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Geographical variations in risk tolerance and the use of financial instruments: evidence from a multi-jurisdictional survey

Gordon L. Clark ^a, Mads Hoefer ^a and Stefania Innocenti ^a

ABSTRACT

A substantial body of literature examines the determinants of risk preferences and their impact on risk-taking. However, few studies offer a nuanced understanding of behaviour situated in a cultural and geographical context. Using data from a representative sample survey of working individuals in 11 jurisdictions, this paper addresses this gap by exploring how context influences individual-level determinants of risk preferences. The findings reveal that, despite commonalities, context significantly affects how individual characteristics shape risk preferences and behaviour. Incorporating institutional and cultural factors into our understanding of human decision-making provides a more accurate representation of the geographical diversity of individual behaviour when faced with similar issues.

KEYWORDS

Risky behaviour; cultural context; geographical context; decision-making; financial instruments; risk tolerance

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1. INTRODUCTION

How people deal with risk is at the heart of the judgement and decision-making (JDM) paradigm in cognitive science (Kahneman & Tversky, 1979). While context is important, it is often neglected. In part, this is because the goals of the JDM research programme are typically concerned with identifying regularities in behaviour that contradict the expectations of the neoclassical economics paradigm (Shafir et al., 1997), including those related to risk tolerance (Thaler, 2015).

At issue is whether observed risk preferences are geographically constant or context-specific – that is, particular to certain jurisdictions and regions given the respondents' socio-economic attributes and status. Notwithstanding the success of the JDM paradigm, if risk preferences and behaviour can be shown to be in part or wholly geographically contingent, then the stylised facts of human rationality must be rewritten to accommodate the institutional and cultural factors that frame the nature and scope of individual behaviour (see Rodríguez-Pose et al., 2023).

CONTACT Gordon L. Clark  gordon.clark@smithschool.ox.ac.uk

^aSmith School of Enterprise and the Environment, Oxford University, Oxford, United Kingdom

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Few studies of risk preferences have been focused on behaviour in specific cultural and institutional settings. Exceptions include the cross-country study of risk preferences and social norms by Henrich et al. (2005), the cross-country study of risk preferences and economic development by Falk et al. (2018) and studies of how people respond to economic risk and uncertainty given their location in time and space (Clark, 2022). The paucity of studies could be explained, in part, by unease about previous studies of human behaviour that over-emphasised the role of context in explaining observed behaviour. Witness the influence of Ellen Churchill Semple's 'environmental determinism' in anthropology and geography over the first half of the twentieth century, which linked place with race and behaviour to discount a common humanity (Klinke, 2022).

At the heart of this paper is an assumption of shared cognitive and emotional capabilities that enable individuals to deal with specific economic, geographical and social circumstances. As such, 'context' stands for spatial heterogeneity, notwithstanding the forces of global economic integration (see Jones, 2017 on Piketty, 2014). Two research questions frame the paper. The first has two parts: to what extent does risk tolerance relate to respondents' individual characteristics *and* to what extent is this relationship moderated by the respondents' country of residence and related cultural norms? The second question also has two parts: to what extent do risk preferences affect respondents' use of financial instruments like insurance, saving and home ownership, *and* to what extent is the use of these instruments moderated by the respondents' country of residence? At issue is the interplay between risk tolerance, socioeconomic status and the financial instruments available to respondents *in* context.

Utilising the results from a cross-country representative sample survey¹ it is shown that, despite the apparent commonalities, contextual factors play a significant role in how individual characteristics shape risk preferences. It is also shown that respondents' jurisdictions of residence moderate the relationship between risk tolerance and the use of financial instruments. As such, our findings support recent research in cognitive science *and* economic geography that attribute an important role to context in framing behaviour (see Fiedler & Juslin, 2006; Huggins & Thompson, 2019). Nonetheless, we echo a point made by Faulconbridge (2008) and Gertler (2003), among others, about the dangers of simply 'reading-off' individual preferences and behaviour from context. As Simon (1956) intimated, our findings suggest that cognition and context are intimately entwined.

The data used in this paper are drawn from a 2016 representative survey across 11 countries or jurisdictions. The survey focused on employed individuals aged 25–60 years and covered the UK, selected European countries (Germany, Italy, Spain and Switzerland), the Americas (Brazil, Mexico and the USA) and three countries or jurisdictions in Asia (Australia, Hong Kong and Malaysia).² Notwithstanding commonalities and differences in respondents' risk preferences given their age, gender and incomes, the importance of these factors is moderated by jurisdiction. Additionally, it is shown that the use of financial instruments depends on respondents' risk tolerance and context.

This paper makes three contributions to the literature. First, we provide a 'working' model of human behaviour that gives weight to behaviour *in* context. In doing so, we neither idealise human agency nor do we assume that agency is derivative of context. Second, we treat context as a multi-dimensional 'space' of institutions, social norms and cultural expectations that together frame human aspirations and behaviour. While it is tempting to assign priority to one driver of behaviour-in-context, such as culture and social norms, disentangling the separate effects of institutions, social norms and cultural expectations is beyond the reach of this paper. Third, we provide an empirical perspective on these issues that is more nuanced compared with related research in economic geography and in the behavioural and cognitive sciences.

Our project has its limits. Countries or jurisdictions can be thought to be rather crude geographies in that many are composites of cities and regions with diverse histories and social norms and traditions. Even so, the nation-state is typically responsible for financial regulation and, more

often than not, ensures individual and family wellbeing through national income and welfare policies. Additionally, there is a gap between attitudes and intentions and what people do in the face of the exigencies of the moment. The empirical analysis does not capture real-time decisions in the face of specific events or circumstances. Our analysis is also limited by sparse information on the familial and social context of decision-making. In many middle-class families, individual risk-taking is the product of shared decision-making trading-off individual earnings and savings intentions on behalf of household wellbeing (see Clark et al., 2012). These are important research topics that could be addressed in various ways, including research that joins surveys with context-specific engagement with individuals and households (see Morduch & Schneider, 2017).

The data upon which this paper is based were collected in 2016 – when the worst effects of the global financial crisis had passed to be replaced with modest rates of global – and country-specific economic growth. Financial and economic risks remained salient for many people, albeit mediated by country-specific experience and policies.³ Unseen but looming on the horizon were the risks to employment associated with technological innovation (Aghion et al., 2021).

2. RELATED LITERATURE

2.1. Individual characteristics and risk preferences

The literature on risk preferences is large and extensive. Here, we highlight the role that key individual factors including age, gender, income and other personal and material circumstances play in affecting risk tolerance.

Age: Wang et al. (2023) found that risk tolerance exhibits a largely linear decline with increasing age. Studies of age-related risk preferences typically invoke the lifecycle hypothesis which supposes that risk aversion is positively correlated with age and stage-of-life (Bakshi & Chen, 1994; Palsson, 1996). By implication, as pensions and income from invested assets replace earned income, retirees are reluctant to carry the nature and scope of risks they took before retirement. Conversely, the evidence suggests that the further people are from retirement the more willing they are to take risks. As such, the age effect is hypothesised to be negative.

H1 the age effect: older individuals are less risk tolerant than their younger counterparts.

Dependants: analysing 18 studies, Atanasov (2015) found that making choices for others was associated with more risk-aversion compared with making choices for oneself. Additionally, Görlitz and Tamm (2015) found that men and women experience increasing risk aversion as early as two years before becoming a parent. This effect seemingly disappears when dependent children become older. Presumably, the responsibilities associated with caring for dependents drive individuals to prefer safer (financial) choices to ensure (financial) stability and security for their dependants. This suggests a negative effect.

H2 the dependants' effect: having to provide for a larger number of dependants decreases individual's risk tolerance.

