

THE ABILITY TO CREATE HOUSEHOLD WEALTH:  
AN ALTERNATIVE PERSPECTIVE AND CONCEPTUAL FRAMEWORK

by

Jens Wiemker

Submitted in partial fulfilment of the requirements  
for the degree of Master of Science

at

Dalhousie University  
Halifax, Nova Scotia  
July 2022

© Copyright by Jens Wiemker, 2022

## Table of Contents

List of Tables .....	iii
List of Figures .....	iv
Abstract .....	v
List of Abbreviations .....	vi
Acknowledgements.....	vii
Chapter 1: Introduction .....	1
Chapter 2: Review of Literature .....	6
2.1. The role of behavioral biases and heuristics in household finance .....	6
2.2. The role of early-life and adverse events in household finance.....	10
2.3. The role of socioeconomic status in household finance .....	16
2.4. The role of cultural heritage in household finance.....	19
Chapter 3: Presentation of an alternative perspective and conceptual framework .....	23
3.1. Alternative perspective on the ability to create household wealth.....	23
3.2. Conceptual framework .....	27
3.3. Suggestions for further research .....	30
Chapter 4: Discussion and Implications .....	34
Chapter 5: Conclusion.....	39
References.....	40
Appendix A: Tables .....	45
Appendix B: Figures .....	49
Appendix C: Study Questionnaire .....	63
Appendix D: Study Questionnaire – US version edit.....	72

## **List of Tables**

Table 1	Measures of socioeconomic status (Ensminger et al. 2000).....	45
Table 2	The four dimensions of core self-evaluations.....	46
Table 3	Hofstede's six dimensions of cultural differences.....	47
Table 4	Diversity in higher education (2010-2019).....	48

## List of Figures

Figure 1	Earnings and unemployment rates by educational attainment in the US (2021).....	49
Figure 2	Median household income by educational attainment in the US (1990-2018).....	50
Figure 3	Wealth gaps by educational attainment in the United States (1989-2019).....	51
Figure 4	Percentage of labor force by educational attainment in the US (1992-2016).....	52
Figure 5	Historical performance of asset classes in the United States (1972-2020).....	53
Figure 6	Stock price development of GameStop Corp. (NYSE: GME) in 2020-2022.....	54
Figure 7	Gene culture-coevolution (Laland, 2008).....	55
Figure 8	The cycle of influence: economics, psychology, and biology.....	56
Figure 9	Country Comparison – Hofstede’s dimensions (Canada, Germany, Italy, US).....	57
Figure 10	Global debts: Public, Household, and Nonfinancial Corporate (1970-2020).....	58
Figure 11	National debt per capita in the US (1990-2021).....	59
Figure 12	Life expectancy at birth by region (1950-2050).....	60
Figure 13	Number of people with a bachelor’s degree or higher in the US (2001-2021) .....	61
Figure 14	Conceptual framework: the ability to create household wealth.....	62

## **Abstract**

This work reviews the theories and evidence on households' financial decision-making and further relates these to a household's ability to create wealth: how do households' financial decisions differ, what factors are associated with the different decisions leading to different outcomes, and how does a household's ability to make financial decisions relate to the ability to create wealth. The work will furthermore contribute to the existing literature by integrating disparate pieces of literature from research areas independent from finance and behavioral economics such as biology, psychology, neuroscience, anthropology, and sociology into a conceptual framework pertaining to the ability to create household wealth. The developed conceptual framework is intended to serve as a foundation to generate ideas on new theories regarding households' financial decision-making and wealth creation. This work will also contain suggestions for further research and introduce a study questionnaire to validate parts of the developed and presented conceptual framework. Behavioral biases, early-life and adverse event experiences, socioeconomic status, and cultural heritage will be given particular consideration in the conceptual framework and study questionnaire. Against the background of changing retirement systems, namely the shift from defined benefit plans to defined contribution plans and voluntary-contributions personal retirement savings vehicles, this work will demonstrate that the significance of education as a determinant of household wealth is destined to fade. Overall, this work aims to introduce an alternative perspective and conceptual framework for future research on the ability to create household wealth and to policy makers, who are focused on managing household wealth disparities more effectively in the future.

### **List of Abbreviations**

APA	American Psychological Association
CSE	Core self-evaluations
EUT	Expected Utility Theory
GME	GameStop Corporation
IQ	Intelligence quotient
SES	Socioeconomic status
UAI	Uncertainty Avoidance Index
US	United States
VS	Ventral striatum

## **Acknowledgements**

I would like to express my most sincere gratitude to Dr. Rick Nason for his continuous support on my journey through the Master of Science in Business program and his guidance on developing this master thesis. I would also like to extend my sincere thanks to Dr. Greg Hebb and Dr. Yonggan Zhao for providing me with valuable feedback and stimulating input in preparation of this master thesis. At last, I am very grateful to Dr. Hamed Aghakhani and the Faculty of Management community for having given me the opportunity to learn and thrive over the course of the program and equip me with the necessary tools to pursue a PhD in Finance at Arizona State University in the upcoming fall.

## **Chapter 1: Introduction**

The presented work will predominantly focus on making a contribution to the relatively young yet rapidly evolving research area of household finance. Household finance began to emerge in the mid-2000s and gained particular traction with the unfolding and aftermath of the financial crisis in 2008. At the center of this research is household financial decision-making. Such decisions include everything from borrowing and saving to investing.

While household finance may appear to be similar to personal finance at first glance, the two are distinguishably different. Personal finance is much more of an industry term and encapsulates two main components: personal money-management and the practice and profession of financial planning. The first, personal money-management, is primarily concerned with budgeting, insurance, financial planning, tax, and will matters. An example would be parents that are trying to figure out how to send their children to college. Commonly, a professional financial planner may step into this picture and provide assistance. In consultation with the household, the financial planner would develop a personal financial plan that takes into account the household's personal goals (i.e. sending children to college) as well as any other personal investment commitments, cash-flow contingencies, and potentially even tax implications. From an academic perspective, personal finance and financial planning tend to be affiliated with faculties such as human sciences unlike household finance, which is generally affiliated with finance and economic departments at universities.

The research area of household finance takes on a much more holistic and economic perspective on household decisions pertaining to borrowing, saving, and

investing; how households compare to one another in their decisions and respective outcomes. Research topics tend to focus on household portfolio decisions and asset allocation, retirement planning and plan contributions, consumer credit and mortgage debt, payday borrowing, and bankruptcy. In an attempt to understand how households form their decisions, researchers have considered the role of asymmetric information and behavioral biases. More recently, factors such as the socioeconomic status (SES) of a household, the cultural heritage, the cognitive ability, early-life experiences, and the influence of social networks in relation to household finance have drawn the attention of researchers. Influences from psychology, neuroscience, sociology, and anthropology have become more apparent as they are being considered in relation to household finance.

The ability to make sound financial decisions as a household is arguably an important determining factor of the ability to build household wealth if a household itself was responsible for its retirement planning and savings. As this work will illustrate, education has been a strong predictor of household income and household wealth in the past. At the same time, this work will argue that the predictive power has relied more on the correlational relationship than the causal relationship between education and household wealth. The work aims to introduce an alternative perspective as to what factors and research may provide a more accurate framework on how to determine the ability to build (and maintain) household wealth in the future against the background of changing retirement systems and under the consideration of findings and resulting implications from disciplines outside of traditional finance and economics.

Traditionally, the educated class has been associated with individuals and households of higher socioeconomic status (SES). Socioeconomic status is a social

construct which is commonly measured objectively as a combination of independent characteristics such as education, income, and occupation. At the same time, it is crucial to mention -in general and for purposes discussed later in this work- that SES is also frequently measured subjectively (e.g., where does an individual place themselves on the social ladder). Another component of SES is the -objective and perceived- access to resources, both economic and social.

Figure 1, Figure 2, and Figure 3 show that the cohort of higher educated households has historically tended to achieve higher household income and household wealth in comparison to their less educated peers of relatively lower SES. While the relationship between education and household income is likely to remain the same in the future, the relationship between education and household wealth will be argued to change.

With increased access to higher education, individuals of a much broader range of SES do not only attend but graduate university in North America. Based on the fact that more individuals are attaining university degrees, as shown in Figure 4, and that a higher level of attained education has historically translated into higher household income and household wealth (Figure 1, Figure 2, and Figure 3), one may expect that even more households will fare financially well in the future and attain greater household wealth in the process.

However, based on emerging evidence related to financial decision-making, it has to be considered that other factors are likely to provide greater influence on the ability to create household wealth than a formal education per se. While education has and will likely continue to level the playing field in terms of expected household income, the level

of education may not be as good of an indicator -in the future- of how well a household will fare in attaining household wealth. This is particularly so against the background of governments (and employers) shifting more responsibility on the individual household when it comes to retirement planning and savings. This circumstance exposes households to influences stemming from behavioral economics, psychology, neuroscience, biology, sociology, and anthropology.

The presented conceptual work will involve comprehensive reasoning and will therefore be argumentative in nature. It hopes to establish and convey an alternative perspective and framework that will lead to an appreciation as to why the ability to build household wealth will likely lie -to a significant degree- beyond educatable means (e.g., attaining a higher level of formal education per se). In order to achieve this purpose, the work will integrate disparate pieces of literature into a framework conveying the alternative perspective. The framework is furthermore intended to be used to generate future ideas for new theories and research pertaining to the ability to create household wealth.

Accordingly, Chapter 2 will take stock of emerging empirical evidence and explanations that relate to household finance on the basis of cognitive biases, early-life and adverse event experiences, socioeconomic status, and cultural heritage. Chapter 3 will introduce the alternative perspective and conceptual framework on the ability to create household wealth (in the future). Chapter 3 will also contain suggestions for further research and introduce a study questionnaire to test some of the propositions related to the presented conceptual framework. Chapter 4 will discuss limitations and

implications related to the presented alternative perspective, conceptual framework, and proposed study. Chapter 5 will then conclude the work discussed and presented.

## **Chapter 2: Review of Literature**

### **2.1. The role of behavioral biases and heuristics in household finance**

The research field of Behavioral Economics is generally said to be rooted in the groundbreaking work of Israeli psychologists Daniel Kahneman and Amos Tversky. The introduction of their Prospect Theory in 1979 marked not only the beginnings of Behavioral Economics but imposed a limit on neoclassical economics and the modern expected utility theory by von Neumann and Morgenstern (1944). Behavioral Economics strives to describe and explain the actual behavior by people under risk and uncertainty (based on biases, heuristics, and other psychological effects), contrary to the framework modeled after decisions of perfectly rational agents (EUT).

In their Prospect Theory, Kahneman and Tversky (1979) showed that investors value gains and losses differently. This cognitive bias is known as loss aversion. To illustrate, loss aversion is the tendency of an individual to prefer avoiding the loss of a certain amount of money over gaining the equivalent amount of money. Another observable form of loss aversion would be: an investor buys a stock that has gone up in price and sells it when it has gone down in price. Research by Dimmock and Kouwenberg (2010) has shown that loss aversion reduces the probability of a household to participate in the stock market. Non-participation in the stock market is however detrimental to building household wealth.<sup>1</sup>

Another prominent cognitive bias in Behavioral Economics is the so-called confirmation bias. The confirmation bias was originally introduced by English psychologist Peter Wason (1960) and describes the tendency of an individual to seek out

---

<sup>1</sup> based on the historical performance of asset classes (Figure 5)

information that strengthens or validates previously held beliefs. To illustrate, an investor or household would seek out information that strengthens or validates previously held beliefs about a particular stock or a certain macroeconomic trend, for example. The presence of confirmation bias among investors was identified by Duong et al. (2014), who studied how financial information is used by investors. Acting on such information and bias can consequently have (severe) adverse effects on the financial outcome of a choice made by an individual or household.

Unlike the two previously discussed biases, the so-called overconfidence bias is unique in that it can also possess significant benefits for an individual and household, including for its ability to create wealth as well as for social mobility purposes in general. Overconfidence is present when individuals overestimate their abilities. As one can logically infer, this trait can be as damaging as it could be beneficial. For example, Belmi et al. (2020) conducted a series of studies on overconfidence among individuals of relatively high vs. low social class. They found that overconfidence is more pronounced among members of relatively higher social class than among individuals of relatively lower social class. They furthermore linked the more pronounced overconfidence among members of relatively higher social class to the desire to achieve high social rank. More importantly, even in scenarios in which members of the relatively higher social class had no performance advantage, they exhibited a greater amount of overconfidence than the members of the relatively lower social class. Because overconfidence allows individuals to appear more competent on average, the likelihood of attaining a higher social rank increases for these individuals. At the same time, overconfidence does not lead to value-maximizing investment decisions (Pikulina et al., 2017).

Another common cognitive bias present among humans and thus in households and investors, both private and retail, is the endowment effect. The endowment effect describes the phenomenon in which individuals attach greater value to possessions that they own. To illustrate, investors associate greater value with the stocks they own than they would associate with the very same stocks if they did not own them. Accordingly, investors may experience a difficult time to part with their position in a stock. This holds true even when the investors' position has experienced significant gains (on paper) and they would be advised to rebalance their portfolio under the modern portfolio theory (Markowitz, 1952). However, given this particular cognitive bias, investors may not exit their position because they became emotionally attached to their position (expecting a higher price for their position than they themselves would pay if they were to acquire their own position), potentially exposing themselves to greater risk and a non-value-maximizing portfolio.

While the endowment effect can be used to describe the phenomenon in which investors have gotten emotionally attached to their position and do not rebalance their portfolio despite significant (paper) gains, the sunk cost fallacy (also known as the sunk-cost effect) describes the phenomenon in which investors continue to invest further funds into a "losing" position regardless of objective measures and best practices that would indicate not to do so. While this behavior is not only irrational, it can very well lead to significant financial losses.

Even if investors do not invest further funds into positions that have lost value, yet they hold on to their position because they do not want to realize the actual loss, the behavior is irrational and non-value maximizing. Behavioral economists call this

phenomenon the status quo bias. It describes the tendency of an individual to leave matters as they are and a resilience to embrace the change and action one would take as a rational agent.

