. At best, these students can recognize the difference between needs and wants, make simple decisions about everyday spending, recognize the purpose of everyday financial documents, such as an invoice, and apply single and basic numerical operations in contexts that they are likely to have personally encountered“ (OECD, 2014).

One of the most interesting results of the PISA study is that financial literacy is a result of exposure to financial issues. Those who have an account with a financial institution show a higher performance in financial literacy questions than others (OECD, 2014). It is for this reason that an individual´s degree of financial literacy can be assumed to be a function of age, and it seems natural that 15-year-olds with typically low exposure to the financial system cannot be expected to be highly motivated to be thinking in financial terms. This might be one of the reasons why participants of the PISA study show an overall weak performance.

Our study focuses on German and American college-students aged 18 and above, that will have to make far-reaching financial decisions in their personal and business lives soon. Students are at a transitional stage where parental supervision will be reduced and they will depend on their own financial decision-making. In contrast to 15 year olds, college-students are exposed more widely to financial transactions like online payment facilities, mobile phone bills, car insurance, savings products, overdrafts, student loans, mortgages for housing and many more.

There are 180 financial literacy initiatives in the EU, 154 of them are considered core schemes. Most activity happens in the UK with 32 percent, followed by Germany 22 percent and Austria 10 percent. Poland performs best in Eastern Europe with six percent while France and the Netherland have low respondent rates but show stronger effort in financial literacy schemes (Habschick M., 2007). Young adults are the foremost target group of all schemes, mainly set up in schools and universities. Additionally, low-income and low-educated groups are targeted via intermediaries and service organizations. One specific study examines twelve countries, also including the US and Germany, but only asking three test questions (Lusardi & Mitchell, 2014c).

The Vienna Economic Chamber authorized a cross border study during 2003 and 2004 among 200 final year students in Austria, Germany, the Czech Republic

and Hungary comparing their economic knowledge. Less than 50 percent of the students answered the twelve questions on average correctly. Germans outperformed the other students in questions relating to: budget deficit, inflation rate, and the impact of customs tariff reductions. Between 59 percent and 67 percent of all students from all four countries answer questions relating to the market economy (e.g. the significance and implications of a trade deficit and the consequences of increasing public spending) correctly (Schlögl, 2007).

A summary of results of other empirical financial literacy studies around the world is documented in Table 2 on page 20. It shows the percentages of correct answers to three financial literacy questions tested in various countries. Germans outperform the Americans and most other countries (except New Zealand and the Netherlands) demonstrating solid financial knowledge. Women score lower on these financial literacy questions almost everywhere. Additionally, the results indicate that financial literacy follows an inverted-U shape with respect to age and financial literacy is associated with higher income levels and educational achievement (Xu & Zia, 2013).

“For high income countries like Germany and the US, financial literacy is correlated with retirement planning, financial literacy is associated with more sophisticated investment behavior, financial literacy affects debt and mortgage outcomes for individuals, and financial literacy may even have other macroeconomic implications” (Xu & Zia, 2013). Still, the lack of international comparison is a severe omission going forward because this knowledge offers the potential to equip young adults with capabilities to exploit opportunities in changing economic environments but more importantly, not to make essential long term mistakes regarding their financial decisions. International studies will provide politicians, schools, universities and financial institutions with knowledge that fills the gap in international financial literacy research.” (Schuchardt, et al., 2009). There is not enough cross-sectional country analysis of financial literacy levels and financial knowledge (Xu & Zia, 2013). In summary, the literature on

financial literacy up to now has produced some remarkable observations in selected areas of financial literacy mostly on national levels. There is a research gap regarding more detailed international comparisons which this dissertation intends to fill.

Table 2: Selected Financial Literacy Survey Results from Around the World

Country (Year of Survey)	Q1 Compound Interest	Q2 Inflation	Q3 Risk Diversification	Survey Sample
High Income				
United States (2011)[1]	65%	64%	52%	1,488
Italy (2006)[2]	40%	60%	45%	3,992
Germany (2009)[3]	82%	78%	62%	1,059
Sweden (2010)[4]	35%	60%	68%	1,302
Japan (2010)[5]	71%	59%	40%	5,268
New Zealand (2009)[6]	86%	81%	27%	850
Netherlands[7]	85%	77%	52%	1,324
Upper-middle-income				
Russia (2009)[8]	36%	51%	13%	1,366
Romania (2010)[9]	24%	43%	-	2,048
Azerbaijan (2009)[10]	46%	46%	-	1,207
Chile (2006)[11]	2%	26%	46%	13,054
Lower-middle-income				
Indonesia (2007)[12]	78%	61%	28%	3,360
India (2006)[13]	59%	25%	31%	1,496
West Bank & Gaza (2011)[14]	51%	64%	-	2,022

Source: Financial Literacy around the World, Xu & Xia 2013

[1] (Lusardi & Mitchell, 2011b)
[2] (Fornero & Monticone, 2011)
[3] (Bucher-Koenen & Lusardi, 2011)
[4] (Almenberg & Säve-Söderbergh, 2011)
[5] (Sekita, 2011)
[6] (Crossan, Feslier, & Hurnard, 2011)
[7] (Alessie, Rooij, & Lusardi, 2011)
[8] (Klapper & Panos, 2011)
[9] World Bank CPFL program
[10] World Bank CPFL program
[11] (Behrman, Mitchell, Soo, & Bravo, 2010)
[12] (Cole, Shapiro, & G.K., 2010)
[13] (Cole, Shapiro, & G.K., 2010)
[14] World Bank CPFL program

3 Methodology

3.1 Survey Execution

Before conducting the finalized survey, a pre-test was undertaken by asking ten students to fill out the prototype questionnaire and comment on it. Suggestions of the students included changes in the questions' degree of difficulty, naming of missing alternative multiple choice answers, the overall layout of the questionnaire, as well as its comprehensibility and unambiguousness. The students' feedback was then used to adequately adjust and finalize the questionnaire.

The first part of the survey was conducted in 2012 at seven different institutions across Germany including Europa Universität Flensburg, Leuphana Universität Lüneburg, Hochschule für angewandte Wissenschaften Hamburg, Helmut-Schmidt-Universität Hamburg, Fachhochschule Kiel, London Metropolitan University Hamburg and Fachhochschule Stralsund. The biggest German group is made up of 173 students (38 percent) from the Europa Universität Flensburg, followed by 97 students (21 percent) from Leuphana Universität Lüneburg and 80 students (17 percent) from Hochschule für angewandte Wissenschaften Hamburg. Helmut Schmidt Universität is representing 54 students (twelve percent), Fachhochschule Kiel 30 students (seven percent), London Metropolitan University 17 students (four percent) and Fachhochschule Stralsund eight students (two percent). An overview of all participating universities is given in Table 3 on page 22.

Table 3: Overview of Participating Universities

	Name of University	# of students	%
Germany	Europa-Universität Flensburg	173	38%
	Leuphana Universität Lüneburg	97	21%
	Hochschule für angewandte Wissenschaften, Hamburg	80	17%
	Helmut-Schmidt-Universität, Hamburg	54	12%
	Fachhochschule Kiel	30	7%
	London Metropolitan University, Hamburg	17	4%
	Fachhochschule Stralsund	8	2%
	Total	459	

	Name of University	# of students	%
USA	Lebanon Valley College, PA	279	56%
	University of Wisconsin Eau Claire, WI	119	24%
	San Diego State University, CA	66	13%
	DePaul University, IL	17	3%
	Michigan University, MI	16	3%
	Total	497	

We found a strong interest in our efforts on the part of these institutions and all of them asked for feedback regarding the results of the survey, because they wanted to know if there was anything that they should do about the financial literacy of their students. We provided this feedback in the form of descriptive results. We will not name the students' institutions in the later descriptive section 4.1.2, because some institutions asked that their students' affiliation be kept confidential for fear that results could be used for competitive purposes and damage some institutions´ reputations.

Quite a few faculty members suggested that we do an international comparison, because they wanted to know if other nations' students had similar financial expertise as the Germans and if possibly there is something to be learned from these other nations. We therefore decided to create an English language version of the questionnaire, which was administered in 2013 at five different institutions in the US including Lebanon Valley College PA, University of Wisconsin Eau Claire WI, San Diego State University CA, DePaul University IL and Michigan University MI. Lebanon Valley College is representing the largest portion of American students, 297 students (58 percent), followed by the University of Wisconsin Eau Claire with 119 students (23 percent), San Diego State University with 66 students (thirteen percent), DePaul University with 17 students (three percent) and Michigan University with 16 students (three percent).

The translation process necessitated a few minor changes with respect to institutional questions for which no true translation existed. Examples of changes included questions about the interpretation of a specific loan contract or a statement of the balance of a specific bank account. Also, in order to not confuse participants, a re-numbering of items became necessary. Other adjustments included matters such as differentiating class rank into the five major groups, e.g. freshman, sophomore, junior, senior and graduate, the students' U.S. state of birth and asking for Junior College before they went to university. In both surveys, paper-and-pencil form was chosen, and a total of n=956 completely filled-out questionnaires were generated.

The selection of students and their respective majors was depending on the openness of professors to distribute the questionnaire in class and the availability of majors in their schools. The sample consist of aggregated majors and was arranged based on total sample size as pictured in Table 4 on page 23.

Table 4: Number of Students According to Majors

	1	2	3	4
	Major	**GER %**	**US %**	**Total %**
A	Business (Management/ Marketing/ Finance/ Accounting)	29%	33%	62%
B	Social Science (Humanities/ Education/ Communications)	5%	7%	12%
C	Science & Health	9%	6%	15%
D	Engineering & Others	5%	6%	11%
E	Total	48%	52%	100%

The largest group of students for both nationalities is represented by business majors amounting to 62 percent of the full sample. 29 percent of the Germans are business majors and 33 percent of the Americans are business majors. The second largest groups stems from the aggregated major Social Science and represents twelve percent of the sample. This groups splits into five percent Germans and seven percent Americans. The third largest group are Science & Health students accounting for

fifteen percent of the sample. The group consists of 9 percent Germans and six percent Americans. All details about the majors are described in Table 4. Further information about the sample characteristics can be found in the result section 4.1.2.1.

3.2 Questionnaire Design

3.2.1 Overview

The US questionnaire consists of 65 questions, the German questionnaire consists of 67 questions and can be found in Appendix 1 (US) on page 88 and in Appendix 2 (German) on page 101 respectively. Previous research employed smaller numbers of questions and was mostly based on Lusardi's questions (Bucher-Koenen & Lusardi, 2011). A reason for this may have been the researchers´ fear of low response rates in mailings or online surveys. Since in our case respondents filled out the questionnaires in a classroom-type setting there was no reason to expect this and the large number of interesting variables seemed justifiable.

Some of the questions used were taken from the literature to be able to capitalize on prior experiences and potentially compare results of this study to others. Specifically, questions 25 through 36 were taken from previous research studies, questions 1-24 and 37-45 were newly developed. The use of established questions reduces the likelihood that measurement errors occur and facilitates comparison with other studies. With respect to the quality criteria of the data set, the measurements undertaken are objective, reliable, and of valid nature (Diekmann, 2004).

The structure of our questionnaires matches our definition of Financial Literacy and Financial Context as our research design shows in Figure 1 on page 2. In order to generate questions about Financial Literacy and Financial Context we split these two areas of interest into thirteen sub-categories to be described in some detail in the following two chapters.

3.2.2 Questions on Financial Literacy

Eleven questions ask about money and transactions, planning and managing, risk and reward, financial landscape and check participants´ factual knowledge about

the financial system. This involves mostly products, markets and institutions. Figure 5 on page 25 names these sub-categories and puts them in context.

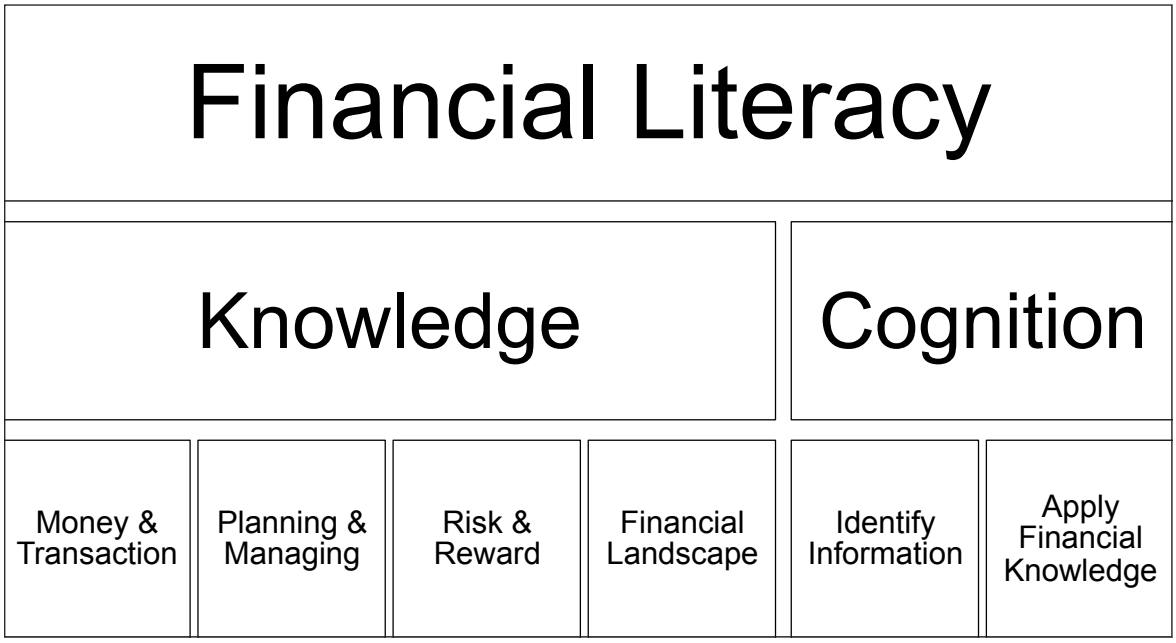


Figure 5: Financial Literacy-related Questions as Part of Questionnaires

Questions like “If the market interest rate falls, what should happen to bond prices?” or “What does diversification do to your risk position?” would be representative of this class of questions. Eight of these questions were found in national studies documented in the literature, the other three we developed ourselves. The category called “Planning and Managing” is also conceptually tested with factual knowledge questions.

Knowledge about facts of the financial system enables individuals to reach their financial goals only if they understand how to use it properly. We call this ability Financial Cognition and we use seven questions to measure it. Basically, they are about appropriate ways to identify and process the information gathered. In other words: do they know how to make good decisions? We believe that this individual characteristic is much harder to test than pure factual knowledge, which is also the reason why we resorted to three well-tested questions of large scale surveys which we found documented in the literature. In addition, we came up with four self-developed questions, all of which can be found in Appendix 3 on page 116.

3.2.3 Questions on Financial Context

The term “experience” is used here as a descriptor of the respondents´ origin and the environment surrounding them. In the strict sense of this dissertation, experience relates to financial matters only which may originate from different areas of activity such as education, work, home and family as well as society in general. Figure 6 on page 26 names the sub-categories and puts them in context.

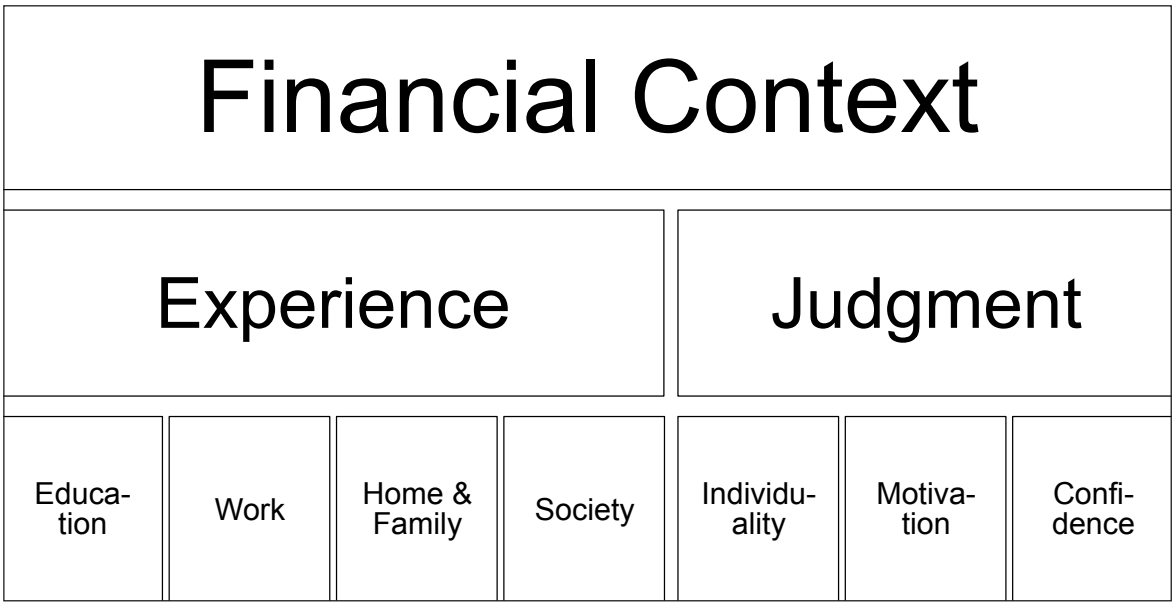


Figure 6: Financial Context-related Questions as Part of Questionnaires

While many students will continue their education, some of them may soon move into the labor market or may already be engaged in casual employment outside of school. In addition to financial challenges related to running a household, individuals’ financial decisions and behaviors can influence and be influenced by society as a whole. This includes matters such as being informed and understanding the rights and financial responsibilities of consumers and understanding the purpose of taxes and local government charges (OECD, 2014).

The experience questions also target more specific information regarding field of study, degree, university rank. Other questions aim at personal status: age, marital status, gender, nationality, original town where they grew up. Moreover, we found it interesting to learn if students have a job besides going to college, how much money

they have available to spend, who is in charge of their financials, if their native language matches the questionnaire language, if they have ever taken a loan, if they own a credit card, debit card, car, or if they smoke. Also we wanted to know more about students´ social context: who their main income provider is, what profession the main income provider is working in and what the best estimate of parental income might be. All experience-related questions can be found in Appendix 3 on page 116.

In addition we asked people to subjectively self-assess their abilities (“judgment”) to be able to compare this to their true (“objective”) ability through the use of performance tests. (Rooij, Lusardi, & Alessie, 2007)

Our self-assessment covers people´s individuality, certain motivational issues and confidence. Confidence as an important psychological construct will be examined, because people have the tendency to view themselves, the world and the future, more positively than is objectively warranted (Fast, Sivanathan, Mayer, & Galinsky, 2011).

The phenomenon is part of a large body of evidence in cognitive psychology, which has researched the widespread pervasiveness of positive illusions and self-enhancement biases amongst people. The pervasive effect of overconfidence arises when the perception of one’s knowledge actually exceeds the reality (Deaves, Lüders, & Schröder, 2005). Thus, overconfidence, as well as underconfidence, are cognitive traits which reflect a systematic discrepancy between an individual’s expectations and actual achievements (McGraw, Mellers, & Ritov, 2004).

Students were able to choose within a five level Likert scale, ranging from either poor to very good or strongly disagree to strongly agree, to explain to what extent they agreed or disagreed with the content mentioned. To measure the students’ perception of financial safety, we ask the student to judge if he is worried that he won´t have enough funds to maintain his current standard of living after retirement, if he believes that he is self-reliable for the influence he has on the amount of money he will have available after retirement.

Additional questions were created to measure the individual involvement of the student with financial topics. Here students were asked to describe if their personal involvement would allow them to have a positive attitude regarding pension planning. Furthermore, the student was asked if he is considering to enter into a retirement plan, and if he would enter into a retirement plan if this was subsidized by government. A complete documentation of the judgment questions can be found in Appendix 3 on page 116.

3.3 Data Preparation

Of the original sample of 956 students, there are 65 percent German female and 37 percent American female students. To avoid a misrepresentation of results based on a disproportionate distribution of gender and to be able to able to draw conclusions about the student population in Germany and the US in general, we adjust the proportions of our sample accordingly. There are 20,379,000 students in the US in 2011 and the percentage of female students amounts to 53 percent

(Davis & Bauman, 2013). Based on this information, we adjust our sample by creating adjusted gender proportions to account for the actual distribution of the national student populations. The new weights will be applied in further analyses. Also, we control for age by the fact that only students were asked to fill out the survey. This reduces the number of useful questionnaires to 696, but at the same time eliminates a potential sampling bias that would distort further analyses.

In order to be able to measure and compare subjective and objective financial literacy as well as some of its determinants, a few data transformations are in order. First, our measurement of students´ “subjective” self-assessment about their abilities in financial matters will be based on four judgment questions, each one to be answered on a five-point scale. Subjective financial literacy then is the sum of the values of these individual estimates. These answers are then related to the individual level of financial literacy based on answers to financial literacy questions.

We construct an “objective” performance score based on the correctness of answers to eighteen financial literacy questions (0=right, 1=wrong), which we call Financial

Literacy Score (FLS). It is the sum of eleven knowledge questions, which create the sub-score “Knowledge” (FLS1) as well as seven cognitive questions, which create the sub-score “Cognition” (FLS2). The maximum raw score to be obtained in this category is eighteen (100 percent).

The Knowledge Score consists of eleven questions (25-26, 29-30, 32-38) relating to the four subcategories: money & transactions, planning & managing finances, risk & return and financial landscape. The seven questions constituting the Cognition Score (27-28, 31, 39-40, 42-43) represent the subcategories: identification of financial information and application of information in a financial context. The definitions are in line with the OECD definition (OECD, 2014). Figure 7 on page 30 names these scores and puts them in context. There is one correct answer for each question, hence the maximum score for Knowledge is eleven, the maximum score for the Cognition Score is seven and therefore the total maximum score for Financial Literacy is eighteen points, indicating excellent financial literacy.

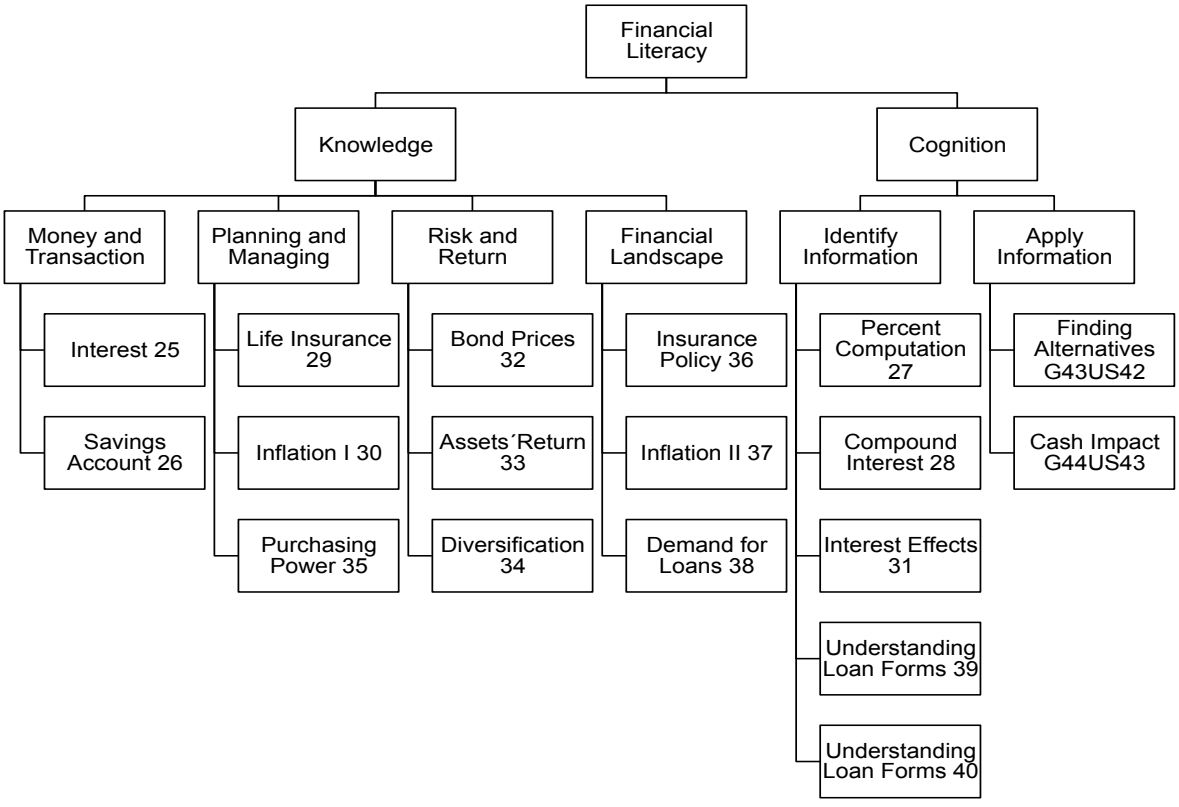


Figure 7: Elements of Financial Literacy Score [15]

[15] Numbers indicate Question Numbers in Questionnaire

We can now compare the students' individual self-assessment and their objective abilities by subtracting the scores. The result is called "confidence":

subjective financial literacy – objective financial literacy = confidence

This calculation will yield three possible outcomes. The students will exhibit overconfidence, underconfidence or accurate self-assessment. A positive value would indicate overconfidence, a negative value would indicate underconfidence, while a confidence score of zero would represent accurate self-awareness.

3.4 Methods of Data Analysis employed

We will employ multiple methods to analyze our data in order to be able to increase our confidence in the results of our analyses. Also, different research questions warrant the use of different analytical methods to be employed.

Besides standard descriptive statistics for each individual variable (financial literacy, experience, judgment question), some multivariate techniques will be used to explain differences and similarities of groups of respondents.

In order to be able to judge the financial performance of respondents, we analyze and compare financial literacy scores and their individual constituents for significant differences. We also check for potential violations of the underlying distributional assumptions (Jannsen & Laatz, 2010). To verify if financial literacy differentiates between Germans and Americans we also use discriminant analysis. We look at Germans and Americans as the group of interest and discriminate based on financial literacy variables.

In case the financial literacy tests reveal some national differences, we will look for experience and judgment variables which influence financial literacy of the Germans and Americans. We employ classification tree analysis to confirm and then explain the national differences based on experience and judgment

variables. First, we verify nationality as a potential strongest influence in a first node of a tree which then gives potential to look for further influencing experience and judgment variables in the succeeding nodes.

The methodology we use is Chi-squared Automatic Interaction Detection (CHAID) (IBM, 2012). It is a stepwise procedure using a chi-square statistic to determine the independent variable that has the strongest interaction with the dependent variable. The output of this procedure is a tree-like structure, which in our case is limited to six hierarchical levels. Tree generation itself can be based on a variety of methods and metrics. We decide to use chi-square for determining node splitting and the Pearson method because it is recommended due to its computational efficiency (IBM, 2012). For the SPSS-procedure to work properly, the appropriate measurement levels and value labels have to be assigned to all analysis variables.

In order to find separating characteristics regarding financial context, we use a discriminant analysis. We look at Germans and Americans as the group of interest and discriminate based on experience and judgment. We assume that covariance matrices do not differ between Germans and Americans (Burns & Burns, 2008). We interpret the coefficients of the resulting discriminant function as a measure of relevance for separating the two defined groups. If the weight of a coefficient is relatively high (i.e. above 0.3), the corresponding variable contributes a lot to discriminating between the groups. We continue to check for confidence of participants since it has been proofed that overconfidence shows a positive relationship with financial literacy (Hansen, 2015).

Finally, these results will be compared to endogenously identified groups of similar respondents. For this, a hierarchical cluster analysis technique will be used. (Bock, 1974). Within each cluster, the differences between the single objects should be

small, while the differences between the various clusters should be large (Bortz, 1999). In a first step of a hierarchical cluster analysis, the totality of objects in a data set is divided into the smallest possible number of clusters, so that initially each cluster only consists of one single object. Then the pairwise similarities or distances between all different objects are determined and the two objects showing the highest similarity or the smallest distance are brought together to a new cluster.

The clustering method chosen here is Ward's method. Unlike other methods, Ward's method does not merge two objects or groups with the smallest distance between each other instead it combines the groups or objects whose fusion is accompanied by the slightest increase in the total error sum of squares.

In this way, the variances in the respective clusters are kept as small as possible (Bortz, 1999). Consequently, Ward's method produces very homogeneous clusters (Backhaus & Weiber, 2008). In summary, we will use the research methods described to arrive at recommendations for a financial literacy strategy to improve German students' financial literacy as shown in Figure 8 on page 32.

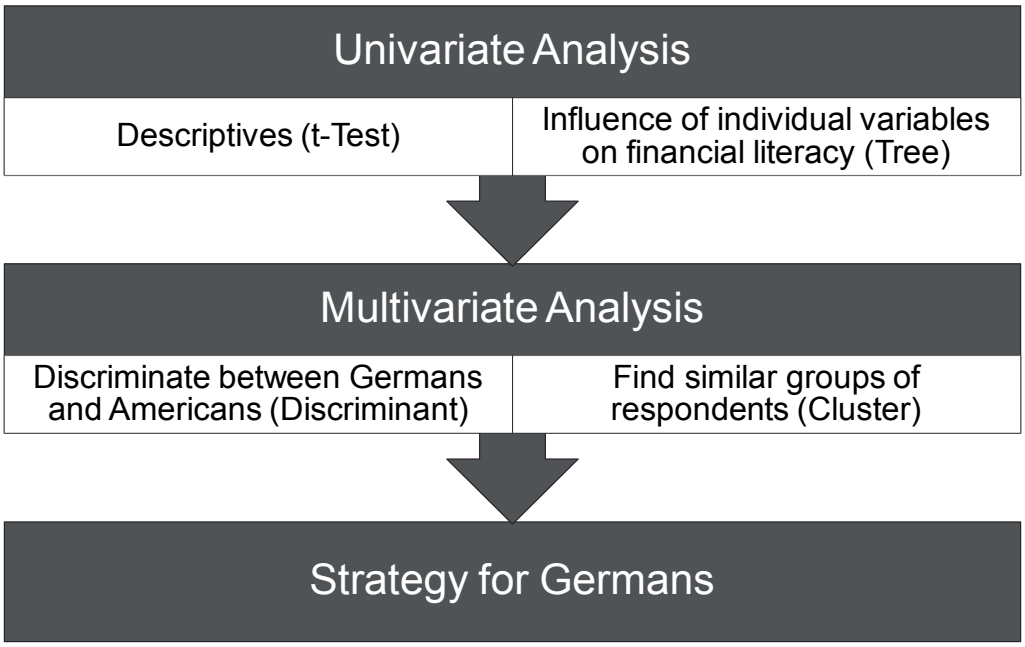


Figure 8: Research Steps in this Dissertation

4 Results

4.1 Status of Financial Literacy and Financial Context

In this chapter we will describe the data set based on nationality and the following characteristics: financial literacy, experience, and judgment. First, we will outline the Financial Literacy Score, Knowledge Score and Cognition Score. Then we continue to show the answers to the individual financial literacy questions. This is followed by a description of the data set based on experience variables. Last, we will outline the data set based on judgment variables. We will look for significant differences.