Education: Brown et al. (2006) showed that risk aversion is negatively correlated with higher education. Additionally, Outville (2015) showed that more risk-averse individuals tend to have lower levels of post-secondary formal education. As such, higher education can lead to prioritising personal development, future-oriented consumption, and more informed and far-sighted financial choices. As such, we hypothesise the education effect to be positive.

H3 the education effect: higher levels of education increase risk-taking.

Financial literacy: while financial literacy is highly correlated with education, Sutter et al. (2020) found that financial literacy promotes patience. Mudzingiri et al. (2019) and Lusardi and Mitchell (2011) argue that being financially literate enhances one's ability to take more risk and time-effective decisions, suggesting that more financially literate individuals undertake greater risk-taking.

H4 the competence effect: more financially literate individuals have higher propensity to engage in risk-related decisions.

Gender: Barber and Odean (2001) showed that men are more likely to take financial risks than women (see also Charness & Gneezy, 2012). But Lindquist and Säre-Söderbergh (2011) noted that, when accounting for age, risk-tolerance amongst women yields more variable effects than expected. The evidence suggests that women are, on average, more risk averse than men.

H5 the gender effect: women are less risk tolerant than men.

Perception of government and welfare policies: Bird (2001) found higher risk tolerance in jurisdictions with higher levels of social spending. Similarly, Rapp et al. (2018) found that generous unemployment policies positively influence individuals' views on the feasibility of self-employment. These findings suggest that the perception of a strong welfare state may enable or encourage citizens to take more risk than they might otherwise do, therefore leading to a positive welfare effect.

H6 the welfare effect: perception of strong welfare encourages risk-taking.

Health: Rosen and Wu (2004) and Edwards (2008) amongst others found that poor health is associated with less risky portfolios in the US Health and Retirement Study (HRS) suggesting a negative relationship between health and risk appetite. Bressan et al. (2014) reported that self-assessed poor health negatively impacts portfolio choice. Berkowitz and Qiu (2006) and Coile and Milligan (2009) found that health shocks reduce the share of risky assets in individual investment portfolios either directly or indirectly. We therefore hypothesise a positive health effect.

H7 the health effect: those who feel as healthy or healthier than average, are more likely to be risk tolerant.

Income: many studies have shown that lower-income individuals are more risk averse than higher income individuals (Grable, 2000; Haushofer & Fehr, 2014; Tanaka et al., 2010). Yao et al. (2011) claimed that wealthier individuals are more inclined to pursue risky investments to maintain their lifestyles after retirement. Likewise, Van Rooij et al. (2012) identified income as a key predictor of financial decision-making, portfolio risk levels, and risk tolerance. Shaw (1996) found a positive correlation between wage levels and risk preferences. In sum, the income effect is hypothesised to be positive.

H8 the income effect: having a higher income leads to higher risk tolerance.

2.2. Moderating effect of culture on risk tolerance

In economic geography and related research in economics, there is a presumption that jurisdiction-specific institutions, culture and social structure shape preferences and behaviour (see Alesina & Giuliano, 2015). Aoyama (2009) suggested that social norms and conventions can predate

the modern state and provide legitimacy for contemporary institutions and culturally informed preferences and expectations of behaviour. This argument animates Greif's (2006) historical account of the evolution of cultural beliefs as regards individual autonomy and the nation-state.

Huggins and Thompson (2015, p. 135) argued that 'culture shapes what individuals perceive as opportunities' while Spigel (2017, p. 293) citing Bourdieu (1977) advances the argument that 'culture is best understood as the stabilised patterns of practice [individuals] develop through [their] understanding of the fields they operate within'. This suggests that culture is relational, setting the terms of engagement between individuals and their communities and the state (national and sub-national). See also Bathelt and Glückler (2011).

Arguably, cultural expectations, if widely shared along with institutional mechanisms that reinforce their observance, frame behaviour (MacKinnon et al., 2009). Formal institutions often prescribe behaviour, whether by the rewards and sanctions that promote individual and collective expectations or by rules and regulations that claim legitimacy locally, nationally and even globally (Gertler, 2010, p. 243). In many jurisdictions, culturally grounded informal institutions and norms ensure that individuals honour social standards and behavioural expectations. In certain branches of economics, notably those concerned with the origin and performance of enforceable contracts, it is believed that state-enforced rewards and sanctions are vital in promoting the performance of contract and shared expectations of behaviour (see Hardin, 1996 and Posner & Rasmusen, 1999). Others, however, disagree (see Nahata et al., 2014, for a review).

The empirical link between culture, context and behaviour, and preferences is under-developed principally because of the difficulty of measuring cultural traits and their impacts. To this end, the tension between individualism and collectivism has been used to represent cultural norms and are considered relevant to the study of risk preferences (see Bontempo et al., 1997; Chui et al., 2010; Fan & Xiao, 2006; Hsee & Weber, 1999; Rieger et al., 2015; Wang & Fischbeck, 2008).

Although imperfect, this tension can be thought to represent the degree to which people in a society are integrated or not into groups (Hofstede, 2001). Arguably, individualistic societies tend to have loose ties that often relate to individuals and their immediate families. By contrast, the concept of collectivism is used to represent societies in which integrated relationships tie extended families and others into inclusive and oftentimes broad-based communities. In theory, social ties are assumed to protect individual welfare in exchange for loyalty and opposition to others who might challenge the integrity of such groups.

When focusing on the aggregate effect of culture on risk tolerance, two claims summarise expectations and likely behavioural patterns (Rieger et al., 2015). Individualistic societies stress personal achievement notwithstanding the costs of over-confidence and over-optimism thereby fostering individual risk-related attitudes and behaviour including financial risk-taking (Chui et al., 2010). Conversely, it can be contended that collectivistic societies cultivate strong social networks which provide 'cushions' or collective insurance against the costs of possible financial losses. In effect, the existence of these cushions can encourage individuals to pursue risk-taking behaviour which they would otherwise seek to avoid (see Fan & Xiao, 2006; Hsee & Weber, 1999; Wang & Fischbeck, 2008).

As such, it is difficult to posit an unambiguous relationship between the level of individualism or collectivism existing in a society and the aggregate levels of risk tolerance. Nevertheless, culture can be thought to moderate many of the individual-level risk-related patterns identified above. We illustrate the possible impact of culture on risk-taking behaviour by reference to the variables identified in the previous section.

Age: the effect of culture on individual behaviour is expected to grow with age. While social learning happens during childhood, cultural norms are perceived as more important by older individuals (see Fung, 2013). For instance, Neugarten (1977) noted that adults often believe

that their capacity to effectuate change diminishes with age. Heckhausen and Schulz (1995) claimed that older individuals' personal goals tend to align with external expectations, possibly due to age-related cognitive decline and increasing reliance upon society. In sum, the influence of age on reducing risk tolerance is likely stronger in individualistic societies which emphasise risk as a means for individual achievement, which, in turn, may be negatively affected by reduced cognitive and physical capabilities as age increases.

H1a: the age effect is likely to be stronger in individualistic societies.

Dependants: as mentioned above, making decisions on behalf of, and thinking about others, is likely to reduce individuals' risk tolerance. However, this effect may be somewhat weakened in collectivist societies according to the 'cushion' hypothesis (Hsee & Weber, 1999). In fact, being embedded in social networks may dampen responsibility towards one's own direct dependants, thus weakening the dependants effect.

H2a: the dependants effect is weaker in collectivistic societies.

Education: while education is typically positively associated with risk tolerance, individualism can be thought to encourage more educated agents to take comparatively higher calculated risks since education boosts confidence in achieving personal gains through risk-taking (Humphrey & Bliuc, 2021; Moon et al., 2023). In collectivist societies, despite education fostering individualistic attitudes, social norms hold sway considering the impact of individual risk-taking on family and community (LeFebvre & Franke, 2013). This suggests that the positive effect of education on risk preferences is stronger in individualistic contexts.