A psychological phenomenon that has gained particular traction and popularity in recent times is the so-called bandwagon effect. The bandwagon effect is present when an investor buys a stock because everyone else in the market appears to be chasing it. With the existence of social media networks, this behavior has arguably been amplified, as the number of retail investors has significantly increased over the past decade and a significant amount of retail investors rely on information from social media platforms (e.g., Facebook, Reddit etc.) to inform their investment decisions.<sup>2</sup> Following other investors in their course of action provides the investor duplicating the actions with a sense of safety. It does so because the investor would otherwise fear of missing out on a great return, despite the fact that the investor may be turning a blind eye to the risk involved. A very prominent example of the bandwagon effect is the stock rally of GameStop Corp. (NYSE: GME) in 2021. As Figure 6 shows, in August 2020, GME was still trading at less than \$5 per share and only made moderate gains until the beginning of 2021. Yet, on January 25, 2021 the stock opened at around \$96, gained a high of \$483, and closed at \$325. Based on the severity of such behavior, the bandwagon effect is also referred as the herding effect.

Overall, every human being is subject to cognitive biases. Because of our limitation as humans to process all information at any time, we have developed heuristics, which are mental shortcuts and rules of thumb to deal with everyday life situations,

---

<sup>2</sup> Ontario Securities Commission report, 2021: Self-directed investors: insights and experiences ([Link](#))

whether they are personal, professional, or financial in nature. Heuristics reduce the cognitive load and allow us to function without having to pause at every step of the way, having to attempt processing all information. Biases and heuristics are unconscious and automated processes (Kahneman, 2011; Van Lange et al., 2021, p. 50 f.). Some individuals and households are more prone to having biases or heuristics, leading to inaccurate conclusions, than others. While the evolution and development of cognitive bias is complex in nature, there are various factors that have been identified as contributing to the variance in certain biases. To name a few: demographics, genetics, intelligence as well as the need for cognition<sup>3</sup>, cultural capital, life-experiences, and environment (Hodges et al., 2022; Brewster et al., 2014; Teovanović et al., 2015).

## **2.2. The role of early-life and adverse events in household finance**

The experiences made by an individual early on in life, the exposure to certain environments, and the witnessing of adverse events have all shown to have a significant influence on and correlation with the choices made by a household, and consequently the well-being and performance of the household's finances. This section will address childhood development in general (and particularly the cognitive development of a child and human) before it is going to summarize the latest research endeavors in the area of household finance pertaining to the role of early-life and adverse events and present the most relevant findings from disciplines such as psychology, neuroscience, and behavioral economics.

---

<sup>3</sup> “the tendency for an individual to engage in and enjoy thinking” (Cohen et al., 1955; Cacioppo & Petty, 1982, p. 116)

The main areas of (childhood) development are: a) motor and physical, b) language and communication, c) cognitive, and d) social and emotional. Arguably, of particular relevance to household finance is the aspect of cognitive development. The cognitive abilities are the brain's skill set and mechanisms on how to develop knowledge (i.e. think, read, learn, and remember), to reason, to pay attention, and to solve problems. As most of the human brain growth occurs in the first five to six years of life, childhood and early-life events have shown to be of great importance to the cognitive development of a human.<sup>4</sup>

In the theme of childhood and cognitive development, poverty and neglect have been demonstrated to be particularly significant negative environmental factors (Smith et al., 1997; Sedlak and Broadhurst, 1996). Furthermore, imaging studies have identified abnormalities in the brain structure (e.g., cerebral) among individuals who have experienced childhood neglect (De Bellis et al., 2009; Grassi-Oliveira et al., 2008). To further illustrate the adverse brain development of individuals who were exposed to the aforementioned environmental factors in their childhood, Loughan and Perna (2012) conducted a study on children with a background of poverty and neglect. They found that of these children: a) 56% had below average IQ scores, b) 32-52% demonstrated below average academic ability, c) 36-55% had below average memory testing, and d) 36-47% demonstrated below average executive functioning.

Other research has demonstrated that the development of the brain and cognitive function over a life-time are closely linked to the socioeconomic status in childhood, but also that poverty [including at a later stage in life] impedes the cognitive function of an

---

<sup>4</sup> Help Me Grow initiative, State of Minnesota (Department of Education, Department of Health, and Department of Human Services)

individual (Hackman and Farah, 2009; Mani et al., 2013). While the first is strongly tied to chronic stress during the childhood, the latter is based on the circumstance that when people perceive themselves as poor, then this in itself constrains mental resources, impeding on cognitive function. At the same time, having less and being in a state of scarce resources have been found to help explain why [actual] poor individuals engage in the behavior of overborrowing – because of a shift in attention allocation (Shah et al., 2012).

Related to the role of early-life, Evans et al. (2009) demonstrated that childhood poverty, which leads to chronic stress, ultimately leads to working memory impairments [that sustain into and throughout adulthood]. The working memory of an individual is of great importance when it comes to processing information and problem-solving as well as storing information for future guidance. The working memory is therefore crucial in the decision-making process of any individual. Accordingly, this neurocognitive and biological mechanism helps explain why households whose members grew up in poverty or in a relatively lower SES environment tend to make less optimal financial choices and decisions than their counterparts who grew up in a relatively higher SES environment. Hanson et al. (2016) identified lower ventral striatum (VS) activity among adults who experienced chronic stress very early on in their childhood. The VS is a cluster of neurons in the brain that is critical for the neurological reward system of an individual. In essence, the observed lower VS activity translates into adults not being as receptive to positive stimuli in comparison to their counterparts who did not experience chronic stress early on in their childhood. Closely linked to lower VS activity are furthermore poor

moods and less optimism as well as the lack of resilience, which are crucial traits and prerequisites for the personal and financial well-being of an individual.

Haushofer and Fehr (2014) argue that the psychological consequences from poverty lead to behavior and choices that keep individuals and households in poverty. It is the associated stress factor that is the driver behind these negative states, which affect the decision-making process of an individual adversely and tends to result in more risk aversion as well. While (childhood) poverty has been linked to suboptimal consumption and budgeting choices, it is also associated with undersaving as well as underinvestment in education (Banerjee and Duflo, 2007). As savings are a crucial part in attaining a degree of financial freedom and peace of mind -which in return would be expected to lower stress- it is crucial to mention that the savings behavior of individuals is linked to their genetic predisposition, though parenting can have a moderate influence on the savings behavior of a child and young adult (Cronqvist and Siegel, 2015).

Complementary to the role of early-life is the experience of adverse events in an individual's life. In the context of household finance, adverse events can be of micro- and macroeconomic scope alike. Adverse events of microeconomic scope can be such as the loss of a job or the loss of money in the stock market. The ones of macroeconomic scope can be such as living through a difficult economic period in time or being exposed to misfortune among members of an individual's personal circle (e.g., family, friends, neighbors etc.).

Malmendier and Nagel (2011) found that "individuals who have experienced low stock market returns throughout their lives [...] report lower willingness to take financial risk, are less likely to participate in the stock market, invest a lower fraction of their

liquid assets in stocks if they participate, and are more pessimistic about future stock returns” (p. 373).

The personal background and former life experiences tend to also transcend into the decision-making process of an individual as an organizational actor. Malmendier et al. (2011) found that CEOs who witnessed difficult economic times in their childhood and earlier on in life are more averse to taking on company debt than their executive peers who did not grow up in similar times. The CEOs with such early-life experience tended to make more of an effort to utilize internal resources to finance the company’s investments than their counterparts who grew up without experiencing difficult economic times. While the experience of adverse economic times can shape the decision process of an individual, so can other background traits and experiences. Malmendier et al. (2011) also found that if a CEO had prior military experience, he was more likely to engage in utilizing external debt and pursue a leveraged strategy.

Knüpfer et al. (2017) report that even when an individual has not personally gone or lived through hardship, the probability that the individual will participate in the stock market is still lower when the individual witnessed misfortune among members of their own personal circle. Thus, the mere exposure to and witnessing of adverse events among others tends to make an individual more risk-averse, negatively affecting participation in the stock market.

Kuhnen (2015) conducted an experiment to test whether an individual’s investing behavior and beliefs about investing opportunities changes when the individual experiences positive investment outcomes over negative ones. The study found that when an individual experiences the latter, the individual indeed becomes more pessimistic

about investing. Accordingly, a household's choices and investing behavior tends to change depending on the overall economic state.

Findings from psychology may help explain the phenomenon as to why decision-makers may become more reluctant to participate in the stock market after having experienced a loss in the financial market, financial hardship in general, or witnessed adverse economic events among members of their personal circle. Specifically, psychologists have found and demonstrated in various ways that individuals are more influenced by personal experiences than statistical information (Nisbett and Ross, 1980; Weber et al., 1993; Hertwig et al., 2004; Malmendier and Nagel, 2011).

Overall, this section has demonstrated that an individual's childhood takes a significant role in the cognitive development of that individual. The existence of chronic stress particularly during childhood tends to place a limit on the cognitive ability of an individual. The adverse brain development related to childhood environmental factors such as poverty and neglect is hardly reversible during adulthood. Yet, the cognitive development and abilities have a significant impact on personality traits that help explain differences among economic choices and investment behaviors of households regardless of the overall economic conditions present. At the same time, even when individuals of a household do not possess such cognitive limitations, they still tend to be influenced in their investment behavior and economic choices by the witnessing of or exposure to adverse economic events in their personal lives as well as personal circles (Knüpfer et al., 2017).

### **2.3. The role of socioeconomic status in household finance**

Socioeconomic status (SES) is a social construct which can be measured objectively and subjectively. When measured objectively, it is commonly measured by either education, income, occupation, or a combination of these independent characteristics. While education can be measured using relatively straight forward continuous variables and categorical variables, measuring income is already much more diverse in nature. For example, it can be measured simply in terms of household income. It however can also be measured in terms of thresholds (e.g. poverty threshold levels). It furthermore can be measured in absolute and in relative terms.<sup>5</sup> All in all, it is crucial to be aware of how relatively high SES versus relatively low SES was measured in any given study. The third independent characteristic, occupation, can be distinguished in terms of occupational complexity, employer vs. employee status, power structures, skill level, job title, and work environment conditions – to name the most common ones.

When SES is measured subjectively, the study participants are usually asked where they see or would place themselves on the social ladder.<sup>6</sup> To illustrate, individuals may be asked whether they consider themselves to be part of the “working class”, “middle class”, “upper middle class”, or so forth. This type of survey question utilizes categorical variables. A study design may however also utilize continuous variables to measure SES subjectively. For example, individuals may be posed with the question how they would rank their access to economic resources on a given scale (e.g., 0 to 10; 10

---

<sup>5</sup> American Psychological Association: Measuring Socioeconomic Status and Subjective Social Status

<sup>6</sup> American Psychological Association: Measuring Socioeconomic Status and Subjective Social Status

being the highest). They may also be asked how they would rate their access to social resources<sup>7</sup>.

As much as SES can be measured in terms of perceived access to resources, both economic and social, it can also be measured in terms of objective or assumed access to such resources based on proxies related to education, income, or occupation.

Pertaining to observing differences in household economic choices and investment behavior based on SES, Kuhnen & Miu (2017) conducted a study in which they investigated whether individuals of different SES learn differently from financial information. In their study, they utilized four different measures of SES to validate their findings. The first measure of SES was based on a score computed in accordance with Ensminger et al. (2000). Table 1 illustrates how SES was measured and scored in detail. Based on the participants' responses and composed score (on a scale from 0 to 100), the roughly 200 participants of the study were divided into a lower SES subsample (1/3 of participants) and a mid to higher SES subsample (2/3 of participants). Kuhnen & Miu (2017) further utilized two other measures of SES which were objective in nature. One measured whether a certain income threshold was met, the other whether a certain educational threshold was met. The fourth measure of SES was subjective in nature. Participants were asked to place a value on their perceived societal ranking (on a scale from 0 to 10). Participants were assigned to the relatively lower SES group when they did not meet the threshold on the two objective measurement questions as well as when they ranked themselves lower than a five on the subjective measurement question. Otherwise, the participants were placed in the relatively higher SES group for each measure of SES. Participants were asked to make a series of investment choices. Each time they were

---

<sup>7</sup> resources embedded in an individual's social network (e.g., access to support, assistance etc.)

given the option to invest in a risky asset (i.e. stock) or a safe asset (i.e. bond). Kuhnen & Miu (2017) found that for three of the four measures of SES, participants of lower SES formed more pessimistic beliefs about the future returns of the risky asset.<sup>8</sup> Such pessimism led participants in the lower SES to avoid investing in the risky asset over a series of investment tasks, and to rather invest in the safe asset (i.e. bond) with a known payout.

Other studies have shown that macroeconomic expectations (e.g., future performance of the economy or stock market) differ among households of different SES as well as households of different levels of attained education (Souleles, 2004; Das et al., 2020). Again, based on the respectively applied measure of SES, those of relatively lower SES possessed more pessimistic beliefs. Such pessimism is detrimental as the risk-aversion toward and non-participation in risky asset markets such as the stock market are ultimately detrimental to the accumulation of household wealth.

This section, so far, has demonstrated that there is a variety of SES measures available and possible, and that these can be objective and subjective in nature. Both types of SES measure have shown to help explain differences in the forming of economic beliefs and expectations of households as well as how such differences consequently lead to different outcomes in economic choices and investment behavior. For the purpose of this particular work, the remainder of this section will focus in further detail on the importance of perceived SES.

---

<sup>8</sup> The measure of SES that did not show significance was the objective education threshold measure (i.e. whether neither of the participant's parents has attained a higher education degree).

Take the relationship of social class and self-views for example. Individuals of relatively higher SES have been found to possess higher positive core self-evaluations<sup>9</sup> (CSE) than individuals of relatively lower SES (Kraus & Park, 2014; Judge & Hurst, 2007). Furthermore, high positive CSE is not only a reliable predictor of future income but more importantly “high core self-evaluations enhance the benefits derived from” factors such as income, family SES, and academic achievement (Judge & Hurst, 2007, p. 1212).

Social class has also been shown to be correlated with the tendency of an individual to engage in selfish behavior as well as with the perceived sense of control and the perceived sense of power that an individual possesses (Kraus et al., 2009; Dubois et al., 2015). Individuals of relatively higher SES had a greater tendency to exhibit the aforementioned traits than individuals of relatively lower SES.