4.1.1 Financial Literacy

4.1.1.1 Differences and Similarities of all Respondents

4.1.1.1.1 Overview

Financial literacy is significantly different between Germans and Americans. Table 5 on page 34 summarizes the averages of the financial literacy scores as well the percent of correct answers to the individual financial literacy questions. Column 6 illustrates if there is a significant difference between the Germans and Americans. Three stars indicate a significant difference.

Table 5: Summary of Correct Answers to Financial Literacy Questions

1	2	3	4	5	6	7
Description	Question Number	Germans	Americans	Difference	Sign. t-Test	Sign. Discr.
Financial Literacy Score (FLS)		63%	60%	3%	***	
Knowledge Score (FLS1)		72%	71%	1%		
Cognition Score (FLS2)		57%	53%	4%	***	
1) Knowledge						
1.1 Money & Transaction						
	25	64%	66%	-2%		
	26	89%	69%	20%	***	***
1.2 Planning & Managing						
	29	55%	63%	-8%	***	
	30	48%	31%	17%	***	
	35	74%	73%	1%		
1.3 Risk & Return						
	32	20%	41%	-21%	***	***
	33	32%	36%	-4%		
	34	81%	81%	0%		
1.4 Financial Landscape						
	36	52%	61%	-9%	***	
	37	54%	26%	28%	***	***
	38	55%	37%	18%	***	
2) Cognition						
2.1 Identify Information						
	27	93%	85%	8%	***	
	28	66%	46%	20%	***	***
	31	77%	67%	10%	***	
	39	69%	83%	-14%	***	
	40	70%	80%	-10%	***	
2.2 Apply Information	G43/US42	62%	59%	3%		
	G44/US43	70%	66%	4%		

German students' Financial Literacy Score average is 63 percent compared to 60 percent for the Americans. Basically this is due to differences in their cognitive abilities while the Knowledge sub-score is not significantly different. In the Knowledge Score Germans answer on average 72 percent of questions correctly, the Americans 71 percent correctly. Regarding the Cognition Score, Germans outperform the Americans with an average score of 57 percent percent compared to the US students with 53 percent. Next, we will look at the individual financial literacy questions.

Twelve out of eighteen financial literacy questions show mean differences between the Germans and Americans. Furthermore, these twelve questions divide into seven knowledge and five cognitive questions. The different knowledge questions relate to all four categories: money & transaction, planning & managing, risk & return and financial landscape.

The five different cognitive questions relate to two categories identifying information and applying information. The following tables show the detailed performances for each question. The questions are presented according to their categories and with answer options, the correct answer marked in bold. The average percentage of Germans and Americans answering the question correctly and incorrectly are shown in the last two columns.

4.1.1.1.2 Knowledge

Dissimilar Knowledge questions are presented in Table 6 on page 37 and Table 7 on page 38. The Money & Transaction question 26 asks about savings accounts and the handling of an ATM to withdraw cash. 89 percent of Germans answer this question correctly compared to 69 percent of Americans. Questions 29 and 30 are both Planning & Management questions. 63 percent of Americans, answer question 29 which asks about life insurance, correctly, compared to only 55 percent of Germans. Question 30 examines the topic inflation and price development which is more known to German students who outperform Americans with 48 percent correct

answers compared to 31 percent. The risk and return question 32 which targets interest rate and bond prices is a strength of the Americans who have 41 percent correct answers compared to 20 percent of Germans. Questions 36 and 37 are both Financial Landscape questions. Question 36 tests knowledge about insurance policies and was answered correctly by 61 percent of Americans compared to 52 percent Germans. Question 37 is assessing the knowledge about beneficiaries of inflation which is a strength of the Germans who reached 54 percent compared to 26 percent of Americans. Question 38 relates to the category Financial Landscape and checks knowledge about the effect of an increase of the federal funds rate. This is a strength of the Germans who outperform the Americans with 55 percent compared to 38 percent.

Table 6: Differences Regarding Knowledge I

Fin. Literacy Category	Knowledge Category	Q	Question Text	Answer	Nationality	
					German	US
					%	%
Knowledge	Money & Transaction	**26**	You have an account with a savings bank. Which of the following statements is NOT correct? A) You can get cash at an ATM machine 24 hours a day **B) Internationally, you can get cash at ATM machines at no cost** C) You can get to know your account balance at every ATM machine of your bank D) You can deposit money at each branch of your savings bank at the ATM machine	False Correct	11% 89%	31% 69%
Knowledge	Planning & Management	**29**	If each of the following persons had the same amount of take home pay, who would need the greatest amount of life insurance? A) An elderly retired man, with a wife who is also retired B) A young married man without children **C) A young single woman with two young children** D) A young single woman without children	False Correct	45% 55%	37% 63%
Knowledge	Planning & Management	**30**	Inflation can have various effects. Which of these statements are correct? A) Products become more expensive B) People rather tend to spend money instead of saving it C) Real wages increase D) A,B and C are correct **E) A and B are correct** F) None of the above	False Correct	52% 48%	69% 31%

Table 7: Differences Regarding Knowledge II

Fin. Literacy Category	Knowledge Category	Q	Question Text	Answer	Nationality	
					German	US
					%	%
Knowledge	Risk & Return	**32**	If the market interest rate falls, what should happen to bond prices? **A) Rise** B) Fall C) Stay the same D) None of the above	False Correct	80% 20%	60% 40%
Knowledge	Financial landscape	**36**	Is it possible that your insurance company can reject your claim due to the fact that you entered answers incorrectly when you extended the policy contract a year ago ? **A) Yes** B) No C) Varies from insurance company to insurance company D) Don't know	False Correct	48% 52%	39% 61%
Knowledge	Financial landscape	**37**	Who benefits from inflation? **A) Debtor** B) Creditor C) Nobody D) Both	False Correct	46% 54%	74% 26%
Knowledge	Financial landscape	**38**	If the Fed increases the federal funds rate. A) Demand for credit increases B) Demand for credit decreases C) Savings increase D) Savings decrease E) A and D are correct **F) B and C are correct**	False Correct	45% 55%	63% 37%

German students are international travelers due to the proximity of various countries and the easiness of travel to other cultures. This supports the German performance in question 26 which shows the good knowledge of Germans when dealing with international ATM. The Americans are better equipped with knowledge about insurance questions (questions 29 and 36), which fits the picture that students in the US receive a driver's license at age of 16. They are therefore likely to deal with auto insurance from this early point on (Chen & Volpe, 1998). In contrast, questions 30 and 37 deal with inflation, which was an

important historical topic in Germany which turns into more knowledge about inflation on the German side. Question 32 deals with interest rates and the development of bond prices. Dealing with capital market instruments is anchored in the American culture. Very likely due to the exposure to capital markets products like stocks and bonds, the American student outperform the German student in this area.

Similar knowledge questions are provided in Table 8 on page 40. The results show that Germans and Americans have equivalent knowledge about influences on the interest rate which belongs to the category Money & Transaction. The two Risk & Return questions 33 and 34, which ask about returns of various asset classes and benefits of asset diversification respectively, show similar results. Question 35 asks about purchasing power over time, belongs to the category Planning & Management and also shows similar results for both nationalities.

Table 8: Similarities Regarding Knowledge

Fin. Literacy Category	Knowledge Category	Q	Question Text	Answer	Nationality	
					German	US
					%	%
Knowledge	Money & Transaction	25	What influences the interest rate on your loan? (G:25, US:25) A) Your credit rating B) The volume of your loan C) The time you need to pay back the loan **D) All of the above**	False Correct	36% 64%	34% 66%
Knowledge	Risk & Return	33	Imagine a long time horizon of 10 or 20 years. Which of the following assets tends to give the highest return? A) Savings Account B) Bonds **C) Stocks** D) Don't know	False Correct	68% 32%	64% 36%
Knowledge	Risk & Return	34	Please complete the sentence: If an investor diversifies his money into various different assets, the risk to lose money… A) increases **B) decreases** C) remains the same D) Don't know	False Correct	19% 81%	20% 80%
Knowledge	Planning & Management	35	Expecting that by 2020 your salary has doubled and at the same time all prices of products have increased by 100%: How much can you buy with your salary? A) More than today B) Less than today **C) The same** D) Don't know	False Correct	26% 74%	27% 73%

4.1.1.1.3 Cognition

Dissimilar cognition questions are presented in Table 9 on page 42. Question 27, 28 and 31 test if the student is able to identify financial information. Question 27 examines the ability to calculate a rebate for a fridge. Germans reach 91 percent compared to the US with 85 percent. Question 28 asks how long it would take until debt has doubled at a specific interest rate. Germans outperform the Americans with 66 percent correct answers compared to 46 percent. Question 31 shows two saving scenarios and wants to know which scenario leaves the student better off. This topic demonstrates another strength of the Germans who reach 77 percent correct answers compared to 67 percent of Americans. In all three Identification of financial information questions, Germans score higher than the Americans.

Questions 39 and 40 belong to the Application of financial information in a financial context category. Question 39 asks the student to read off the loan amount paid out from a document given. The Americans are better in reading this document and score 83 percent compared to 69 percent of Germans. Question 40 shows a strength of Americans when applying information in a financial context. Students are asked to identify the loan amount which they need to pay back which is stated on the same loan document. 80 percent of Americans answer this question correctly compared to 70 percent of Germans.

Question 27, 28 and 31 are revealing good math training of German students since they outperform the Americans in identifying financial information and calculating percentages. However, when asked to apply financial information in a financial context like in question 39 and 40, the Americans outperform the Germans, which shows that the experience with loans and the training with real life decisions is better on the American side.

Table 9: Differences Regarding Cognition

Fin. Literacy Category	Cognition Category	Q	Question Text	Answer	Nationality	
					German	US
					%	%
Cognition	Identify financial information	**27**	If the original price of a refrigerator is $1,200 and it is reduced by 20%, how much does it cost? **A) $960** B) $1,000 C) $940 D) $860	False Correct	7% 93%	15% 85%
Cognition	Identify financial information	**28**	Imagine, your credit card is debited with $1,000 and the interest rate is at 20% p.a. If you do not pay off any debt, how long would it take until your debt has doubled? A) 2 years **B) Less than 5 years** C) 5-10 years D) More than 10 years	False Correct	34% 66%	54% 46%
Cognition	Identify financial information	**31**	Robert and Mary are the same age. At age 25, Mary began saving $2,000 a year while Rob saved nothing. At age 50, Rob realized that he needed money for retirement and started saving $4,000 per year, while Mary kept saving her $2,000. Both save their money in a savings account that brings an identical interest. Now they are both 75 years old. Who has the most money in his or her retirement account? A) They would each have the same amount because they put away exactly the same B) Rob, because he saved more each year C) Mary, because she has put away more money **D) Mary, because her money has grown for a longer time at compound interest**	False Correct	23% 77%	33% 67%
Cognition	Apply information in a financial context	**39**	What is the loan amount that is paid out to you? A) $ 244,140 B) $ 419,140 **C) $ 175,000** D) $ 13,971	False Correct	31% 69%	18% 82%
Cognition	Apply information in a financial context	**40**	What is the total amount you need to pay back? A) $ 244,140 **B) $ 419,140** C) $ 175,000 D) $ 13,971	False Correct	30% 70%	20% 80%

Similar Cognition answers are represented in Table 10 on page 43.

The results show that Germans and Americans have equivalent cognitive abilities regarding application of information in a financial context concerning question G:43,US:42 and question G:44,US:43. Question G:43,US:42 asks the student to find alternatives which would reduce total interest costs and question G:44,US:43 asks to find alternative which would reduce monthly debt payments.

Table 10: Similarities Regarding Cognition

Fin. Literacy Category	Cognition Category	Q	Question Text	Answer	Nationality	
					German	US
					%	%
Cognition	Apply information in a financial context	G:43, US:42	Which alternative would reduce your total interest cost? A) Increasing contract period (maturity) from 360 months to 372 months **B) Reducing contract period from 360 months to 348 months** C) Increase insurance of residual debt D) None of the mentioned alternatives	False Correct	38% 62%	31% 69%
Cognition	Apply information in a financial context	G:44, US:43	You are short of cash. Which alternative would decrease your monthly debt payments? **A) Increasing contract period (maturity) from 360 months to 372 months** B) Reducing contract period from 360 months to 348 months C) Increase insurance of residual debt D) None of the mentioned alternatives	False Correct	30% 70%	34% 66%

A discriminant analysis discriminates German and American students based on 18 financial literacy questions which are described in detail in Table 11 on page 45 and in Appendix 6 and 7 on page 134 and 135. The discriminant function is significant but still only explains 30 percent of between group variability whether a respondent is German or American. A closer analysis of the structure matrix loadings reveals four significant discriminators, namely: Q26 Savings Account (0.381), Q28 Compound Interest (0.322), Q32 Bond Prices (-0.339) and Q37 Inflation II. (0.454). These four question are also part of the twelve questions we found in the t-Test analysis which showed nationality as a major influence. Thus, the discriminant analysis results partly reinforce the t-Test results.

Table 11: Discriminating Financial Literacy Questions between Germany and US

Nationality			
Financial Literacy Category	**Financial Literacy Question**	**Discrimi-nant Function**	**Structure Matrix Loadings**
Knowledge	Q25_ Interest	-.198	-.032
Knowledge	Q26_Savings Account	.925	.381
Cognition	Q27_Percent Computation	.665	.191
Cognition	Q28_ Compound Interest	.568	.322
Knowledge	Q29_Life Insurance	-.353	-.129
Knowledge	Q30_Inflation I	.504	.271
Cognition	Q31_ Interest Effects	.273	.166
Knowledge	Q32_Bond Prices	-1.168	-.339
Knowledge	Q33_Assets' Return	-.307	-.069
Knowledge	Q34_Diversification	-.283	.005
Knowledge	Q35_Purchasing Power	-.138	.015
Knowledge	Q36_Insurance Policy	-.413	-.132
Knowledge	Q37_Inflation II	1.128	.454
Knowledge	Q38_Demand for Loans	.566	.266
Cognition	Q39_Understanding Loan Forms I	-.429	-.246
Cognition	Q40_Understanding Loan Forms II	-.270	-.166
Cognition	QG:43/US:42_Finding Alternatives	-.473	-.110
Cognition	QG:44/US:43_Cash Impact	.188	.060
	Constant	-.680	

4.1.1.2 Differences and Similarities of Subgroups of Respondents

The subgroups we choose for our analysis are based on Figure 6 on page 26 which defines experience categories such as Education, Work, Home & Family, and Society. Specific subgroups are: business majors, students with a job besides college, students who have taken a loan before, students who possess financial assets, students who own a credit card, students who own a car, students who smoke, students where mother and father are both income providers and students who take care of their financials themselves. Literature reiterates that the assessment of subgroups is important because parents often have been suspected to be the most influential factor of financial literacy of children (Grohmann & Menkhoff, 2015). Students who are employed or who are from higher status families show higher credit card knowledge which reiterates that exposure to financial decisions helps students to be more financially literate (Danes, Hira, & Tahira, 1987). Students are more knowledgeable in what they have experienced and on issues with which they are familiar. Therefore the highest scores are related to auto insurance (Chen & Volpe, 1998).

Table 12 on page 47 summarizes the characteristics of our subgroups of students and their average financial literacy. Regarding the Financial Literacy Score means of subgroups of German vs. American undergraduates we find that the scores of German students who have taken a loan and own a car as well as the students where the main income provider are mother and father, are better than the scores of the respective American students.

Table 12: Subgroups' Financial Literacy

1	2	3	4	5	6	7	8	9	10	11	12
Exp. Category	**Sub-groups**	**Subgroup Specification**	**German FLS**	**US FLS**	**Signifi-cance**	**German FLS1**	**US FLS1**	**Signifi-cance**	**German FLS2**	**US FLS2**	**Signifi-cance**
Society	Gender	Male	68%	63%		79%	73%		61%	56%	
		Female	58%	57%		67%	69%	***	53%	50%	
Education	Business Major	Business Major	66%	63%		74%	73%		61%	57%	
		Non-Business Major	55%	53%		68%	65%		47%	45%	
Work	Job besides Collge	No	60%	59%		72%	69%		53%	52%	
		Yes	64%	61%		73%	72%		59%	54%	***
Society	Taken a Loan before	No	62%	58%		70%	67%		56%	52%	
		Yes	68%	62%	***	81%	74%		60%	54%	
Society	Possess Financial Assets	No	59%	55%		69%	63%		53%	51%	
		Yes	66%	61%		75%	72%		59%	54%	***
Society	Own Credit Card	No	61%	57%		71%	69%		54%	50%	
		Yes	65%	63%		74%	73%		59%	56%	
Society	Own a Car	No	61%	58%		71%	67%		54%	52%	
		Yes	66%	61%	***	75%	73%	***	61%	54%	***
Society	Smoke	No	63%	60%		72%	71%		57%	53%	
		Yes	63%	52%		73%	63%		57%	45%	
Home & Family	Main Income Provider	Mother	62%	57%		73%	67%	***	55%	51%	
		Father	63%	62%		72%	74%		56%	54%	
		Both	67%	56%		74%	66%	***	62%	50%	
Home & Family	Main Income Provider is	Self-employed	61%	61%		70%	71%		56%	55%	
		Employed	63%	59%		74%	71%		57%	52%	
Home & Family	Who is in charge of your Financials	Myself	64%	62%		74%	73%		57%	55%	
		My parents	59%	57%	***	65%	68%		55%	50%	
		Others	60%	65%	***	65%	64%		57%	66%	

Concerning the Knowledge Score results, the Germans who own a car and have mother and father as income providers, show a better Knowledge Score compared to American students. In contrast, US women show a better Knowledge Score compared to German women.

The Cognition Score results of subgroups demonstrate that the Germans who have a job besides going to college, possess financial assets and own a car show better Cognition Scores than the American students.

In summary, with a few exceptions (e.g. US females and the Knowledge Score), the mean tests of three financial literacy scores show better results for the German subgroups. The characteristics, which are attached to the Germans who are better compared to the US students are: Germans who have a job besides college, Germans who have taken a loan, Germans possessing financial assets and the

Germans who own a car. This means that the German students who have been exposed to financial decisions are more financially literate than the American students with the same exposure. In the next chapter, we will now describe the overall survey sample based on experience.

4.1.2 Financial Context

4.1.2.1 Experience

The majority of students in our study, around 69 percent in Germany and 67 percent in the US, are business majors. 15 percent of the official student population are business students in Germany and 20 percent in the US which shows that our survey over represents business majors (Statistisches Bundesamt, 2013/14) (National Science Board, 2015). Our study indicates that 68 percent of German students have a job while in college which compares to 60 percent in the US. Another national German survey shows that 56 percent of students have a job while in school which gets close to our survey results (Allensbach, 2011). Remarkably, 57 percent of Americans have some experience with taking a loan but only 19 percent of German students do. Another US study reveals that 68 percent of US students have taken a loan to finance their college education which is in line with our high percentage of 57 percent of US students which have taken a loan (Principal Finance Group, 2014).

In contrast, another German study confirms that a very low percentage, only six percent, of German students have ever taken a loan (Allensbach, 2011). Another big difference exists regarding ownership of financial assets. Only 57 percent of the German students own any type of financial asset whereas 85 percent of Americans do. More Americans own a car, 65 percent versus 42 percent of Germans, and only 5 percent of Americans smoke versus 17 percent in Germany.

Table 13 on page 49 summarizes the results of the experience variables from our survey. A z-test for proportions shows significantly different variables which are marked with three stars. These differences are driven by culture and infrastructure. Public

transportation does not exist everywhere in the US which is a reason why US students need a car. Americans are actively participating in stock markets whereas Germans tend to have a savings account (Giannetti & Koskinen, 2010). German public universities do not charge tuition which means that German students do not need student loans as much. In summary, the students are already influenced by their cultural heritage.

Table 13: Experience Characteristics

1	2	3	4	5	6	7
Experience Category	**Experience Variable**	**Experience Variable Specification**	German		US	
			%	Count	%	Count
Society	What is your gender? (G:8,US:7)	Male	46%	159	47%	164
		Female	54%	189	53%	184
Education	Business major (G:1, US:1)	Business major	69%	238	67%	231
		Non-Business major	31%	106	33%	116
Work	Do you have a job besides going to college? (G:13,US:12)	No***	32%	111	40%	137
		Yes***	68%	236	60%	209
Society	Have you ever taken a loan (i.e. student loan) from a bank? (G:15,US:14)	No***	81%	282	43%	150
		Yes***	19%	65	57%	197
Society	Do you possess any financial assets? (G:16, US:15)	No***	43%	148	16%	54
		Yes***	57%	197	85%	294
Society	Do you own a credit card? (G:22, US:21)	No	45%	156	48%	167
		Yes	55%	191	52%	181
Society	Do you own a car? (G:23, US:23)	No***	58%	200	35%	122
		Yes***	42%	147	65%	226
Society	Do you smoke? (G:24, US:24)	No***	83%	289	95%	330
		Yes***	17%	58	5%	18
Society	Who is the main income provider in your family? (G:46, US:44)	Mother	15%	50	20%	65
		Father	66%	217	60%	195
		Both	19%	62	20%	66
Home & Family	The main income provider is? (G:47, US:45)	Self-employed	21%	68	20%	65
		Employed	79%	252	80%	267
Home & Family	Who is in charge of your financials? (G:51, US:49)	Myself***	87%	290	62%	202
		My parents***	9%	31	37%	120
		Others***	4%	12	1%	4
Home & Family	Which is the best description of the town where you grew up? (G:52, US:50)	Less than 3000***	32%	109	13%	44
		3000-15000***	17%	57	33%	112
		15001-100000***	22%	74	33%	111
		Larger than 100000***	29%	96	21%	69

4.1.2.2 Judgment

According to our definition of Judgment and its categories, the total of 21 judgment variables can be categorized into 14 Individuality variables, three Motivation variables and four Confidence variables. 17 out of 21 variables show differences between the Germans and Americans, which is demonstrated by three stars in column 7 in Table 14 on page 51 in Table 15 on page 53 and in Table 16 on page 54. The tables summarize the answers to the judgment questions and show the judgment questions according their categories, the possible answer range and the mean answer of Germans and Americans for each question. First, we will describe Individuality variables, then the Motivation variables, followed by the Confidence variables. Besides showing the results in a table, we will also picture the category results in a profile which facilitates the interpretation.

Table 14 on page 51 and Figure 9 on page 52 show the results for variables from the Judgment category Individuality and its answer range: strongly disagree to strongly agree. Germans are more worried than Americans that they will have enough funds to maintain the same standard of living after retirement even though Germany's social system has more social benefits for retirement than in the US. American students feel less comfortable about their parents dealing with retirement planning. Americans say that they, more than the Germans, prefer saving over spending which is unexpected since the Germans are known to be the saving nation (Börsch-Supan, 2015). Germans are more risk averse and do not like investment into equities as much. In contrast, Americans want to make sure that their investments are safe but at the same time are convinced to take greater financial risk to improve the financial situation and to achieve a return.

Germans and Americans have similar attitudes when they are asked how comfortable they feel about retirement planning. They are similarly impulsive when buying things they cannot afford and they are both prepared to borrow money in case an investment is profitable.

Table 14: Judgment Description Individuality

1	2	3	4	5	6	7
Judgm. Categ.	**J. No**	**Judgment Variable**	**Answer**	**Ger-man**	**US**	**Sign.**
				Mean	**Mean**	
Individuality	1	Sufficient Income	1) Very poor - 5) Very good	2.45	2.33	
	21	Econ. Knowl. Parents	1) Very good - 5) No knowledge	2.4	2.03	***
	6	Worried Retirement	1) Strongly disagree - 5) Strongly agree	3.3	2.64	***
	7	Dealing Retirement		2.86	2.89	
	8	Parents Retirement		3.21	2.95	***
	9	Impulsive		2.33	2.26	
	10	Prefer Saving		3.28	3.62	***
	11	Safe Investment		3.47	3.6	
	12	Shares too Risky		2.97	2.51	***
	13	Borrow for Investment		2.64	2.97	
	14	Investments Safe		3.6	4.01	***
	15	Greater Risk		2.45	2.71	***
	16	Risk for Opportunity		2.46	3.45	***
	17	Retirement Gap	1) None - 5) Huge influence	3.33	4.07	***

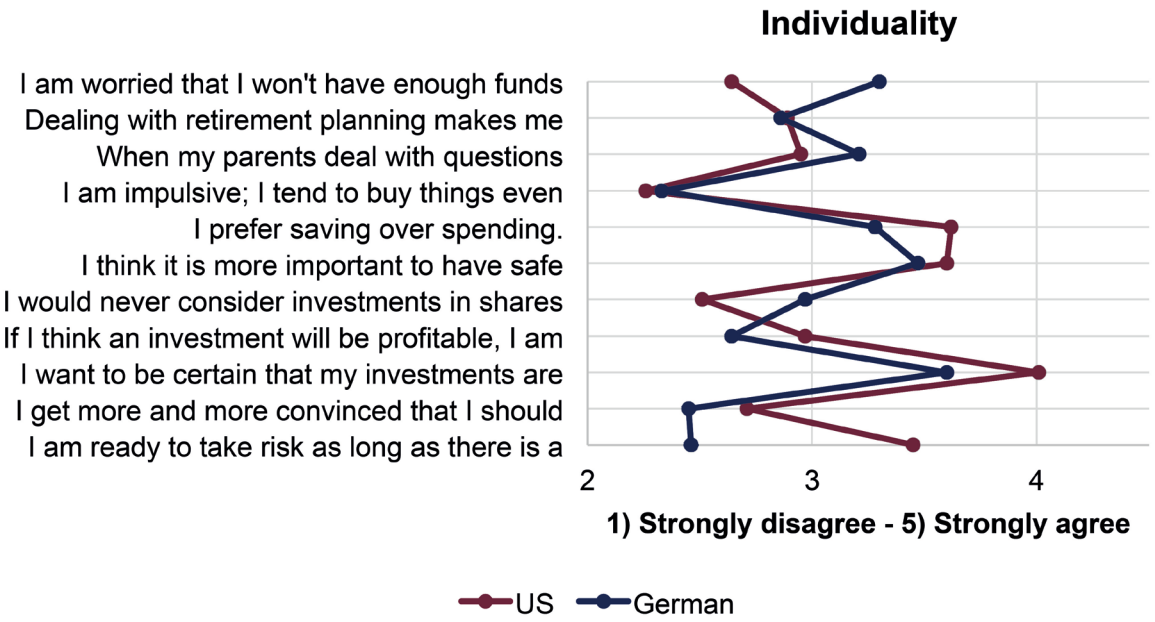


Figure 9: Profile Individual Disagreement and Agreement

Table 15 on page 53 and Figure 10 on page 53 summarize the motivational attitudes of respondents. Americans are quite opinionated when asked if they would like to enter into a retirement plan within the next twelve months. They are almost opposed to this idea. As soon as the retirement plan is subsidized by government or as soon as students have found a job, Americans would become much more motivated to enter into a retirement plan.

Germans' original motivation to enter into a retirement plan is higher than the motivation of the Americans'. Germans' motivation to enter into a retirement plan also increases with a subsidy or having a job but Americans are even more responsive to any kind of incentive.

Table 15: Judgment Description Motivation:

Judgm. Categ.	J. No	Judgment Variable	Answer	German	US	Sign.
				Mean	Mean	
Confidence	2	Spending Behavior	1) Very poor - 5) Very good	1.98	3.75	***
	3	Future Budget		2.2	3.9	***
	4	Evaluating Risk		3.03	3.32	***
	5	Econ. Knowledge		2.81	3.27	***

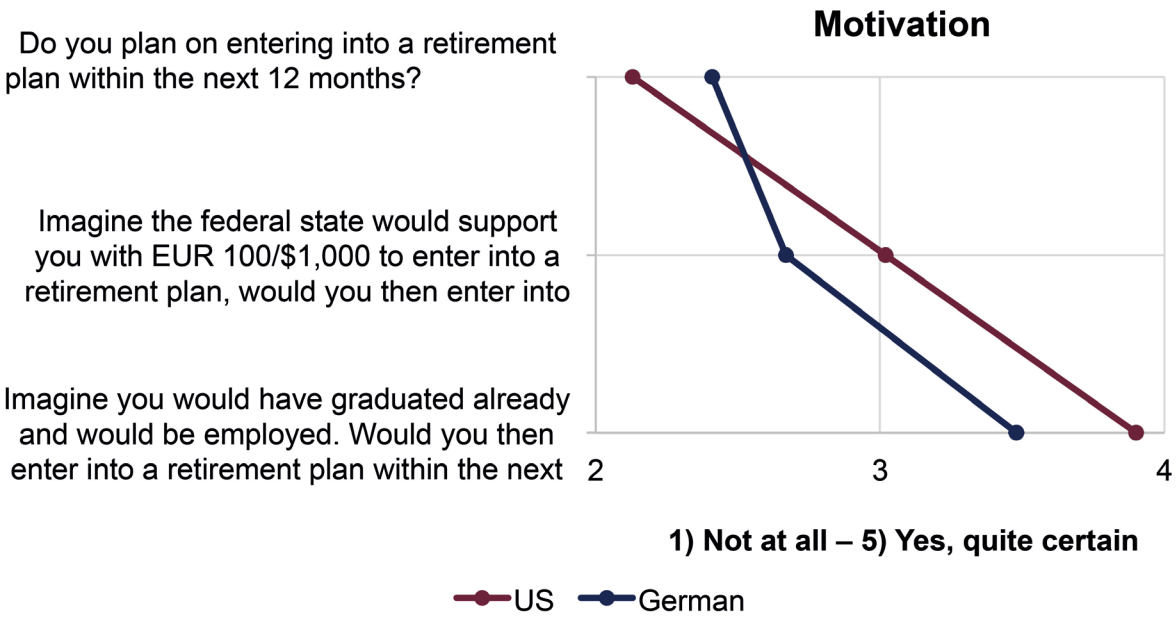


Figure 10: Profile Motivation to Enter into a Retirement Plan

The confidence results are shown in Table 16 on page 54 and pictured in Figure 11 on page 55. The two nationalities differ regarding the judgment of how they rate their capabilities in handling their spending behavior. The Germans see themselves with poor financial management whereas the Americans are more self-confident and feel good about their spending behavior. Similarly, the Germans are less confident than the US undergraduates in handling their future budget, in evaluating risk and in assessing their own financial knowledge.