H3a: the education effect is stronger in individualistic societies.

Financial literacy: culture is also thought to moderate the effect that financial literacy has on risk tolerance. In individualistic societies, individuals are more likely to seek advice from professionals over relatives or friends (Lu et al., 2021). Equally, individualism is thought to dampen mistrust in financial institutions (Lu et al., 2021; Yamagishi et al., 1998), suggesting that financial advice is less about risk management and more about realising individuals' objectives beyond risk minimisation. For these reasons, it is plausible to assume that the effect of financial literacy on risk tolerance is stronger in individualistic societies.

H4a: the competence effect is stronger in individualistic societies.

Gender: the effect that gender exerts on risk aversion is expected to be weaker in individualistic societies. Individualism is associated with personal liberty and self-determination, values that discount support for patriarchal norms and promote greater gender equality. Davis and Williamson (2022) found that individualism is positively associated with women's economic rights. Going further, Falk and Hermle (2018) argued that higher levels of economic development allow for more equitable gender relationships and thereby reduce the effect of gender on risk aversion. This suggests that individualistic cultures amplify women's appetite for risk, thus weakening the gender effect.

H5a: the gender effect is likely to be weaker in individualistic societies.

Government and welfare policies: in individualistic societies, weaker social ties suggest that individuals cannot rely as much on others for social welfare. By contrast, in collectivist cultures people are better supported by their extended families, friends and social networks (Fafchamps &

Gubert, 2007). As such, ‘institutions’ of mutual insurance provide a buffer against financial risks and reduce the perceived need for government welfare support. As a result, expectations of entitlements to government welfare support can play a significant role in providing a safety net for individuals in individualistic cultures (Hsee & Weber, 1999).

H6a: the welfare effect is stronger in individualistic societies.

Health: ailments, chronic diseases and poorer health in general are less likely to represent an obstacle in collectivistic societies, due to the ‘cushion’ effect. For this reason, the impact of poor health on risk taking is more likely to be stronger in individualistic societies.

H7a: the health effect is weaker in collectivistic societies.

Income: individualism tends to magnify the effect that income exerts on risk taking. Yao et al. (2011) found that, all things being equal, wealthier individuals are more inclined to pursue risky investments to maintain their lifestyles over the long term. This effect is likely to be heightened in societies where mutual insurance is lacking or non-existent.

H8a: the income effect is stronger in individualistic societies.

The theorised effects of individual-level characteristics on risk preferences and the respective moderating effects of culture are summarised in Figure 1.

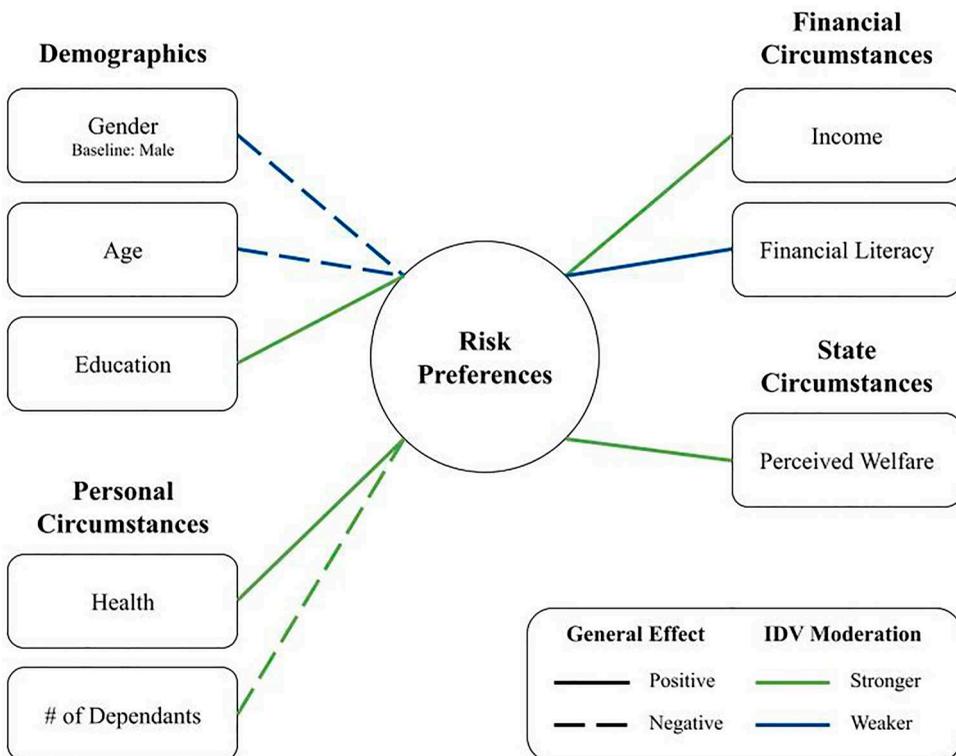


Figure 1. Theoretical framework linking individual-level characteristics and risk preferences.

2.3. Risk tolerance and financial instruments

The literature on risk preferences and financial decisions is also extensive. Here we focus on the use of financial instruments such as the accumulation of savings, life insurance policies and homeownership.

Savings: it is widely recognised that saving functions as a buffer in an uncertain world and is aligned with the permanent income hypothesis and precautionary motives wherein it is assumed that individuals seek to secure future consumption without falling short (see Leland, 1968). Recent research indicates that risk-tolerant individuals save to offset the risks they have taken (see Crainich et al., 2013; Ebert & Wiesen, 2014). Risk-seeking has also been found to have a positive effect on precautionary savings (see Bartzsch, 2008; Limosani & Millemaci, 2014) although there are doubts as to whether the effect is systematic (see Charness et al., 2020). In sum, at least two factors influence savings rates as risk preferences change: a decline in precautionary savings with rising risk preferences and an increased engagement in riskier activities. We hypothesise that the relationship between savings rates and risk preferences is not linear, likely exhibits a decreasing slope, and indicates that as risk preferences rise, the propensity to hold precautionary savings diminishes relative to an increased appetite for risky choices. Whether this relationship has an inverse-U shape is an empirical question.

H9: an increasingly negative relationship between risk preferences and savings exists.

Life insurance: this kind of product typically protects families from income loss due to the early death of a breadwinner (Eling et al., 2021; Han & Hung, 2017). While it is commonly believed that more risk-averse individuals buy more insurance, empirical research yields inconsistent results. For example, Luciano et al. (2016) and Giesbert et al. (2011) found a negative effect of risk aversion on the demand for insurance whereas Liebenberg et al. (2012) found no significant association between risk aversion and holding life insurance. Eling et al. (2021) found a positive and significant association between willingness to take financial risks and holding life insurance. Like savings, holding life insurance is influenced by two factors: the propensity to insure and the inclination to engage in risky behaviours. Given that life insurance uptake reflects the risks associated with an individual's activities, we hypothesise a non-linearly decreasing relationship between risk preferences and life insurance uptake, though the exact shape requires empirical investigation.

H10: an increasingly negative relationship between risk preferences and life insurance ownership exists.

Homeownership: research shows that risk tolerance significantly influences the decision to purchase a house. Liao et al. (2014) and Diaz-Serrano (2005) found a negative relationship between risk aversion and housing wealth, with less risk-averse households experiencing greater changes in consumption in response to house price appreciation. This suggests that risk-averse individuals may be less likely to invest in housing. Cox et al. (2015) supported this finding, demonstrating that households with higher risk tolerance were more likely to opt for mortgage products, indicating a greater willingness to take on financial risks.

H11: risk-tolerant individuals are more likely to invest in housing.