The discussed (investment) behavior and tendencies based on SES are of great importance to a person’s social and professional success. Because social class shapes the beliefs of an individual about his abilities, Belmi et al. (2020) believe that this phenomena in itself has a significant impact on how status hierarchies perpetuate.

#### **2.4. The role of cultural heritage in household finance**

The role of cultural heritage<sup>10</sup> is another important component that plays a crucial role in the decision-making process of an individual, and consequently in household economic choices and investment behavior.

---

<sup>9</sup> The four dimensions of core self-evaluation (CSE) are: self-esteem, generalized self-efficacy, emotional stability, and locus of control. Table 2 contains a more detailed description of each dimension. The four dimensions are based on the core self-evaluation theory (Judge et al., 1997).

<sup>10</sup> cultural origin of a person, cultural influence on a person (e.g., ancestral or environmental)

Among the members of society, there is variation in behavior due to the genetic predisposition influenced by the respective cultural and ancestral background of the individual. As illustrated in Figure 7: culture shapes genes and genes shape culture – over time and over generations (Laland, 2008). In accordance with Figure 7, social transmission<sup>11</sup> plays another significant role in household finance.

An evolving, interdisciplinary research field called neuroeconomics aims to understand the biological basis of decision-making. While neuroeconomics' original approach was primarily focused on taking and applying theories from economics and psychology while observing and monitoring the neural activity of the respective study participants, its more recent approach has shifted to attempting the utilization of neuroscientific data to predict variables that are of interest to economists (e.g., risk-aversion, novelty-seeking etc.).<sup>12</sup> As Figure 8 demonstrates, both approaches have their validity considering the permanently on-going cycle of influence among economics, psychology, and biology. Though genetic studies in neuroeconomics are still scarce, there have been important findings with implications for household finance. For example, Kuhnen & Chiao (2009) found that the possession or lack of certain genes (and their variants) significantly influence the economic choice and investment behavior of individuals. Specifically, the degree of risk-taking varied among the participants of the study. From an evolutionary and anthropological perspective, risk-taking is speculated to be linked to novelty-seeking<sup>13</sup>. Accordingly, an individual's financial decision-making

---

<sup>11</sup> the transfer of customs, language, or other aspects of the cultural heritage of a group from one generation to the next (source: APA Dictionary of Psychology)

<sup>12</sup> Prof. Joe Kable (UPenn): Current Progress in Neurofields: Neuroeconomics (publicly available lecture)

<sup>13</sup> a personality trait characterized by a strong interest in having new experiences; it is often associated with risk-taking behavior, and hence the term may be used synonymously with sensation seeking (source: APA Dictionary of Psychology)

and investment attitude may -in part- be rooted in and influenced by the respective individual's ancestral exposure and necessity to novelty-seeking behavior.

For the scope of this work, it is furthermore of great importance to address the Hofstede's cultural dimensions theory (Hofstede, 1980) and to discuss one of its six dimensions in particular: the uncertainty avoidance index. In 1980, Dutch social psychologist Geert Hofstede -inspired by his work for IBM- developed a framework to distinguish (national) cultures from around the world based on certain attributes. Though the original framework contained only four dimensions, it has since evolved into a framework using six dimensions. These are namely: 1) power distance, 2) individualism, 3) masculinity, 4) uncertainty avoidance, 5) long-term orientation, and 6) indulgence.<sup>14</sup> Table 3 contains the official definitions of these six dimensions. For the purpose of this work and section, however, attention will be given to the uncertainty avoidance index (UAI). The UAI captures the degree to which a society is uncomfortable dealing with unknowns about the future. To illustrate by example, Figure 9 displays the Hofstede index values of four different countries: Canada, Germany, Italy, and the United States.<sup>15</sup> Among these, the US has the lowest UAI (value: 46) and Italy the highest (value: 75).<sup>16</sup> Put into context, this means that in terms of cultural difference, Americans are much more comfortable with uncertainty and ambiguity than Italians. Another way of expressing the differences in this dimension would be the receptiveness to new and unorthodox ideas.

---

<sup>14</sup> The original four dimensions were: power distance, individualism, masculinity, and uncertainty avoidance.

<sup>15</sup> Hofstede index values are on a scale of 0 to 100

<sup>16</sup> Hofstede UAI values (of the comparison): Canada: 48, Germany: 65, Italy: 75, and the United States: 46

Pertaining to the idea of cultural influences and social transmission, Pan et al. (2020) performed a very enticing study, relating the Hofstede UAI to CEOs' corporate decision-making. Among their findings was that "CEOs with a more uncertainty-avoiding cultural heritage are less likely to engage in acquisitions" and "uncertainty-averse CEOs prefer targets in familiar industries and targets that can be more easily integrated" (p. 2977). They furthermore found that "cultural identity by CEOs' parents and the ethnic composition of CEOs' early life environment significantly influence the cultural transmission process. Cultural differences about uncertainty attitudes persist over multiple generations, but become less pronounced over time" (p. 2977).

Overall, the discussed findings in this section give reason to believe that cultural heritage plays a crucial role in the decision-making process of an individual. Attributes such as risk-aversion and novelty-seeking can be traced back to cultural influences, whether parental, ancestral, or environmental (social transmission). These very attributes have shown to be of significant influence on household economic choices and investment behavior.

## **Chapter 3: Presentation of an alternative perspective and conceptual framework**

### **3.1. Alternative perspective on the ability to create household wealth**

Traditionally, the educated class has been associated with households of higher socioeconomic status (SES). Consider Figure 1 and Figure 2, for example: members of the higher educated cohort have -historically- achieved higher incomes than members of the less educated cohort. Accordingly, it is no surprise that societies and governments have had a strong incentive for its members and citizens to attain higher levels of education. The expected higher incomes [resulting from a higher educated workforce] are desirable for households as they generally lift the standard of living and for governments as they tend to raise the overall tax revenue.

Historically correlated with the level of education has also been the level of household wealth (Figure 3). As can furthermore be seen in Figure 3, the gap in median household wealth between the differently educated households has been relatively steady over time. This work is going to argue that the predictive power of education has relied more on the correlational relationship than the causal relationship between education and household wealth. Going forward, other factors may be better suited as determinants of the ability to create household wealth.

Public debts -nominal and per capita- have been growing at staggering rates over the past decades (Figure 10 and Figure 11). The life expectancies of people worldwide, on the other hand, have also steadily grown over the past decades, and are projected to continue to do so (Figure 12). With greater life expectancy grows the demand on retirement savings as well as public health expenditures, the latter of which would once again negatively contribute to public debt, *ceteris paribus*. Considering the rising cost of

health care globally<sup>17</sup>, one would have to assume that public health expenditure is however going to grow even more, placing an even greater strain on public funds.

Based on developments and forecasts preceding the last few decades, retirement systems had already begun to change, and they continue to do so, ultimately placing greater responsibility on the individual household. The trend has been a shift from publicly funded plans (administered by a government) and employment-based defined-benefits pension plans to employment-based defined-contributions plans and personal retirement savings vehicles.

In 1978, the U.S. Congress passed the Revenue Act of 1978. Among various changes to the tax code (i.e. tax rates and tax brackets), it added a section to the U.S. Internal Revenue Code called: 401(k). In essence, this provision allowed employees to avoid taxation on deferred compensation. Ultimately, this provision formed the basis of what came to be known as the retirement savings vehicle in the United States. A 401(k) retirement plan is basically a contribution plan (funded by pre-tax payroll deductions) that often times consists of a financial portfolio holding stocks and bonds. The portfolio is commonly managed by an external, company-sponsored financial manager, who invests the funds based on a declared risk profile (e.g., high, medium, low risk investments). This vehicle essentially allowed companies to unburden themselves of the liability to guarantee any particular kind of retirement benefits (i.e. defined-benefits pension plans) to the retiree upon retirement. Though it is common that employers match the employees' contributions to the plan (up to a certain amount), the performance of the actual retirement savings account (i.e. 401(k)) is now subject to the performance of the financial markets. As a result, the responsibility no longer lies with the employer,

---

<sup>17</sup> The New York Times: A World of Rising Health Care Costs

including the guarantee to any defined retirement benefits. Furthermore, employees generally had to opt into this type of retirement vehicle (i.e. 401(k)), which in itself created a detrimental barrier to retirement savings, as will be discussed later on.

Canadians have the option of contributing to a so-called Registered Retirement Savings Plan (RRSP). While the RRSP is not identical with the 401(k), it can be compared to the traditional Individual Retirement Account (IRA) in the US.<sup>18</sup> Considering that US social security benefits and Canada Pension Plan benefits are only intended to replace part of an individual's income upon retirement, it is interesting to see what other vehicles have been introduced by governments over time.

A good example of such vehicle is the Canadian Tax-Free Savings Account (TFSA), which was introduced in 2009. An individual can make after-tax contributions (subject to an annual cap; 2022: \$6,000<sup>19</sup>) to a declared TFSA account. A TFSA account can be a traditional savings account earning interest, but it also permits any type of investment that an RRSP does.<sup>20</sup> Any gains earned in the TFSA account are tax-free.

Other countries have introduced similar or different mechanisms and vehicles over time. For example, in 1975, Germany introduced the so-called 'Sparer-Freibetrag' (~ saver amount of exemption), which represents annual threshold for tax-free capital gains.<sup>21</sup> In 2002, Germany introduced another publicly subsidized, yet personally voluntary funded form of retirement vehicle with the so-called 'Riester-Rente'.

---

<sup>18</sup> RRSP & traditional IRA: Individual can make pre-tax contributions to such an account. Investments in the account grow tax-deferred. Taxes are paid on the withdrawals from the account.

<sup>19</sup> Tax-Free Savings Account, Canada Revenue Agency; annual cap is indexed to inflation and rounded to the nearest \$500

<sup>20</sup> cash, mutual funds, stocks, GICs, bonds, and certain shares of small business corporations

<sup>21</sup> with the introduction of a flat rate tax of 25% on capital gains in 2009, the 'Sparer-Freibetrag' turned into the 'Sparer-Pauschbetrag'

Overall, and for the purpose of this work, it is crucial to make the following observation: the aforementioned developments and trends have and continue to shift more and more responsibility regarding retirement savings [and the planning thereof] onto the individual household. Against this background, a household is likely to become more subject to its own attitudes, skills, beliefs, and “flaws” when it comes to the ability to create household wealth despite attaining a higher level of education and household income. Governments (and employers) putting more and more responsibility on the individual household when it comes to retirement planning creates an environment in which influences from behavioral economics, psychology in general and social psychology in particular, neuroscience, biology, sociology, and anthropology take on a more important role. Such influences may have serious implications for the ability to create and maintain household wealth in the future.

As Figure 13 shows, in the past 20 years, proportionally more and more members of society have attained a higher education degree. While the US population has only grown by 7.35% from 2010 to 2020<sup>22</sup>, the number of people that have attained a higher education degree has grown by 38.44% from 2011 to 2021 (Figure 13). Figure 4 supports the aforementioned trend, disclosing the proportions of the work force by attained educational level from 1992 to 2016. Education has and will likely continue to help level the playing field in terms of expected household income. However, as households will become more and more responsible for their own retirement planning, the significance of education as a determinant of household wealth may fade for the following reason.

Traditionally, a higher education translated into a higher income. The correspondingly higher level of income can be argued to have translated into higher

---

<sup>22</sup> U.S. Census Bureau 2020 census

automated, involuntary retirement savings contributions as well as higher defined and guaranteed retirement benefits – all of which contributed to a higher household wealth. Specifically, a significant portion would have been derived from the automated, involuntary contributions to a publicly-funded pension plan (administered by a government). Another significant portion would have been in the form of an employer-sponsored retirement package with defined benefits linked to the condition of employment and factors such as the level of income and position within the company (i.e. variations in defined retirement benefits for employees of one and the same company).

However, going forward, an individual's retirement savings is going to rely much more on the individual [employee]'s voluntary contributions to a defined-contributions plan such as the 401(k) as well as to any other form of voluntary retirement savings vehicle. Hence, individuals and households alike will largely have to become personally active in the process of retirement planning, and thus are prone to become subject to the conceptually identified influences and components laid out in the literature review. Accordingly, the significance of education as a determinant of household wealth may fade as factors related to individual decision-making are becoming more applicable and thus relevant to the process of attaining household wealth.

### **3.2. Conceptual framework**

As the literature review has demonstrated, economic choices and investment behavior of individuals are significantly influenced by factors such as cognitive bias, early-life and adverse event experience, social status, and cultural heritage. Accordingly, when a household becomes more responsible for its own retirement planning and savings, the

aforementioned influences are likely to lead to different outcomes in household wealth. Taking into account the aforementioned circumstance, this work has developed a conceptual framework pertaining to the ability to create household wealth, which is depicted in Figure 14.

The four identified components, which are laid down in the literature review, do not only pose an influence on the economic choices and investment behavior of households but also entertain a relationship with one another. For example, as the literature review has revealed, overconfidence bias is more pronounced among individuals of relatively higher SES than of relatively lower SES. This example illustrates that the pronouncement of behavioral biases can have a significant correlation with another component such as SES. At the same time, the literature review has also revealed that overconfident individuals appear more competent on average, and thus are more likely to attain a higher social rank. A higher social rank in turn can encapsulate higher income and greater access to resources, both economic and social.

Cultural influences and social transmission furthermore can shape an individual's predisposition to certain biases. While behavioral biases and heuristics can also be influenced by early-life and adverse events, behavioral biases and heuristics can lead to adverse events as well. For example, if investors are miscalibrated, exhibiting one or multiple behavioral biases, and act on these, this can potentially have serious financial implications – anything from losing a substantial amount of money in the stock market to having to declare personal bankruptcy. Accordingly, it is of importance -under this conceptual framework- to recognize that the four identified components do not necessarily represent independent influences on household economic choices and

investment behavior but that they coexist and, in addition, entertain relationships among themselves (Figure 14).

Under the premise that households have and continue to become more responsible for their own retirements, households are destined to face more financial decisions related to retirement planning and savings. The ability to make sound financial decisions as a household is arguably an important determining factor of the ability to build household wealth. Hence, as household economic choices and investment behavior have shown to significantly differ based on the identified and discussed components, it is likely that so will the ability to create household wealth. Furthermore, as households do differ in terms of the conceptually identified components, so will the outcome (i.e. household wealth) for each household. Accordingly, this developed framework hopes to provide a platform that will help explain future disparities in wealth among households to a better degree.