Table 16: Judgment Description Confidence

Judgm. Categ.	J. No	Judgment Variable	Answer	German	US	Sign.
				Mean	Mean	
Confidence	2	Spending Behavior	1) Very poor - 5) Very good	1.98	3.75	***
	3	Future Budget		2.2	3.9	***
	4	Evaluating Risk		3.03	3.32	***
	5	Econ. Knowledge		2.81	3.27	***

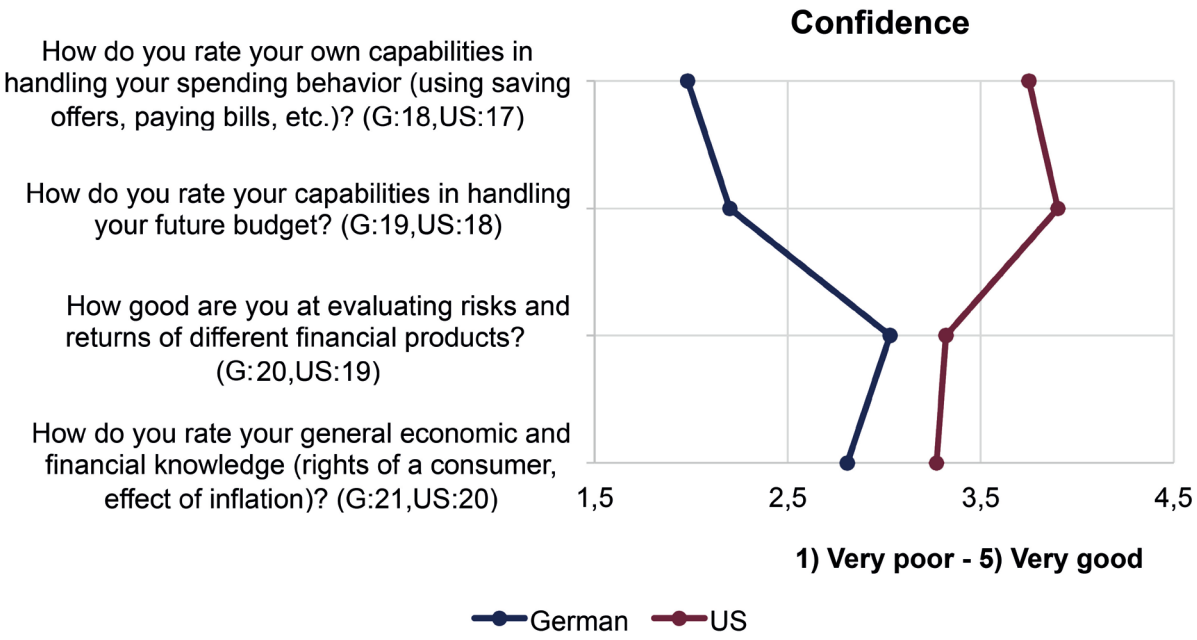


Figure 11: Profile Confidence about Financial Capabilities

The results of the Confidence Scores of the Germans and Americans are presented in Table 17 on page 56. Out of the possible 20 self-assessment points which represent 100 percent, the mean of the US students' Confidence Score is 64 percent with a standard deviation of 0.19. The minimum and maximum Confidence Scores are 6 percent and 100 percent respectively. Seven students indicate a confidence score of 13 percent or worse.

Out of the possible 20 self-assessment points, the mean of the GER students' Confidence Score is only 38 percent with a standard deviation of 0.17. The minimum and maximum confidence scores are 0 percent and 88 percent respectively. 31 students indicate a confidence score of 13 percent or worse.

Table 17: Confidence Score

	German					US				
	Mean	Median	Min	Max	St. Dev.	Mean	Median	Min	Max	St. Dev.
Confidence Score	38%	38%	0%	88%	0.17	64%	63%	6%	100%	0.19

In the US 94 students (27 percent) have a Confidence Score at or below 50 percent whereas 285 German students (82 percent) reach a Confidence Score at or below 50 percent.

Despite very few similarities, the analysis shows that Americans are generally more confident about their financial abilities, more proactive as well as more fearless towards taking risk. These characteristics are also reflected in the American positive way of thinking of being able to make it everywhere (Obama, 2012). Literature confirms that individual confidence is related to planning financials which also means that greater confidence benefits financial literacy (Lusardi & Mitchell, 2005). In the next section, we will investigate factors influencing students' financial literacy.

4.2 Explanation of Financial Literacy

4.2.1 Model Specification

Our strategy to analyze influences on German and American financial literacy in general is illustrated in Figure 12 on page 57. We use respondents´ experience in financial matters plus their judgmental abilities as explanatory categories. Each one of these categories is explained in detail in chapter 3.2.3.

First, we will look for experience variables which influence financial literacy. Then we perform a discriminant analysis between Germans and Americans to look for separating experience variables.

Second, we will look for judgment variables which influence financial literacy. This will be followed by a discriminant analysis where we will look for separating judgment variables between the Germans and Americans.

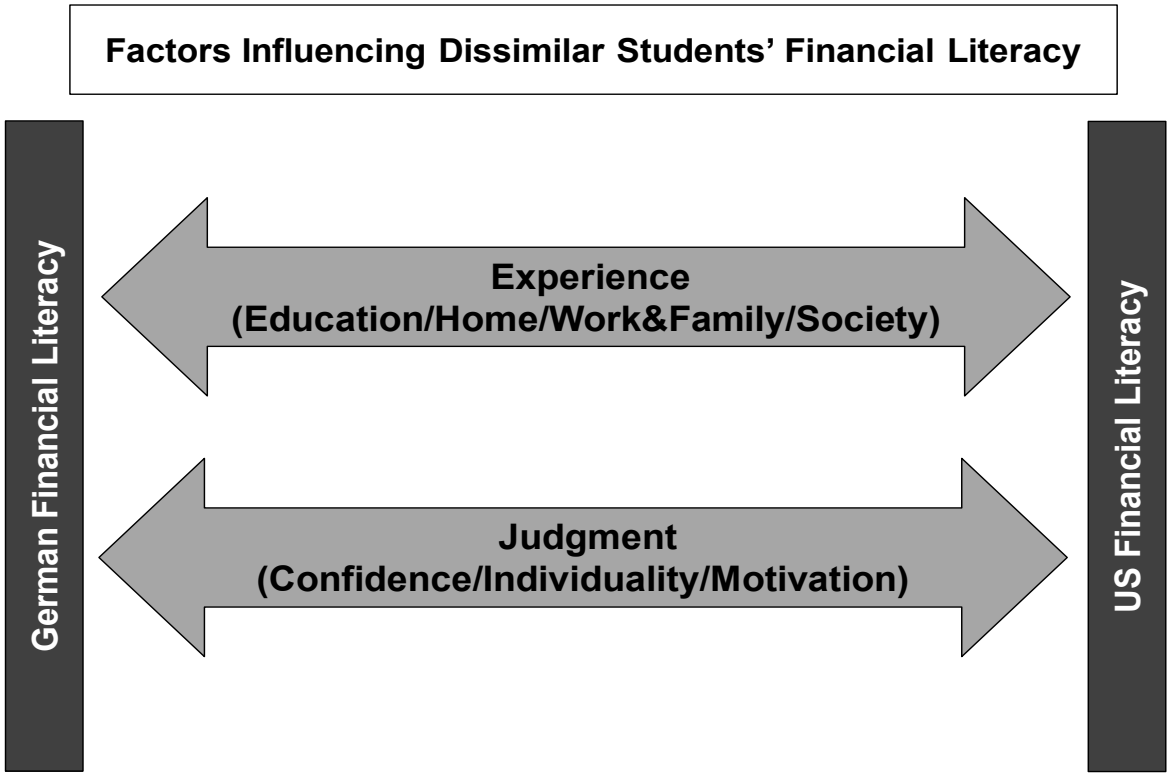


Figure 12: Factors Influencing Dissimilar Respondents' Financial Literacy

4.2.2 Experience

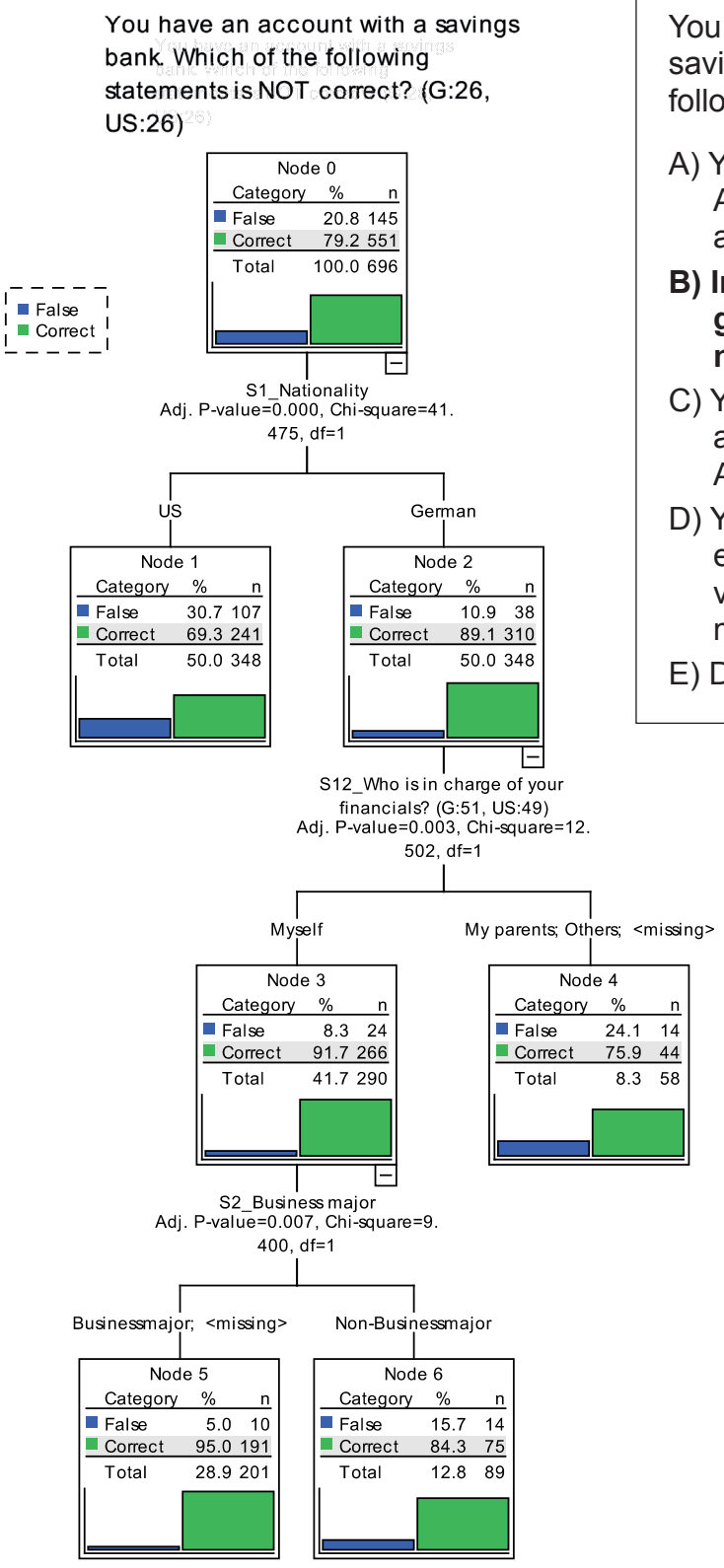
4.2.2.1 Tree Analysis

To determine if experience variables have an influence on financial literacy, we are applying the decision tree method. This offers the potential to look for influencing experience variables in the lower nodes of the tree. We are generally looking for trees with nationality in the first node only because this implies that the answer is mainly influenced by nationality which differentiates between Germans and Americans.

Representative of all decision trees analyzed, we show the tree for question 26 in Figure 13 on page 59: Each box is representative of a specific subset of our students. For example, node 1 represents US students because the first split of the sample is based on *nationality*. The reason why our tree methodology chose *nationality* as the first split variable is the fact that in this case nationality explains the answering behavior best of all explanatory variables. The information in node 1 tells us that 69 percent of the US students answered correctly while this is the case for 89 percent of German students (node 2).

Moving down the tree, nodes 3 and 4 split the German sub sample according to variable *Who is in charge of your financials?* because it explains the answering behavior of the Germans best. Specifically, if someone is *German* and in *charge of his own financials*, he has a 92 percent probability of answering question 26 correctly. In the case of the *US* students, no other variable can be identified as having a significant influence on the answering behavior to question 26. There is another variable for the Germans which explains their answering behavior which is being a *business major*. The information in the final node 5 can be interpreted like this: if you are *German* and if you are *in charge of your financials* and if you are *business major*, there is a 95 percent chance of answering correctly. Further trees with nationality in the first node can be found in Appendix 3 on page 116.

Nationality is the strongest influence for the answer to question 28 (Compound Interest). 46 percent of Americans have a correct answer and 66 percent of Germans have a correct answer. For the Germans and Americans, the second strongest influencing variable is *Gender*. Of the American students who are *male*, 54 percent answer question 28 correctly compared to 78 percent of *Germans* students who are *male*. For the *US* students, *Gender* is the terminal node. For *Germans* who are *male*, the third strongest influencing variable is *Business Major*. To demonstrate the strong influence of three mentioned variables we can conclude that of the students who are *German*, *male* and *business major*, 68 percent answered question 28 correctly.



Question 26

You have an account with a savings bank, which of the following is not correct?

A) You can get cash at an ATM machine 24 hours a day

B) Internationally, you can get cash at ATM machines at no cost

C) You can get to know your account balance at every ATM machine of your bank

D) You can deposit money at each branch of your savings bank at the ATM machine

E) Don‘t know

Figure 13: How Decision Tree Analysis with Experience Variables works for Q26

Nationality is the strongest influence for the answer to question 30 (Inflation I). 31 percent of Americans show a correct answer and 48 percent of Germans do. For the Americans, the second strongest influencing variable is *Gender*. For the *Germans*, the second strongest influencing variable is *Business Major*. Thus, of the *American* students who are *male*, 38 percent answer question 30 correctly. *Gender* is the terminal node for the *US* students. For the students who are *German* and *business major*, the third strongest influence is *Gender*. Of the students who are *German*, *business major* and *male*, 60 percent answered question 30 correctly.

Further questions which are mainly influenced by *nationality* are: question 31 (Interest Effects), question 37 (Inflation II), question 39 (Understanding Loan Forms I). For the experience variables we find in total six relevant financial literacy questions where nationality is in the first node and therefore the most influencing variable. These questions split equally into three knowledge questions: Q26, Q30, Q37 and three cognition questions: Q28, Q31, Q39.

We see that German students' financial literacy is influenced by the following experience characteristics: *Business Major*; *Gender*; *Possession of Financial Assets* and *Who is in Charge of Your Financials*. For the Americans, major influencing experience variables are: *Gender*, *Possession of Financial Assets* and *Ownership of a Credit Card*.

A solid education (business major) is important for the Germans because it improves financial knowledge which benefits financial literacy. A student who is responsible for his financials himself at an early age and who possess financial assets is likely to show stronger financial literacy skills. The most influencing variable for the Americans is the ownership of a credit card. Thus, the environment in which we grow up shapes financial literacy. To be male also enhances the chances to be more financially literate which supports findings from other researchers (Lusardi & Mitchell, 2008). However, we cannot prove this based on a logical argument. Further research will be needed to investigate gender differences. The variable which influences both

nationalities' financial literacy positively, besides *Gender,* is the *Possession of Financial Assets*. This indicates that the exposure to financial transactions is one of the main drivers of financial literacy.

4.2.2.2 Discriminant Analysis

A discriminant analysis reveals the experience variables which differentiate between German and American students. Hence, we are looking at experience variables which influence financial literacy (tree analysis) and at the same time separate Germans and Americans. The variables used are: *Gender, Business, Major Job, Money Available, Loan, Financial Assets, Credit Card, Car, Smoke, Who Provides Income, Occupation Income Provider, Charge of Financials* and *Town*. The quality of the discriminant function is very high and the structure matrix reveals *Having taken a loan* (0.663), *Possession of Financial Assets* (0.450) and *Owning a car* (0.503) as significant discriminators (Appendix 7 on page 135).

Thus, Americans have considerably more experience with loans, financial assets and ownership of cars. More Americans have experience with loans due to the educational system which is in general charging tuition. The Americans own more financial assets and cars are an essential transportation vehicle for American students because public transportation is less common in US cities.

Most importantly, we find the variable *Possession of Financial Assets* as a key influencing variable of financial literacy (decision tree) and also as a separating variable (discriminant analysis) for both nationalities. This means that the ownership of financial assets is underrepresented for the Germans and offers the key target area for improvement.

4.2.3 Judgment

4.2.3.1 Tree Analysis

To determine if judgment has an influence on financial literacy of German and Americans, we are first applying the decision tree method.

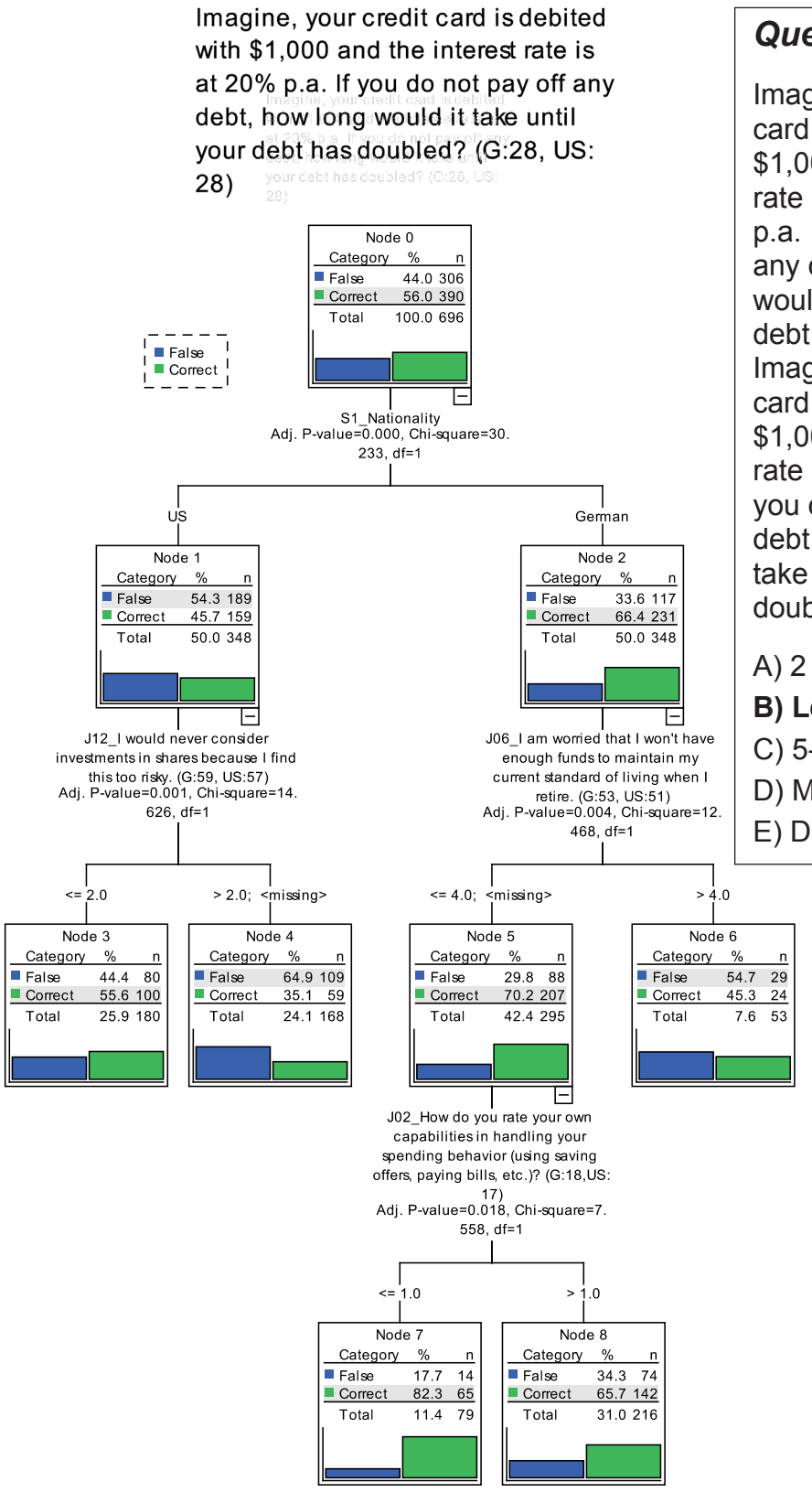
Recall that for question 26 (Savings Account), 69 percent of Americans show a correct answer and 89 percent of Germans do. Instead of splitting these groups by experience variables (see chapter 4.1.2.1), we now use Judgment to further distinguish amongst our students if nationality has a significant influence. For question 26, the Germans' judgment about the sufficiency of their income is the strongest influencing variable (J01 Sufficient Income). Of the German students who believe that their monthly income is insufficient, 92 percent answer correctly compared to only 73 percent of the Germans.

To further illustrate, we show the complete decision tree for question 28 in detail in Figure 14 on page 64. Each box is representative of a specific subset of our students. Node 1 represents US students because the first split of the sample is based on nationality. The reason why our tree methodology chose nationality as the first split variable is the fact that in this case nationality explains the answering behavior best of all explanatory variables. The information in the graph on node 1 that is given tells us that 46 percent of the US students answered correctly while this is the case for 66 percent of German students (node 2).

Moving down the tree, nodes 3 and 4 split the American sub sample according to variable *J12* (I would never consider investment in shares because I find this too risky) because it explains the answering behavior of the Americans. Specifically, if someone is *American* and does not find shares too risky, he has a 56 percent probability of answering question 28 correctly. In the case of the US students, no other variable can be identified as having a significant influence on the answering behavior to question 28, so *J12* is the final node.

The nodes 5 and 6 split the German sub sample based on variable *J06* (I am worried that I won't have enough funds to maintain my current standard of living when I retire) because in the German case it explains the answering behavior best. Node 5 shows us that 70 percent of German students answered correctly who are rather not worried regarding their standard of living after retirement. Moving down the tree, node 5 is split by the variable *J02* (How do you rate your own capabilities in handling your spending behavior) into nodes 7 and 8. J02 is the third variable which can explain a correct answer to question 28. In detail, the information in the final node 7 can be interpreted like this: if you are German and not worried regarding their standard of living after retirement and believe that your spending behavior is poor, there is a 82 percent chance of answering question 28 correctly. Further trees with nationality in the first node can be found in Appendix 5 on page 127.

Nationality is the strongest influencing variable for the answer to question 29 (Life Insurance). 63 percent of Americans show a correct answer and only 55 percent of Germans do. For the students who are Americans the second strongest influence is J10 (Prefer Saving) followed by J05 (Econ. Knowledge). For the students who are German, the second strongest influencing variable is J08 (Parents Retirement), followed by J04 (Evaluating Risk).



Question 28

Imagine, your credit card is debited with $1,000 and the interest rate is at 20 percent p.a. If you do not pay off any debt, how long would it take until your debt has doubled?) Imagine, your credit card is debited with $1,000 and the interest rate is at 20% p.a. If you do not pay off any debt, how long would it take until your debt has doubled?

A) 2 years
B) Less than 5 years
C) 5-10 years
D) More than 10 years
E) Don‘t know

Figure 14: How Decision Tree Analysis with Judgment Variables works for Q28

Further questions with nationality in the first node are: question 30 (Inflation I), question 32 (Bond Prices), 37 (Inflation II), question 39 (Understanding Loan Forms I) and question 40 (Understanding Loan Forms II).

We find eight financial literacy questions with nationality in the first node as the most influencing variable. They are made up of five knowledge questions (Q26, Q29, Q30, Q32, Q37) and three cognition questions (Q28, Q39, Q40).

We see that German students' financial literacy is influenced by the following judgment characteristics: *Sufficient Income, Spending Behavior, Evaluating Risk, Econ. Knowledge, Worried Retirement, Dealing Retirement* and *Parents Retirement*. For the Americans, major influencing judgment variables are: *Econ. Knowledge, Prefer Saving* and *Shares too Risky.*

4.2.3.2 Discriminant Analysis

A discriminant analysis reveals the judgment variables which differentiate between German and American students. Our goal is to find judgment variables which influence financial literacy (tree analysis) and at the same time separate Germans and Americans. The variables used are J01 to J21. The discriminant function is significant and a closer analysis of the structure matrix reveals two significant discriminators, namely: *J02 Spending Behavior* and *J03 Future Budget* which both belong to the judgment category confidence (Appendix 8 on page 137).

The significant structure matrix loadings from the discriminant analysis of *J02 Spending Behavior* and *J03 Future Budget* show that confidence levels are different for both nationalities. This means that Germans are considerably less confident than the Americans. Confidence is positively associated with financial literacy which indicates that the judgmental attitudes are benefitting the Americans and are disadvantageous for the Germans. Regarding financial literacy this means that Germans could improve their situation by becoming more confident.

4.2.4 Summarizing the Impact of Experience and Judgment

In summary, based on the decision tree analysis with experience and judgment variables, we find nine financial literacy questions where the answers are mainly influenced by nationality. These questions are shown in Table 18 on page 66. They stem from financial literacy categories knowledge and cognition. Five questions stem from the knowledge categories: Money & Transaction, Planning & Managing, Risk & Return and Financial Landscape. Four questions stem from the cognition category: Identify Information. The only missing category is “Apply Information”. These findings indicate that we are able to find national influences in half of the financial literacy questions and in almost all financial literacy categories. They strongly support the results from the t-Test analysis.

Table 18: Nationality’s Influence on Financial Literacy

Knowledge Category	**Question Number**	**Question**
Money & Transaction	**26**	Savings Account
Planning & Managing	**29**	Life Insurance
Planning & Managing	**30**	Inflation I
Risk & Return	**32**	Bond Prices
Financial Landscape	**37**	Inflation II
Cognition Category	**Question Number**	**Question**
Identify Information	**28**	Compound Interest
Identify Information	**31**	Interest Effects
Identify Information	**39**	Understanding Loan Forms I
Identify Information	**40**	Understanding Loan Forms II

More importantly than confirming the results of nationality being an important variable which influences financial literacy, we look at experience and judgment variables which influence the Germans and Americans. Our scheme in Figure 15 on page 67 demonstrates influencing variables on financial literacy.

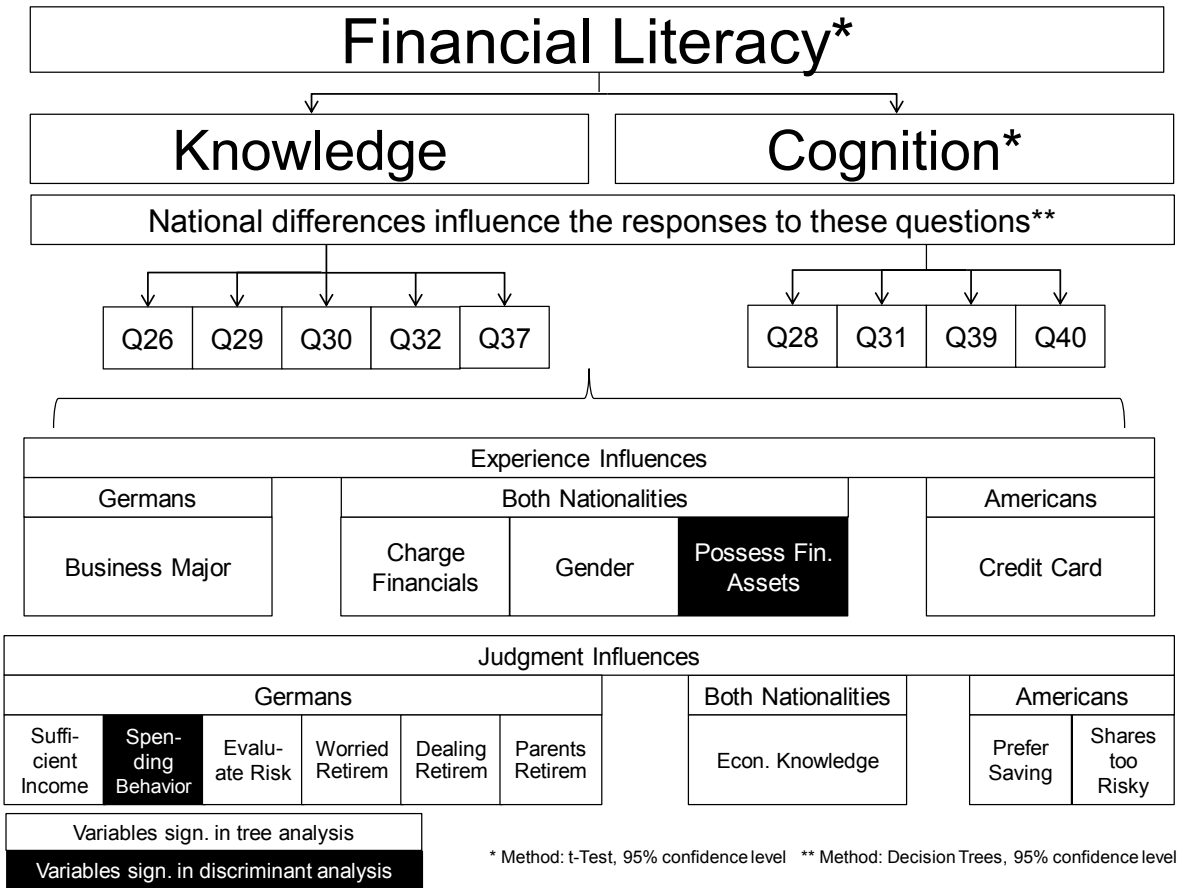


Figure 15: Influences on Financial Literacy

The white boxes show influencing variables. The black boxes show influencing variables which at the same time discriminate between Germans and Americans. On the one hand, we find that while Germans' possession of financial assets is underrepresented compared to Americans, their financial literacy is influenced by possession of financial assets, business education, financial responsibility, as well as attitudes regarding sufficient income, spending behavior, evaluation of risk, retirement topics and economic knowledge. On the other hand, Americans' financial literacy is influenced by the ownership of a credit card, financial responsibility, possession of financial assets as well as attitudes regarding savings, ownership of shares and economic knowledge. Remarkably, financial responsibility (*charge financials*), the *possession of financial assets* and judgment regarding *economic knowledge* are influences which both nationalities have in common. The only variable

out of the common ones which discriminates between the Germans and Americans is *possession of financial assets*. Because we know from the descriptives that Germans own considerably less financial assets, we conclude that Germans' financial literacy can be mainly improved by increased ownership of financial assets which at the same time means that Germans would need to increase the practice of financial decision-making.

The discriminating variable *spending behavior* indicates that the Germans have considerably less confidence regarding their spending behavior than the Americans. We suggest that Germans practice financial decision-making via increased ownership of various types of financial assets and gain confidence via a successful administration of their financials. A push for German students' self-esteem about financials could help to improve their financial literacy.

4.3 Other Aspects

4.3.1 The Importance of Overconfidence

We continue to investigate the details of German and American confidence because we want to know how over-, or underconfident the students are. Surprisingly, literature indicates that overconfidence has a positive effect on financial literacy (Hansen, 2015).