2.4. Moderating role of culture on financial behaviour

It is plausible that culture moderates the importance of risk tolerance when deciding to acquire specific financial instruments whose valuation depends on a preference for risk and on their availability. The literature on the matter is scant but suggestive.

Savings: given the tendency of individuals living in individualistic societies to exhibit overconfidence and optimism (Rieger et al., 2015), it is plausible that individuals with the same risk preferences hold fewer savings compared to those in collectivist societies. By contrast, individuals in collectivistic societies may save more for their immediate needs and to adhere to social norms.

H9a: holding risk tolerance constant, individuals in collectivistic jurisdictions are more likely to hold savings.

Life insurance: it has been found that individualism dampens mistrust in financial institutions and reduces reliance on informal networks as sources of financing (Lu et al., 2021). Therefore, holding risk preferences constant, individuals residing in individualistic societies that lack supporting networks, are expected to be more likely to take up life insurance as a financial product than their counterparts in collectivist societies.

H10a: holding risk tolerance constant, individuals in individualistic societies are more likely to take out life insurance.

Homeownership: owning a home is strongly related to a country’s institutional structure and cultural traditions. Specifically, Smith (2013) argued cultural attitudes towards homeownership and debt significantly impact how housing markets function – affecting mortgage lending practices and innovation in financial products aimed at facilitating homeownership. Further, market deregulation and liberalisation, both attributes of individualistic societies, are believed to lead to risky financial products, contributing to the use of housing as a speculative investment product (Haliassos 2012; Lowe et al., 2012). As such, individualism is expected to positively moderate the effect of risk preferences on homeownership. Additionally, given sparser social network structures, the acquisition of a house is more likely to be the responsibility of the individual in individualistic societies as compared to collectivist ones.

H11a: holding risk tolerance constant, individuals in individualistic societies are more likely to invest in housing.

Like above, the theorised effects of risk preferences on the uptake of financial instruments and the respective moderating effects of culture are summarised in Figure 2.

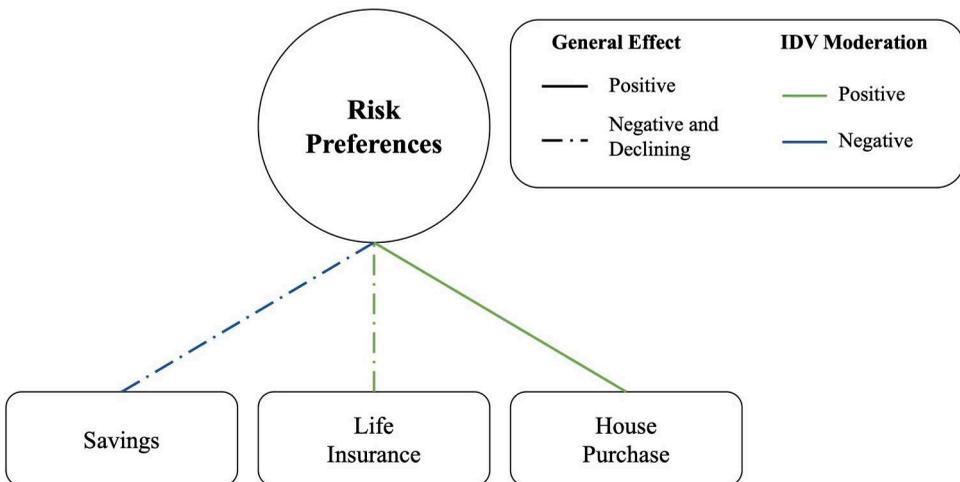


Figure 2. Theoretical framework linking risk preferences and the use of specific financial instruments.

3. DATABASE AND SURVEY

To assess individual and jurisdiction-specific differences in risk tolerance, their determinants and effects on the holding of financial instruments, we rely on data from a 2016 international survey which the Zurich Insurance Group commissioned in conjunction with Oxford University. See Survey Appendix in the online supplemental data for more details. Representative samples of working men and women aged 25–60 years, including those who had been out of work for less than three months, were developed for 11 countries and jurisdictions in Europe, the Americas and Asia.

The survey contained 57 questions divided into ten sections and took approximately 25 minutes to complete. The first five sections were devoted to eliciting information on respondents' backgrounds, their awareness and knowledge of insurance, their personal circumstances, their expectations of family, employers and government, and their attitudes towards and trust in institutions. The sixth section assessed their levels of risk aversion. Sections seven through ten tackled willingness to pay for insurance, financial literacy, the socio-demographic profiles of respondents and their employment status.⁴

We rely on question 35 to measure risk tolerance. This question asked respondents which level of risk they were willing to take when saving or investing.⁵ The question read as follows. *Which level of risk are you willing to take when saving or making investments?* The five answer options were ordinal in nature and approximately equidistant. Specifically, they were as follows (ranging from maximum to minimum risk tolerance): *substantial risk expecting to earn substantial returns; above average risk to earn above average returns; average risk expecting to earn average returns; below average risk to earn below average returns; not willing to take any financial risks.*

To investigate the effect of demographic variables on risk tolerance, we relied on respondents' self-identification via a binary gender variable (Q1), a continuous age variable (Q2) and a continuous education variable that measured years of schooling (Q48). To assess the effect of personal circumstances on risk tolerance, we used a categorical measure of self-assessed health and expected health – a question that asked respondents whether, given their age, they felt healthier, about as healthy or less healthy than average (Q22) and Q23 deals with expectations. A continuous measure to elicit the number of dependents of the respondent (Q51) was utilised. This variable was included to control for the nature of individual decision-making, trading-off earnings and savings intentions on behalf of collective future wellbeing (see Clark et al., 2012).

Regarding individual financial circumstances, we used ordinal country-specific income bands standardised with a mean of 0 and standard deviation of 1 per country (Q5c). In addition, we considered categorical responses about individuals' income change over the past year compared with the previous 5 years as well as their expected change in income over the next 12 months (Q39 and Q40 respectively). Each question offered response options indicating a decline, no change, or an increase in income as well as an option to state uncertainty about such change for future income. To assess the role of competence and analytical skills we relied on binary answers to Q45 to Q47. These questions are part of the financial literacy test regime elaborated by Lusardi and Mitchell (2011) and provide evidence as to whether respondents were able to calculate compound interest, conduct basic calculations and understand portfolio diversification.

Further, we assessed individual 'state' circumstances via a continuous self-reported estimate of the percentage that the relevant government would pay as a monthly benefit if the individual were unable to work due to personal circumstances (Q27). Arguably, this question measures the individual-level perception of government welfare policies and expected entitlement levels. As such, this serves as a proxy to individual-level perception of welfare support and can be considered an individual-level variable, albeit provided by governments (local or national).⁶