The accumulated level of household wealth by an individual household is likely to have an influence on the presence and pronunciation of behavioral biases among the members of that particular household, including descendants such as children and grandchildren. Household wealth may further create, prevent, or mitigate discussed early-life and adverse event experiences. Based on the discussed findings, household wealth is almost certain to shape the socioeconomic status of a household. Though household wealth is unlikely to entertain a relationship with cultural heritage, it is likely to radiate some effects via social transmission. Figure 14 visualizes the proposed and discussed conceptual framework and active cycle pertaining to the ability to create wealth, going forward.

Overall, behavioral biases and heuristics, early-life and adverse event experiences, socioeconomic status, and cultural heritage have shown to have a significant impact on the economic choices and investment behavior of individuals and households alike. Hence, if households are placed in a position in which they are given more responsibility and control of their retirement planning and savings, it is only logical to conclude that this development will have serious implications for the ability to attain household wealth. While the level of education is likely to remain a solid determinant of household income, it is unlikely to be as good of a determinant of household wealth, which it however has been in the past for the discussed reasons. Going forward, households will experience more exposure to their own decision-making when it comes to retirement planning and savings, and will have to bear the consequences of these decisions. The future can therefore be expected to deliver evidence that the relationship of household education and household wealth relied more on a correlational relationship than a causal relationship, and that a higher education and income are not bound to automatically translate into higher household wealth for as long as households will become more responsible of their retirement planning and savings.

### **3.3. Suggestions for further research**

With increased access to higher education, a much more heterogenous group of individuals is nowadays present among university students and graduates (Table 4). This includes people of a diversity of cultural backgrounds as well as of a range of socioeconomic backgrounds. The same holds true for the attendance of such a diverse

cohort at each university – that is, student body’s at virtually all institutions of higher education -particularly in North America- have become more diverse in nature.<sup>23</sup>

Pertaining to the overall theme of the ability to create household wealth, this work has developed a study questionnaire that aims to further examine the relationship and influence of biases, SES, and cultural heritage among university students, receiving the same education at one and the same institution of higher learning. In its first application, the questionnaire could be used on a group of undergraduate business students (all business majors included) that has finished all or most of its core curriculum business courses. In a second application, it is likely to be of interest to widen the cohort to undergraduate students at one and the same university, and then compare the findings and potential implications.

Appendix 1 contains the developed study questionnaire, including comments. The focus of the study would be to gain a better understanding and knowledge of investment attitudes as well as expectations and choice preferences among university students. In particular, the questionnaire aims to elicit macroeconomic expectations and beliefs as well as risk preferences. Some of the questions furthermore serve the purpose to check the participant’s responses for consistency and rationality in relation to other responses provided by the same individual. The proposed study hypothesizes that significant variations in outcomes will be observed in relation to the participants’ socioeconomic background, cultural heritage, and experience of adverse events in the past. In regard to the participant’s socioeconomic background, the questionnaire contains questions asking for information such as the participant’s (parental) household income, parental education, and parental occupation. In its current version, the cultural heritage

---

<sup>23</sup> this work however is not denying the potential existence of certain skews present among the distribution

notion of the questionnaire is restricted to inquiring about the parents' origin (in terms of country). It however could be widened to identifiers such as the generation of immigrant. Pertaining to the component of adverse events, the questionnaire aims to obtain information such as whether the participant has ever experienced or witnessed financial hardship in the past. To assure the robustness of results, a regression of the data will control for variables such as GPA, receipt of scholarship, and existence of student debt (among various others).

Statistics show that only around 50% of people in the United States invest in the stock market.<sup>24</sup> In Canada, the share of participants is slightly higher depending on the respective statistic and applicable definition of investments.<sup>25</sup> The avoidance of stock market investments has been particularly prevalent among people of lower SES. As discussed earlier in this work, non-participation in the stock market is however detrimental to accumulating household wealth.

The proposed study aims to examine if the earlier defined cohort of university students display similar varying economic expectations, preferences, and choices based on differences in their SES, cultural heritage, and exposure to adverse events. If so, to what degree are these phenomena prevalent among this cohort at this stage in life.

Ultimately, the study is to provide a better understanding into the investment attitudes of an equally formal educated cohort with a diverse background. As these attitudes tend to play a crucial role in an individual's economic choices and investment behavior, they are expected to pose serious implications for the ability to create (and maintain) household wealth in the future against the background of the discussed nature

---

<sup>24</sup> Statista: Share of adults investing money in the stock market in the United States from 1999 to 2020

<sup>25</sup> BMO: RRSP Survey, 2019

presented in the perspective and corresponding conceptual framework section earlier in this work. The findings would furthermore be beneficial from a policy perspective as they would help gain a better understanding of the drivers behind the hypothesized differences in investment choices across the socioeconomic spectrum, cultural heritage, and adverse event experience.

## **Chapter 4: Discussion and Implications**

One of the most obvious implications of the discussed work is household wealth disparity. However, unlike the current household wealth disparity among society, the future one can likely be explained -to a better degree- by the conceptually identified components laid down in the literature review to which households will become more subject under the changes and trends in public finances and retirement vehicles.

In the context of the preceding work, there are furthermore limitations and other implications to be addressed. Take the component of behavioral biases, for example. Cognitive biases and heuristics are prevalent among all people. The particular pronunciation of each bias however differs from individual to individual. The same applies to heuristics, which are mental shortcuts developed by an individual to reduce the cognitive load and assist with problem-solving activities and immediate judgment calls (note: heuristics carry potential to be irrational or lead to inaccurate conclusions). Behavioral biases and heuristics alike are -in part- shaped by the three other components identified in the conceptual analysis laid down in the literature review. Accordingly, it is important to realize when performing studies such as the one proposed, that SES, cultural heritage, and early-life and adverse event experiences can have differently contributed to any biases observed among the responses of study participants. And that the independent variables (i.e. the three components) however are the ones showing signs of significance when it comes to the economic choices and investment attitudes and behaviors observed in the study data.

Another important aspect pertains to the component of SES. Historically, it was said that SES is bridged by the end of young adulthood (with the attainment of

education). In essence, if your father and mother are medical doctors, SES is assumed to be bridged when you graduate from medical school, or attain a similar professional degree or level of education and profession. However, currently, more than 50% of all university students in the United States are first-generation students, meaning that neither parents have obtained a bachelor's degree or higher.<sup>26</sup> The proportion of first-generation students in Canada is similar.<sup>27</sup> This trend has to be given consideration when examining the investment beliefs and behavior of individuals and households going forward. In particular, it has to be examined what measures of SES help explain the differences in macroeconomic expectations and investment choices among households.

Speaking to the element of predictive power when it comes to differences in tendencies about (financial) decision-making of individuals, it is important to note that past behavior is generally the best determinant of future behavior. Past behavior as a determinant [in terms of predictive power] is followed by a catalogue of personality characteristics. Fascinatingly enough, brain scans carry as good of a predictive power, now, as demographics (i.e. men vs. women) do. The least powerful determinant -in terms of amount of variance- are genetics.<sup>28</sup> Having said all that, it is easy to see that all of these components are encapsulated in some shape or form in the four conceptually identified components laid down in the literature review, namely: behavioral biases and heuristics, early-life and adverse event experience, socioeconomic status, and cultural heritage.

---

<sup>26</sup> RTI International, 2019: First-generation College Students: Demographic Characteristics and Postsecondary Enrollment.

<sup>27</sup> Statistics Canada, 2011: Postsecondary Education Participation among Underrepresented and Minority Groups

<sup>28</sup> Prof. Joe Kable (UPenn): Current Progress in Neurofields: Neuroeconomics (publicly available lecture)

Concerning the greater responsibility of households to plan and save for retirement against the background of the discussed trends and developments, it is worth mentioning that the U.S. Congress passed reforms to the 401(k) retirement vehicle in 2006. Driven by research from Nobel laureate Richard Thaler<sup>29</sup>, the reform encouraged and allowed -regardless of state law- companies to automatically enroll its employees in a 401(k) plan. The reform however does not require companies to do so, it only gives the company the option to do so. According to the U.S. Department of Labor, if a company chooses to implement a basic automatic enrollment 401(k) plan, then the plan “must state that employees will be automatically enrolled in the plan unless they elect otherwise and must specify the percentage of an employee's wages that will be automatically deducted from each paycheck for contribution to the plan”.<sup>30</sup> The underlying concept at play here is the behavioral aspect of opt-in versus opt-out. Madrian & Shea (2001) found that the rate of participation and the number of employees staying enrolled in a 401(k) plan increased significantly with automated enrollment.

While the discussed findings evolving around SES and its influence on decision-making have primarily demonstrated disadvantages for people of relatively lower SES, it may be of interest to mention the findings of a study performed by Chuprinin & Sosyura (2018). They found that mutual fund managers with a relatively lower SES background outperform mutual fund managers with a relatively higher SES background. The authors argued that individuals with a relatively lower SES background face not only a higher barrier of entry into the profession of being mutual fund manager but also a higher threshold for promotions, essentially “forcing” them to do better in order to succeed in

---

<sup>29</sup> Charles R. Walgreen Distinguished Service Professor of Behavioral Science and Economics

<sup>30</sup> U.S. Department of Labor: Automatic Enrollment 401(k) Plans for Small Businesses

their endeavor to become and succeed as a mutual fund manager. These findings might appear as somewhat of a paradox at first. However, it is important to realize that the scope of the study focuses on individuals with a relatively lower SES background who have made a conscious choice to become a professional money manager (and who attained all the relevant qualifications). In this light, it is not a paradox to the discussed findings in the literature review. If anything, it provides perspective and brings to light the dynamics at play in particular environments and professions against the SES background of an individual.

On the subject of SES, it is of the utmost importance to always identify the specific measure or measures of SES used in any given study. The study findings have to always be put into context with the applicable measure of SES. The applied measure of SES of one study could very well not be comparable to the ones of another study. To illustrate, a study finding may state “people of higher SES exhibited the following behavior [...] or had a tendency to [...]”. The very same members of this higher SES cohort (or at least some of them) could be classified as people of lower SES in another study, depending on the actual measure of SES.

At last, the conceptual analysis has arguably implications for both, government policy makers and university administrators. Both could possibly improve their communication pertaining to the matter at hand (retirement planning and household wealth), including its scope and urgency. Such communication would include appropriate expectation management. On the side of government, it would be desirable to transparently communicate and raise the awareness of the factual shift away from defined benefit plans to defined contribution plans, which places greater uncertainty on the

performance of retirement savings while placing greater responsibility onto the individual household. As defined benefit-pensions have steadily declined over the past decades and it has become clear that most household lack adequate retirement savings, additional personal retirement savings vehicles such as the Canadian TFSA have been invented. Instead of communicating the introduction and existence of such vehicles, it would be desirable to communicate as to why these vehicles are invented. It furthermore would be desirable to see communication stating clearly that publicly-funded pension plans will only replace a portion of income upon retirement, resulting in the necessity for households to make voluntary contributions to other tax-preferred savings vehicles to secure their retirement. Universities could likely contribute in a positive way by raising awareness about the discussed trend, and the relevance of the identified components influencing economic outlook beliefs as well as investment attitudes and behaviors.

## **Chapter 5: Conclusion**

This work has conceptually identified four components that are very likely to have serious implications for the ability to create household wealth in the future. These components are namely: behavioral biases and heuristics, early-life and adverse event experiences, socioeconomic status, and cultural heritage. The presence of these influences is hypothesized to become more dominant against the background of changing retirement systems, which ultimately place greater responsibility onto the individual household pertaining to retirement planning and savings.

This work has furthermore argued that the significance of education as a determinant of household wealth is likely to fade in the future. At the same time, education is likely to remain a suitable determinant of household income and can furthermore be expected to continue to level the playing field in terms of expected earnings. Based on the discussed trends and presented conceptual framework, this work has attempted to show that the relationship between education and household wealth relied more on the correlational relationship than the causal relationship in the past.

Overall, this work hopes to have provided a stimulant perspective on the ability to create household wealth, laying the groundwork for future research ideas and for policy makers, who are focused on managing household disparities more effectively in the future.

## References

- Banerjee, A. V. and E. Duflo (2007). The Economic Lives of the Poor. *The Journal of Economic Perspectives* 21(1), 141–168.
- Belmi, P., M. A. Neale, D. Reiff, and R. Ulfe (2020). The Social Advantage of Miscalibrated Individuals: The Relationship Between Social Class and Overconfidence and Its Implications for Class-Based Inequality. *Journal of Personality and Social Psychology* 118(2), 254–282.
- Brewster, P. H. W., R. J. Melrose, M. J. Marquine, J. K. Johnson, A. Napoles, A. MacKay-Brandt, S. Farias, B. Reed, and D. Mungas (2014). Life Experience and Demographic Influences on Cognitive Function in Older Adults. *Neuropsychology* 28(6), 846–858.
- Cacioppo, J. T. and R. E. Petty (1982). The Need for Cognition. *Journal of Personality and Social Psychology* 42(1), 116–131.
- Chuprinin, O. and D. Sosyura (2018). Family Descent as a Signal of Managerial Quality: Evidence from Mutual Funds. *Review of Financial Studies* 31(10), 3756–3820.
- Cohen, A. R., E. Stotland, and D. M. Wolfe (1955). An experimental investigation of need for cognition. *Journal of Abnormal and Social Psychology* 51(2), 291–294.
- Cronqvist, H. and S. Siegel (2015). The Origins of Savings Behavior. *The Journal of Political Economy* 123(1), 123–169.
- Das, S., C. M. Kuhnen, and S. Nagel (2020). Socioeconomic status and macroeconomic expectations. *Review of Financial Studies* 33(1), 395–432.
- Dave, C., C. C. Eckel, C. A. Johnson, and C. Rojas (2010). Eliciting risk preferences: When is simple better? *Journal of Risk and Uncertainty* 41, 219–243.
- De Bellis, M. D., M. S. Keshavan, D. B. Clark, B.J. Casey, J. N. Giedd, A. M. Boring, K. Frustaci, and N. D. Ryan (1999). Developmental Traumatology Part II: Brain Development. *Biological Psychiatry*, 45(10), 1271–1284.
- Dimmock, S. G. and R. Kouwenberg (2010). Loss-aversion and household portfolio choice. *Journal of Empirical Finance* 17(3), 441–459.