Out of the possible 20 self-assessment points, the mean German Confidence Score is only 38 percent. This mean Confidence Score relates to a German average Financial Literacy Score of 63 percent. The minimum and maximum Confidence Scores are zero percent and 88 percent whereas the minimum and maximum Financial Literacy Scores are eleven percent and 100 percent respectively. While 31 German students indicate a Confidence Score of thirteen percent or worse, only one student assesses his Financial Literacy Score to be 88 percent. Accordingly, seven students scored 22 percent or less on the Financial Literacy Score and three students scored even 100 percent.

Out of the possible 20 self-assessment points, the mean of the US students' Confidence Score is 64 percent. This mean Confidence Score relates to an US average Financial Literacy Score of 60 percent. The minimum and maximum Confidence Scores are recorded at six percent and 100 percent whereas the minimum and maximum Financial Literacy Scores are 17 percent and 100 percent respectively. While seven students indicate a Confidence Score of thirteen percent or worse, eleven students assess their Financial Literacy Score at 100 percent. Accordingly, ten students scored 22 percent or less on the Financial Literacy Score and two students scored 100 percent.

Figure 16 on page 70 and Figure 17 on page 71 picture the relationship between financial literacy and confidence. It can be said that the higher the confidence, the higher the literacy. More specifically, German students in the 5th percentile (i.e. the five percent lowest literacy scores) who answered only 28 percent of financial literacy questions correctly show an extremely low confidence (13 percent confidence). Their American counterparts are much more confident (31 percent confidence). The difference is striking and systematic.

For students in the 25th percentile, the German average financial literacy score is 50 percent which is the same for the Americans. In contrast, the confidence score is only 25 percent for the Germans and but even 50 percent for the Americans. The difference between confidence score and financial literacy score has widened for the Germans, showing a higher financial literacy score in comparison to the confidence score. The Americans show exactly the same result, 50 percent, for the confidence score as well as for the financial literacy score.

In the 75th percentile Germans show a financial literacy score of 78 percent, the Americans show 72 percent. The confidence score for the Germans increases to 50 percent. Americans reach 75 percent on the confidence score. The gap between confidence and financial literacy is still striking for the Germans and minor for the Americans.

The best performers of Germans and Americans, located in the 95th percentile, scored both 89 percent on the financial literacy score. The confidence score amounts to 63 percent for the Germans and 94 percent for the Americans. In summary, the average confidence score for the Germans always remains below the financial literacy results. The Americans show higher confidence scores compared to their financial literacy scores.

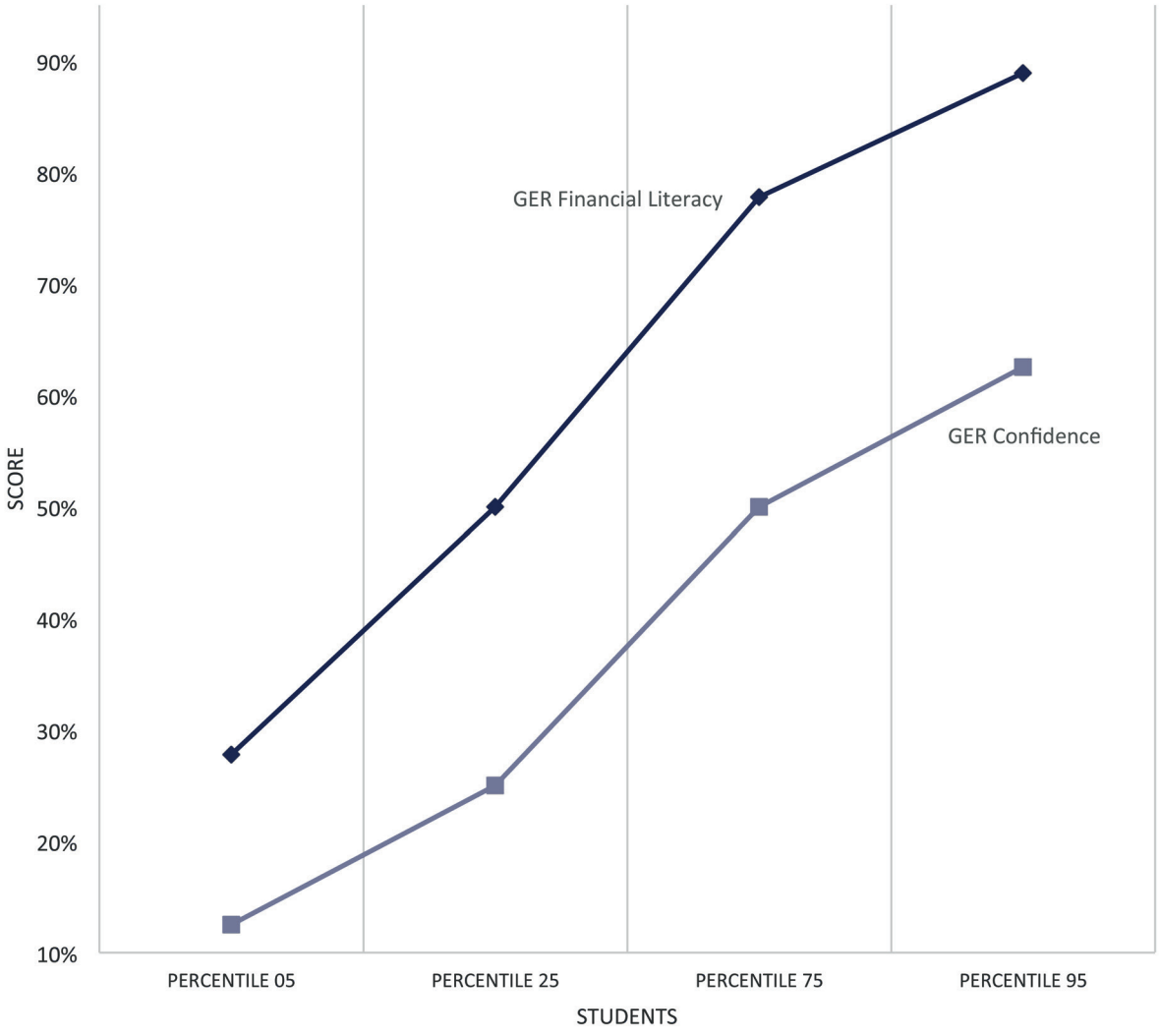


Figure 16: Comparison German Financial Literacy Score versus Confidence Score

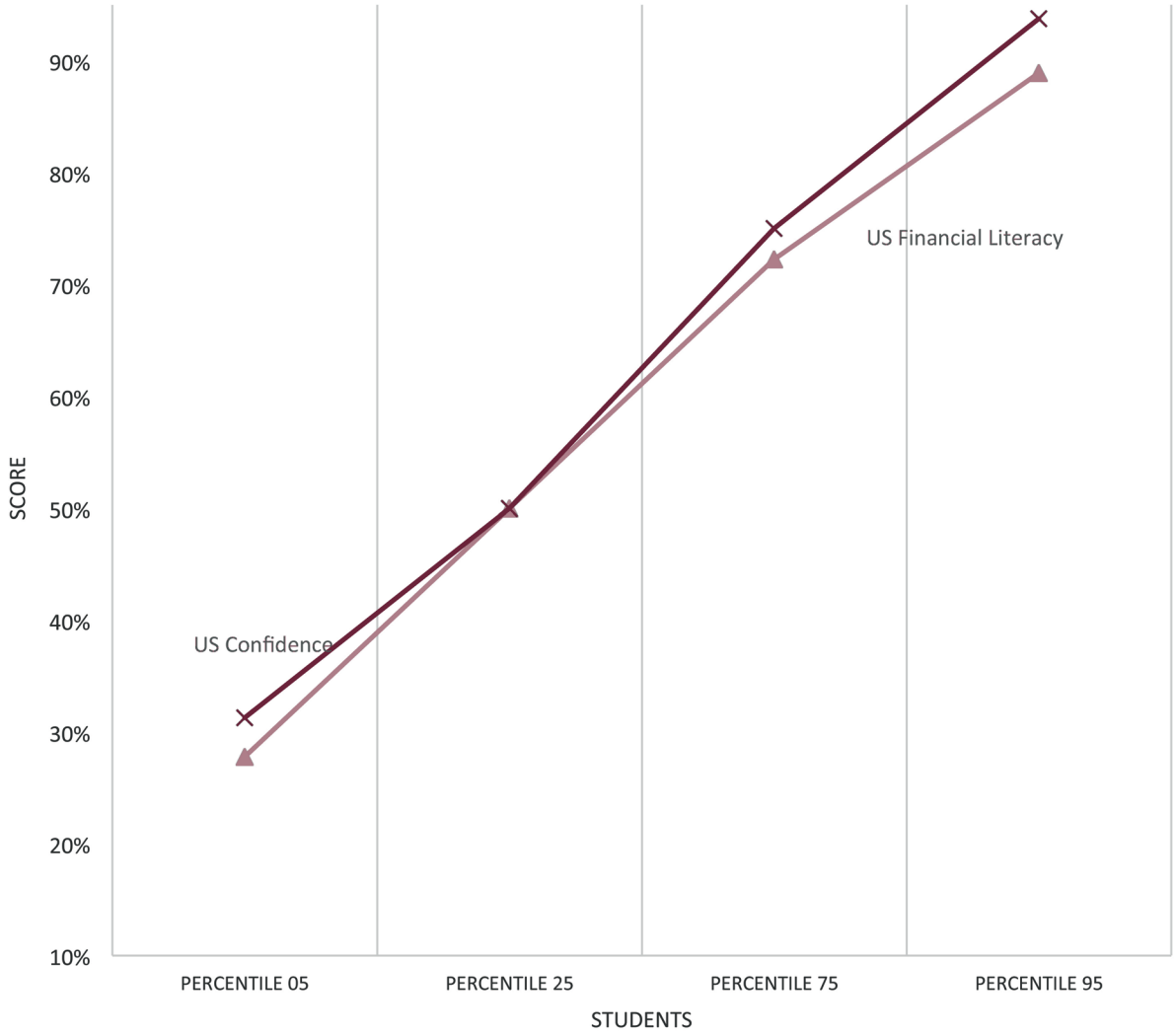


Figure 17: Comparison American Financial Literacy Score versus Confidence Score

Next, we show the results for the subtraction of the Confidence Score and the Financial Literacy Score to indicate overconfidence or underconfidence. Figure 18 on page 72 pictures the results of German students showing a higher Financial Literacy Score compared to their Confidence Score shown by the line below the x-axis, indicating underconfidence. In contrast, American students show a higher Confidence Score compared to their Financial Literacy Score shown by the line above the zero axis, indicating overconfidence.

Hence, findings demonstrate that Americans are more confident than the Germans regarding their financial abilities but remarkable that the majority of Americans even overestimate their financial skills. Germans in contrast are less confident and even underestimate their financial skills.

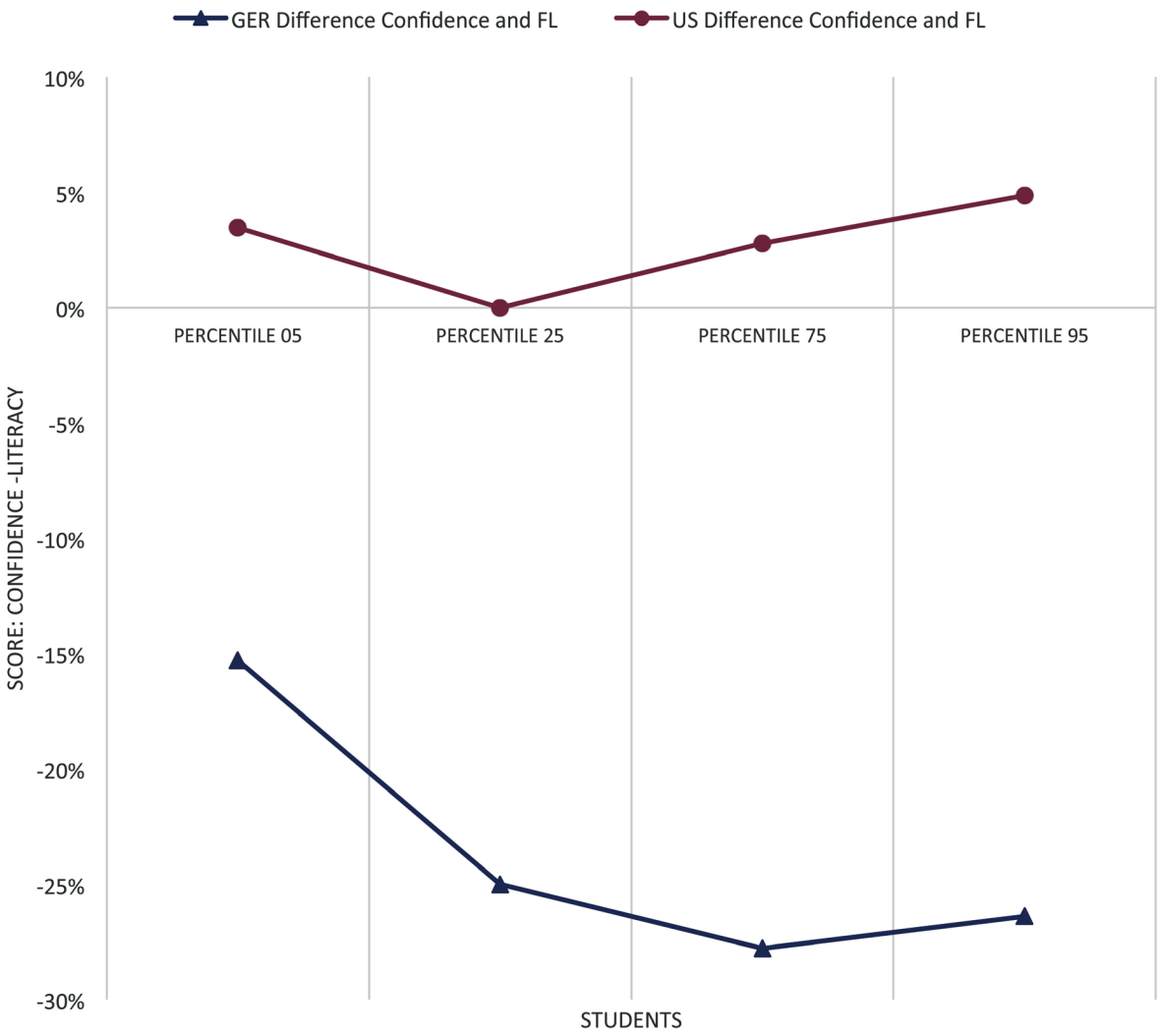


Figure 18: Difference Mean Confidence Score minus Mean Financial Literacy Score

Overconfidence correlates positively with financial literacy (Hansen, 2015). Germans shy away from financial opportunities due to a lack of confidence about succeeding. The students who are entering the workforce today might be skilled and business savvy. “Yet to rise to the ranks of the C-suite, confidence matters as much as competence. Encouraging more students to be proactive with financial

decisions would strengthen the skills and confidence they need to succeed" (Sangster, 2014).

4.3.2 Groups with Similar Answering Patterns

When conducting a cluster analysis to group similar respondents, we arrived at a split up of all respondents into three clusters. The first cluster consists of 238 students compared to 228 students in the second cluster and 230 students in the third cluster. Figure 19 on page 74 shows the average financial literacy scores of the three clusters, Table 19 on page 76 summarizes experience characteristics of the clusters with significant differences and Table 20 on page 77 depicts the considerably different judgment variables. Due to the national characteristics within the clusters, we name cluster one *The Mix: Unexperienced (a*), cluster 2 *The Americans (b)* and cluster 3 *The Germans (c).* In the following, we will describe the clusters based on mainly significant differences. Please refer to Appendix 9 on page 139 to see all descriptives of experience variables and Appendix 10, Appendix 11 and Appendix 12 on page 140 f to see all descriptives of judgment variables.

The students in cluster *The Mix: Unexperienced (a)* score on average 44 percent on the Financial Literacy Score, 49 percent on the Knowledge Score and 41 percent on the Cognition Score. Students in the cluster *The Americans* show better scores than *The Mix: Unexperienced* students*,* scoring on average 60 percent on the Financial Literacy Score, 76 percent on the Knowledge Score and 50 percent on the Cognition Score. The most financially literate students in this analysis are *The Germans* who score on average 80 percent on the Financial Literacy Score, 91 percent on the Knowledge Score and 74 percent on the Cognition Score. The letters a, b in Figure 19 indicate that *The Germans* (c) have significantly better average for each score compared to *The Mix: Unexperienced (a)* and *The Americans (b)*. This partly confirms our findings from the t-Test analysis, in which German students have a better Financial Literacy Score and Cognition Score. Thus, we confirm the enhanced financial literacy results of German students.

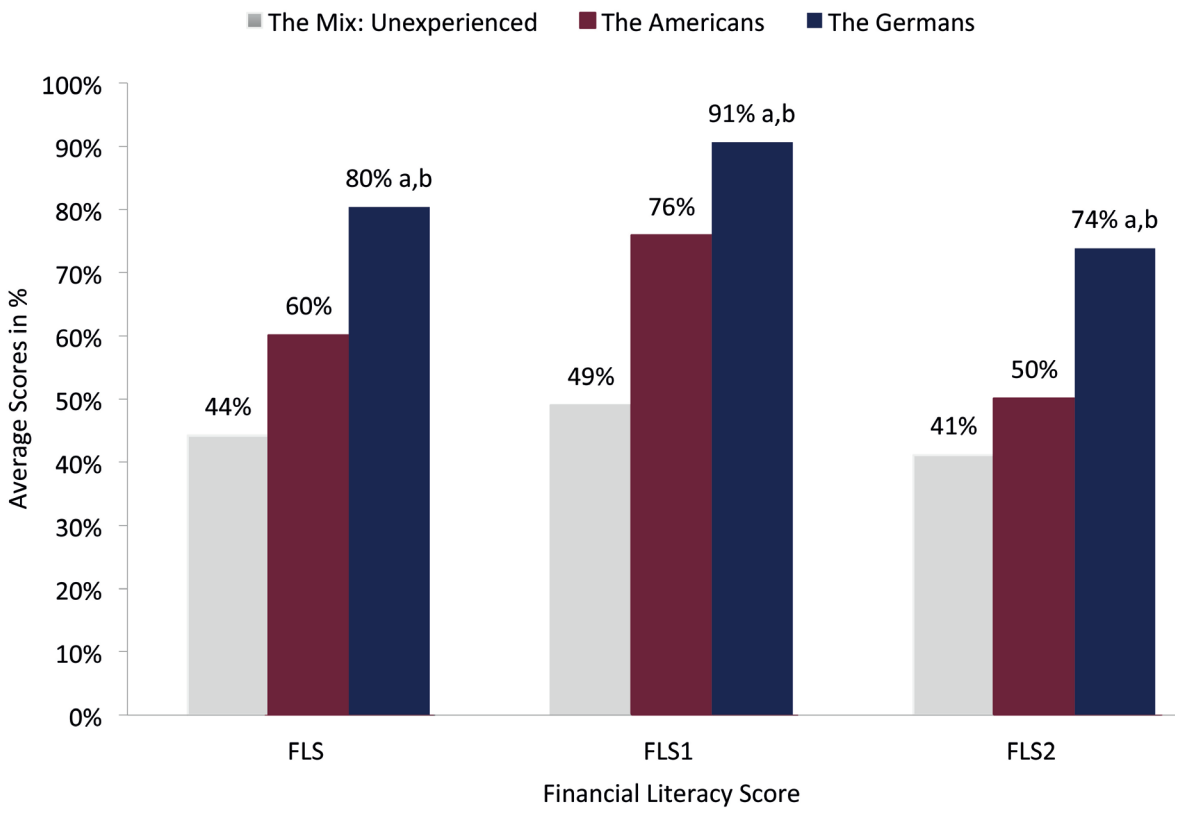


Figure 19: Financial Literacy of Clusters

The letters a, b and c in Table 19 on page 76 indicate the significant difference of the value next to the letter compared to the cluster which is attached to the letter in the equivalent column. For example, the letters a and b next to *The Germans' (c)* male percentage of 43 percent means that *The Germans* have significantly more women in the cluster compared to *The Americans* (b) and *The Mix: Unexperienced (a)*.

The cluster *The Mix: Unexperienced (a)* can be characterized by balanced proportions of 33 percent of German students and 35 percent Americans. Most females, 40 percent of all female students, are represented in this cluster. This is significantly more compared to *The Germans* which is demonstrated by the letter c in column 2 in Table 19 on page 76 next to the female percentage of 40 percent. There are 45 percent of non-business majors and 40 percent have no job besides college. 39 percent of students have never taken a loan before. 37 percent of the

students in the cluster *The Mix: Unexperienced* do not own a credit card, 39 percent do not own a car and 42 percent smoke.

The cluster *The Americans (b)* represents 37 percent Americans and only 29 percent Germans. There are 35 percent of women in this cluster and 39 percent are non-business majors which is both times considerably higher than the percentage in *The Germans* cluster shown by the letter c. A large proportion, 40 percent of students have taken a loan before. 35 percent of students do not own a credit card and 33 percent do not own a car. 33 percent of students are in charge of their financials themselves.

Table 19: Cluster Descriptives Experience

1	2	3	4
	The Mix: a)	**The Americans b)**	**The Germans c)**
Total students	**238**	**228**	**230**
	%	**%**	**%**
Nationality German	33%	29%	38%b
Nationality US	35%	37%c	28%
Gender Male	27%	30%	43%a,b
Gender Female	40%c	35%c	24%
Businessmajor	29%	30%	41%a,b
Non-Businessmajor	45%c	39%c	16%
Job No	40%	30%	29%
Job Yes	31%	34%	35%
Loan No	38%b	29%	32%
Loan Yes	26%	40%a	34%
Fin. Assets No	39%	32%	29%
Fin. Assets Yes	32%	33%	35%
Credit Card No	37%c	35%	28%
Credit Card Yes	31%	31%	38%a
Car No	39%c	33%	28%
Car Yes	30%	33%	38%a
Smoke No	33%	34%	33%
Smoke Yes	42%	24%	34%
Charge Fin. Myself	30%	33%	36%a
Charge Fin. Parents	40%c	35%	25%
Charge Fin. Others	38%	19%	44%

In *The Germans (c)* cluster are 38 percent of German students and 28 percent American students (column 4). The letter b next to the 38 percent in Table 19 indicates that the percentage of the German students in this cluster is significantly higher compared to the percentage of Germans in *The Americans (b)* cluster. Male students represent 43 percent and business majors 41 percent in *The Germans* cluster. 38 percent of students own a credit card and 38 percent own a car. There are 36 percent of students in this cluster who are in charge of their financials themselves. There are no differences regarding the possession of financial assets within the three clusters which does not confirm our previous significant findings.

We continue the description of the clusters based on judgment variables. We find three significant mean results of Judgment variables shown in Table 20 on page 77. The letter c indicates that the mean of *The Mix: Unexperienced* and *The Americans* is significantly different from *The Germans'* mean in column 6. Regarding variable *J12*, *The Mix: Unexperienced* and *The Americans* are more positive about investments into shares. *The Germans* find shares more risky and are more risk averse. Based on the results regarding variable *J02* and *J03*, *The Mix: Unexperienced* and *The Americans* show more confidence about their spending behavior and also about the handling of their future budget compared to *The Germans*.

Table 20: Cluster Description Judgment

1	2	3	4	5	6	7
J Category	**J No**	**Judgment Variable**	**Answer**	**The Mix: Unexperienced (a)**	**The Americans (b)**	**The Germans (c)**
Individuality	12	I would never consider investments in shares because I find this too risky.	1) Strongly disagree-5) Strongly agree	2.9 c	2.8 c	2.4
Confidence	2	How do you rate your own capabilities in handling your spending behavior (using saving offers, paying bills, etc.)?	1) Very poor - 5) Very good	2.9 c	3.1 c	2.6
Confidence	3	How do you rate your capabilities in handling your future budget?	1) Very poor - 5) Very good	3.1	3.2 c	2.9

In summary, the clustering of the respondents, which is based on the answers to financial literacy questions, reiterates that the cluster with most Germans shows a higher financial literacy compared to Americans. Furthermore, the Germans in *The Germans* cluster are business majors, own more financial assets, a credit card as well as a car and are more in charge of their financials themselves than *The Americans.* This points to a general tendency that the Germans which are very financially literate and reach an average Financial Literacy Score of 80 percent, exercise financial decision-making on a regular basis, take responsibility and have exposure to various financial assets. Regarding individuality and confidence, *The Germans* still remain risk averse and less confident compared to *The Americans*. *The Germans* still tend to shy away from investments into equity and consider their personal handling of their spending behavior and handling of future budget as average compared to *The Americans. The American* students prefer investments in the riskier assets class equity and believe that they handle their spending behavior and future budget well, even though they score lower on the financial literacy scores.

4.4 Comparison and Interpretation of Results

We show how the results of our employed methods: t-Test, tree analysis, discriminant analysis, and cluster analysis, compare. These methods were used to examine if nationality has a significant influence on financial literacy. The results are shown in Table 21 on page 80. The Financial Literacy Score and Cognition Score are influenced by nationality based on the t-Test method and additionally the Knowledge Score based on the cluster analysis.

Regarding individual financial literacy questions, we find national influences for twelve financial literacy questions based on the t-Test, four questions based on the discriminant analysis and nine questions based on the decision tree analysis. The findings in the decision tree analysis are in line with the findings from the t-Test and the significant four questions from the discriminant analysis are in line with the other two methods. Thus, for four questions, namely Q26 (Savings Account), Q32 (Bond Prices), Q37 (Inflation II) and Q28 (Compound Interest), we can confirm nationality

as a significant influence by three methods. A reason for deviating results is that the t-Test and decision tree method are univariate, comparing only two variables at a time. In contrast, the discriminant and cluster methods are multivariate taking into account several variables at the same time. We consider the results from the univariate as well as multivariate analyses as good to confirm that there are national differences of financial literacy between German and American students. In the most recent OECD study, US students represented the average literate country of the OECD (OECD, 2014). Thus, German students' financial literacy probably is stronger than the average financial literacy of students in OECD countries.

Table 21: Methods used to Examine if Nationality is Influencing Financial Literacy

Significance of Nationality					
		Univariate		Multivariate	
Description	**Q**	**t-Test**	**Tree Analysis**	**Discriminant Analysis**	**Cluster Analysis**
Financial Literacy Score (FLS)		✓	-	-	✓
Knowledge Score (FLS1)		✗	-	-	✓
Cognition Score (FLS2)		✓	-	-	✓
1) Knowledge					
1.1 Money & Transaction					
	25	✗	✗	✗	
	26	✓	✓	✓	
1.2 Planning & Managing					
	29	✓	✓	✗	
	30	✓	✓	✗	
	35	✗	✗	✗	
1.3 Risk & Return					
	32	✓	✓	✓	
	33	✗	✗	✗	
	34	✗	✗	✗	
1.4 Financial Landscape					
	36	✓	✗	✗	
	37	✓	✓	✓	
	38	✓	✗	✗	
2) Cognition					
2.1 Identify Information					
	27	✓	✗	✗	
	28	✓	✓	✓	
	31	✓	✓	✗	
	39	✓	✓	✗	
	40	✓	✓	✗	
2.2 Apply Information					
	G43/US42	✗	✗	✗	
	G44/US43	✗	✗	✗	

Furthermore, we conduct this survey to answer research questions related to influences on financial literacy demonstrated in Table 22 on page 81. We find various experience and judgment variables which influence financial literacy of Germans and Americans as well as different levels of confidence.

Table 22: Research Questions and Results

#	Questions	Method	Results
1	Does financial literacy differ between German and American students?	t-Test, Proportions, Decision Tree, Discriminant Analysis	Yes
2	Are Germans more financially literate than Americans?	t-Test	Yes
3	Do experience and judgment influence financial literacy?	Decision Tree	Yes
4	Do experience and judgment separate Germans and Americans?	Discriminant Analysis	Yes
5	Are Germans more overconfident than Americans?	Subtraction of Standardized Scores	No
6	Will there be nationality patterns when the data set is clustered based on responses to financial literacy questions?	Cluster Analysis	Yes

Americans are more confident and even overconfident than the Germans which is likely to benefit American financial literacy. Germans' financial literacy is influenced by business education, personal responsibility of financials as well as attitudes about sufficient income, about spending behavior, about the evaluation of risk and about retirement planning. Americans' financial literacy is influenced by the ownership of a credit card and attitudes regarding savings and equity investments. The experiences which influence financial literacy of both nationalities are the *possession of financial assets* as well as *economic knowledge.* Additionally, we find that Germans have considerably less experience regarding the possession of financial assets compared to the Americans. Thus, we assume that experience with financial assets and therefore increased financial decision-making is a key driver to improve financial literacy of Germans. We need to critically note that we do not research possible and very a likely relationship between experience and judgment which we suggest for further research.

With the findings from our analysis with endogenously defined groups, we partly confirm findings from the methods which use exogenously defined groups. In the areas where we cannot confirm findings, we become more cautious with the interpretation. In comparison to the experiences and judgment characteristics of the original population of German students (chapter 4.1.1 and chapter 4.1.2), the cluster *The Germans is* more financially literate. *The Americans* cluster and their original sample show similar financial literacy results. Thus, *The Germans* cluster has aggregated the better performing Germans who then also show a high percentage of ownership of financial assets. Hence, the cluster analysis also supports our finding that the possession of financial assets has a positive influence on financial literacy.

Finally, we revert to the subgroup analysis of the original sample in Table 23 on page 83 which restates that German students who own financial assets are more financially literate compared to German non-possessors. The analysis also shows that the German student who is a business major, owns a car, has taken a loan, has a job or owns a credit card is more financially literate than the German student who does *not* study business, owns a car, has a loan, job or credit card. The same pattern holds also for American students. Additionally, we see that the financial literacy of a German student with financial assets and other experiences is better than the financial literacy of the American student with the same exposure. For example a German student who possesses financial assets scores 59 percent on the Cognition Score compared to 54 percent of the American student.