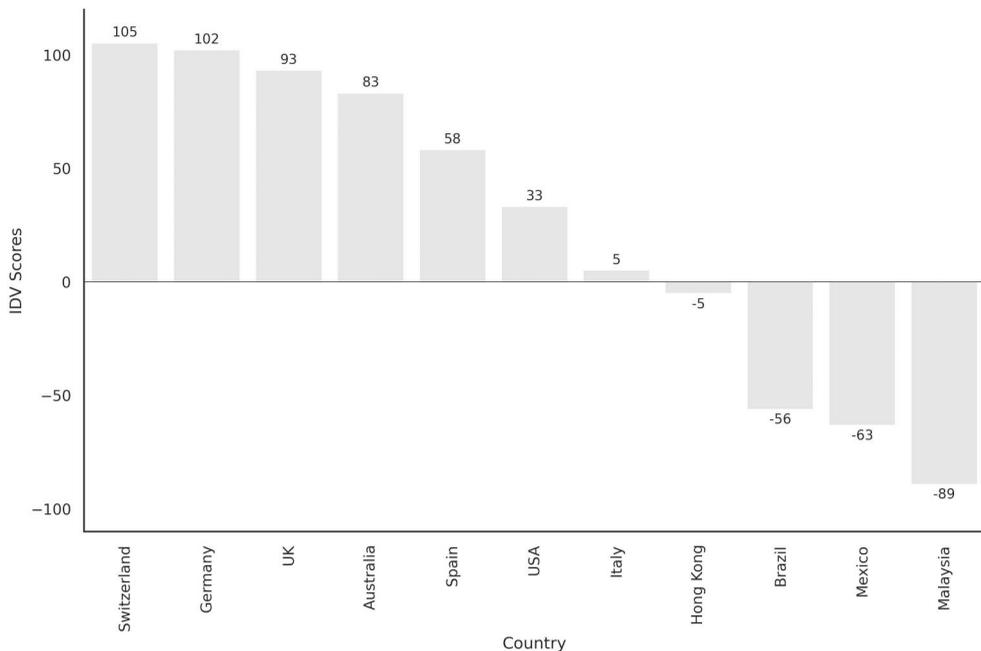


Figure 3. Individualism (IDV) scores across jurisdictions developed by Hofstede (2001) and measured by Minkov et al. (2017).

To assess hypotheses 9–11, we used survey questions regarding the uptake of financial instruments. The instruments considered were holding savings, taking-up life insurance and allocating money towards the purchase of a house. We measured savings via a binary variable indicating whether an individual has saved surplus income or not (Q37) in the 12 months prior to the survey. Specifically, this question read: *If you earned more than you spent in the past year, did you save that surplus income?* Whether an individual had taken up life insurance is assessed via a binary variable indicating life insurance uptake (Q6). The allocation of funds towards the purchase of a house was measured via two multiple-select variables indicating expenditures towards a house to live in or to rent out (Q38).

Finally, to contextualise our results with the cultural dimension of individualism versus collectivism, we utilised the country-level individualism (IDV) scores generated by Minkov et al. (2017) across 56 jurisdictions for the years of 2015 and 2016, including all jurisdictions relevant for the present study (see Figure 3).

4. EMPIRICAL AND ESTIMATION STRATEGY

The empirical strategy had two parts. First, we focus on the effect of individual-level predictors on respondents' risk tolerance (including country fixed effects). Subsequently, the regression models are extended to between-country variations in risk tolerance as well as the moderating effects of culture on individual-level predictors of risk tolerance.

In the second part of the analysis, we examine the effect of risk tolerance on the uptake of (risky) financial instruments (again including country fixed effects) in addition to the moderating effects of culture on the relationship between risk tolerance and the uptake of (risky) financial instruments. These steps are explained below.

4.1. Estimating the effect of individual-level predictors of risk tolerance

To analyse the effect of individual-level predictors on risk tolerance, we pooled all jurisdictions in the dataset and implemented the following ordinary least squares (OLS) regression with country dummies:

$$\begin{aligned}
 RiskTolerance_i = & \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Age_i^2 + \beta_4 Education_i \\
 & + \beta_5 Income_i + \beta_6 \Delta Income_i + \beta_7 E(\Delta Income)_i + \beta_8 FinancialLiteracy_i \\
 & + \beta_9 Health_i + \beta_{10} E(Health)_i + \beta_{11} Dependents_i \\
 & + \beta_{12} PerceivedWelfare_i + \alpha_c + u_{ic}
 \end{aligned} \tag{1}$$

The main dependent variable was $RiskTolerance_i$, an ordinal variable indicating individual i 's risk tolerance, which has been normalised to a mean 0 and standard deviation 1. In line with our framework, we include a set of individual-level predictors. $Gender_i$ was a binary variable (baseline: male); Age_i and Age_i^2 were continuous variables; $Education_i$ was a continuous variable on the years of schooling received by individual i . To evaluate the effect of one's financial circumstances we included $Income_i$, $\Delta Income_i$ and $E(\Delta Income)_i$ which were standardised ordinal variables on the current income of individual i , its change over the past 12 months relative to the last 5 years and their expected change over the next 12 months. $FinancialLiteracy_i$ was a binary indicator of individual i 's financial abilities. Furthermore, we considered respondents' health by including $Health_i$ and $E(Health)_i$ as categorical variables on individual i 's perceived current and future health. We also included $Dependents_i$, a continuous variable indicating the number of dependants for whom individual i was responsible for. Lastly, we considered individual perceptions of the availability of state welfare benefits ($PerceivedWelfare_i$) as a continuous variable: α_c indicated the country fixed effects and u_{ic} indicates the individual-level standard errors clustered at country level.

4.2. Estimating the influence of culture on individual-level predictors of risk tolerance

Next, we studied the country-specific effects on risk tolerance. We began with a one-way ANOVA of the average risk tolerance for each country in our sample to measure the importance of between-country variation in risk tolerance. Notably, we contextualise cross-country results by the culture dimension of individualism versus collectivism. In doing so, we relate the ANOVA results to the respective country-specific individualism (IDV) scores produced by Minkov et al. (2017).

Next, we augment Equation (1) by interacting individual level predictors with each country dummy as follows:

$$RiskTolerance_i = X_i Country_c + u_i \tag{2}$$

Where X_i is

$$\begin{aligned}
 & \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Age_i^2 + \beta_4 Education_i + \beta_5 Income_i + \beta_6 \Delta Income_i \\
 & + \beta_7 E(\Delta Income)_i + \beta_8 FinancialLiteracy_i + \beta_9 Health_i + \beta_{10} E(Health)_i \\
 & + \beta_{11} Dependents_i + \beta_{12} PerceivedWelfare_i
 \end{aligned} \tag{3}$$

This allows for an estimate of interaction effects and the moderating effects of culture on individual-level predictors of risk tolerance. Again, u_i are individual-level standard errors. The coefficients on $X_i Country_c$ can be interpreted as the country-specific (namely cultural) effects of individual-level predictors from regression (1) on risk tolerance.

4.3. Estimating the effect of risk tolerance on the uptake of financial instruments

Subsequently, we test the effect of risk tolerance on the uptake of (risky) financial instruments. Our model specification is like that presented above. However, we switch the dependent variable from $RiskTolerance_i$ to the respective financial instrument. The focal independent variable of these regressions is $RiskTolerance_i$ while X_i depicts our set of control variables as specified in Equation (3). The regression is specified as follows:

$$FinancialInstrument_i = \gamma RiskTolerance_i + X_i + \alpha_c + u_{ic} \quad (4)$$

We consider three different types of $FinancialInstrument_i$: whether individual i has saved surplus income, taken out life insurance or has allocated money towards homeownership. All these variables are binary. Again, α_c represents country fixed effects and u_{ic} are individual-level country-clustered standard errors.

4.4. Estimating the effect of culture on individual-level predictors of the use of financial instruments

To establish the existence of country-specific (that is cultural) effects on the importance that risk tolerance exerts on the use of financial instruments, Equation (4) extends like Equation (2):

$$FinancialInstrument_i = \gamma RiskTolerance_i Country_c + X_i Country_c + u_i \quad (5)$$

Again, we contextualise $RiskTolerance_i$ and $Country_c$ with the respective IDV scores, shedding light on the influence of culture on individual-level predictors of the use of financial instruments and include individual-level standard errors u_i .

5. RESULTS OF ECONOMETRIC ANALYSES

5.1. Estimating the role of individual determinants of risk tolerance

Table 1 shows the effects of individual characteristics on risk tolerance.⁷ Column 1 presents the results of the basic model. It was found that women were substantially less risk tolerant than men by about a third of a standard deviation. This result is in line with results obtained by Falk et al. (2018) and by Falk and Hermlle (2018) in a related cross-country study. Age was not found to significantly affect the risk tolerance of respondents, whereas higher educational attainment increased risk tolerance by about a hundredth of a standard deviation per extra year of schooling. Despite being a relatively small effect, it matches the findings of previous studies that have shown that higher levels of education and/or cognitive abilities are related to higher risk tolerance.