- Dubois, D., D. D. Rucker, and A. D. Galinsky (2015). Social Class, Power, and Selfishness: When and Why Upper and Lower Class Individuals Behave Unethically. *Journal of Personality and Social Psychology* 108(3), 436–449.
- Duong, C., G. Pescetto, and D. Santamaria (2014). How value–glamour investors use financial information: UK evidence of investors’ confirmation bias. *The European Journal of Finance* 20(6), p.524–54.
- Eckel, C. C. and P. J. Grossman (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and Human Behavior* 23(4), 281–295.
- Ensminger, M. E., C. B. Forrest, A. W. Riley, M. Kang, B. F. Green, B. Starfield, and S. A. Ryan (2000). *Journal of Adolescent Research* 15(3), 392–419.
- Evans, G. W., M. A. Schamberg, and B. S. McEwen (2009). Childhood Poverty, Chronic Stress, and Adult Working Memory. *Proceedings of the National Academy of Sciences of the United States of America* 106(16), 6545–6549.
- Grassi-Oliveira, R., M. Ashy, and L. M. Stein (2008). Psychobiology of childhood maltreatment: effects of allostatic load? *Brazilian Journal of Psychiatry* 30(1), 60–68.
- Hackman, D. A. and M. J. Farah (2008). Socioeconomic status and the developing brain. *Trends in Cognitive Sciences* 13(2), 65–73.
- Hanson, J. L., D. Albert, A.-M. R. Iselin, J. M. Carré, K. A. Dodge, and A. R. Hariri (2016). Cumulative stress in childhood is associated with blunted reward-related brain activity in adulthood. *Social Cognitive and Affective Neuroscience* 11(3), 405–412.
- Haushofer, J. and E. Fehr (2014). On the psychology of poverty. *Science* 344(6186), 862–867.
- Hertwig, R., G. Barron, E. U. Weber, and I. Erev (2004). Decisions from Experience and the Effect of Rare Events in Risky Choice. *Psychological Science*, 15(8), 534–539.

- Hodges, T. E., G. Y. Lee, S. H. Noh, L. A. M. Galea (2022). Sex and age differences in cognitive bias and neural activation in response to cognitive bias testing. *Neurobiology of Stress* 18, 100458–100458
- Hofstede (1980). Culture's consequences: international differences in work-related values. *Sage Publications*.
- Judge, T. A. and C. Hurst (2007). Capitalizing on One's Advantages: Role of Core Self-Evaluations. *Journal of Applied Psychology* 92(5), 1212–1227.
- Judge, T. A., E. A. Locke, and C. C. Durham (1997). The dispositional causes of job satisfaction: A core evaluations approach. *Research in Organizational Behavior* 19, 151–188.
- Kahneman, D. (2011). Thinking, Fast and Slow. (1st ed.). *Farrar, Straus and Giroux*.
- Kahneman, D. and A. Tversky (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 47(2), 263–292.
- Knüpfer, S., E. Rantapuska, and M. Sarvimaeki (2017). Formative Experiences and Portfolio Choice: Evidence from the Finnish Great Depression. *The Journal of Finance* 72(1), 133–166.
- Kraus, M. W. and J. W. Park (2014). The undervalued self: social class and self-evaluation. *Frontiers in Psychology* 5, 1404–1404.
- Kraus, M. W., P. K. Piff, and D. Keltner (2009). Social Class, Sense of Control, and Social Explanation. *Journal of Personality and Social Psychology* 97(6), 992–1004.
- Kuhnen, C. M. (2015). Asymmetric Learning from Financial Information. *The Journal of Finance* 70(5), 2029–2062.
- Kuhnen, C. M. and J. Y. Chiao (2009). Genetic Determinants of Financial Risk Taking. *PLoS ONE* 4(2): e4362.
- Kuhnen, C. M. and A. C. Miu (2017). Socioeconomic status and learning from financial information. *Journal of Financial Economics* 124(2), 349–372.

- Laland, K. N. (2008). Exploring Gene-Culture Interactions: Insights from Handedness, Sexual Selection and Niche-Construction Case Studies. *Philosophical Transactions: Biological Sciences* 363(1509), 3577–3589.
- Lange, P. A. M. van, E. T. Higgins, and A. W. Kruglanski (2021). Social Psychology: Handbook of Basic Principles (3rd ed.). *The Guilford Press*.
- Loughan, A., and R. Perna (2012). Neurocognitive impacts for children of poverty and neglect. *CYF News*. <https://apa.org/pi/families/resources/newsletter/2012/07>
- Madrian, B. C. and D. F. Shea (2001). The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior. *The Quarterly Journal of Economics* 116(4), 1149–1187.
- Malmendier, U. and S. Nagel (2011). Depression Babies: Do Macroeconomic Experiences Affect Risk Taking? *The Quarterly Journal of Economics* 126(1), 373–416.
- Malmendier, U., G. Tate, and J. Yan (2011). Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies. *The Journal of Finance* 66(5), 1687–1733.
- Mani, A., S. Mullainathan, E. Shafir, and J. Zhao (2013). Poverty Impedes Cognitive Function. *Science* 341(6149), 976–980.
- Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance* 7(1), 77–91.
- Nisbett, R. E. and L. D. Ross (1980). Human Inference: Strategies and Shortcomings of Social Judgment. *Englewood Cliffs, NJ: Prentice-Hall*.
- Pan, Y., S. Siegel, and T.Y. Wang (2020). The Cultural Origin of CEOs' Attitudes towards Uncertainty: Evidence from Corporate Acquisitions. *The Review of Financial Studies* 33(7), 2977–3030.
- Pikulina, E., L. Renneboog, and P. N. Tobler (2017). Overconfidence and investment: An experimental approach. *Journal of Corporate Finance* 43, 175–192.

- Sedlak, A. J. and D. D. Broadhurst (1996). Third National Incidence Study of Child Abuse and Neglect: Final Report. *U.S. Department of Health and Human Services*.
- Shah, A. K., S. Mullainathan, and E. Shafir (2012). Some Consequences of Having Too Little. *Science* 338(6107), 682–685.
- Smith, J. R., J. Brooks-Gunn, and P. Klebanov (1997). The consequences of living in poverty for young children's cognitive and verbal ability and early school achievement. In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of growing up poor*. *Russell Sage Foundation*.
- Souleles, N. S. (2004). Expectations, Heterogeneous Forecast Errors, and Consumption: Micro Evidence from the Michigan Consumer Sentiment Surveys. *Journal of Money, Credit and Banking* 36(1), 39–72.
- Teovanović, P., G. Knežević, and L. Stankov (2015). Individual differences in cognitive biases: Evidence against one-factor theory of rationality. *Intelligence* 50, 75–86.
- Von Neumann, J. and O. Morgenstern (1944). *Theory of Games and Economic Behavior* (1st ed.). *Princeton University Press*.
- Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *The Quarterly Journal of Experimental Psychology* 12, 129–140.
- Weber, E. I., U. Böckenholt, D. J. Hilton, and B. Wallace (1993). Determinants of Diagnostic Hypothesis Generation: Effects of Information, Base Rates, and Experience. *Journal of Experimental Psychology. Learning, Memory, and Cognition*, 19(5), 1151–1164.

Appendix A: Tables

**TABLE 1**

**Measures of socioeconomic status (Ensminger et al., 2000)**

<i>Domain</i>	<i>Measure</i>	<i>Coding</i>
Financial capital	Mother's employment	0 = not working .5 = working part-time 1 = working-full time
	Father's employment	0 = not working .5 = working part-time 1 = working full-time
	Aid to Families with Dependent Children	0 = yes 1 = no
	Food stamps	0 = yes 1 = no
	Free or reduced-cost lunches	0 = yes 1 = no
Human capital	Mother's education	0 = less than high school graduate .5 = high school graduate, vocational school, and/or some college 1 = college graduate
	Father's education	0 = less than high school graduate .5 = high school graduate, vocational school, and/or some college 1 = college graduate
Social capital	Family structure	0 = single parent .5 = parent and stepparent, other adult 1 = mother and father

**Table 1:** Measures of socioeconomic status (Ensminger et al., 2000)

The SES composite score is calculated as the mean of all [eight] values, if the study respondent provides an answer to at least six of the measures. The mean score is then multiplied with 100 in order to achieve a scale of 0 to 100. The source of this table is: Ensminger et al., 2000.

**TABLE 2**

**The four dimensions of core self-evaluation**

<b>Self-esteem</b>	General belief about one's self-worth
<b>Generalized self-efficacy</b>	Belief in one's competence to successfully deal with a broad range of stressful or challenging tasks (in general; not with a specific one in mind)
<b>Emotional stability</b>	One's ability to remain emotionally stable and balanced in difficult or undesirable situations.
<b>Locus of control</b>	Belief to what degree one controls the events taking place in one's life.

**Table 2:** The four dimensions of core self-evaluation

The four dimensions are based on the core self-evaluation theory (Judge et al., 1997).

**TABLE 3**

**Hofstede's six dimensions of cultural differences**

<p><u>POWER DISTANCE INDEX (PDI)</u> This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally.</p>
<p><u>INDIVIDUALISM VERSUS COLLECTIVISM (IDV)</u> The high side of this dimension, called Individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families.</p> <p>Its opposite, Collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."</p>
<p><u>MASCULINITY VERSUS FEMININITY (MAS)</u> The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite, Femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.</p>
<p><u>UNCERTAINTY AVOIDANCE INDEX (UAI)</u> The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.</p>
<p><u>LONG TERM ORIENTATION VERSUS SHORT TERM NORMATIVE ORIENTATION (LTO)</u> Every society has to maintain some links with its own past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently.</p>
<p><u>INDULGENCE VERSUS RESTRAINT (IVR)</u> Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.</p>

**Table 3:** Hofstede's six dimensions of cultural differences

The displayed definitions are the official ones listed on: [hi.hofstede-insights.com/national-culture](http://hi.hofstede-insights.com/national-culture).  
Based on Hofstede's cultural dimensions theory (Hofstede, 1980).

**TABLE 4**

**Diversity in higher education (2010-2019)**

<b>Ethnicity</b>	<b>2010</b>	<b>2019</b>
Asian	52.4%	58.1%
White	33.2%	40.1%
Black	19.8%	26.1%
Hispanic	13.9%	18.8%

**Table 4:** Diversity in higher education (2010-2019)

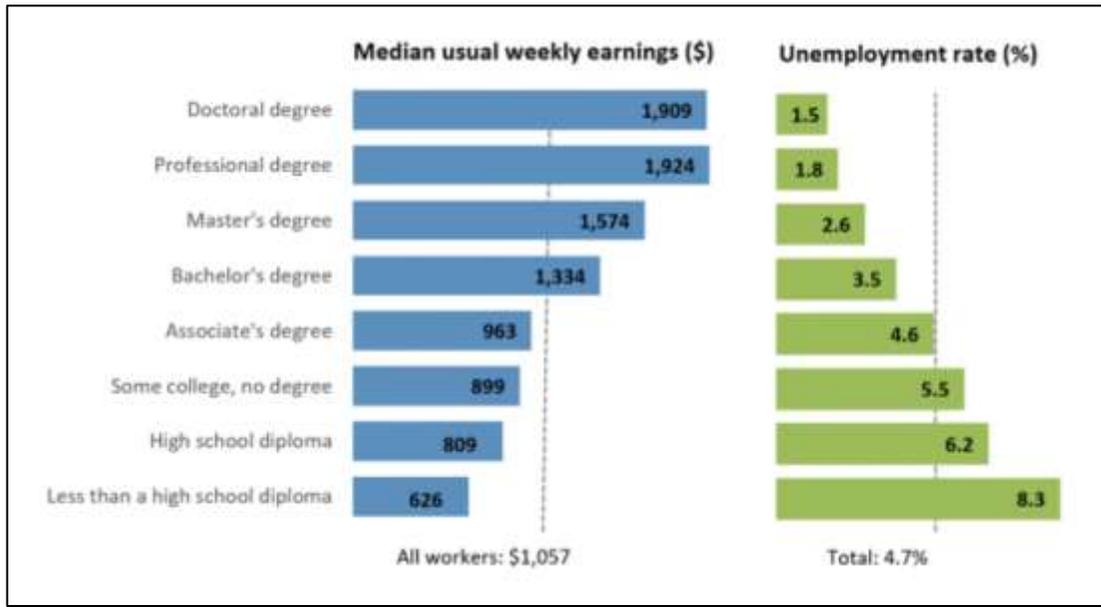
Data are for persons age 25 and over who held a bachelor's degree or higher.

The source of this data is: [census.gov/newsroom/press-releases/2020/educational-attainment.html](https://www.census.gov/newsroom/press-releases/2020/educational-attainment.html).

## Appendix B: Figures

FIGURE 1

### Earnings and unemployment rates by educational attainment in the US (2021)

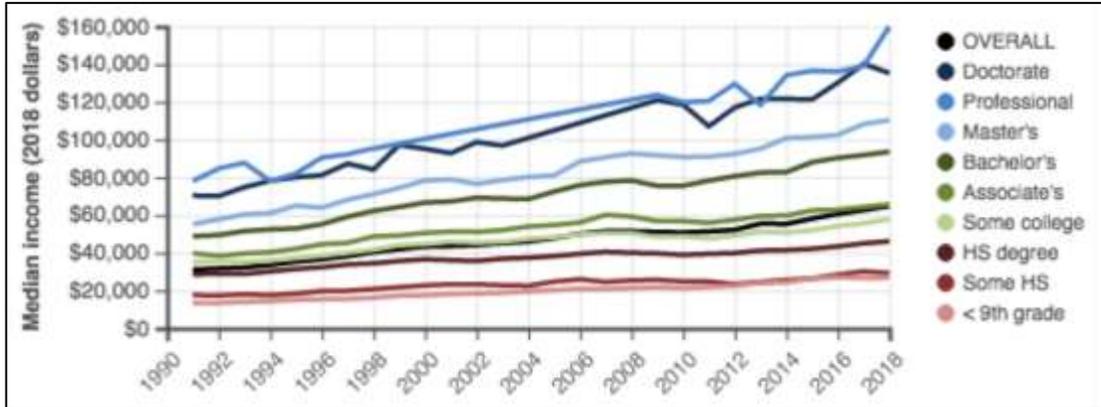


**Figure 1:** Earnings and unemployment rates by educational attainment in the US (2021)

Data are for persons age 25 and over. Earnings are for full-time wage and salary workers. The source of the figure is: U.S. Bureau of Labor Statistics, Current Population Survey.