Table 23: Excerpt Subgroups' Financial Literacy

1	2	3	4	5	6	7	8	9	10	11	12
Exp. Category	**Sub-groups**	**Subgroup Specification**	**German FLS**	**US FLS**	**Signifi-cance**	**German FLS1**	**US FLS1**	**Signifi-cance**	**German FLS2**	**US FLS2**	**Signifi-cance**
Society	Gender	Male	68%	63%		79%	73%		61%	56%	
		Female	58%	57%		67%	69%	***	53%	50%	
Education	Business Major	Business Major	66%	63%		74%	73%		61%	57%	
		Non-Business Major	55%	53%		68%	65%		47%	45%	
Work	Job besides Collge	No	60%	59%		72%	69%		53%	52%	
		Yes	64%	61%		73%	72%		59%	54%	***
Society	Taken a Loan before	No	62%	58%		70%	67%		56%	52%	
		Yes	68%	62%	***	81%	74%		60%	54%	
Society	Possess Financial	No	59%	55%		69%	63%		53%	51%	
		Yes	66%	61%		75%	72%		59%	54%	***
Society	Own Credit Card	No	61%	57%		71%	69%		54%	50%	
		Yes	65%	63%		74%	73%		59%	56%	
Society	Own a Car	No	61%	58%		71%	67%		54%	52%	
		Yes	66%	61%	***	75%	73%	***	61%	54%	***
Home & Family	Main Income Provider	Mother	62%	57%		73%	67%	***	55%	51%	
		Father	63%	62%		72%	74%		56%	54%	
		Both	67%	56%		74%	66%	***	62%	50%	
Home & Family	Main Income Provider is	Self-employed	61%	61%		70%	71%		56%	55%	
		Employed	63%	59%		74%	71%		57%	52%	
Home & Family	Who is in charge of your	Myself	64%	62%		74%	73%		57%	55%	
		My parents	59%	57%	***	65%	68%		55%	50%	
		Others	60%	65%	***	65%	64%		57%	66%	

Since we establish the experience variable "possession of financial assets" as a key variable influencing financial literacy we do not only want to look at average scores but in more detail at the distribution of financial literacy scores of Germans and Americans with and without the possession of financial assets (Figure 20 and Figure 21).

Figure 20: FL of Germans with Fin. Assets versus Germans without

German students who possess financial assets have a better financial literacy compared to German students who do not possess any type of financial asset demonstrated in Figure 20. We see the same results for American students which can be found in Appendix 13 on page 143. Furthermore, German financial literacy is better than financial literacy of American students who possess financial assets shown in Figure 21 on page 85.

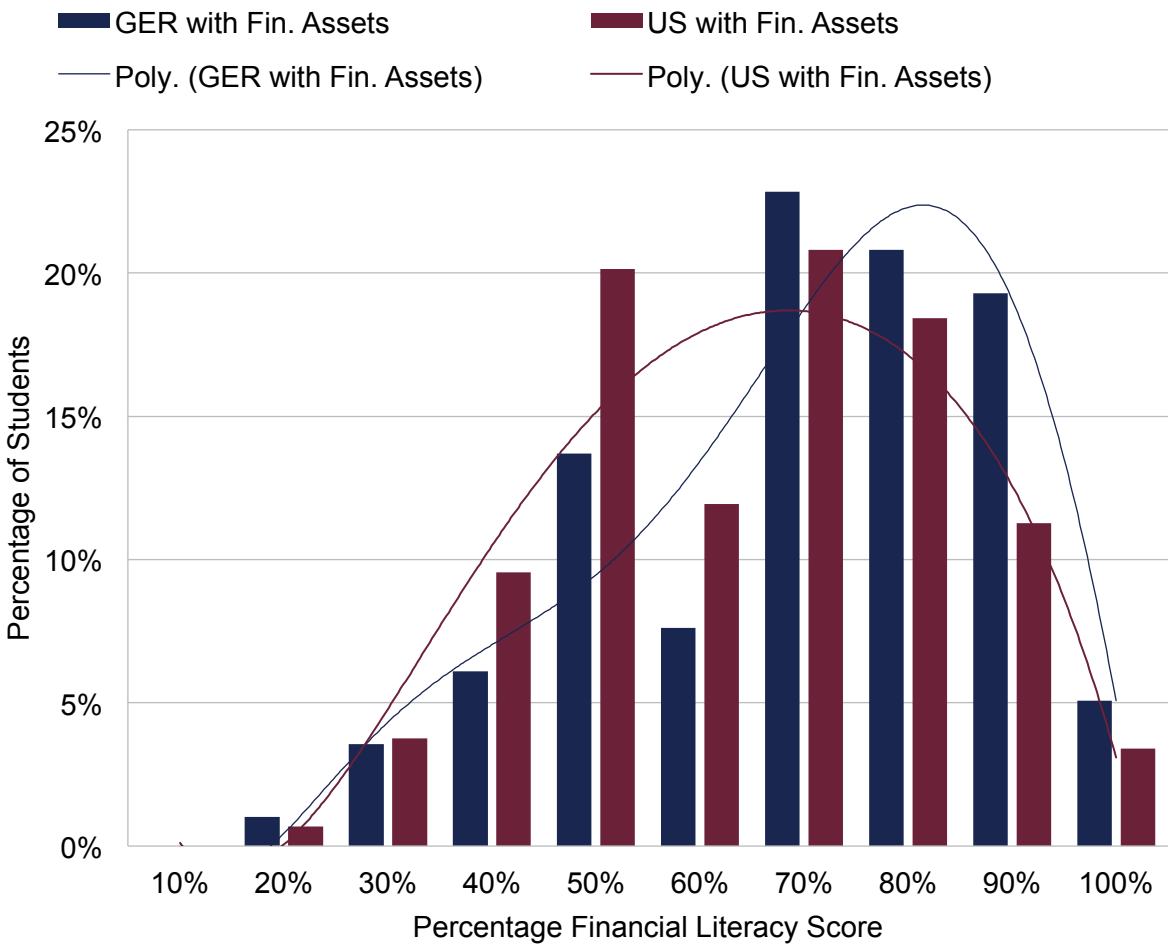


Figure 21: FL of Germans with Fin. Assets versus Americans with Fin. Assets

Even though we see that the possession of financial assets has a positive influence on German financial literacy, German students do actually have less experience with the ownership of financial assets (Table 13 on page 49) compared to Americans. Despite this fact, Germans are still more financially literate than the Americans which is rather driven by financial knowledge and cognition. Nevertheless, there is room for improvement for the Germans especially via the possession of financial assets or in other words by practicing financial decision-making.

Therefore, we suggest that German students enhance their financial literacy by training financial decision-making and by becoming more confident through financial success in the long run. This will equip students to take advantage of new financial opportunities, responsibilities and enhance their financial literacy.

5 Improving Financial Literacy

5.1 Partner

We now know students' financial literacy and their financial context and we find that German financial literacy is better than American financial literacy but still on a low level. We find that possession of financial assets is a key driver of financial literacy for Germans and will now identify suitable partners who will help and develop specific measures to improve German students´ financial literacy.

We propose a financial literacy initiative at universities which increases awareness of financial literacy, access to financial education, determines financial key topics and improves financial education infrastructure. Furthermore, universities need to market awareness of available resources; develop tailored materials; tap into effective partnerships; support research and evaluation of financial education programs and most importantly implement an effective financial training for students. Key will be to cultivate effective financial decision-making of students. Such a financial initiative will help to assure a minimum-level but also increase financial literacy of students. Universities are a suitable partner because they combine financial proficiency, didactics and a large reach.

5.2 Measures

It will be important to implement educational standards which organize and provide the educational content. In order to use financial products successfully, basic financial knowledge to accomplish transactions and appropriate choice of products are important. The expected minimum level of financial literacy covers the following five categories: 1) knowledge of financial concepts, 2) ability to communicate about financial concepts, 3) aptitude in managing personal finances, 4) skill in making appropriate financial decisions and 5) confidence in planning effectively for future financial needs (Remund, 2010).

We recommend a very distinctive financial curriculum to ensure financial knowledge of German students starting with an introductory finance 101 course, followed by a stock market game to apply the contents learned. Then, most importantly, German students at the beginning of their studies will receive a virtual money account to create their personal diversified investment portfolio. They administrate the money from the beginning of their studies until they finish school. Professors will coach the student each semester in managing the portfolio, considering the strategy, asset classes as well as risk and return. At the end of their studies, students will receive a grade based on how their portfolio performed compared to a benchmark. In case, they beat the benchmark, they will be rewarded in form of a reduction of the tuition or with actual money. These suggested tools shall be used for any type of major. Crucial is that financial knowledge will be applied over and over again and that good financial performance will be strongly incentivized. It will not only motivate but also force students to deal in depth with financial decision-making and train them effectively for their later lives when they have to deal with their own, real money.

Financial literacy plays a key role in stabilizing the global financial system. Therefore it is critically important to enhance financial literacy of this generation but also of generations to come. The question if financial training can help to teach someone to become financially capable has been extensively discussed in literature. “The results from a meta-analysis indicate that financial literacy and capability interventions can have a positive impact in some areas (increasing savings and promoting financial skills such as record keeping) but not in others (credit default)” (Miller, Reichelstein, Salas, & Zia, 2014). Applying the kind of initiatives which effectively improve financial literacy in the long run will need to become a priority for the future. This requires further research to identify the relationship between financial experiences and judgment as well as cross cultural and evidence-based research especially targeting young people but also low-income groups, women and the less educated. Without embarking upon effective measures we will leave societies at risk and at a higher cost compared to not making an effort.

Appendix

Appendix 1: US Questionnaire

If not stated otherwise, please note the relevant letter in the marked area.

Your data and information will be treated confidentially.

1. What is your major field of study?

Answer 1:

2. Which degree are you aiming for?

A) Bachelor B) Master C) PhD D) Other **Answer 2:**

3. What is your class rank?

A) Freshman B) Sophomore C) Junior D) Senior E) Graduate

Answer 3:

4. Did you attend Junior College before?

A) Yes B) No **Answer 4:**

5. How old are you?

A)18-22

B) 23-29

C) 30-39

D) 40-49

E) 60 or older **Answer 5:**

6. Are you

A) Single B) Married C) Divorced **Answer 6:**

7. Are you

A) Female B) Male **Answer 7:**

8. Which nationality do you belong to?

A) US B) Other **Answer 8:**

9. Which US State are you originally from?

Answer 9:

10. Is English your native language?

A) Yes B) No **Answer 10:**

11. Have you worked before college?

A) Yes B) No **Answer 11:**

12. Do you have a job besides going to College?

A) Yes B) No **Answer 12:**

13. How much money do you have available to spend monthly after deducting all costs?

A) $ 600

B) $ 601-800

C) $ 801-1,000

D) $ 1,001-1,200

E) $ 1,201 or more

F) Not sure **Answer 13:**

14. Have you ever taken a loan (e.g. student loan) from a bank?

A) Yes B) No **Answer 14:**

15. Do you own any of these financial assets (multiple answers possible, mark all the relevant fields)?

☐ Stocks	☐ Bonds	☐ Funds
☐ Savings Account	☐ Pension Plan	☐ Real Estate
☐ None	☐ Not sure	

Please mark the relevant field Q16-Q20

	1 Poor	**2**	**3**	**4**	**5** Very good
16. How sufficient is your monthly income?	☐	☐	☐	☐	☐
17. How do you rank your own capabilities in handling your spending behavior (using saving offers, paying bills etc.)?	☐	☐	☐	☐	☐
18. How do you rank your capabilities in handling your future budget?	☐	☐	☐	☐	☐
19. How good are you at evaluating risks and returns of different financial products?	☐	☐	☐	☐	☐
20. How do you believe is your general economic and financial knowledge (rights of a consumer, effect of inflation)?	☐	☐	☐	☐	☐

21. Do you own a credit card?

A) Yes B) No **Answer 21:**

22. Do you own a debit card?

A) Yes B) No **Answer 22:**

23. Do you own a car?

A) Yes B) No **Answer 23:**

24. Do you smoke?

A) Yes B) No **Answer 24:**

25. What influences the interest rate on your loan?

A) Your credit rating

B) The volume of your loan

C) The time you need to pay back the loan

D) All of the above

E) Don't know **Answer 25:**

26. You have an account with a savings bank. Which of the following statements is **NOT** correct?

A) You can get cash at an ATM machine 24 hours a day

B) Internationally, you can get cash at ATM machines at no cost

C) You can get to know your account balance at every ATM machine of your bank

D) You can deposit money at each branch of your savings bank at the ATM machine

E) Don't know

Answer 26:

27. If the original price of a refrigerator is $1,200 and it is reduced by 20%, how much does it cost?

A) $960

B) $1,000

C) $940

D) $860

E) Don't know **Answer 27:**

28. Imagine, your credit card is debited with $1,000 and the interest rate is at 20% p.a. If you do not pay off any debt, how long would it take until your debt has doubled?

A) 2 years

B) Less than 5 years

C) 5-10 years

D) More than 10 years

E) Don't know **Answer 28:**

29. If each of the following persons had the same amount of take home pay, who would need the greatest amount of life insurance?

A) An elderly retired man, with a wife who is also retired

B) A young married man without children

C) A young single woman with two young children

D) A young single woman without children

E) Don't know **Answer 29:**

30. Inflation can have various effects. Which of these statements are correct?

A) Products become more expensive

B) People rather tend to spend money instead of saving it

C) Real wages increase

D) A,B and C are correct

E) A and B are correct

F) None of the above

G) Don't know **Answer 30:**

31. Rob and Mary are the same age. At age 25 Mary began saving $2,000 a year while Rob saved nothing. At age 50, Rob realized that he needed money for retirement and started saving $4,000 per year while Mary kept saving her $2,000. Both save their money in a savings account that brings an identical interest. Now they are both 75 years old. Who has the most money in his or her retirement account?

A) They would each have the same amount because they put away exactly the same

B) Rob, because he saved more each year

C) Mary, because she has put away more money

D) Mary, because her money has grown for a longer time at compound interest

E) Don't know **Answer 31:**

32. If the market interest rate falls, what should happen to bond prices?

A) Rise

B) Fall

C) Stay the same

D) None of the above

E) Don't know **Answer 32**:

33. Imagine a long time horizon of 10 or 20 years. Which of the following as sets tends to give the highest return?

A) Savings Account

B) Bonds

C) Stocks

D) Don't know **Answer 33:**

34. Please complete the sentence:
If an investor diversifies his money into various different assets, the risk to lose money….

A) increases
B) decreases
C) remains the same
D) Don't know **Answer 34:**

35. Expecting that by 2020 your salary has doubled and at the same time all prices of products increased by 100%: How much can you buy with your salary?

A) More than today
B) Less than today
C) The same
D) Don't know **Answer 35:**

36. Is it possible that your insurance company can reject your claim due to the fact that you entered answers incorrectly when you extended the policy contract a year ago?

A) Yes
B) No
C) Varies from insurance company to insurance company
D) Don't know **Answer 36:**

37. Who is benefiting from inflation?

A) Debtor
B) Creditor
C) Nobody
D) Both
E) Don't know **Answer 37:**

38. If the Fed increases the federal funds rate…

A) Demand for credit increases

B) Demand for credit decreases

C) Savings increase

D) Savings decrease

E) A and D are correct

F) B and C are correct

G) Don't know **Answer 38:**

Example of an Amortization Schedule of an Installment Loan

Loan principal amount	$175,000.00	Annual loan payments	$13,971.36
Annual interest rate	7.000%	Monthly payments	$1,164.28
Loan period in years	30	Interest in first calendar year	$12,193.68
First year of loan	2007	Interest over term of loan	$244,140.80
First month of loan	January	Sum of all payments	$419,140.80

Year	Month	Beginning Balance	Payment	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
2007	Jan	$175,000.00	$1,164.28	$1,020.83	$143.45	$1,020.83	$174,856.55
	Feb	$174,856.55	$1,164.28	$1,020.00	$287.73	$2,040.83	$174,712.27
	Mar	$174,712.27	$1,164.28	$1,019.15	$432.86	$3,059.98	$174,567.14
	Apr	$174,567.14	$1,164.28	$1,018.31	$578.83	$4,078.29	$174,421.17
	May	$174,421.17	$1,164.28	$1,017.46	$725.65	$5,095.75	$174,274.35
	June	$174,274.35	$1,164.28	$1,016.60	$873.33	$6,112.35	$174,126.67
	Jul	$174,126.67	$1,164.28	$1,015.74	$1,021.87	$7,128.09	$173,978.13
	Aug	$173,978.13	$1,164.28	$1,014.87	$1,171.28	$8,142.96	$173,828.72
	Sep	$173,828.72	$1,164.28	$1,014.00	$1,321.56	$9,156.96	$173,678.44
	Oct	$173,678.44	$1,164.28	$1,013.12	$1,472.72	$10,170.08	$173,527.28
	Nov	$173,527.28	$1,164.28	$1,012.24	$1,624.76	$11,182.32	$173,375.24
	Dec	$173,375.24	$1,164.28	$1,011.36	$1,777.68	$12,193.68	$173,222.32

Year	Beginning Balance	Payment	Principal	Cumulative Principal	Cumulative Interest	Ending Balance
2008	$173,222.32	$13,971.36	$1,906.07	$3,683.75	$24,258.97	$171,316.25
2009	$171,316.25	$13,971.36	$2,043.97	$5,727.72	$36,186.36	$169,272.28
2010	$169,272.28	$13,971.36	$2,191.73	$7,919.46	$47,965.98	$167,080.54

39. What is the loan amount that is paid out to you?

A) $ 244,140

B) $ 419,140

C) $ 175,000

D) $ 13,971 **Answer 39:**

40. What is the total amount you need to pay back?

A) $ 244,140

B) $ 419,140

C) $ 175,000

D) $ 13,971 **Answer 40:**

41. How much interest do you pay in March 2007?

A) $ 1,019

B) $ 1,014

C) $ 3,059

D) $ 1,164 **Answer 41:**

42. Which alternative would reduce your total interest cost?

A) Increasing contract period (maturity) from 360 months to 372 months

B) Reducing contract period from 360 months to 348 months

C) Increase insurance of residual debt

D) None of the mentioned alternatives

E) Don't know **Answer 42:**

43. You are short of cash. Which alternative would decrease your monthly debt payments?

A) Increasing contract period (maturity) from 360 months to 372 months

B) Reducing contract period from 360 months to 348 months

C) Increase insurance of residual debt

D) None of the mentioned alternatives

E) Don't know **Answer 43:**

44. Who is the main income provider in your family?

A) Mother

B) Father

C) Both with similar amounts

D) Don't know **Answer 44:**

45. The main income provider is?

A) Self-employed

B) Employed

C) Don't know **Answer 45:**

46. What kind of job is the main income provider having?

Answer 46:_____

47. How do you judge the know-how of financial and economic knowledge of your parents?

A) Very good knowledge

B) Good knowledge

C) Average knowledge

D) Minor knowledge

E) No knowledge

F) Don't know **Answer 47:**

48. What is your best estimate of your parents' total income last year? Consider annual income from all sources before taxes?

A) Less than $20,000

B) $20,000 to $39,999

C) $40,000 to $79,999

D) $80,000 or more

E) Don't know **Answer 48:**

49. Who is in charge of your financials?

A) Yourself

B) Your Parents

C) Your Siblings

D) Your friend

E) Advisor

F) Don't know **Answer 49:**

50. Which is the best description of the town where you grew up?

A) Village with less than 3,000 inhabitants

B) Small town 3,000 – 15,000 inhabitants

C) Town 15,000- 100,000 inhabitants

D) Large town more than 100,000

E) Don't know **Answer 50:**

Please mark the box with the most relevant statement

	1 strongly disagree	**2** disagree	**3** Undecided	**4** agree	**5** strongly agree
51. I am worried that I won´t have enough funds to maintain my current standard of living when I retire.	☐	☐	☐	☐	☐
52. Dealing with retirement planning makes me feel comfortable.	☐	☐	☐	☐	☐
53. When my parents deal with questions regarding retirement planning this makes me feel comfortable.	☐	☐	☐	☐	☐

54. I am impulsive; I tend to buy things even though I am not really able to afford them.	☐	☐	☐	☐	☐
55. I prefer saving over spending.	☐	☐	☐	☐	☐
56. I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns.	☐	☐	☐	☐	☐
57. I would never consider investments in shares because I find this too risky.	☐	☐	☐	☐	☐
58. If I think an investment will be profitable, I am prepared to borrow money to make this investment.	☐	☐	☐	☐	☐
59. I want to be certain that my investments are safe.	☐	☐	☐	☐	☐
60. I get more and more convinced that I should take greater financial risks to improve my financial position.	☐	☐	☐	☐	☐
61. I am ready to take risk as long as there is a good opportunity to achieve a return.	☐	☐	☐	☐	☐

62. How much influence do you think you have on the amount of money you will have available after your retirement?

1	**2**	**3**	**4**	**5**
None	Little	Undecided	Some influence	Huge influence
☐	☐	☐	☐	☐

	1 Not at all	2 Rather not	3 Unde-cided	4 Rather yes	5 Yes, quite certain
63. Do you plan on entering into a retirement plan within the next 12 months?	☐	☐	☐	☐	☐
64. Imagine the federal state would support you with $1000 to enter into a retirement plan, would you then enter into one within the next 12 months?	☐	☐	☐	☐	☐
65. Imagine you would have graduated already and would be employed. Would you then enter into a retirement plan?	☐	☐	☐	☐	☐

Thank you for your participation!

Appendix 2: German Questionnaire

Sofern nicht anders vorgegeben, notieren Sie bitte den jeweiligen Buchstaben in dem gekennzeichneten Bereich.

Die Daten werden anonym und vertraulich behandelt.

1. In welchem Studiengang befinden Sie sich derzeit?

Antwort 1:_____

2. Welchen Abschluss streben Sie an?

A) Bachelor B) Master C) Promotion D) Andere **Antwort 2:**

3. In welchem **Fach**semester studieren Sie? **Antwort 3:**

4. In welchem **Hochschul**semester studieren Sie? **Antwort 4:**

5. Welche Hochschulzugangsberechtigung haben Sie?

A) Allgemeine Hochschulreife **ohne** Wirtschaftsschwerpunkt

B) Allgemeine Hochschulreife **mit** Wirtschaftsschwerpunkt

C) Fachhochschulreife

D) Andere Zugangsberechtigung **Antwort 5:**

Wenn D, bitte spezifizieren: _____

6. Wie alt sind Sie? **Antwort 6:**

7. Familienstand?

A) Ledig

B) Verheiratet

C) Im Trennungsjahr

D) Geschieden **Antwort 7:**

8. Geschlecht?

A) Weiblich B) Männlich **Antwort 8:**

9. Welcher Nationalität gehören Sie an?

A) Deutsch B) Einer anderen **Antwort 9:**

Wenn B, welcher?_____

10. Sofern Sie in Deutschland geboren sind, in welchem Postleitzahlengebiet sind Sie geboren?

A) 0..... B) 1..... C) 2.....

D) 3..... E) 4..... F) 5.....

G) 6..... H) 7..... I) 8.....

J) 9..... K) Außerhalb Deutschlands L) Weiß ich nicht

Antwort 10:

11. Ist Deutsch ihre Muttersprache?

A) Ja B) Nein **Antwort 11:**

12. Haben Sie eine abgeschlossene Berufsausbildung?

A) Ja B) Nein **Antwort 12:**

Wenn ja, eine **kaufmännische Ausbildung** in einem der folgenden Bereiche?

A) Bank B) Versicherung C) Industrie

D) Handel E) Anderer Bereich **Antwort 12a:**

13. Arbeiten/ Jobben Sie neben dem Studium?

A) Ja B) Nein **Antwort 13:**

14. Wie viel Geld haben Sie im Monat **vor** Abzug aller Kosten ca. zur Verfügung?

A) € 600 oder weniger

B) € 601 - 800
C) € 801 - 1000
D) € 1.001 - 1.200
E) € 1.201 oder mehr
F) Weiß ich nicht **Antwort 14:**

15. Haben Sie schon einmal einen Kredit (z.B. Studienkredit, Ratenkredit) aufgenommen?

A) Ja B) Nein **Antwort 15:**

16. Besitzen Sie Geldanlagen?

A) Ja B) Nein **Antwort 16:**

Wenn ja, kreuzen Sie bitte an, welche der folgenden Geldanlagen Sie besitzen. **(Mehrere Antwortmöglichkeiten möglich)**

☐ Aktien	☐ Investmentfonds	☐ Anleihen
☐ Bausparvertrag	☐ Tagesgeld	☐ Festgeld
☐ Immobilie	☐ Private Rentenversicherung	☐ Weiß ich nicht

Bitte kreuzen Sie an:	**A** Schlecht	**B** Eher schlecht	**C** Aus-reichend	**D** Gut	**E** Sehr gut
17. Wie kommen Sie mit den Ihnen monatlich zur Verfügung stehenden finanziellen Mitteln aus?	☐	☐	☐	☐	☐
18. Wie würden Sie Ihre allgemeinen Kenntnisse in Bezug auf den täglichen Umgang mit Geld einstufen (z.B. Bezahlung	☐	☐	☐	☐	☐

von Rechnungen, Vergleichen von Preisen, Kalkulieren von Rabatten)?

19. Wie würden Sie Ihre allgemeinen Finanzkenntnisse in Bezug auf Ihre Planungskompetenz einschätzen (z. B. Einhaltung des Haushaltsbudgets, Rücklagen für zukünftige Ausgaben bilden)? ☐ ☐ ☐ ☐ ☐

20. Inwieweit sehen Sie sich in der Lage Chancen und Risiken eines Finanzproduktes gegeneinander abzuwägen? ☐ ☐ ☐ ☐ ☐

21. Wie schätzen Sie Ihre allgemeinen wirtschaftlichen Kenntnisse ein (z. B. Rechte und Pflichten als Konsument, Auswirkungen von Inflation auf die eigenen Finanzen)? ☐ ☐ ☐ ☐ ☐

22. Besitzen Sie eine Kreditkarte?

A) Ja B) Nein **Antwort 22:**

23. Besitzen Sie ein eigenes Auto

A) Ja B) Nein **Antwort 23:**

24. Sind Sie Raucher?

A) Ja B) Nein **Antwort 24:**

25. Was kann den Zinssatz für einen Kredit oder ein Darlehen beeinflussen?

A) Ihr Kreditrating

B) Die Höhe des Betrags, den Sie sich leihen

C) Wie lange Sie dafür brauchen, den Kredit zurückzuzahlen

D) Alle der oben genannte

E) Weiß ich nicht **Antwort 25:**

26. Sie haben ein Konto bei der Sparkasse. Welche der folgenden Aussagen ist **nicht** korrekt?

A) Sie können grundsätzlich 24 Stunden am Tag Geld an einem Geldautomaten abheben

B) Sie können weltweit unentgeltlich Bargeld von Ihrem Konto abheben

C) Sie können an Geldautomaten einer Sparkasse Ihren Kontostand abfragen

D) Sie können in einer Filiale Ihrer Sparkasse Geld an entsprechenden Geldautomaten einzahlen

E) Weiß ich nicht

Antwort 26:

27. Wenn der Preis eines Kühlschranks von 1.200 € um 20% reduziert ist, wie viel kostet er dann?

A) € 960,-

B) € 1.000,-

C) € 940,-

D) € 860,-

E) Weiß ich nicht **Antwort 27:**

28. Stellen Sie sich vor, Ihre Kreditkarte ist mit 1.000 € belastet und der Zins satz beträgt 20% pro Jahr. Wenn Sie bei diesem Zinssatz nichts abtragen, wie viele Jahre würde es dauern, bis sich Ihre Schulden verdoppelt haben?

A) 2 Jahre
B) Weniger als 5 Jahre
C) 5 bis 10 Jahre
D) Mehr als 10 Jahre
E) Weiß ich nicht **Antwort 28:**

29. Bei gleichem Monatseinkommen: Welche der folgenden Personen bräuchte den höchsten Auszahlungsbetrag einer Lebensversicherung?

A) Ein älterer Rentner, dessen Frau ebenfalls im Ruhestand ist
B) Ein junger verheirateter Mann ohne Kinder
C) Eine junge alleinstehende Frau mit zwei kleinen Kindern
D) Eine junge alleinstehende Frau ohne Kinder
E) Weiß ich nicht **Antwort 29:**

30. Inflation kann vielfältige Wirkungen entfalten. Welche Aussagen sind Ihrer Ansicht nach korrekt?

A) Konsumgüter werden teurer
B) Menschen neigen eher dazu ihr Geld auszugeben, als es zu sparen
C) Die Reallöhne steigen
D) A, B und C sind korrekt
E) A und B sind korrekt
F) Keine der Aussagen ist korrekt
G) Weiß ich nicht **Antwort 30:**

31. Robert und Maria sind gleich alt. Mit 25 Jahren hat Maria damit begonnen, im Jahr 2.000 € zu sparen, während Robert gar nichts spart. Im Alter von 50 Jahren hat Robert damit begonnen, 4.000 € pro Jahr zu sparen, während Maria weiterhin 2.000 € spart. Beide sparen das Geld auf einem

Sparkonto, das mit dem gleichen Zinssatz verzinst wird. Nun sind beide 75 Jahre alt. Wer hat mehr Vermögen erspart?

A) Sie haben beide das gleiche, da sie den gleichen Betrag gespart haben

B) Robert, da er jedes Jahr mehr gespart hat

C) Maria, weil sie mehr Geld gespart hat

D) Maria, weil ihr Geld über einen längeren Zeitraum durch den Zinseszinseffekt vermehrt wurde

E) Weiß ich nicht **Antwort 31:**

32. Wenn der Marktzinssatz fällt, was passiert mit dem Preis einer Anleihe?

A) Der Preis steigt

B) Der Preis fällt

C) Der Preis bleibt der gleiche

D) Keine der Antworten

E) Weiß ich nicht **Antwort 32:**

33. Stellen Sie sich einen langen Zeitraum vor (z. B. 10 oder 20 Jahre), welche der folgenden Posten gibt normalerweise die höchste Rendite?

A) Sparkonto

B) Anleihen

C) Aktien

D) Weiß ich nicht **Antwort 33:**

34. Vervollständigen Sie den Satz:

Wenn ein Investor sein Geld auf mehrere verschiedene Anlagen verteilt, ... das Risiko Geld zu verlieren.

A) …steigt…

B) …sinkt…

C) …bleibt das Risiko gleich…

D) Weiß ich nicht **Antwort 34:**

35. Angenommen im Jahr 2020 hat sich Ihr Einkommen verdoppelt. Im gleichen Zeitraum haben sich alle Produkte um 100% verteuert. Wie viel werden Sie sich mit ihrem Einkommen kaufen können?

A) Mehr als heute
B) Weniger als heute
C) Genauso viel
D) Weiß ich nicht **Antwort 35:**

36. Kann Ihre Versicherungsgesellschaft Ihren Anspruch ablehnen, weil Sie bei der Aufnahme oder Erneuerung Ihrer Police einige bestimmte Fragen nicht richtig beantwortet haben?