In column 2, it is shown that when controlling for income, the gender effect remains stable. However, it is also shown that education loses its effect. Instead, higher income increases risk tolerance in two ways – via absolute earnings as well as the expected change in earnings over the next 12 months. This confirms the results of previous studies including Tanaka et al. (2010) and Van Rooij et al. (2012). Past changes in income do not have a meaningful effect on risk tolerance. As such, the economic crises preceding the survey administration do not seem to have had a meaningful statistical effect on individuals' risk tolerance.

In the third column of Table 1, we show that respondents who reported greater perceived state welfare support were significantly more inclined to take risks. In column 4, we show that respondents who reported feeling at least as healthy as average were significantly more likely to take risks than those who believed their health was poorer than average. Each step change in reported health increased risk tolerance by one-fifth of a standard deviation. A similar, albeit half as strong, effect was found for expected health over the next 12 months.

There was a significant increase in the adjusted R-squared via the progressive inclusion of the additional predictors at each step. Note that the number of observations decreases over column 1

Table 1. Individual determinants of risk taking.

Dep. variable	(1) Risk taking	(1.1) Risk taking	(2) Risk taking	(3) Risk taking	(4) Risk taking
Gender (baseline: male)	-0.371*** (0.0326)	-0.3878*** (0.0386)	-0.3845*** (0.032)	-0.3761*** (0.031)	-0.3637*** (0.034)
Age sq.	0.0001 (0.0002)	0.0000 (0.0002)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Age	-0.0269 (0.0152)	-0.0227 (0.0167)	-0.0273 (0.017)	-0.0272 (0.017)	-0.0257 (0.017)
Education	0.0082** (0.0030)	0.0050 (0.0033)	0.0003 (0.003)	0.001 (0.003)	0.0013 (0.003)
Income			0.1583*** (0.034)	0.1568*** (0.033)	0.1440*** (0.029)
Income Change			0.025 (0.021)	0.0233 (0.020)	0.0196 (0.019)
E(Income Change)			0.1451*** (0.023)	0.1440*** (0.023)	0.1209*** (0.022)
Financial Literacy			-0.1182*** (0.036)	-0.1039** (0.040)	-0.0851* (0.040)
Perceived Welfare				0.0024* (0.001)	0.0021* (0.001)
Health					0.1901*** (0.030)
E(Health)					0.0865*** (0.022)
Dependents					0.0236 (0.015)
Constant	2.590*** (0.3318)	2.7802*** (0.3727)	2.7103*** (0.369)	2.5956*** (0.375)	2.1879*** 0.378
Country dummies	Yes	Yes	Yes	Yes	Yes
Observations	11,584	9115	9115	9115	9115
Adj. R Squared	0.126	0.145	0.168	0.170	0.180

Notes: OLS estimates, standard errors in parenthesis (clustered at the country level). Income is standardised. * $p < .10$, ** $p < .05$, *** $p < .01$.

to column 1.1 in Table 1. This is because not all respondents reported their current income and/or their expected income over the next 12 months. Reassuringly, the estimation of the basic model in column 1 is mostly unchanged by the exclusion of the subsequently dropped observations in column 1.1. Only the coefficient for education switches from statistically significant to insignificant. Given that the inclusion of income reduces the coefficient on education to essentially 0, this does not pose a problem for the results.

In sum, our models provide support for H5 (women are less risk tolerant than men), H6 (stronger perceived welfare benefits encourage risk taking), H7 (better health increases risk

tolerance) and H8 (higher income leads to higher risk tolerance). Conversely, H1 (older individuals are less risk tolerant than their younger counterparts), H2 (higher number of dependants decreases risk tolerance) and H3 (higher education leads to higher risk preferences) cannot be supported. Finally, the coefficient for financial literacy takes the opposite sign than hypothesised in H4, albeit with only weak significance. As such, H4 (more financially literate individuals have a higher propensity to engage in risk) cannot be supported.

5.2. Estimating the moderating effects of culture on individual-level predictors of risk tolerance

A key interest of the paper was to understand whether context moderates the effects of individual-level predictors on risk tolerance. To this end, we first conduct an ANOVA of the average risk tolerance for each country in our sample. Responses to the risk question were normalised to a mean 0 and standard deviation 1. Country averages are expressed in terms of standard deviations from the full sample mean. The results are presented in Figure 4.

It is shown that risk tolerance varies across jurisdictions. Mexico had the highest level of risk tolerance, half a standard deviation more than the full sample mean. The second and third most risk-tolerant jurisdictions or jurisdictions were Hong Kong and Malaysia. At the other end of the spectrum, Switzerland had the lowest level of risk tolerance, followed by Germany and the UK. In these jurisdictions, risk tolerance was a third of a standard deviation lower than the full sample mean. Interestingly, Figure 4 shows that absolute risk tolerance and IDV scores were negatively related (Pearson correlation coefficient $r(9) = -0.77$, $p = 0.005$).⁸ In sum, this result lends support to the ‘cushion’ hypothesis outlined by Rieger et al. (2015).

To test whether culture moderates the effect of individual-level predictors on risk tolerance, we turn to a country-level analysis. The results of the country-level models are presented in Figure 5.

Panel 1 of Figure 5 shows that the gender effect (women are less risk tolerant than men) is significant for all jurisdictions surveyed. Further, individualist jurisdictions have a more negative

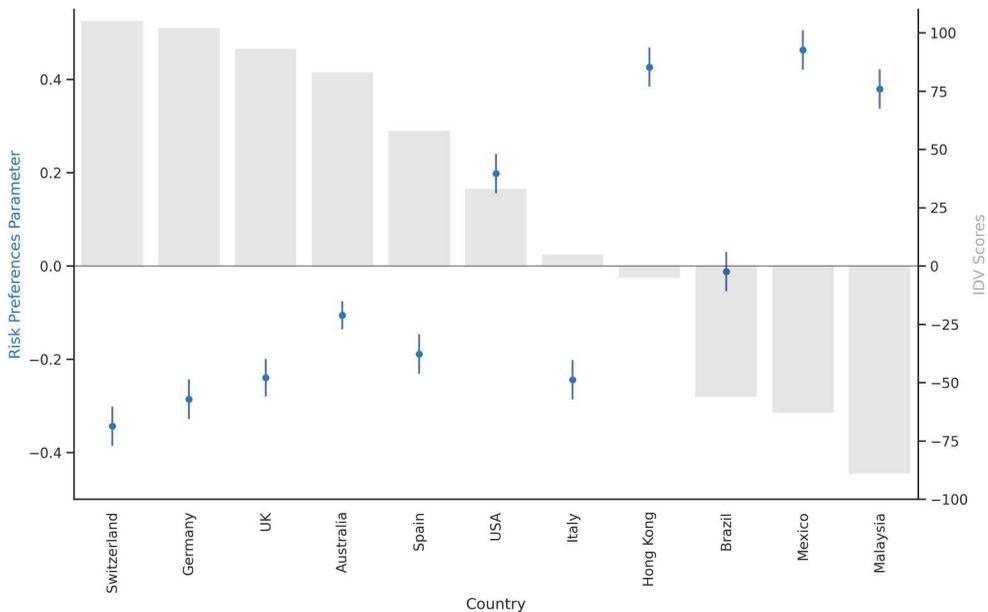


Figure 4. Country average risk tolerance with standard error bars plotted against country specific IDV scores.

Note: Country averages are expressed in terms of standard deviations from the full sample mean.