**FIGURE 2**

**Median household income by educational attainment in the US (1990-2018)**



**Figure 2:** Median household income by educational attainment in the US (1990-2018)

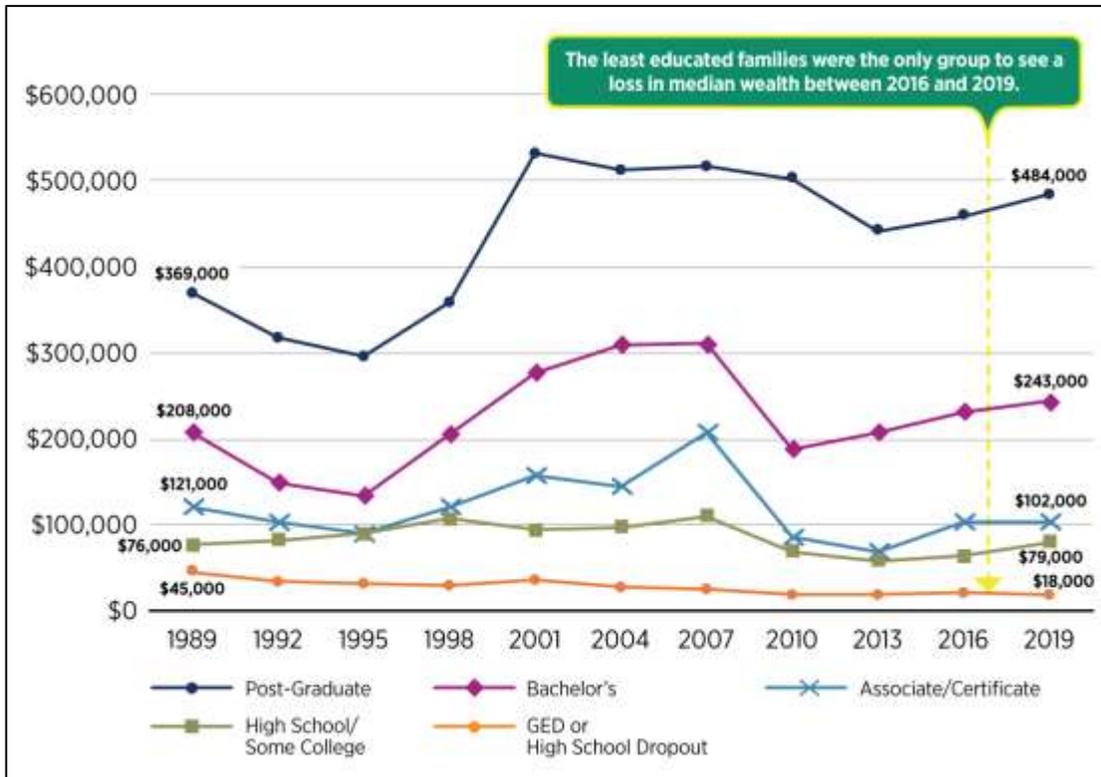
Data are for persons age 25 and over.

The data are retrievable on: [census.gov](https://www.census.gov) (Historical Income Tables: Households – Table H-13).

The source of this figure is: [en.wikipedia.org/wiki/Household\\_income\\_in\\_the\\_United\\_States](https://en.wikipedia.org/wiki/Household_income_in_the_United_States).

**FIGURE 3**

**Wealth gaps by educational attainment in the United States (1989-2019)**

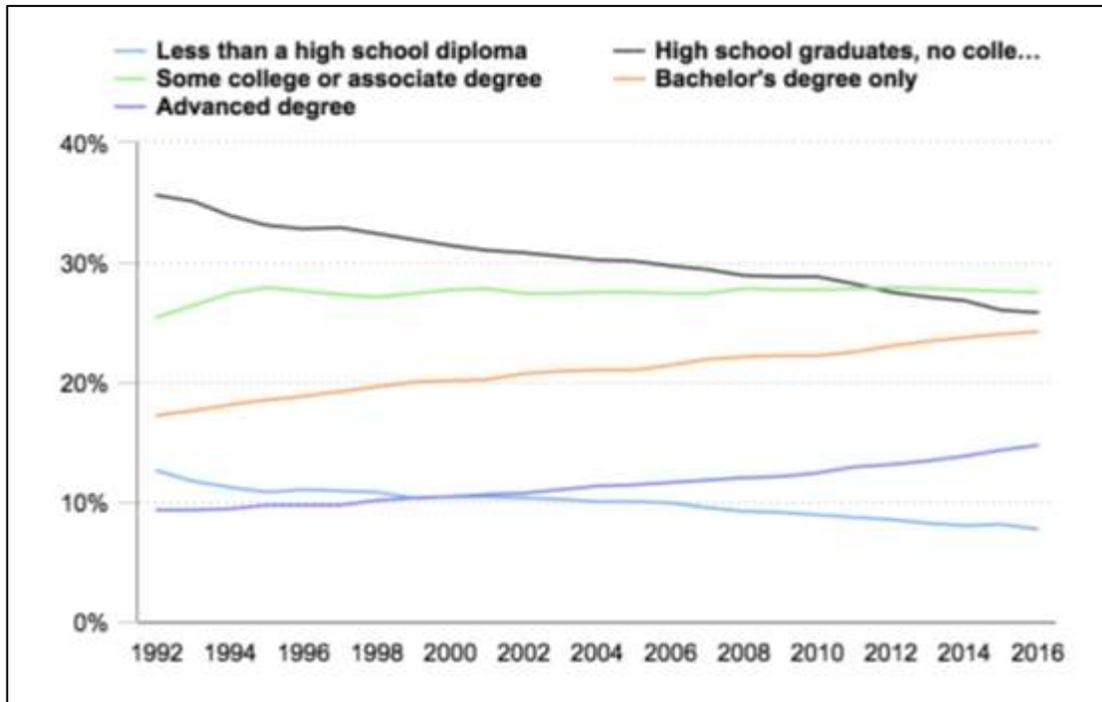


**Figure 3:** Wealth gaps by educational attainment in the United States (1989-2019)

Median (50th percentile) family wealth. Dollar values are CPI-U adjusted to 2019 dollars and rounded to the nearest \$1,000. The source of this figure is: Federal Reserve Bank of St. Louis.

**FIGURE 4**

**Percentage of labor force by educational attainment in the US (1992-2016)**

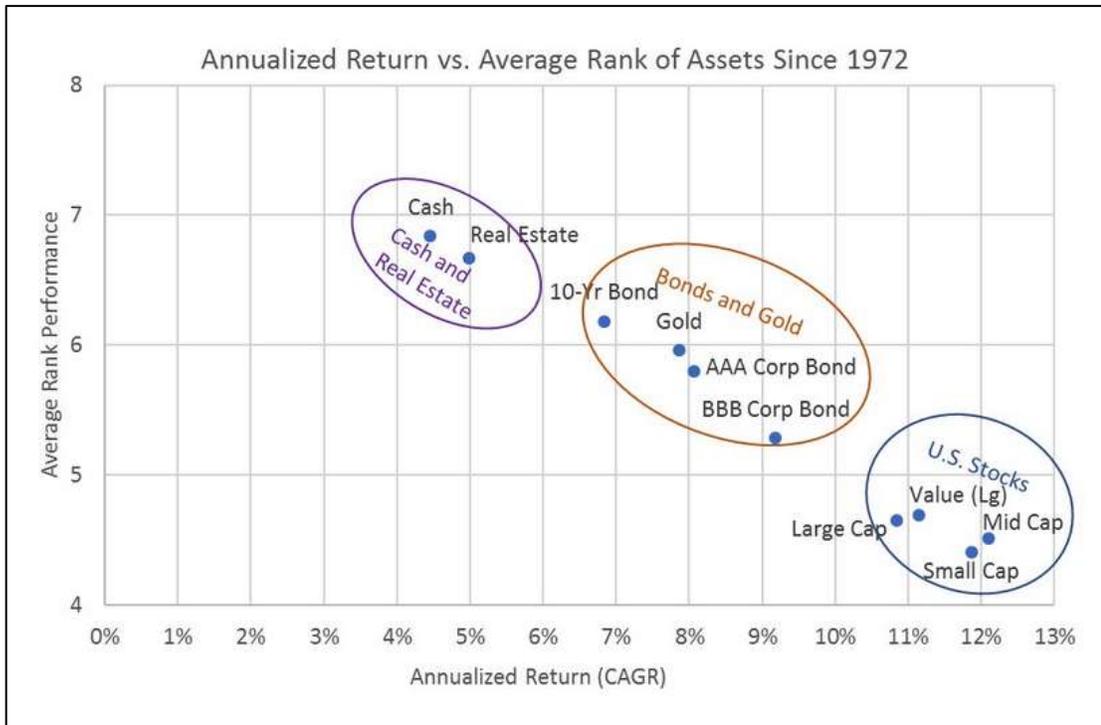


**Figure 4:** Percentage of labor force by educational attainment in the US (1992-2016)

Data are the annual averages for persons age 25 and over. The source of this figure is: U.S. Bureau of Labor Statistics.

**FIGURE 5**

**Historical performance of asset classes in the United States (1972-2020)**



**Figure 5:** Historical performance of asset classes in the United States (1972-2020)

This figure displays the average rank performance of each asset class as well as annualized return of each asset class over the period of 1972 to 2020. The source of this figure is: [etftrends.com/ranking-the-historical-returns-of-asset-classes/](http://etftrends.com/ranking-the-historical-returns-of-asset-classes/). Asset classes are ranked on an annual basis in accordance with their performance. A common illustration of the performance comparison over years is the so-called periodic table of investment returns. A prominent example is the Callan Periodic Table of Investment Returns.

**FIGURE 6**

**Stock price development of GameStop Corp. (NYSE: GME) in 2020-2022**

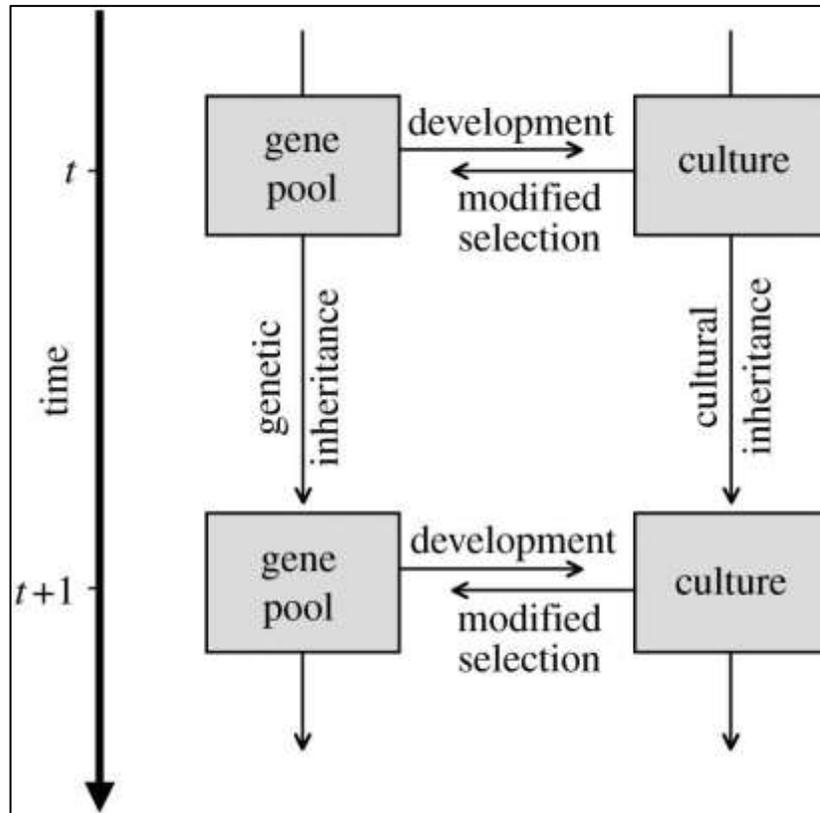


**Figure 6:** Stock price development of GameStop Corp. (NYSE: GME) in 2020-2022

The source of this figure is: Bloomberg LP.

**FIGURE 7**

**Gene culture-coevolution (Laland, 2008)**

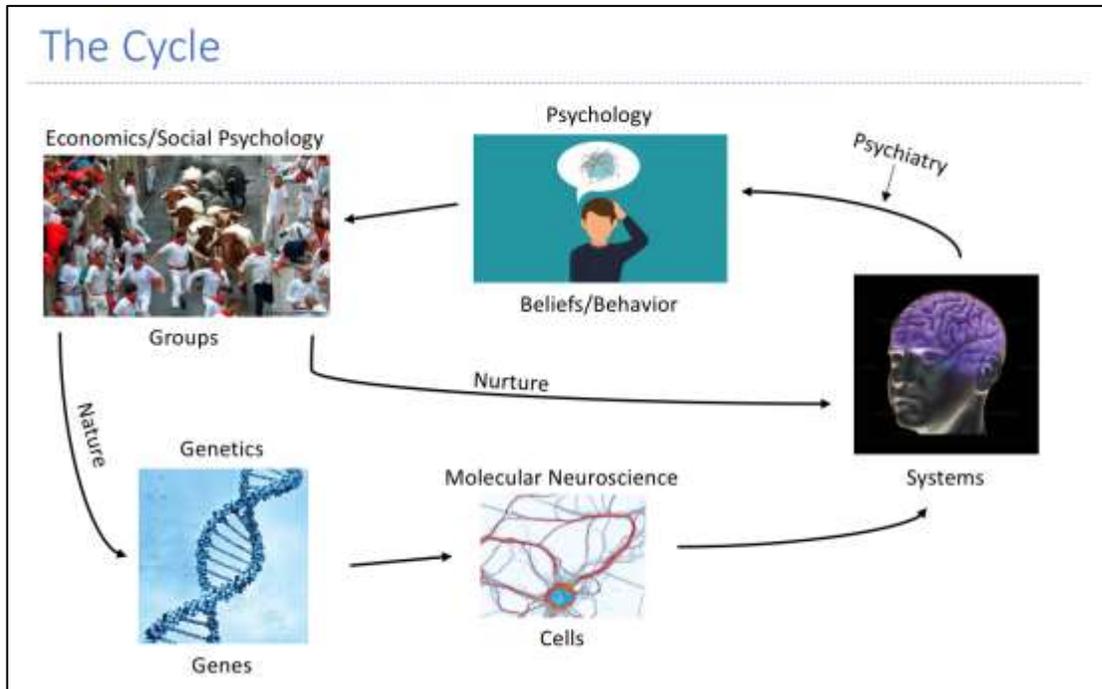


**Figure 7:** Gene culture-coevolution (Laland, 2008)

“Gene–culture coevolution. Genes and culture are two interacting forms of inheritance. Genetic propensities, expressed throughout development, influence what cultural organisms learn. Culturally transmitted information, expressed in behaviour and artefacts, modifies selection acting back on the genome.” (Laland, 2008, p. 3578).