A) Ja
B) Nein
C) Variiert von Anbieter zu Anbieter
D) Weiß ich nicht **Antwort 36:**

37. Wer profitiert von einer Inflation?

A) Kreditnehmer
B) Kreditgeber
C) Keiner
D) Beide
E) Weiß ich nicht **Antwort 37:**

38. Wenn die Europäische Zentralbank den Leitzins erhöht:

A) Steigt die Nachfrage nach Krediten
B) Sinkt die Nachfrage nach Krediten
C) Wird mehr gespart
D) Wird weniger gespart
E) A und D sind korrekt
F) B und C sind korrekt
G) Weiß nicht **Antwort 38:**

II. Darlehensvereinbarung

Art des Darlehens				
Ratenkredit				
(1) Auszahlungsbetrag*	(2) Einmalbetrag** für Restschuldversicherung für DN 1*		(3) Einmalbetrag** für Restschuldversicherung für DN 2*	
7.000,00	1.471,77		0,00	
(4) Nettodarlehensbetrag*	(5) Sollzinsen*	gebundener Sollzins in %	(6) Bearbeitungsentgelt*	in % (aus 4)
8.471,77	4.284,00	12,180	254,15	3,00
(7) Darlehensnennbetrag*	(8) Gesamtbetrag*		Effektiver Jahreszins in %	Zinsen pro Tag*
8.725,92	13.009,92		13,99	2,95

* Alle angegebenen Beträge in EUR

** Die Versicherungsprämie wird an den Versicherer (Cardif Allgemeine bzw. Cardif Lebensversicherungen) abgeführt.

V. Zahlungsplan/Ratenzahlungstermine (Betrag, Anzahl und Fälligkeit der Teilzahlungen)

Mtl. Rate/EUR	Erster Tilgungstermin (Zins und Tilgung)	Ratenzahl/Vertragslaufzeit in Monaten
154,88	01.05.2012	84

Die erste Rate mit Zins- und Tilgungsanteil ist fällig an dem unter "Erster Tilgungstermin" genannten Termin. Alle weiteren Ratenzahlungen mit Zins- und Tilgungsanteil sind fällig an den Tagen der Folgemonate, die in ihrer Zahl dem Tage des Ersten Tilgungstermins entsprechen (Ratenzahlungstermine). Beträgt der Zeitraum zwischen Auszahlung und dem Ertsen Tilgungstermin weniger als einen Monat, verschieben sich der Erste Tilgungstermin und alle weiteren Ratenzahlungstermine jeweils um einen Monat. Die angefallenen Zinsen für den Zeitraum ab Auszahlung des Darlehens bis einen Monat vor dem Ersten Tilgungstermin werden in beiden vorgenannten Fällen zusätzlich mit der ersten Rate eingezogen.

Stellen Sie sich vor, Sie schließen einen Ratenkredit bei Ihrer Hausbank zu den oben stehenden Konditionen ab.

39. Über welchen Betrag können Sie verfügen?

A) € 4.284,00

B) € 7.000,00

C) € 8.725,92

D) € 13.009,92

E) Weiß ich nicht **Antwort 39:**

40. Wie hoch ist der Betrag, den Sie insgesamt zurückzahlen müssen?

A) € 4.284,00

B) € 7.000,00

C) € 8.725,92

D) € 13.009,92

E) Weiß ich nicht **Antwort 40:**

41. Wie setzt sich der Gesamtbetrag von € 13.009,92 zusammen?

A) 4+5+6

B) 1+2+5

C) 4+6

D) 1+5

E) Weiß ich nicht **Antwort 41:**

42. Wie hoch ist der Tilgungsanteil der ersten Monatsrate?

A) € 66,38 (= 154,88 - 88,50)

B) € 88,50 (= 154,88 - 66,38)

C) € 154,88 (= 88,50 + 66,38)

D) € 243,38 (= 154,88 + 88,50)

E) Weiß ich nicht **Antwort 42:**

43. Welche der folgenden Alternativen würde Ihre Gesamtzinsbelastung reduzieren?

A) Erhöhung der Laufzeit von 84 Monaten auf 95 Monate

B) Reduzierung der Laufzeit von 84 Monaten auf 64 Monate

C) Erhöhung der Restschuldversicherung

D) Keine der genannten Alternativen

E) Weiß ich nicht **Antwort 43:**

44. Sie sind knapp bei Kasse. Welche der folgenden Alternativen führt dazu, dass Ihre monatliche finanzielle Belastung sinkt?

A) Erhöhung der Laufzeit von 84 Monaten auf 95 Monate

B) Reduzierung der Laufzeit von 84 Monaten auf 64 Monate

C) Erhöhung der Restschuldversicherung

D) Keine der genannten Alternativen

E) Weiß ich nicht **Antwort 44:**

45. Wie bewerten Sie die Höhe des effektiven Jahreszinses in diesem Beispiel?

A) Eher hoch

B) Eher niedrig

C) Durchschnittlich

D) Weiß ch nicht **Antwort 45:**

46. Wer ist unter Ihren Eltern Hauptverdienende/r?

A) Mutter

B) Vater

C) Beide Elternteile verdienen in etwa gleich viel

E) Weiß ich nicht **Antwort 46:**

47. Der/Die Hauptverdiener/in ist…

A) Selbständig B) Unselbständig C) Weiß ich nicht **Antwort 47:**

48. Welchen Beruf übt der/die Hauptverdienende Ihrer Eltern aus?

Antwort 48: _____

49. Wie würden Sie den Einfluss Ihrer Eltern auf Ihren Umgang mit Finanzen einschätzen?

A) Sehr groß

B) Groß

C) Durchschnittlich

D) Gering

E) Gar keinen

F) Weiß ich nicht **Antwort 49:**

50. Wie hoch ist das Jahreseinkommen Ihrer Eltern (brutto, zusammen)?
Wenn Sie es nicht genau wissen, schätzen Sie bitte.

A) < € 30.000

B) € 30.001 bis € 60.000

C) € 60.001 bis € 100.000

D) > € 100.000

E) Weiß ich nicht **Antwort 50:**

51. Wer kümmert sich in erster Linie um **Ihre** Finanzen?

A) Sie selbst

B) Ihre Eltern

C) Ihre Geschwister

D) Ihr Freund/ Freundin

E) Berater

F) Weiß ich nicht **Antwort 51:**

52. Welches der folgenden beschreibt am besten, die Gesellschaft, in der Sie aufgewachsen sind?

A) Ein Dorf, kleine Ortschaft oder ländlicher Raum (weniger als 3.000 Personen)

B) Eine Kleinstadt (3.000 bis etwa 15.000 Personen)

C) Eine Kleinstadt (15.000 bis etwa 100.000 Personen)

D) Eine Stadt (100.000 bis etwa 1.000.000 Personen)

E) Eine Großstadt (mit mehr als 1.000.000 Personen)

F) Weiß ich nicht **Antwort 52:**

Bitte kreuzen Sie an, inwiefern Sie mit den folgenden Aussagen übereinstimmen!

	A Lehne stark ab	B Lehne eher ab	C Teils, teils	D Stimme eher zu	E Stimme stark zu
53. Ich habe Bedenken, im Ruhestand über ein zu geringes Einkommen zu verfügen, um meinen erwünschten Lebensstandard finanzieren zu können.	☐	☐	☐	☐	☐
54. Die Beschäftigung mit dem Thema Altersvorsorge gibt mir ein positives Gefühl.	☐	☐	☐	☐	☐
55. Wenn sich meine Eltern mit dem Thema Altersvorsorge beschäftigen, gibt mir das ein positives Gefühl.	☐	☐	☐	☐	☐
56. Ich bin sehr impulsiv und neige dazu, Dinge zu kaufen, auch wenn ich sie mir nicht wirklich leisten kann.	☐	☐	☐	☐	☐
57. Ich spare eher, als dass ich Geld ausgebe.	☐	☐	☐	☐	☐
58. Ich denke, es ist wichtiger, sichere Investitionen und garantierte Erträge zu haben, als ein Risiko einzugehen und dadurch möglicherweise höhere Erträge zu erzielen.	☐	☐	☐	☐	☐

59. Ich würde niemals eine Investition in Aktien in Erwägung ziehen, weil ich dies zu riskant finde.	☐	☐	☐	☐	☐
60. Wenn ich denke, dass eine Investition profitabel sein wird, bin ich dazu bereit mir Geld zu leihen, um diese Investition tätigen zu können.	☐	☐	☐	☐	☐
61. Ich möchte mir gewiss darüber sein, dass meine Investitionen sicher sind.	☐	☐	☐	☐	☐
62. Ich bin mehr und mehr davon überzeugt, dass ich größere finanzielle Risiken eingehen sollte, um meine Ertragslage zu verbessern.	☐	☐	☐	☐	☐
63. Ich bin dazu bereit, das Risiko einzugehen Geld zu verlieren, wenn gleichzeitig die Chance besteht eine gute Rendite zu erzielen.	☐	☐	☐	☐	☐

64. Das im Ruhestand fehlende Geld bezeichnet man als Versorgungs- oder Rentenlücke. Was denken Sie, inwieweit haben Sie selbst die Möglichkeit, auf das Ausmaß einer Versorgungslücke im Rentenalter Einfluss zu nehmen?

A	**B**	**C**	**D**	**E**
Gar keine Möglichkeiten	Kaum Möglichkeiten	Teils, teils	Einige Möglichkeiten	Viele Möglichkeiten
☐	☐	☐	☐	☐

	A Nein, keinesfalls	B Nein, eher nicht	C Bin unentschlossen	D Eher ja	E Ja, ganz sicher
65. Haben Sie vor, innerhalb der nächsten 12 Monate einen Altersvorsorgevertrag abzuschließen?	☐	☐	☐	☐	☐
66. Stellen Sie sich vor, Sie erhielten für den Abschluss eines Altersvorsorge-vertrages vom Staat einen Einstiegsbonus in Höhe von EUR 100,- in bar. Würden Sie dann innerhalb der nächsten 12 Monate einen Altersvorsorgevertrag abschließen wollen?	☐	☐	☐	☐	☐
67. Stellen Sie sich vor, Sie hätten Ihr Studium bereits abgeschlossen und wären berufstätig. Würden Sie dann innerhalb der nächsten 12 Monate einen Altersvorsorgevertrag abschließen wollen?	☐	☐	☐	☐	☐

Vielen Dank für Ihre Teilnahme!

Appendix 3: Origin of Questions

Q		Origin of Financial Literacy Questions			
US	**GER**	**Text**	**Source**	**Sample**	**Cat.**
25	25	What influences the interest rate on your loan?	(Keown, 2011)	Canada n=8319	K
26	26	You have an account with a savings bank. Which of the following statements is NOT correct?	(Green, 2013)	US n=28	K
29	29	If each of the following persons had the same amount of take home pay, who would need the greatest amount of life insurance?	(Floyd, 2015)	US n=200	K
30	30	Inflation can have various effects. Which of these statements are correct?	Self-developed		K
32	32	If the market interest rate falls, what should happen to bond prices?	(Rooij, Lusardi, & Alessie, 2007)	Netherlands n=3373	K
33	33	Imagine a long time horizon of 10 or 20 years. Which of the following assets tends to give the highest return?	(Rooij, Lusardi, & Alessie, 2007)	Netherlands n=3373	K
34	34	Please complete the sentence: If an investor diversifies his money into various different assets, the risk to lose money...	(Rooij, Lusardi, & Alessie, 2007)	Netherlands n=3373	K
35	35	Expecting that by 2020 your salary has doubled and at the same time all prices of products increased by 100%: How much can you buy with your salary?	(Rooij, Lusardi, & Alessie, 2007)	Netherlands n=3373	K
36	36	Is it possible that your insurance company can reject your claim due to the fact that you entered answers incorrectly when you extended the policy contract a year ago?	(ANZ Bank, 2008)	Australia n=3500	K
37	37	Who is benefiting from inflation?	Self-developed		K
38	38	If the Fed increases the federal funds rate…	Self-developed		K

US	GER	Text	Source	Sample	Cat
27	27	If the original price of a refrigerator is $1,200 and it is reduced by 20%, how much does it cost?	(ANZ Bank, 2008)	Australia n= 3500	C
28	28	Imagine, your credit card is debited with $1,000 and the interest rate is at 20% p.a. If you do not pay off any debt, how long would it take until your debt has doubled?	(Lusardi, 2008)	US n=812	C
31	31	Rob and Mary are the same age. At age 25 Mary began saving $2,000 a year while Rob saved nothing. At age 50, Rob realized that he needed money for retirement and started saving $4,000 per year while Mary kept saving her $2,000. Both save their money in a savings account that brings an identical interest. Now they are both 75 years old. Who has the most money in his or her retirement account?	(Ela & Goodrich, 2011)	US n=1488	C
39	39	What is the loan amount that is paid out to you?	Self-developed		C
40	40	What is the total amount you need to pay back?	Self-developed		C
42	43	Which alternative would reduce your total interest cost?	Self-developed		C
43	44	You are short of cash. Which alternative would decrease your monthly debt payments?	Self-developed		C

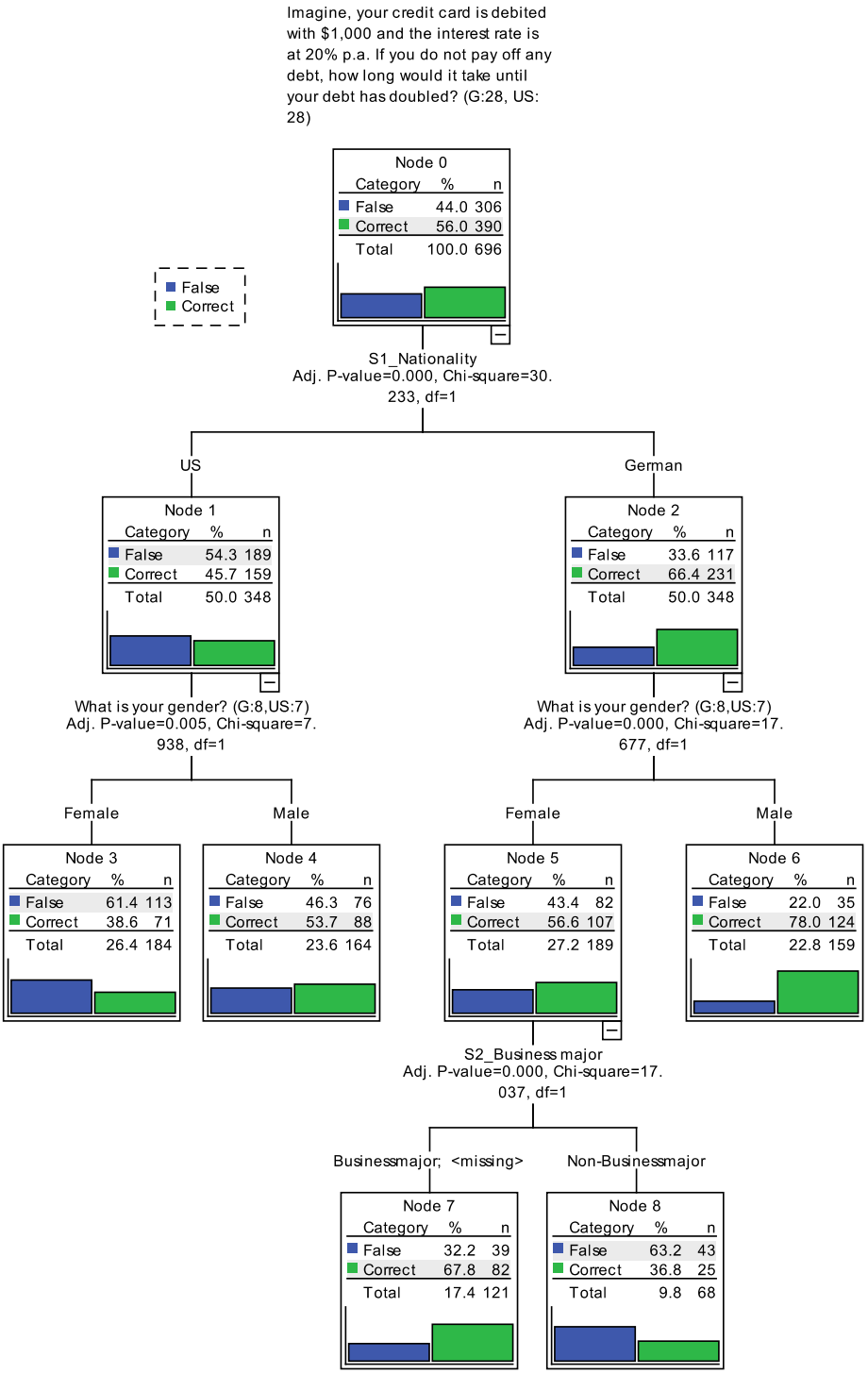
Q		Origin Experience Questions		
US	**GER**	**Text**	**Source**	**Cat.**
1	1	What is your major field of study?	Self-developed	E
2	2	Which degree are you aiming for?	Self-developed	E
3	-	What is your class rank?	Self-developed	E
-	3	How many semesters regarding your specific major have you completed?	Self-developed	E
	4	How many semesters in total have you completed?	Self-developed	E
4	-	Did you attend Junior College before?	Self-developed	E
5	5	What was your entry qualification for college?	Self-developed	E
5	6	How old are you?	Self-developed	E
6	7	Are you single/ married/ divorced?	Self-developed	E
7	8	Are you female or male?	Self-developed	E
8	9	Which nationality do you belong to?	Self-developed	E
-	10	With which number does your zip code start?	Self-developed	E
10	-	Is English your native language?	Self-developed	E
	11	Is German your native language?	Self-developed	E
11	-	Have you worked before college?	Self-developed	E
-	12	Have you completed an apprenticeship before college?	Self-developed	E
12	13	Do you have a job besides going to College?	Self-developed	E
13	14	How much money do you have available to spend monthly after deducting all costs?	Self-developed	E

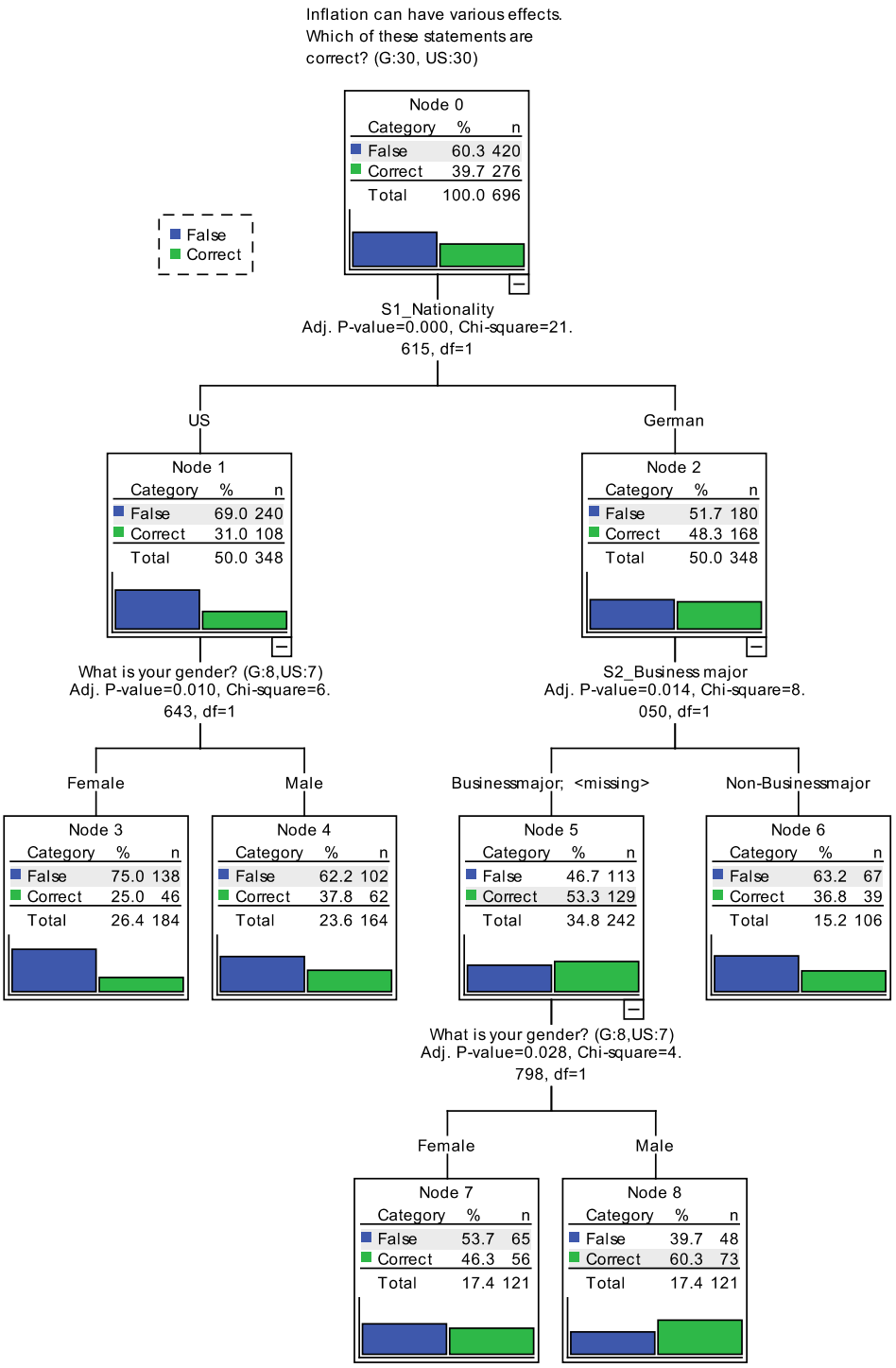
14	15	Have you ever taken a loan (e.g. student loan) from a bank?	Self-developed	E
15	16	Do you own any financial assets	Self-developed	E
21	22	Do you own a credit card?	Self-developed	E
22	-	Do you own a debit card?	Self-developed	E
23	23	Do you own a car?	Self-developed	E
24	24	Do you smoke?	Self-developed	E
44	46	Who is the main income provider in your family?	Self-developed	E
45	47	The main income provider is…	Self-developed	E
46	48	What kind of job is the main income provider having?	Self-developed	E
49	51	Who is in charge of your financials?	Self-developed	E
50	52	Which is the best description of the town where you grew up?	Self-developed	E

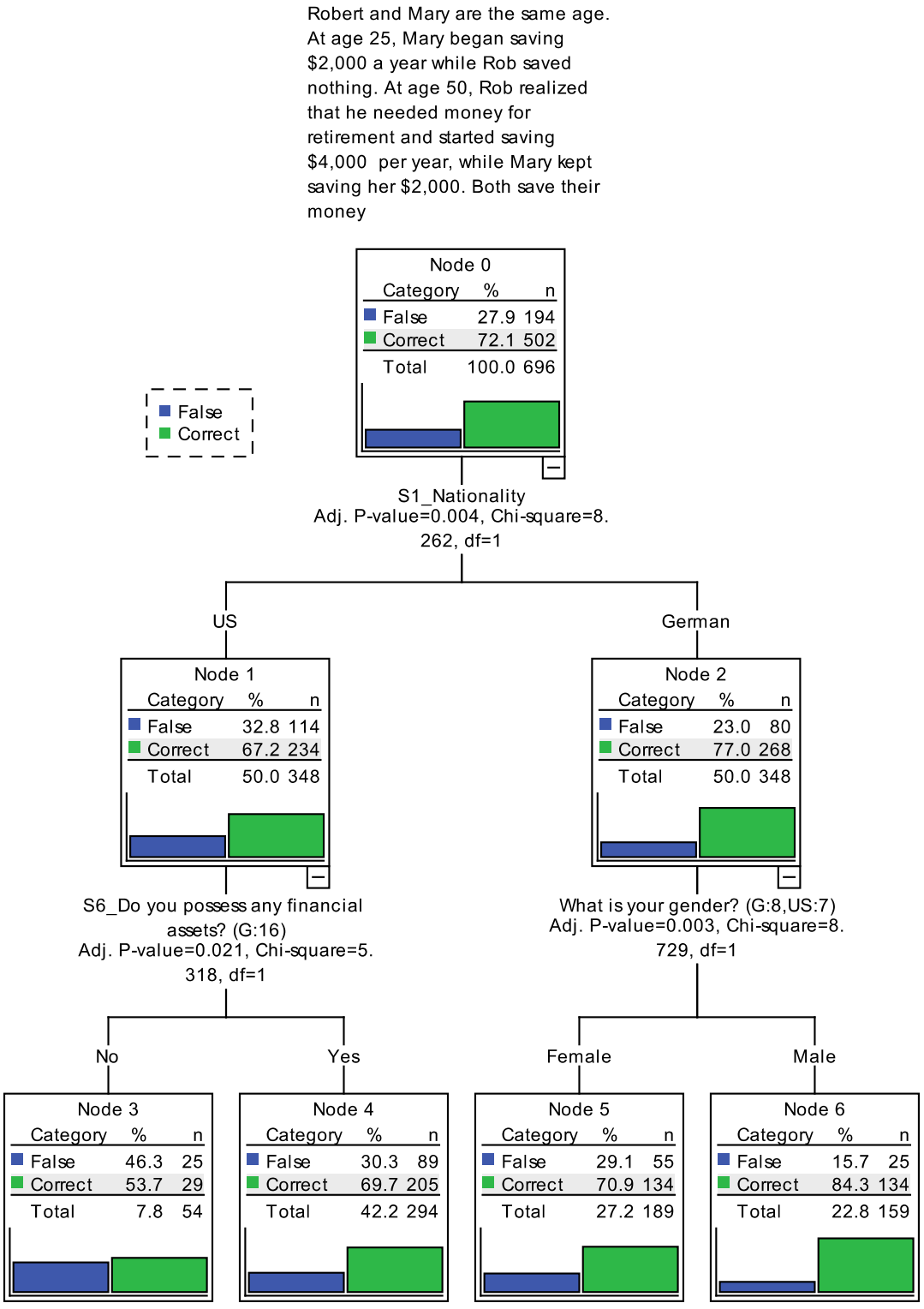
Q		Origin of Judgment Question		
US	**GER**	**Text**	**Source**	**Cat.**
16	17	How sufficient is your monthly income?	Self-developed	J
17	18	How do you rate your own capabilities in handling your spending behavior (using saving offers, paying bills etc.)?	Self-developed	J
18	19	How do you rate your capabilities in handling your future budget?	Self-developed	J
19	20	How good are you at evaluating risks and returns of different financial products?	Self-developed	J
20	21	How do you believe is your general economic and financial knowledge (rights of a consumer, effect of inflation)?	Self-developed	J
47	49	How do you judge the financial and economic knowledge of your parents?	Self-developed	J
48	50	What is your best estimate of your parents‘ total income last year?	Self-developed	J
51	53	I am worried that I won´t have enough funds to maintain my current standard of living when I retire.	Self-developed	J
52	54	Dealing with retirement planning makes me feel comfortable.	Self-developed	J
53	55	When my parents deal with questions regarding retirement planning this makes me feel comfortable.	Self-developed	J
54	56	I am impulsive; I tend to buy things even though I am not really able to afford them.	Self-developed	J
55	57	I prefer saving over spending.	Self-developed	J
56	58	I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns.	Self-developed	J
57	59	I would never consider investments in shares because I find this too risky.	Self-developed	J

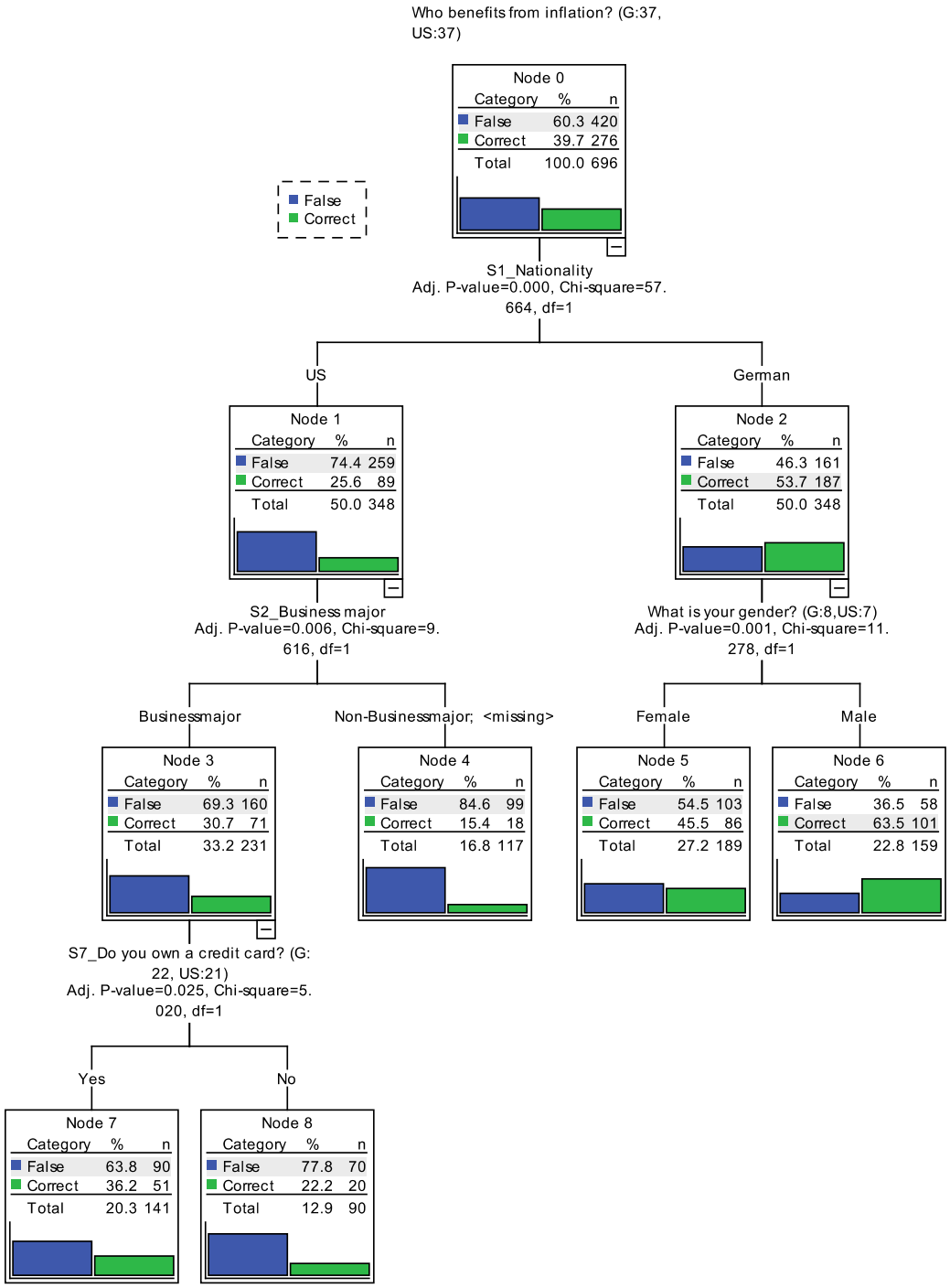
58	60	If I think an investment will be profitable, I am prepared to borrow money to make this investment.	Self-developed	J
59	61	I want to be certain that my investments are safe.	Self-developed	J
60	62	I get more and more convinced that I should take greater financial risks to improve my financial position.	Self-developed	J
61	63	I am ready to take risk as long as there is a good opportunity to achieve a return.	Self-developed	J
62	64	How much influence do you think you have on the amount of money you will have available after your retirement?	Self-developed	J
63	65	Do you plan on entering into a retirement plan within the next 12 months?	Self-developed	J
64	66	Imagine the federal state would support you with $1000 to enter into a retirement plan, would you then enter into one within the next 12 months?	Self-developed	J
65	67	Imagine you would have graduated already and would be employed. Would you then enter into a retirement plan?	Self-developed	J