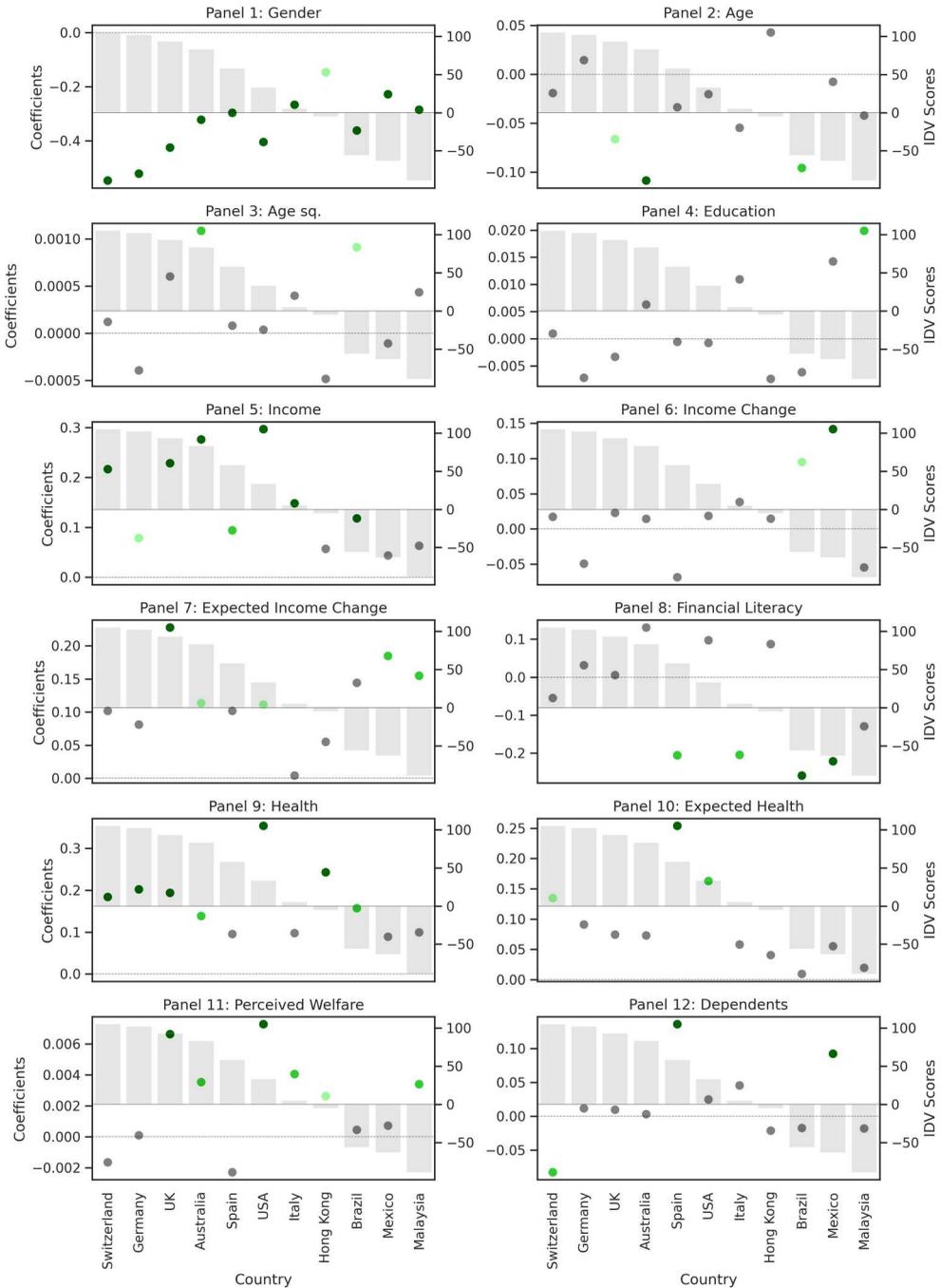


Figure 5. Ten country-specific coefficients of the individual-level predictors of risk tolerance. Note: The left axis refers to the coefficient value of the predictor referenced in the respective panel’s title. The right axis refers to the IDV scores. Grey circles present $p > 0.1$, light green presents $p < 0.1$, green presents $p < 0.05$, and dark green presents $p < 0.01$.

gender effect. Panels 2 and 3 show that risk tolerance declines with age in almost all jurisdictions albeit with decreasing slope: older individuals are less risk tolerant than their younger counterparts but as age increases, its negative effect on risk preference decreases. Nevertheless, this effect is only statistically significant for the UK, Australia and Brazil. As such, the age effect is moderated by jurisdiction of residence.⁹ Panel 4 shows that the effect of education on risk preferences is largely not significant and hovers around 0. The only exception is Malaysia, which exhibits a positive coefficient of education on risk preferences.

Panels 5 through 7 show the jurisdiction-specific income effects on risk tolerance. All significant estimators of the income effects (absolute, change or expected) are positive. However, past changes in income do not exhibit significance for any jurisdiction apart from Mexico. Further, the effect of absolute income on risk tolerance seems to be positively correlated with IDV scores while for expected income change over the next 12 months, no discernible pattern was found.

Panel 8 shows that the effect of competence on risk tolerance was largely insignificant for jurisdictions with higher IDV scores and statistically significant and negative for jurisdictions with lower IDV scores. Panels 9 and 10 show the effect of health on risk tolerance by country. We observe a positive effect of health on risk tolerance across all jurisdictions. Specifically, in jurisdictions with higher IDV scores, higher current health levels significantly increased risk tolerance. The relationship between health and risk tolerance is not significant in jurisdictions with lower IDV scores. Furthermore, Switzerland, Spain and the USA show significantly positive effects of expected health on risk tolerance.

Panel 11 presents the effect of perceived government welfare support on individual risk tolerance by country. The effect is positive and mostly statistically significant apart from Switzerland, Germany, Spain, Brazil and Mexico. Again, a moderate positive trend between the IDV score and the effect of welfare perception on risk tolerance is discernible. Finally, panel 12 shows the effect of the number of dependants on risk tolerance across jurisdictions. Interestingly, this effect hovers around 0 for all jurisdictions apart from Switzerland (negative), Spain (positive) and Mexico (positive), where it is statistically significant.

The results also shed light on the moderating role of culture on individual-level predictors of risk tolerance noted in the previous results section. We can conclude that H6a (the welfare effect is stronger in individualistic societies), H7a (the health effect is weaker in collectivistic societies) and H8a (the income effect is stronger in individualistic societies), are largely supported by the results. Further, while the overall effect of financial literacy on risk preferences is contrary to our hypothesis H4, the results support that individualism moderates this effect positively. As such, H4a (the competence effect is stronger in individualistic societies) is supported.

Conversely, the results support neither H1a, namely that the age effect is likely to be weaker in individualistic societies, H2a, which is that the effect of dependants is weaker in collectivistic societies, nor H3a, which is that education has a stronger positive effect on risk preferences in individualistic jurisdictions. The results related to H5a (the gender effect is likely to be weaker in individualistic societies) indicate the opposite of that initially hypothesised.

As such, while, on aggregate, IDV scores negatively affect risk tolerance, individualism mostly moderates individual-level factors positively (that is income, health, financial literacy and perceived welfare). Note that these results lend further support to the mechanisms through which either individualistic or collectivistic societies foster risk-taking. Characteristics such as income, health, or perceived welfare are hypothesised to matter less in collectivistic societies due to cultural norms.

5.3. Estimating risk tolerance and take-up of financial instruments

In this section, we analyse the effect of risk tolerance on the uptake of a set of financial instruments. Table 2 presents the results.

Table 2. The effect of risk tolerance on the use of Financial Instruments.