**FIGURE 8**

**The cycle of influence: economics, psychology, and biology**

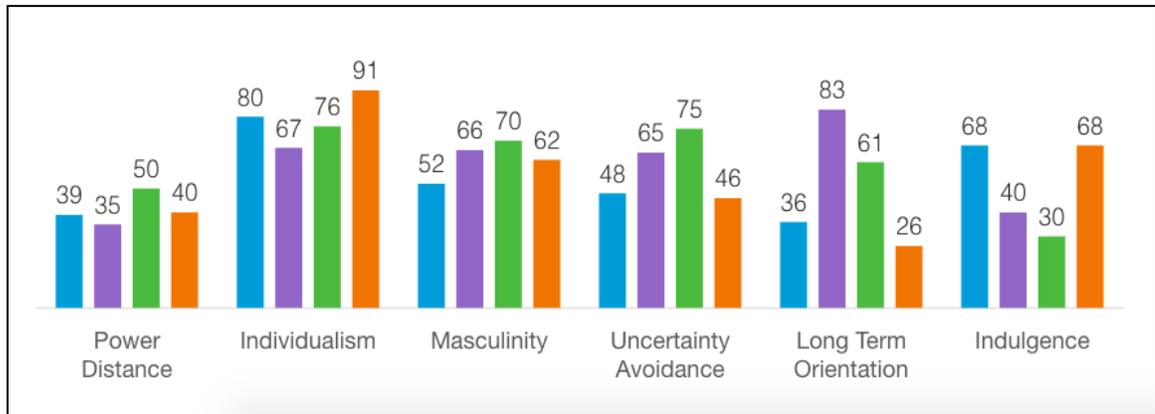


**Figure 8:** The cycle of influence: economics, psychology, and biology

This illustration was modeled after a publicly available lecture titled “Intro to Neuroeconomics” held by Prof. Jan Engelmann (University of Amsterdam).

**FIGURE 9**

**Country Comparison – Hofstede’s dimensions (Canada, Germany, Italy, US)**



**Figure 9:** Country Comparison – Hofstede’s dimensions (Canada, Germany, Italy, US)

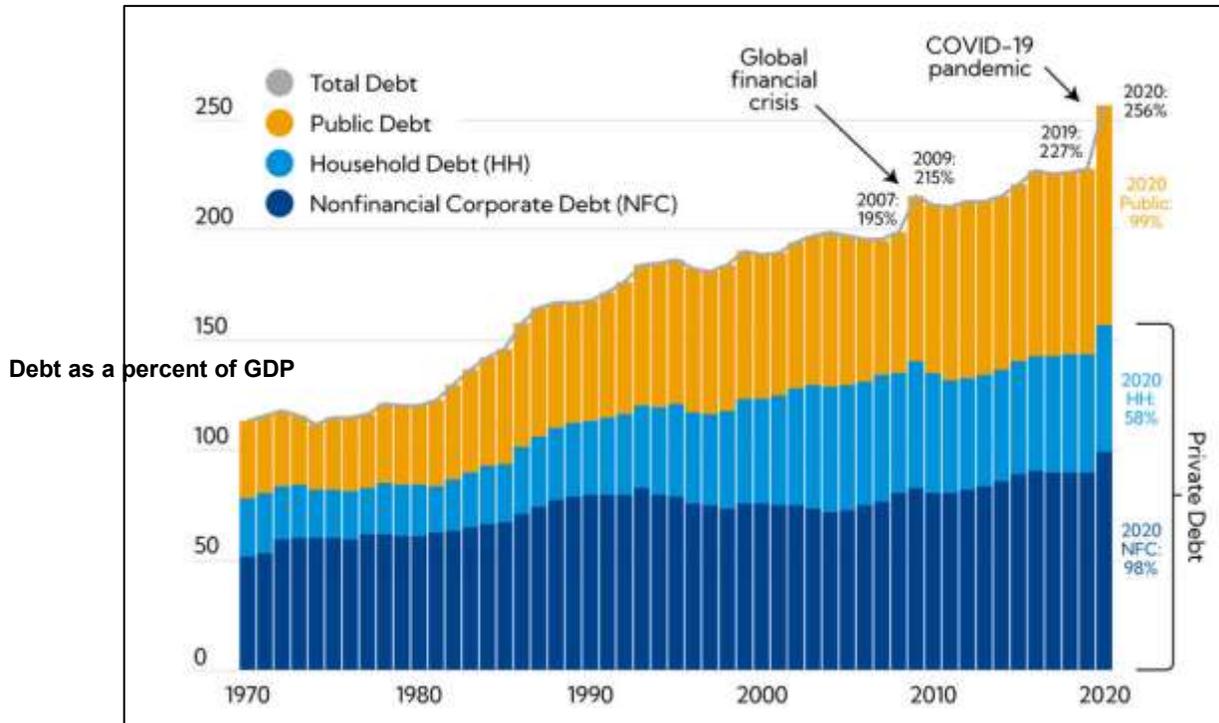
Color legend: Canada . Germany . Italy . United States .

Hofstede index values are on a scale of 0 to 100.

The source of this figure is: [hofstede-insights.com/country-comparison](http://hofstede-insights.com/country-comparison).

**FIGURE 10**

**Global debts: Public, Household, and Nonfinancial Corporate (1970-2020)**

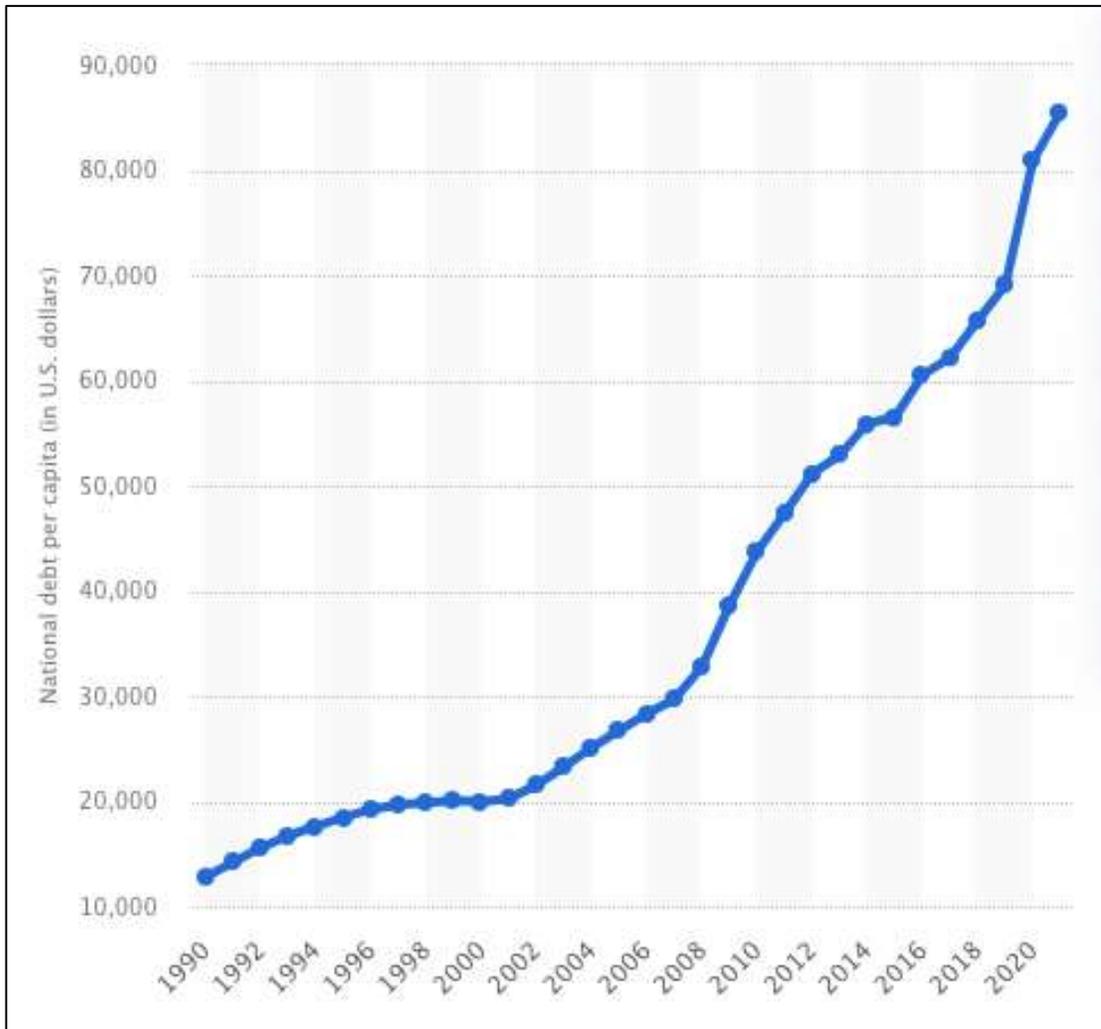


**Figure 10:** Global debts: Public, Household, and Nonfinancial Corporate (1970-2020)

Displayed are the debts as a percent of GDP. The estimated ratios of global debt to GDP are weighted by each country's GDP in US dollars. The source of this figure is: IMF Global Debt Database and IMF staff calculations.

**FIGURE 11**

**National debt per capita in the US (1990-2021)**

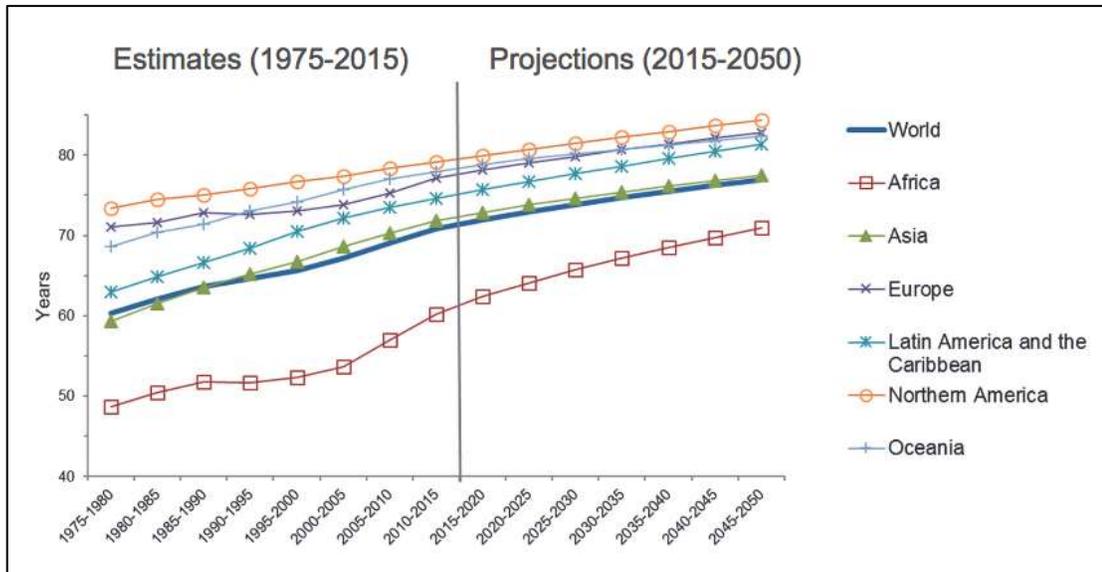


**Figure 11:** National debt per capita in the US (1990-2021)

The source of this figure is: [statista.com](https://www.statista.com).

**FIGURE 12**

**Life expectancy at birth by region (1950-2050)**

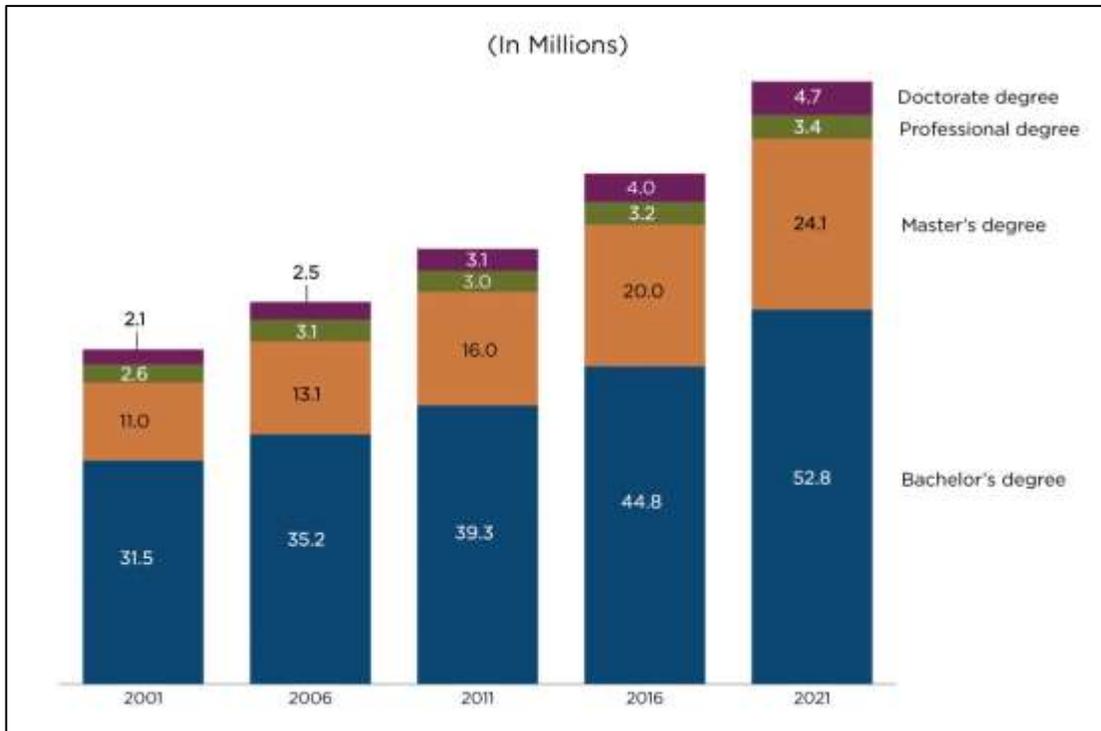


**Figure 12:** Life expectancy at birth by region (1950-2050)

The source of this figure is: UN World Population Prospects, 2017.