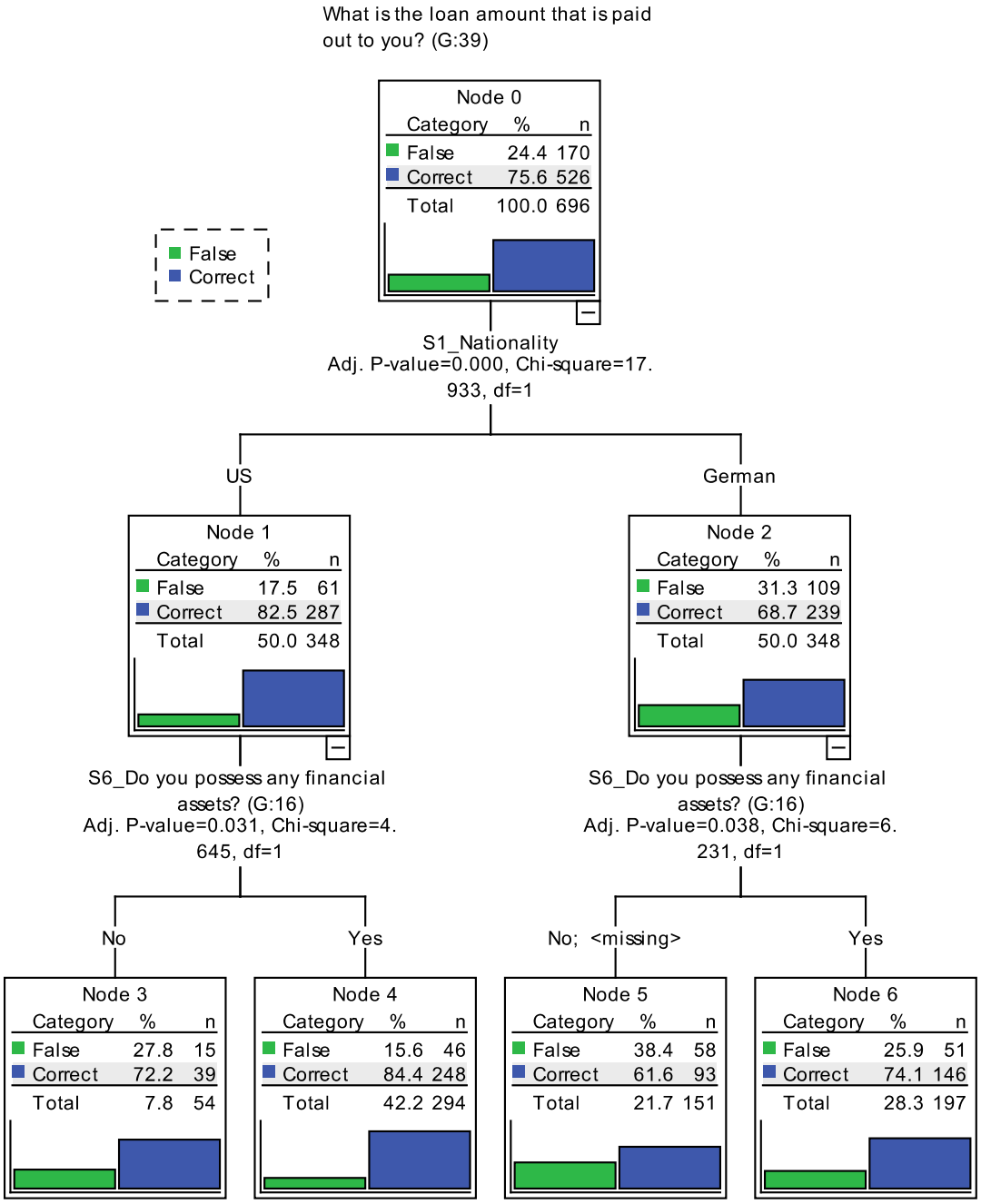
Appendix 4: Decision Trees Experience



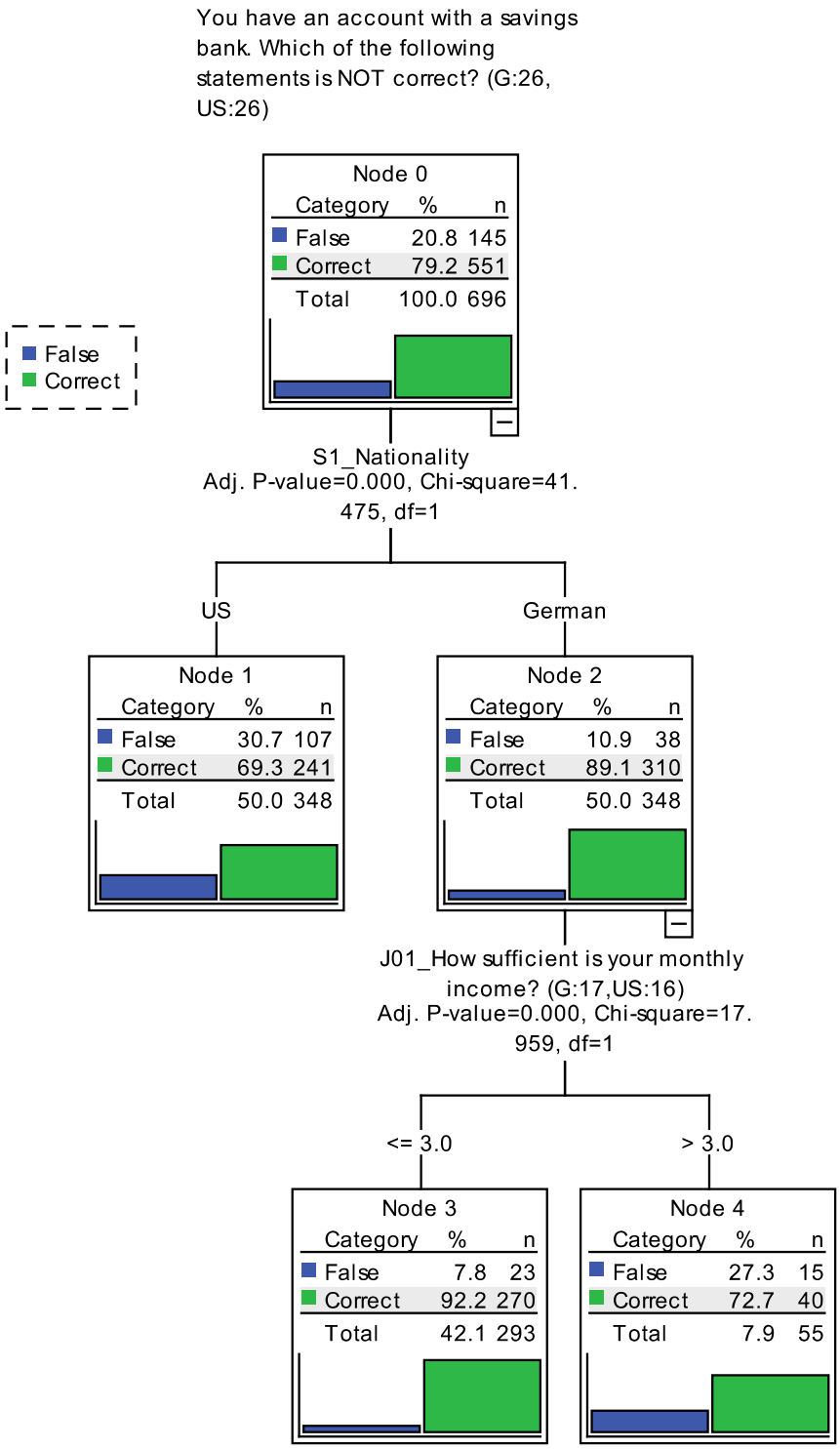

Inflation can have various effects. Which of these statements are correct? (G:30, US:30)
False
Correct
Node 0
Category % n
False 60.3 420
Correct 39.7 276
Total 100.0 696
S1_Nationality
Adj. P-value=0.000, Chi-square=21.615, df=1
US
German
Node 1
Category % n
False 69.0 240
Correct 31.0 108
Total 50.0 348
Node 2
Category % n
False 51.7 180
Correct 48.3 168
Total 50.0 348
What is your gender? (G:8,US:7)
Adj. P-value=0.010, Chi-square=6.643, df=1
S2_Business major
Adj. P-value=0.014, Chi-square=8.050, df=1
Female
Male
Businessmajor; <missing>
Non-Businessmajor
Node 3
Category % n
False 75.0 138
Correct 25.0 46
Total 26.4 184
Node 4
Category % n
False 62.2 102
Correct 37.8 62
Total 23.6 164
Node 5
Category % n
False 46.7 113
Correct 53.3 129
Total 34.8 242
Node 6
Category % n
False 63.2 67
Correct 36.8 39
Total 15.2 106
What is your gender? (G:8,US:7)
Adj. P-value=0.028, Chi-square=4.798, df=1
Female
Male
Node 7
Category % n
False 53.7 65
Correct 46.3 56
Total 17.4 121
Node 8
Category % n
False 39.7 48
Correct 60.3 73
Total 17.4 121

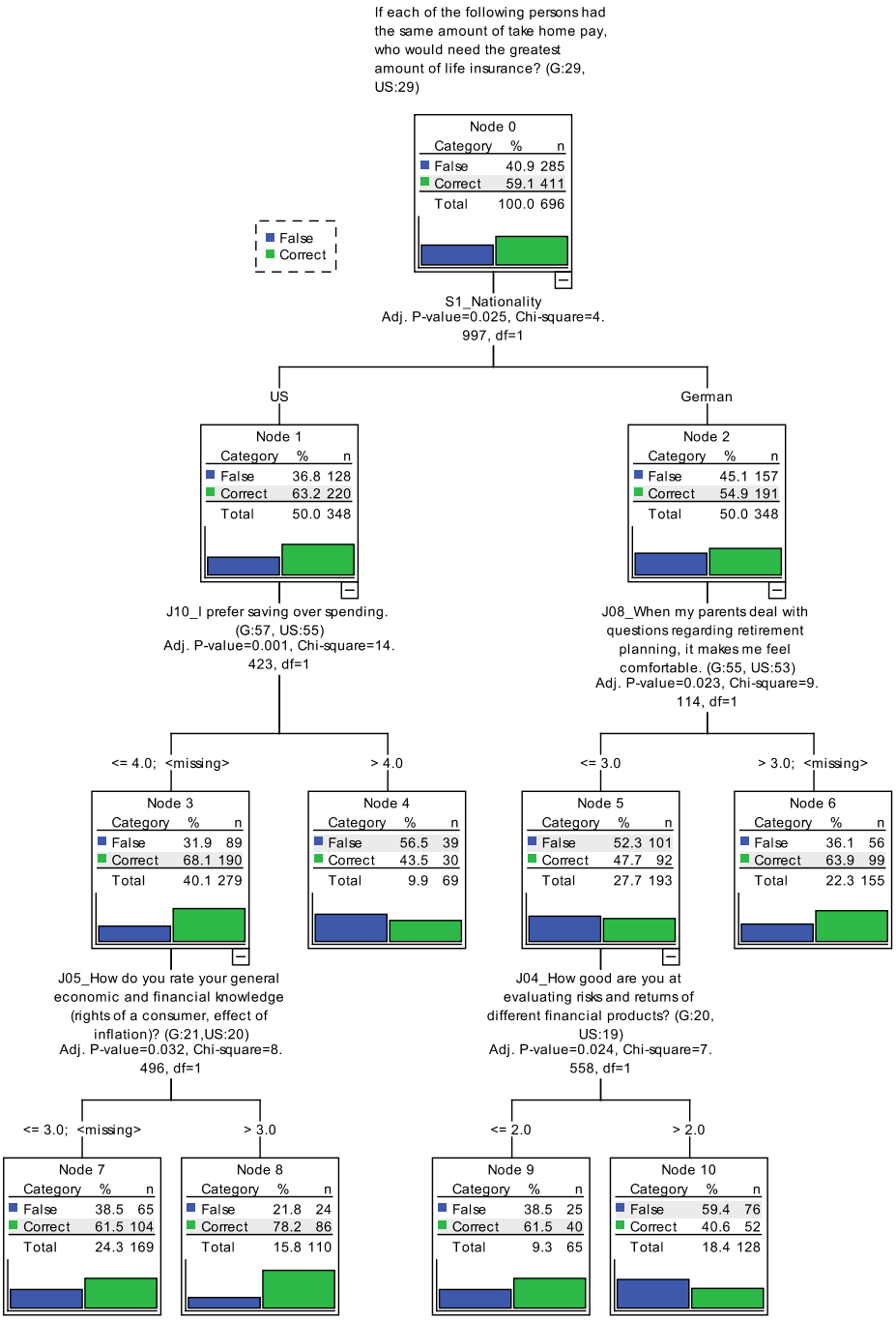

Robert and Mary are the same age. At age 25, Mary began saving $2,000 a year while Rob saved nothing. At age 50, Rob realized that he needed money for retirement and started saving $4,000 per year, while Mary kept saving her $2,000. Both save their money
False
Correct
Node 0
Category % n
False 27.9 194
Correct 72.1 502
Total 100.0 696
S1_Nationality
Adj. P-value=0.004, Chi-square=8.262, df=1
US
German
Node 1
Category % n
False 32.8 114
Correct 67.2 234
Total 50.0 348
Node 2
Category % n
False 23.0 80
Correct 77.0 268
Total 50.0 348
S6_Do you possess any financial assets? (G:16)
Adj. P-value=0.021, Chi-square=5.318, df=1
What is your gender? (G:8,US:7)
Adj. P-value=0.003, Chi-square=8.729, df=1
No
Yes
Female
Male
Node 3
Category % n
False 46.3 25
Correct 53.7 29
Total 7.8 54
Node 4
Category % n
False 30.3 89
Correct 69.7 205
Total 42.2 294
Node 5
Category % n
False 29.1 55
Correct 70.9 134
Total 27.2 189
Node 6
Category % n
False 15.7 25
Correct 84.3 134
Total 22.8 159

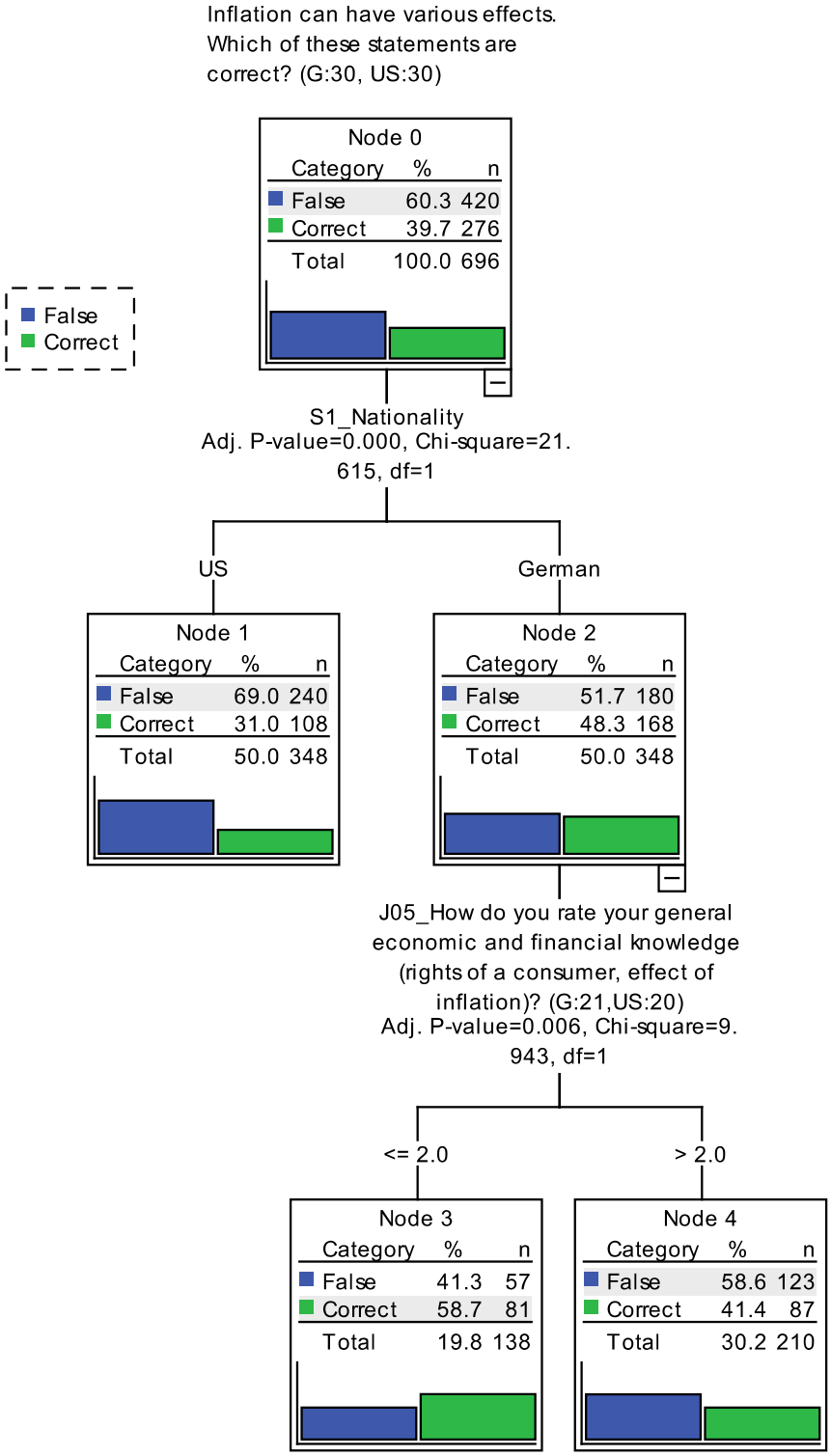

Who benefits from inflation? (G:37, US:37)
Node 0
Category % n
False 60.3 420
Correct 39.7 276
Total 100.0 696
False
Correct
S1_Nationality
Adj. P-value=0.000, Chi-square=57.664, df=1
US
German
Node 1
Category % n
False 74.4 259
Correct 25.6 89
Total 50.0 348
Node 2
Category % n
False 46.3 161
Correct 53.7 187
Total 50.0 348
S2_Business major
Adj. P-value=0.006, Chi-square=9.616, df=1
What is your gender? (G:8,US:7)
Adj. P-value=0.001, Chi-square=11.278, df=1
Businessmajor
Non-Businessmajor; <missing>
Female
Male
Node 3
Category % n
False 69.3 160
Correct 30.7 71
Total 33.2 231
Node 4
Category % n
False 84.6 99
Correct 15.4 18
Total 16.8 117
Node 5
Category % n
False 54.5 103
Correct 45.5 86
Total 27.2 189
Node 6
Category % n
False 36.5 58
Correct 63.5 101
Total 22.8 159
S7_Do you own a credit card? (G:22, US:21)
Adj. P-value=0.025, Chi-square=5.020, df=1
Yes
No
Node 7
Category % n
False 63.8 90
Correct 36.2 51
Total 20.3 141
Node 8
Category % n
False 77.8 70
Correct 22.2 20
Total 12.9 90

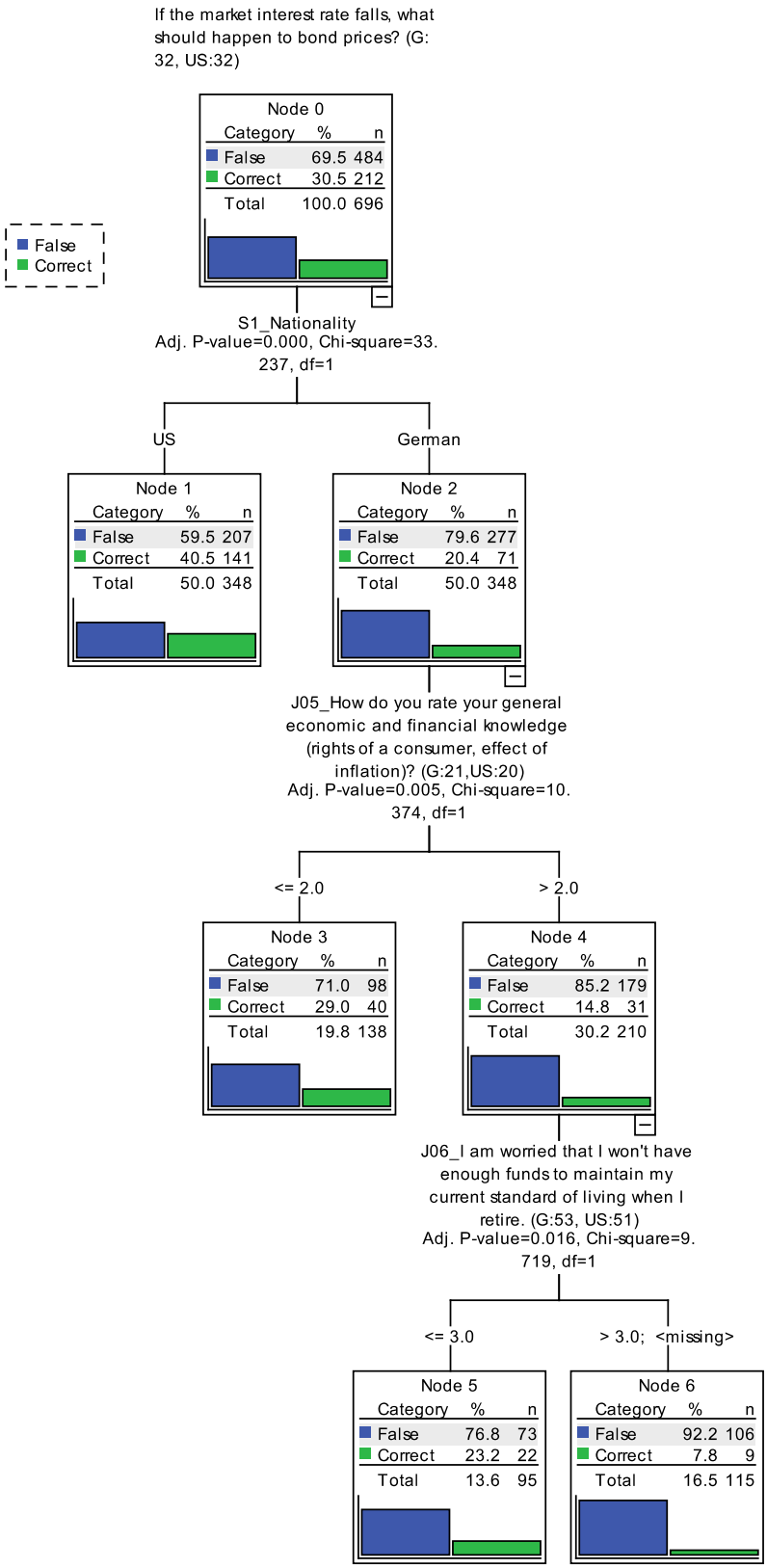

What is the loan amount that is paid out to you? (G:39)
False
Correct
Node 0
Category % n
False 24.4 170
Correct 75.6 526
Total 100.0 696
S1_Nationality
Adj. P-value=0.000, Chi-square=17.933, df=1
US
German
Node 1
Category % n
False 17.5 61
Correct 82.5 287
Total 50.0 348
Node 2
Category % n
False 31.3 109
Correct 68.7 239
Total 50.0 348
S6_Do you possess any financial assets? (G:16)
Adj. P-value=0.031, Chi-square=4.645, df=1
S6_Do you possess any financial assets? (G:16)
Adj. P-value=0.038, Chi-square=6.231, df=1
No
Yes
No; <missing>
Yes
Node 3
Category % n
False 27.8 15
Correct 72.2 39
Total 7.8 54
Node 4
Category % n
False 15.6 46
Correct 84.4 248
Total 42.2 294
Node 5
Category % n
False 38.4 58
Correct 61.6 93
Total 21.7 151
Node 6
Category % n
False 25.9 51
Correct 74.1 146
Total 28.3 197

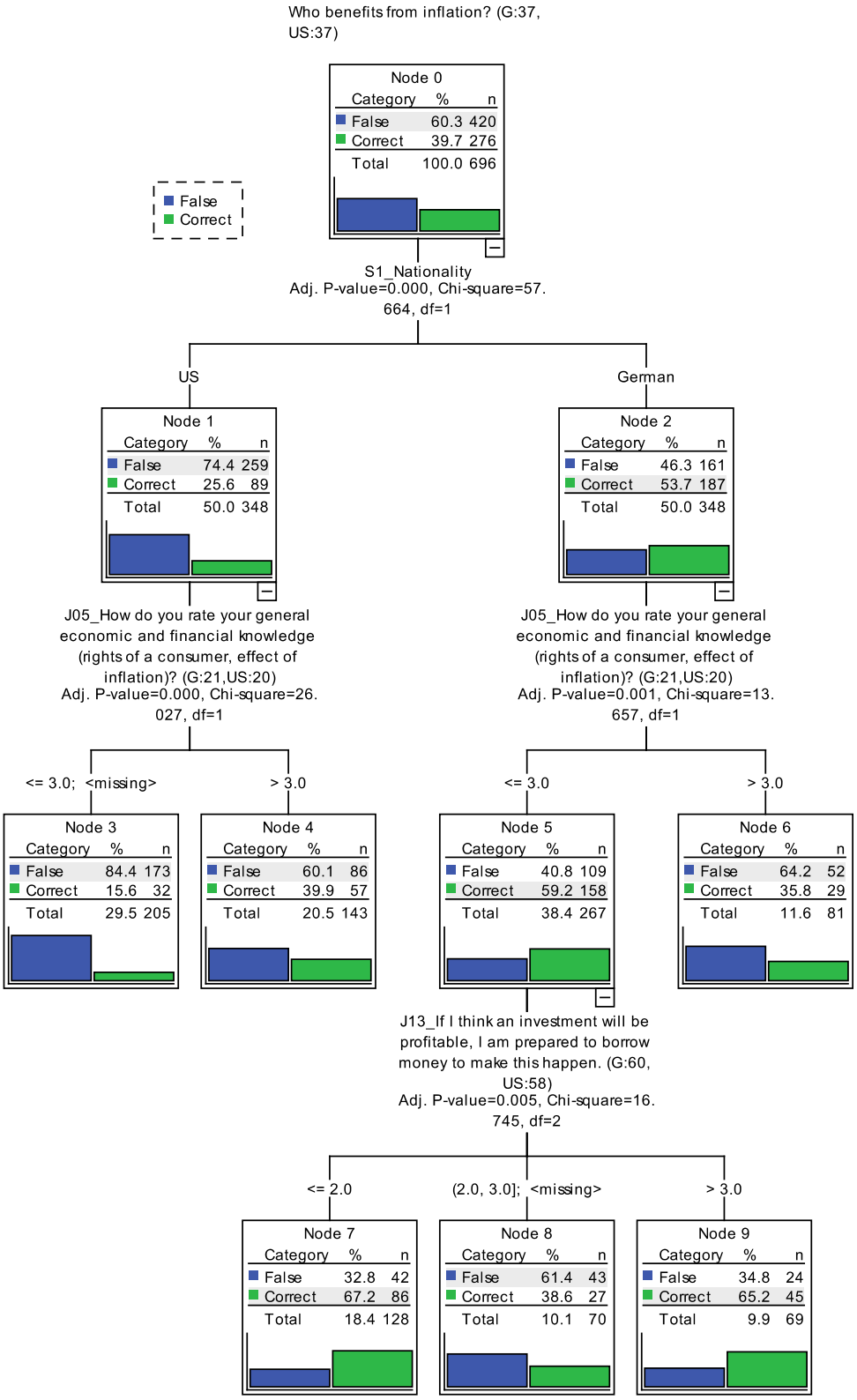
Appendix 5: Decision Trees Judgment

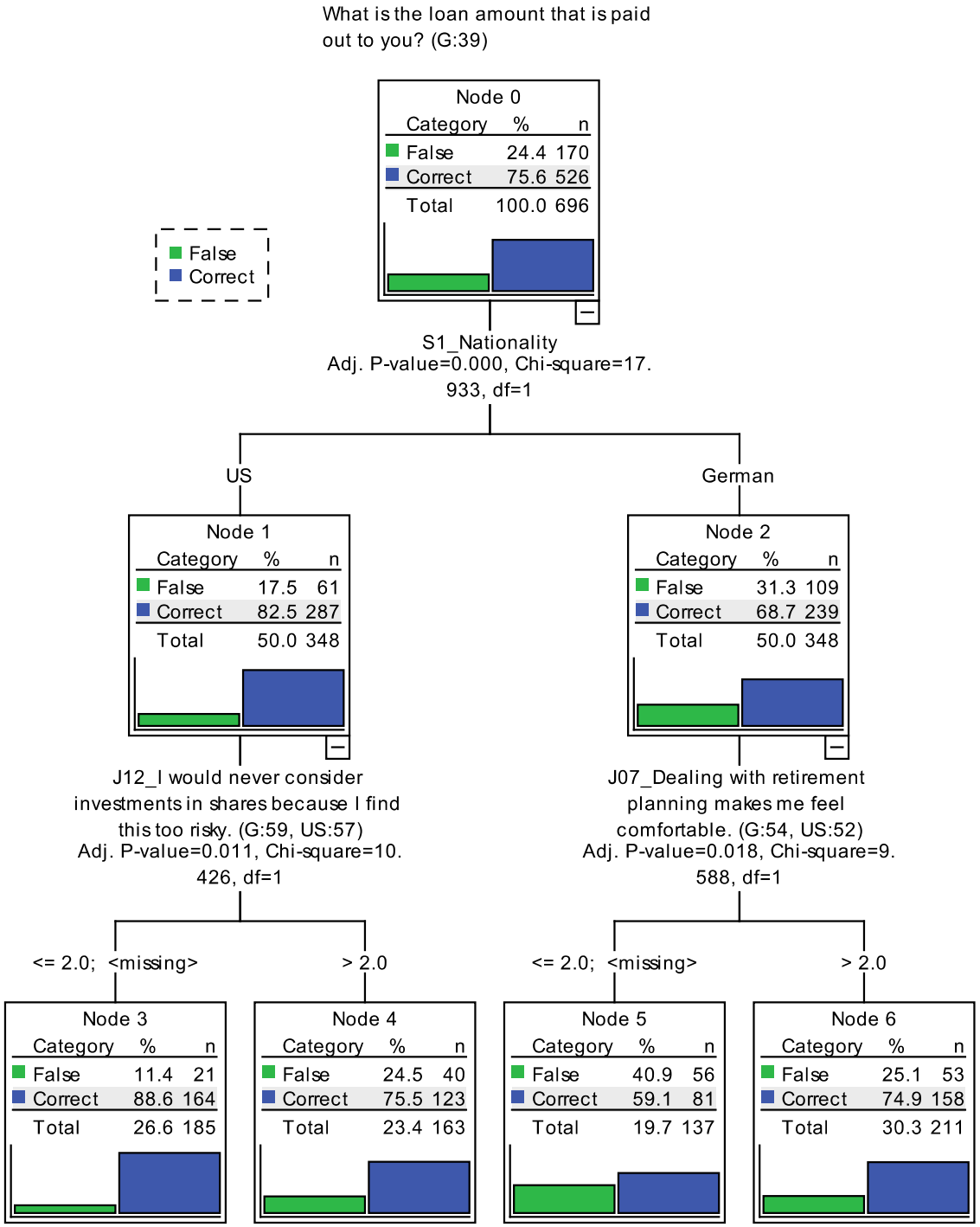


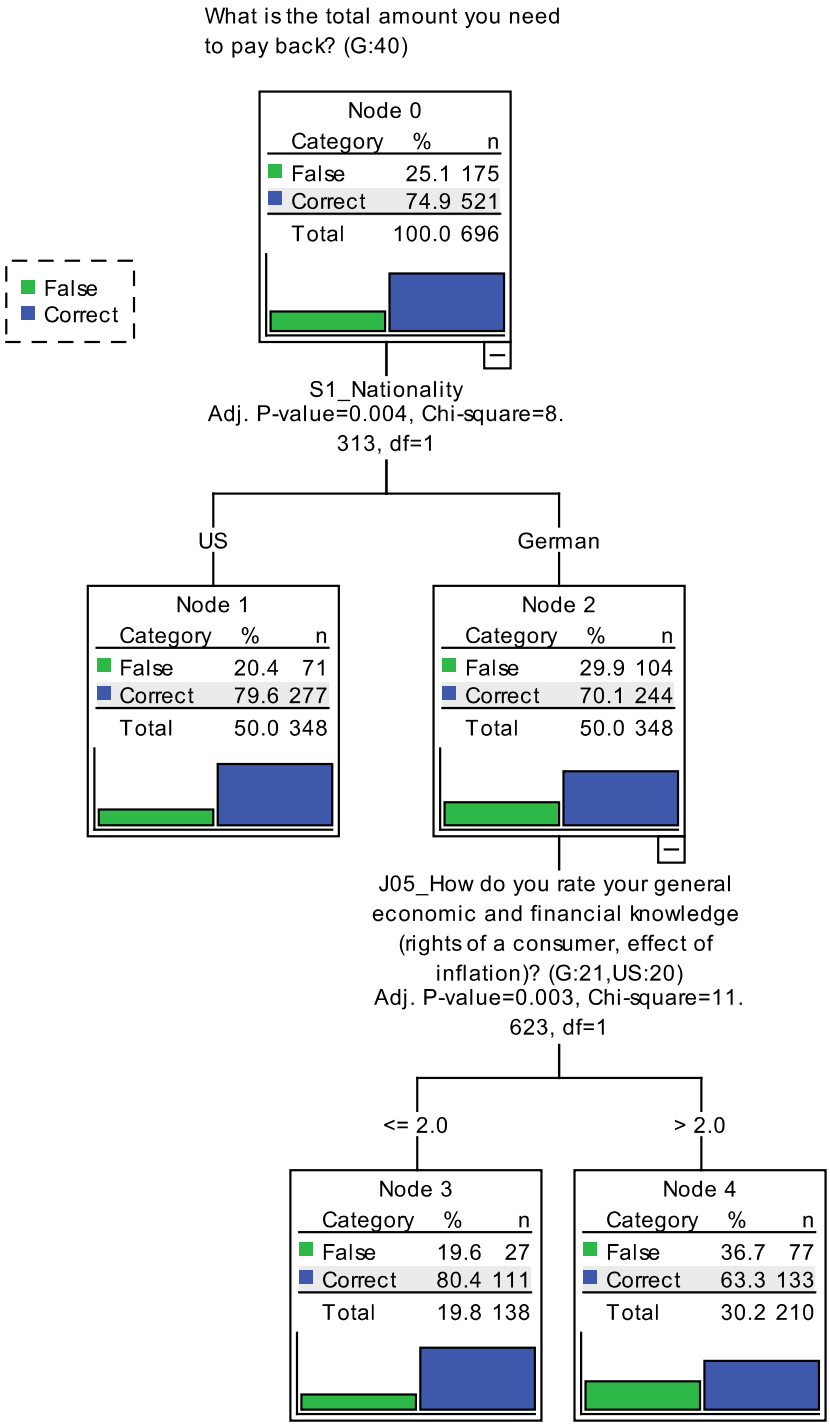

If each of the following persons had the same amount of take home pay, who would need the greatest amount of life insurance? (G:29, US:29)
Node 0
Category % n
False 40.9 285
Correct 59.1 411
Total 100.0 696
False
Correct
S1_Nationality
Adj. P-value=0.025, Chi-square=4.997, df=1
US
German
Node 1
Category % n
False 36.8 128
Correct 63.2 220
Total 50.0 348
Node 2
Category % n
False 45.1 157
Correct 54.9 191
Total 50.0 348
J10_I prefer saving over spending. (G:57, US:55)
Adj. P-value=0.001, Chi-square=14.423, df=1
J08_When my parents deal with questions regarding retirement planning, it makes me feel comfortable. (G:55, US:53)
Adj. P-value=0.023, Chi-square=9.114, df=1
<= 4.0; <missing>
> 4.0
<= 3.0
> 3.0; <missing>
Node 3
Category % n
False 31.9 89
Correct 68.1 190
Total 40.1 279
Node 4
Category % n
False 56.5 39
Correct 43.5 30
Total 9.9 69
Node 5
Category % n
False 52.3 101
Correct 47.7 92
Total 27.7 193
Node 6
Category % n
False 36.1 56
Correct 63.9 99
Total 22.3 155
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.032, Chi-square=8.496, df=1
J04_How good are you at evaluating risks and returns of different financial products? (G:20, US:19)
Adj. P-value=0.024, Chi-square=7.558, df=1
<= 3.0; <missing>
> 3.0
<= 2.0
> 2.0
Node 7
Category % n
False 38.5 65
Correct 61.5 104
Total 24.3 169
Node 8
Category % n
False 21.8 24
Correct 78.2 86
Total 15.8 110
Node 9
Category % n
False 38.5 25
Correct 61.5 40
Total 9.3 65
Node 10
Category % n
False 59.4 76
Correct 40.6 52
Total 18.4 128


Inflation can have various effects. Which of these statements are correct? (G:30, US:30)
False
Correct
Node 0
Category % n
False 60.3 420
Correct 39.7 276
Total 100.0 696
S1_Nationality
Adj. P-value=0.000, Chi-square=21.615, df=1
US
German
Node 1
Category % n
False 69.0 240
Correct 31.0 108
Total 50.0 348
Node 2
Category % n
False 51.7 180
Correct 48.3 168
Total 50.0 348
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.006, Chi-square=9.943, df=1
<= 2.0
> 2.0
Node 3
Category % n
False 41.3 57
Correct 58.7 81
Total 19.8 138
Node 4
Category % n
False 58.6 123
Correct 41.4 87
Total 30.2 210


If the market interest rate falls, what should happen to bond prices? (G: 32, US:32)
False
Correct
Node 0
Category % n
False 69.5 484
Correct 30.5 212
Total 100.0 696
S1_Nationality
Adj. P-value=0.000, Chi-square=33.237, df=1
US
German
Node 1
Category % n
False 59.5 207
Correct 40.5 141
Total 50.0 348
Node 2
Category % n
False 79.6 277
Correct 20.4 71
Total 50.0 348
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.005, Chi-square=10.374, df=1
<= 2.0
> 2.0
Node 3
Category % n
False 71.0 98
Correct 29.0 40
Total 19.8 138
Node 4
Category % n
False 85.2 179
Correct 14.8 31
Total 30.2 210
J06_I am worried that I won't have enough funds to maintain my current standard of living when I retire. (G:53, US:51)
Adj. P-value=0.016, Chi-square=9.719, df=1
<= 3.0
> 3.0; <missing>
Node 5
Category % n
False 76.8 73
Correct 23.2 22
Total 13.6 95
Node 6
Category % n
False 92.2 106
Correct 7.8 9
Total 16.5 115


Who benefits from inflation? (G:37, US:37)
Node 0
Category % n
False 60.3 420
Correct 39.7 276
Total 100.0 696
False
Correct
S1_Nationality
Adj. P-value=0.000, Chi-square=57.664, df=1
US
German
Node 1
Category % n
False 74.4 259
Correct 25.6 89
Total 50.0 348
Node 2
Category % n
False 46.3 161
Correct 53.7 187
Total 50.0 348
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.000, Chi-square=26.027, df=1
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.001, Chi-square=13.657, df=1
<= 3.0; <missing>
> 3.0
<= 3.0
> 3.0
Node 3
Category % n
False 84.4 173
Correct 15.6 32
Total 29.5 205
Node 4
Category % n
False 60.1 86
Correct 39.9 57
Total 20.5 143
Node 5
Category % n
False 40.8 109
Correct 59.2 158
Total 38.4 267
Node 6
Category % n
False 64.2 52
Correct 35.8 29
Total 11.6 81
J13_If I think an investment will be profitable, I am prepared to borrow money to make this happen. (G:60, US:58)
Adj. P-value=0.005, Chi-square=16.745, df=2
<= 2.0
(2.0, 3.0]; <missing>
> 3.0
Node 7
Category % n
False 32.8 42
Correct 67.2 86
Total 18.4 128
Node 8
Category % n
False 61.4 43
Correct 38.6 27
Total 10.1 70
Node 9
Category % n
False 34.8 24
Correct 65.2 45
Total 9.9 69


What is the loan amount that is paid out to you? (G:39)
False
Correct
Node 0
Category % n
False 24.4 170
Correct 75.6 526
Total 100.0 696
S1_Nationality
Adj. P-value=0.000, Chi-square=17.933, df=1
US
German
Node 1
Category % n
False 17.5 61
Correct 82.5 287
Total 50.0 348
Node 2
Category % n
False 31.3 109
Correct 68.7 239
Total 50.0 348
J12_I would never consider investments in shares because I find this too risky. (G:59, US:57)
Adj. P-value=0.011, Chi-square=10.426, df=1
J07_Dealing with retirement planning makes me feel comfortable. (G:54, US:52)
Adj. P-value=0.018, Chi-square=9.588, df=1
<= 2.0; <missing>
> 2.0
<= 2.0; <missing>
> 2.0
Node 3
Category % n
False 11.4 21
Correct 88.6 164
Total 26.6 185
Node 4
Category % n
False 24.5 40
Correct 75.5 123
Total 23.4 163
Node 5
Category % n
False 40.9 56
Correct 59.1 81
Total 19.7 137
Node 6
Category % n
False 25.1 53
Correct 74.9 158
Total 30.3 211


What is the total amount you need to pay back? (G:40)
False
Correct
Node 0
Category % n
False 25.1 175
Correct 74.9 521
Total 100.0 696
S1_Nationality
Adj. P-value=0.004, Chi-square=8.313, df=1
US
German
Node 1
Category % n
False 20.4 71
Correct 79.6 277
Total 50.0 348
Node 2
Category % n
False 29.9 104
Correct 70.1 244
Total 50.0 348
J05_How do you rate your general economic and financial knowledge (rights of a consumer, effect of inflation)? (G:21,US:20)
Adj. P-value=0.003, Chi-square=11.623, df=1
<= 2.0
> 2.0
Node 3
Category % n
False 19.6 27
Correct 80.4 111
Total 19.8 138
Node 4
Category % n
False 36.7 77
Correct 63.3 133
Total 30.2 210

Appendix 6: Results Discriminant Analysis Financial Literacy

Results Discriminant Analysis Financial Literacy	
N German	348
N US	348
Box's M Significance	.000
Eigenwert	0.437
Canonical Correlation	.552
Canonical Correlation squared	30%
Wilks' Lambda	.696
Wilk's Lambda Sign.	.000
Chi-square	248.547
Original groups classified correctly	75%

Appendix 7: Results Discriminant Analysis Experience

Nationality			
Experience Category	**Experience Variable**	**Discrimi-nant Function**	**Structure Matrix Loadings**
Society	Gender	-.041	-.105
Education	Business Major	-.404	-.194
Work	Job	-.429	-.012
Home & Family	Money Available	-.088	.104
Society	Loan	1.616	.663
Society	Financial Assets	.762	.450
Society	Credit Card	.024	.134
Society	Car	.942	.503
Society	Smoke	-.757	-.220
Society	Who Provides Income	-.182	-.072
Home & Family	Occupation Income Provider	-.046	.248
Home & Family	Charge of Financials	.568	.248
Society	Town	.157	.082
	Constant	-1.008	

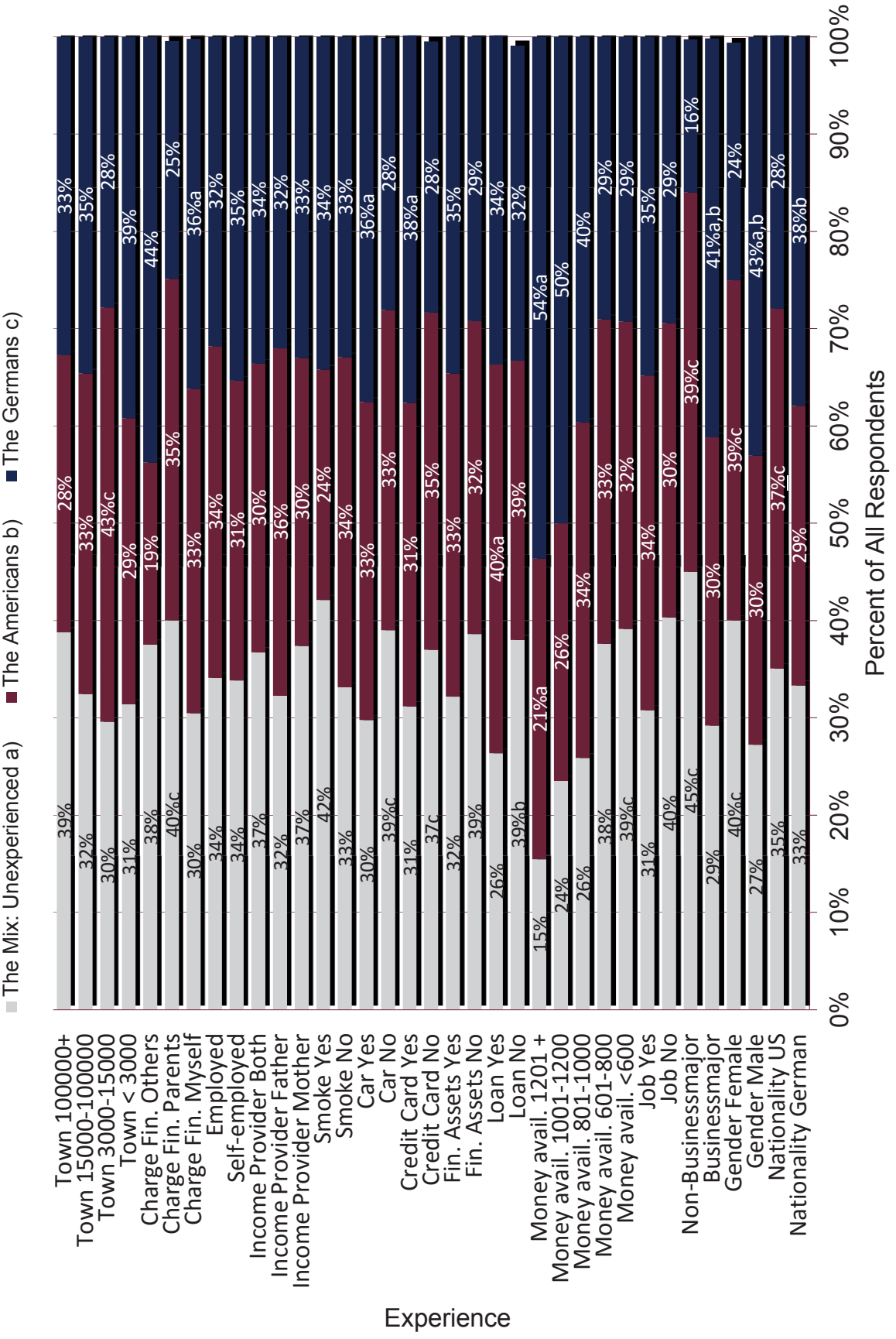
Results Discriminant Analysis Experience	
N German	290
N US	159
Box's M Significance	.000
Eigenwert	0.435
Canonical Correlation	.551
Canonical Correlation squared	30%
Wilks' Lambda	.697
Wilk's Lambda Sign.	.000
Chi-square	159.068
Original groups classified correctly	71%

Appendix 8: Results Discriminant Analysis Judgment

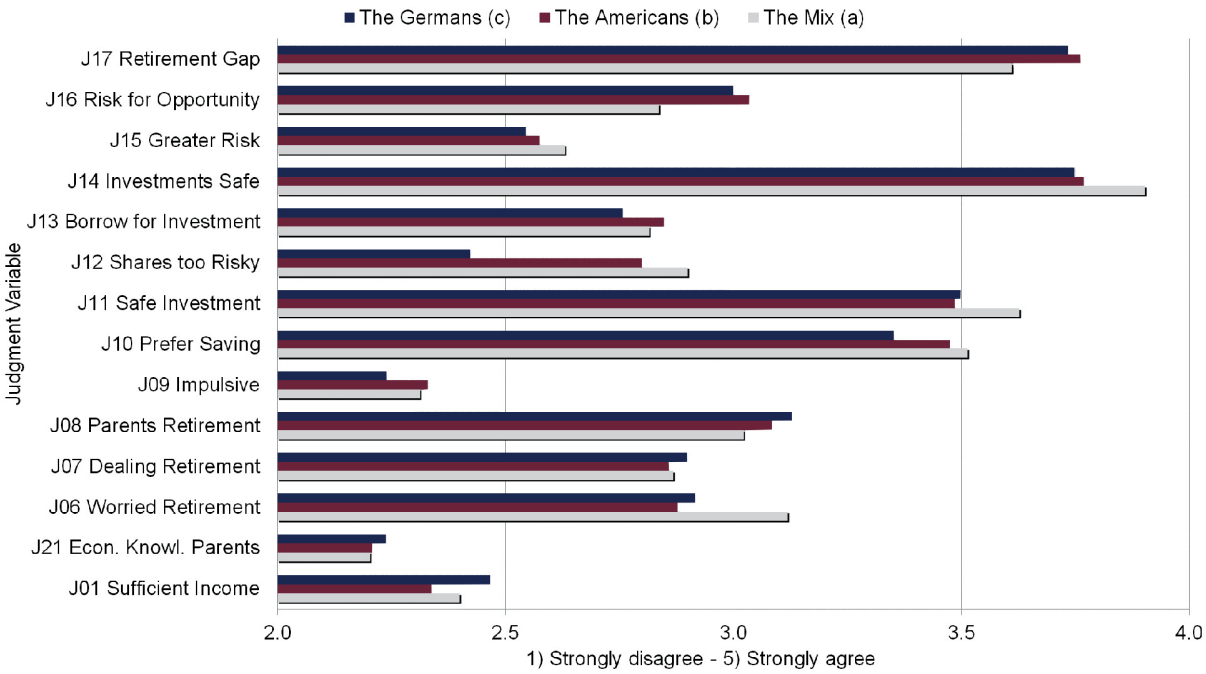
Nationality			
Judgment Category	**Judgment Variable**	**Discrimi-nant Function**	**Structure Matrix Loadings**
Individuality	J01_Sufficient Income	-.176	-.004
Confidence	J02_Spending Behavior	.535	.626
Confidence	J03_Future Budget	.599	.616
Confidence	J04_Evaluating Risk	-.293	.091
Confidence	J05_Econ. Knowledge	-.039	.155
Individuality	J06_Worried Retirement	-.140	-.192
Individuality	J07_Dealing Retirement	.034	
Individuality	J08_Parents Retirment	-.176	-.090
Individuality	J09_Impulsive	.160	-.033
Individuality	J10_Prefer Saving	.074	.108
Individuality	J11_Safe Investment	.272	.048
Individuality	J12_Shares too Risky	-.115	-.160
Individuality	J13_Borrow for Investment	.000	.096
Individuality	J14_Investments Safe	.219	.133
Individuality	J15_Greater Risk	.027	.095
Individuality	J16_Risk for Opportunity	.472	.343
Individuality	J17_Retirement Gap	.282	.247
Motivation	J18_Retirement Plan 12	-.171	-.063
Motivation	J19_Retirement Plan Subsidized	.235	.094
Motivation	J20_Retirement Plan Job	-.045	.119
Individuality	J21_Econ. Knowledge Parents	-.126	-.131
	Constant	-5.475	

Results Discriminant Analysis Judgment	
N German	317
N US	304
Box's M Significance	.000
Eigenwert	2.349
Canonical Correlation	.838
Canonical Correlation squared	70%
Wilks' Lambda	.299
Wilk's Lambda Sign.	.000
Chi-square	735.512
Original groups classified correctly	93%

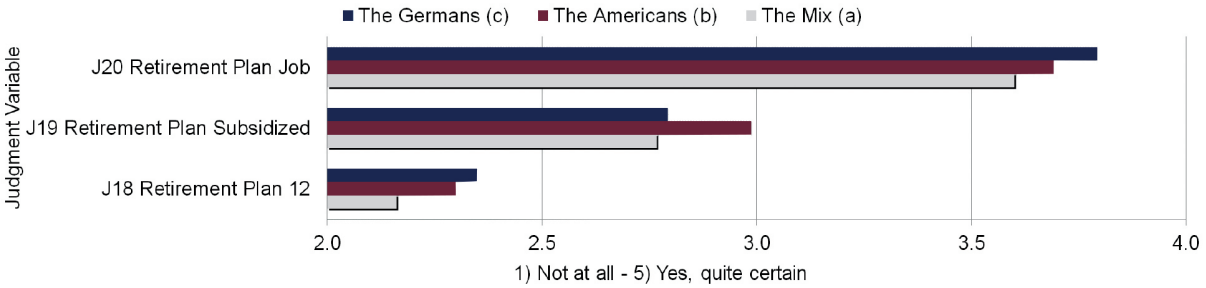
Appendix 9: Cluster Descriptives Experience



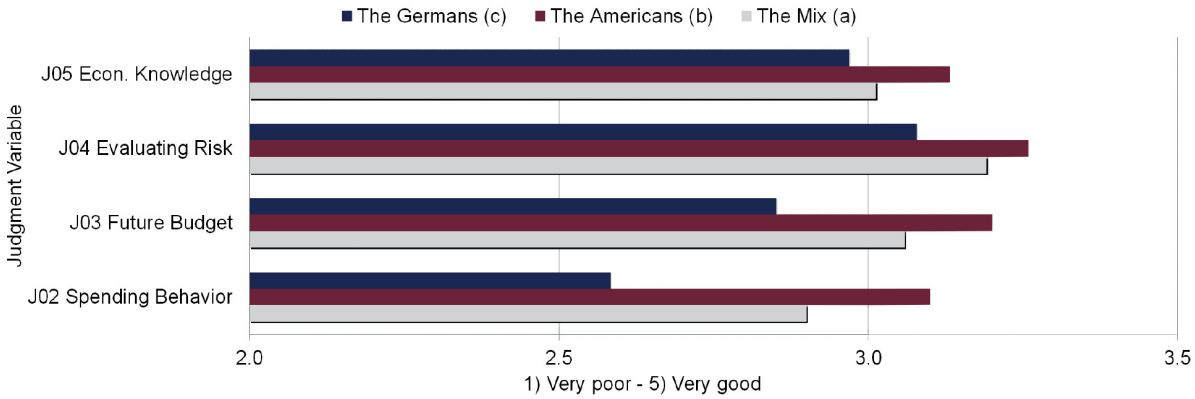
Appendix 10: Cluster Descriptives Judgment Individuality



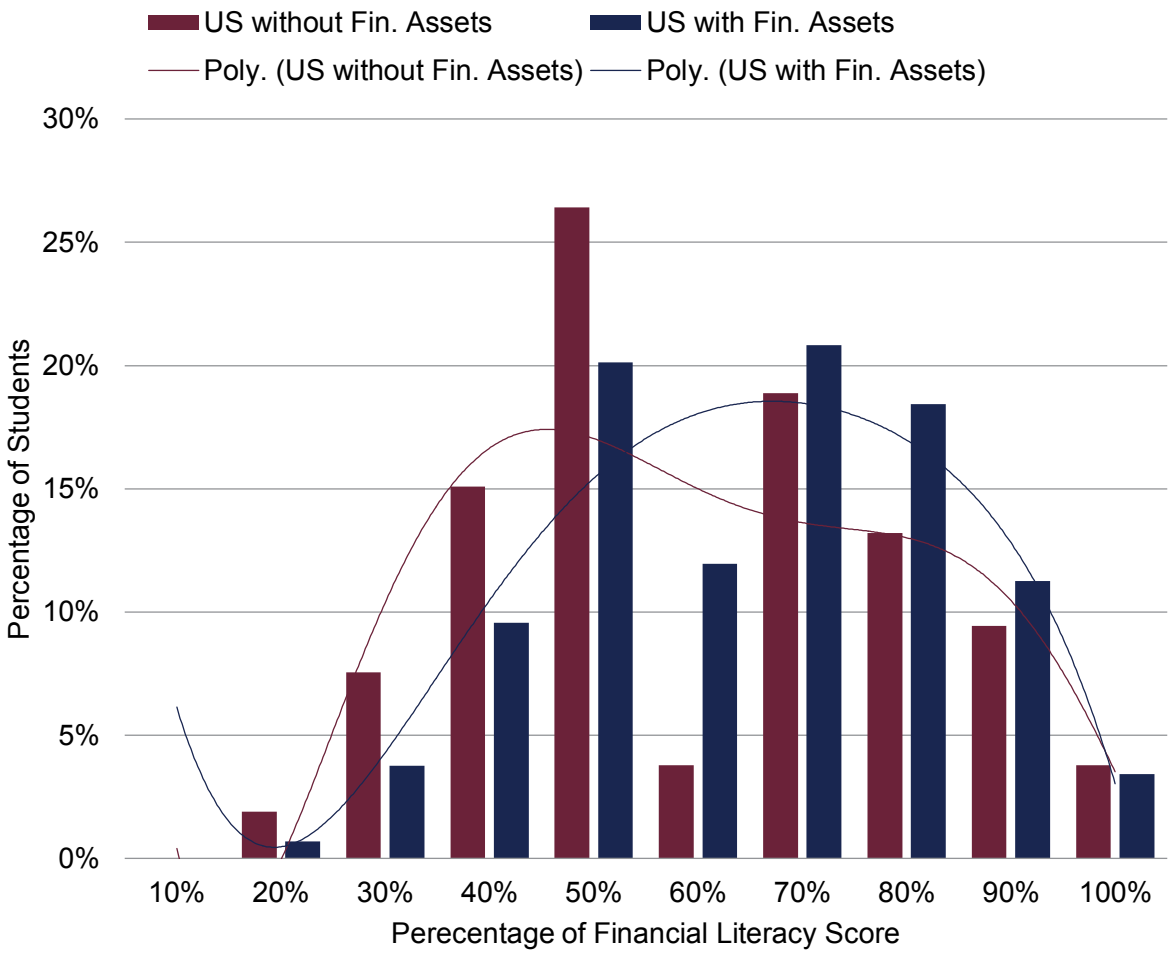
Appendix 11: Cluster Descriptives Judgment Motivation



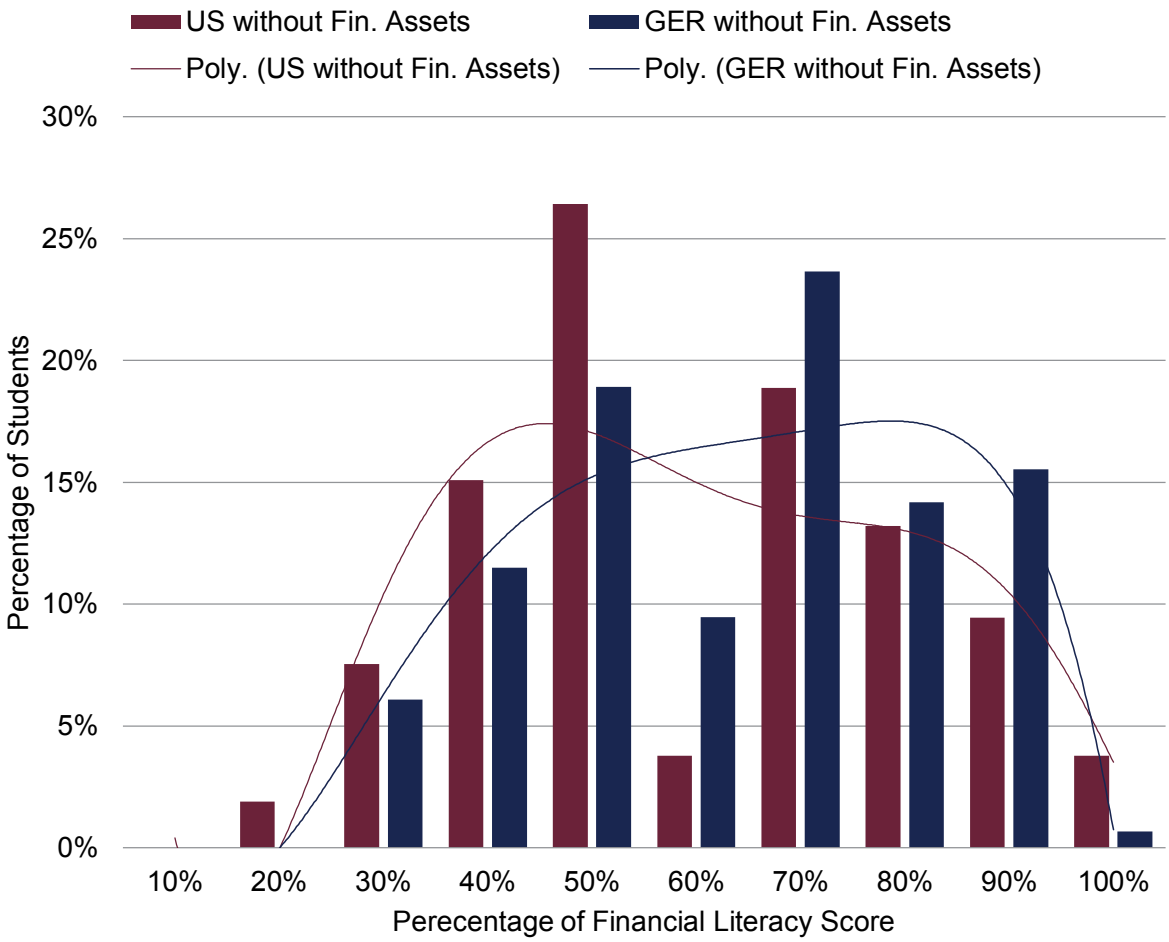
Appendix 12: Cluster Descriptives Judgment Confidence



Appendix 13: FL of Americans with Financial Assets versus Americans without



Appendix 14: FL of Germans without Financial Assets versus Americans without



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