**FIGURE 13**

**Number of people with a bachelor's degree or higher in the US (2001-2021)**



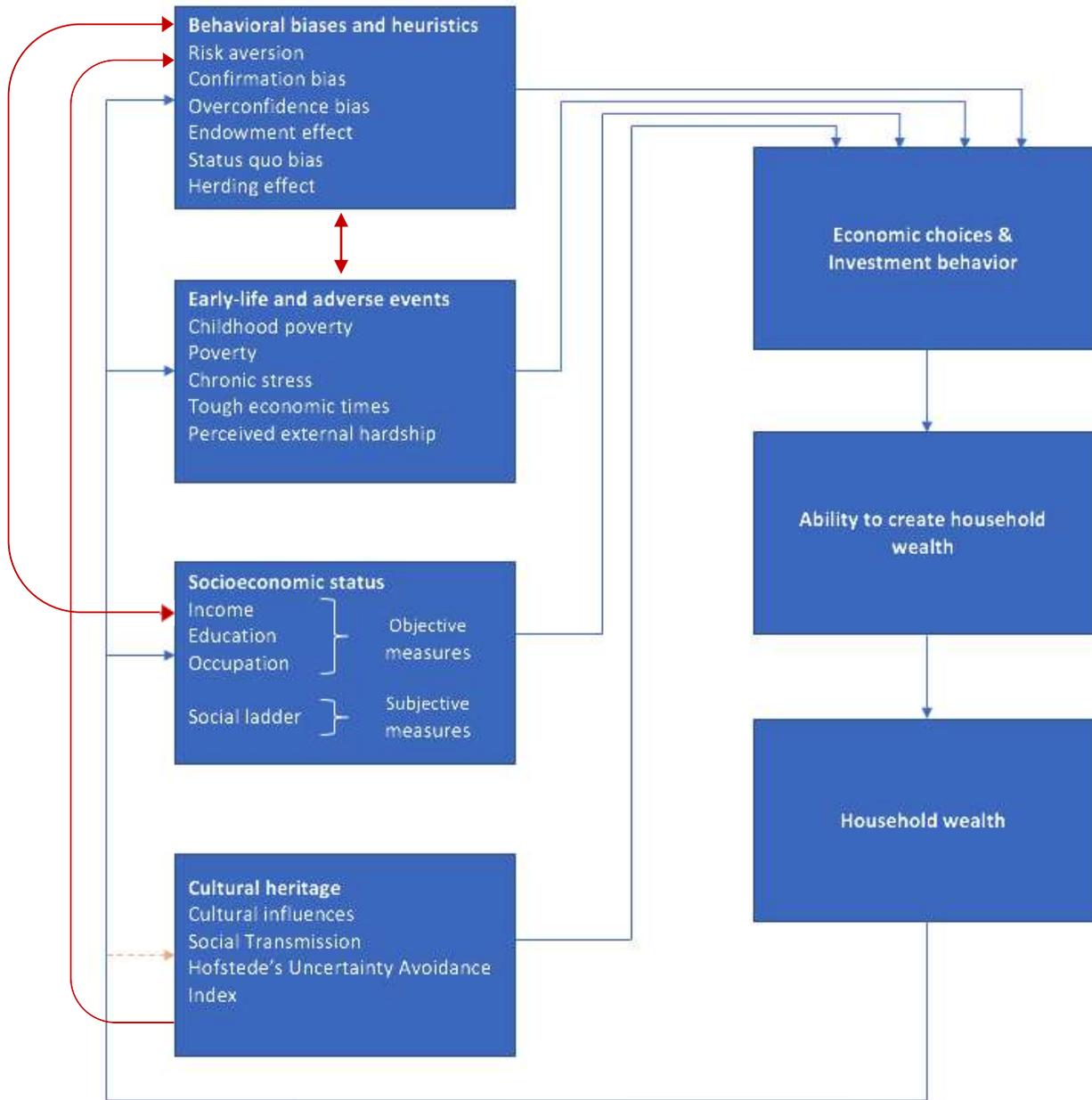
**Figure 13:** Number of people with a bachelor's degree or higher in the US (2001-2021)

Data are for persons age 25 and over.

The source of this figure is: [census.gov/library/visualizations/2022/comm/a-higher-degree.html](https://census.gov/library/visualizations/2022/comm/a-higher-degree.html).

**FIGURE 14**

**Conceptual framework: the ability to create household wealth**



## Appendix C: Study Questionnaire

Note: Comments would not be displayed on actual questionnaire

### Question 1

What do you think is the percent chance (i.e. probability) that a \$1,000 investment in a diversified stock mutual fund will increase in value in the year ahead, so that it is worth more than \$1,000 one year from now?

Your answer, which is a percentage, should be a number between 0 and 100.

Answer: \_\_\_\_\_

Comment:

Purpose

Eliciting economic outlook expectations/beliefs among subjects

Source

Kuhnen, C. M., Miu, A. C., 2017. Socioeconomic status and learning from financial information. *Journal of Financial Economics* 124 (2), 349–372.

## Question 2

Select one of the six different gambles (from below) that you would like to play.

- You must select one and only one of these gambles.
- To select a gamble, place an X in the appropriate box.

Each gamble has two possible outcomes (ROLL LOW or ROLL HIGH) with the indicated probabilities of occurring.

For every gamble, each ROLL has a 50% chance of occurring.

	Roll	Payoff	Chances	Your Selection <b>Mark only one</b>
Gamble 1	LOW	\$28	50%	
	HIGH	\$28	50%	
Gamble 2	LOW	\$24	50%	
	HIGH	\$36	50%	
Gamble 3	LOW	\$20	50%	
	HIGH	\$44	50%	
Gamble 4	LOW	\$16	50%	
	HIGH	\$52	50%	
Gamble 5	LOW	\$12	50%	
	HIGH	\$60	50%	
Gamble 6	LOW	\$2	50%	
	HIGH	\$70	50%	

Comment:

Purpose

Eliciting risk preferences among subjects

Source

Eckel, Catherine C., Grossman, Philip J., 2002. Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and Human Behavior* 23 (4), 281–295.

Dave, C., Eckel, Catherine C., Johnson, Cathleen A., Rojas, Christian, 2010. Eliciting risk preferences: When is simple better? *Journal of Risk and Uncertainty* 41, 219–243.

### Question 3

You receive an endowment of \$1,000. You can invest \$x into a stock with the following two payoffs (50/50 chance):

- Stock payoff – low: -2%
- Stock payoff – high: +10%

Any money not invested into the stock (i.e., \$1,000 - \$x) will be automatically invested into a bond paying 2%.

How many \$x would you invest into the stock?

Your answer, which is a dollar amount, should be a number between 0 and 1000.

Answer: \_\_\_\_\_

Comment:

Purpose:

Putting answers to this task into context with the subjects' answers provided in Task 1 (e.g., consistency, rationality).

#### Question 4

You receive an endowment of \$1,000. You can either invest the \$1,000 into a stock with two different payoffs, or you can invest the \$1,000 into a bond with one known payoff.

The stock has the following payoffs (50/50 chance):

- Stock payoff – low: -2%
- Stock payoff – high: +10%

The bond has the following payoff:

- Bond payoff: +2%

Please select one of the following assets that you choose to invest the \$1,000 in. Please place an X in the appropriate box.

Your  
Selection  
**Mark only one**

Stock	
Bond	

Comment:

Purpose

Putting answers to this task into context with the subjects' answers provided in Task 1 (e.g., consistency, rationality) and Task 3.

### Question 5

*What is your age?* \_\_\_\_\_

### Question 6

*What is your gender?*

Male

Female

### Question 7

*What year are you in?*

First

Second

Third

Fourth

### Question 8

*Where are your parents from? (country)*

Father: \_\_\_\_\_

Mother: \_\_\_\_\_

Comment:

Purpose

Determine cultural heritage (-> Hofstede Uncertainty Avoidance Index)

Source

Question based on: Pan, Y., Siegel, S., Wang, T. Y., 2020. The Cultural Origin of CEOs' Attitudes towards Uncertainty: Evidence from Corporate Acquisitions. *The Review of Financial Studies* 33 (7), 2977–3030.

### Question 9

*To the best of your knowledge, what is your family's annual income?  
(Please select from the following)*

- |                   |                          |                     |                          |                   |                          |
|-------------------|--------------------------|---------------------|--------------------------|-------------------|--------------------------|
| < \$20,000        | <input type="checkbox"/> | \$20,000–\$29,999   | <input type="checkbox"/> | \$30,000–\$39,999 | <input type="checkbox"/> |
| \$40,000–\$49,999 | <input type="checkbox"/> | \$50,000–\$59,999   | <input type="checkbox"/> | \$60,000–\$79,999 | <input type="checkbox"/> |
| \$80,000–\$99,999 | <input type="checkbox"/> | \$100,000–\$149,999 | <input type="checkbox"/> | > \$150,000       | <input type="checkbox"/> |

Comment:

Brackets based on household income distribution in Canada, 2019.  
The source of these statistics is: [statista.com](http://statista.com).

### Question 10

*What is the highest level of education that your parents have completed?  
(Please select from the following)*

#### Father

- |                         |                          |                                    |                          |                       |                          |
|-------------------------|--------------------------|------------------------------------|--------------------------|-----------------------|--------------------------|
| some high school        | <input type="checkbox"/> | GED                                | <input type="checkbox"/> | completed high school | <input type="checkbox"/> |
| some college            | <input type="checkbox"/> | technical and/or associates degree | <input type="checkbox"/> | college degree        | <input type="checkbox"/> |
| some post-graduate work | <input type="checkbox"/> | post-graduate degree               | <input type="checkbox"/> | Other: _____          |                          |
| Do not know             | <input type="checkbox"/> |                                    |                          |                       |                          |

Question 10 continued on next page... (Mother's education)

**Mother**

- |                         |                          |                                    |                          |                       |                          |
|-------------------------|--------------------------|------------------------------------|--------------------------|-----------------------|--------------------------|
| some high school        | <input type="checkbox"/> | GED                                | <input type="checkbox"/> | completed high school | <input type="checkbox"/> |
| some college            | <input type="checkbox"/> | technical and/or associates degree | <input type="checkbox"/> | college degree        | <input type="checkbox"/> |
| some post-graduate work | <input type="checkbox"/> | post-graduate degree               | <input type="checkbox"/> | Other: _____          |                          |
| Do not know             | <input type="checkbox"/> |                                    |                          |                       |                          |

**Comment:**  
Question adjusted from original source: Kuhnen, C. M., Miu, A. C., 2017. Socioeconomic status and learning from financial information. *Journal of Financial Economics* 124 (2), 349–372.

**Question 11**

*Do you have any student debt?*

- Yes  No

**Question 12**

*Do you receive any scholarships?*

- Yes  No

**Question 13**

*Do you receive any other type of financial aid that does not have to be repaid?*

- Yes  No

**Question 14**

*Do you have paid employment while being enrolled as a university student?*

Yes  No

**Question 15**

*Have you ever received an inheritance and/or larger monetary gift?*

Yes  No

**Question 16**

*What is your current cumulative GPA? \_\_\_\_\_*

**Question 17**

*What are your parents' occupations?*

Father: \_\_\_\_\_

Mother: \_\_\_\_\_

Comment:

Rank according to NOC (National Occupational Classification)

### Question 18

*To the best of your knowledge, have you or your immediate family personally experienced any of the following since 2007? (Please check all that apply)*

- |   |                          |
|---|--------------------------|
| Bankruptcy  | <input type="checkbox"/> |
| Foreclosure of property   | <input type="checkbox"/> |
| Loss of employment  | <input type="checkbox"/> |
| Inability to pay your debts on time   | <input type="checkbox"/> |
| Difficulty getting approved for loans,<br>for example to buy a car or a house | <input type="checkbox"/> |
| Having accounts in collection   | <input type="checkbox"/> |
| Borrowing from a payday lender  | <input type="checkbox"/> |
| None of the above   | <input type="checkbox"/> |

Comment:

[Source](#)

Kuhnen, C. M., Miu, A. C., 2017. Socioeconomic status and learning from financial information. *Journal of Financial Economics* 124 (2), 349–372.

## Appendix D: Study Questionnaire – US version edit

### Question 9

*To the best of your knowledge, what is your family's annual income?  
(Please select from the following)*

- |                     |                          |                     |                          |                   |                          |
|---------------------|--------------------------|---------------------|--------------------------|-------------------|--------------------------|
| < \$15,000          | <input type="checkbox"/> | \$15,000–\$24,999   | <input type="checkbox"/> | \$25,000–\$34,999 | <input type="checkbox"/> |
| \$35,000–\$49,999   | <input type="checkbox"/> | \$50,000–\$74,999   | <input type="checkbox"/> | \$75,000–\$99,999 | <input type="checkbox"/> |
| \$100,000–\$149,999 | <input type="checkbox"/> | \$150,000–\$199,999 | <input type="checkbox"/> | > \$200,000       | <input type="checkbox"/> |

Comment:

Brackets based on household income distribution in the United States, 2020.  
The source of these statistics is: [statista.com](https://www.statista.com).