Dep. variable	(1) Savings	(1.1) Savings	(2) Savings	(3) Insurance	(3.1) Insurance	(4) Insurance	(5) House	(6) House
Risk taking	-0.0156* (0.007)	0.0524*** (0.015)	0.0276** (0.011)	0.0686*** (0.009)	0.1260*** (0.010)	0.0950*** (0.009)	0.0165*** (0.005)	0.0128*** (0.004)
Risk taking sq.		-0.0190*** (0.004)	-0.0125*** (0.003)	-0.0160*** (0.005)		-0.0127*** (0.003)		
Gender			0.0149 (0.009)	-0.0432** (0.014)		-0.0432** (0.014)		0.0243 (0.015)
Age sq.			0.0001* (0.00008)	-0.0002** (0.00005)		-0.0002** (0.00005)		-0.0002** (0.00008)
Age			-0.0090 (0.007)	0.0130** (0.005)		0.0130** (0.005)		0.0124* (0.007)
Education			0.0042*** (0.001)	-0.0013 (0.001)		-0.0013 (0.001)		0.0021*** (0.001)
Income			0.0578*** (0.010)	0.0584*** (0.009)		0.0584*** (0.009)		0.0285*** (0.009)
Income Change			0.0659*** (0.011)	0.0060 (0.005)		0.0060 (0.005)		0.0134* (0.006)
E(Income Change)			0.0088 (0.007)	0.0085 (0.006)		0.0085 (0.006)		-0.0066 (0.009)
Financial Literacy			0.1185*** (0.020)	-0.0147 (0.014)		-0.0147 (0.014)		-0.0058 (0.014)
Perceived Welfare			-0.0012*** (0.000)	0.0014*** (0.000)		0.0014*** (0.000)		0.0003 (0.000)
Health			0.0367*** (0.009)	0.0332** (0.011)		0.0332** (0.011)		-0.0032 (0.010)
E(Health)			-0.0296** (0.010)	0.0045 (0.007)		0.0045 (0.007)		-0.0114* (0.006)
Dependents			-0.0271*** (0.006)	0.0399*** (0.009)		0.0399*** (0.009)		0.0248*** (0.004)
Constant	0.4165*** (0.012)	0.3800*** (0.013)	0.3858** (0.149)	0.2182*** (0.016)	0.1865*** (0.007)	-0.1578 (0.103)	0.2638*** (0.009)	-0.0574 (0.127)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9115	9115	9115	8329	8329	8329	9115	9115
Adj. R Squared	0.046	0.050	0.139	0.071	0.073	0.114	0.021	0.035

Notes: OLS estimates, standard errors (clustered at the country level) are in parenthesis. Income is standardised. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In columns 1 and 1.1 of Table 2 we report the results of the basic model of risk tolerance on savings. It was found that this relationship takes an inverse-U shape. In column 2 we show that although we see a decrease in the strength of the effect of risk tolerance on holding precautionary savings, the results are robust enough to include a set of individual-level predictors. As such, the results show that higher risk tolerance reduces prudence and is associated with respondents who are more likely to spend their earned income. However, this relationship takes the form of an inverted U, meaning that as risk tolerance increases from very low to moderate levels, the proportion of discretionary income devoted to savings increases, while an increase from moderate to high levels of risk tolerance decreases the share of income saved (see Figure 6, Panel 1). It could be that individuals of moderate risk tolerance hedge their increased risk taking while those with high risk tolerance cease to do so.

In columns 3 and 3.1 of Table 2, we report the results of the basic model of risk tolerance on life insurance uptake. We found a relationship that takes an inverse-U shape. The results are robust to including a set of individual-level predictors as shown in column 4. As such, the results show that increasing risk tolerance increases the likelihood of taking out life insurance, albeit with diminishing intensity and only until above average risk tolerance (see Figure 6, Panel 2). As such, a similar argument to holding discretionary savings applies – individuals may be hedging against their risk taking by taking out life insurance, albeit only up to a certain level of risk tolerance, after which they stop hedging against their increasing risk taking.

In columns 5 and 6 we show that risk tolerance positively affects the likelihood of allocating money towards the purchase of a house, even after controlling for additional individual-level predictors. We did not find that the addition of a squared term for risk tolerance adds further nuance to the model; rather, it generated insignificant results. This suggests that risk preferences affect home purchasing decisions in a linear fashion.

In sum, our results support H9 (a negative and decreasing relationship between risk tolerance and holding discretionary savings), H10 (a negative and decreasing relationship between risk tolerance and life insurance uptake) and H11 (risk-averse individuals are less likely to invest in housing).

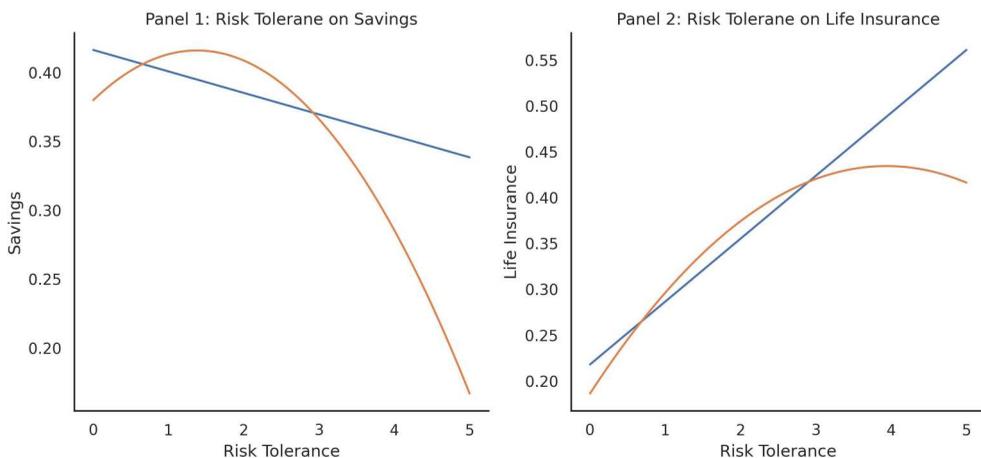


Figure 6. Coefficients for risk tolerance on discretionary savings (Panel 1) and life insurance (Panel 2). Note: The blue line represents the basic model of regression (4) with risk tolerance as a linear dependent variable. The orange line represents the basic model as specified in Equation (4) with risk tolerance included both as a linear and as a squared term.

5.4. Estimating the moderating effect of culture of risk tolerance on the take-up of financial instruments

To establish the existence of country-specific effects of risk tolerance on the uptake of the set of financial instruments analysed, the base model was re-estimated with additional country interaction effects as specified in Equation (5). As before, we were concerned with identifying similarities and differences in the *significance*, *size* and *sign* on the risk coefficient for each country. As before, the country-specific results are set out in graphical form to ease comparison (see Figure 7).

In Panel 1 of Figure 7, it is shown that risk tolerance is not a significant factor in the decision to save in all jurisdictions but the UK, Australia and Hong Kong. As such, the effect recorded in Table 2 and Panel 1 of Figure 6 might be affected by a handful of jurisdictions while the majority exhibits only modest and therefore insignificant effects. Including a squared risk tolerance term in the model leads to a greater number of jurisdictions exhibiting significance in at least one of the coefficients. Nevertheless, the result confirms that the individual-level cross-country effect might be driven by a subset of jurisdictions.

By contrast, Panel 2 of Figure 7 shows that the effect of risk tolerance on life insurance uptake is not significant for Mexico, while it is significant and positive for all other jurisdictions. This effect is, however, stronger for jurisdictions with high IDV scores compared with more collectivistic jurisdictions.

Finally, we hypothesised that the effect of risk tolerance on the decision to purchase a house would have distinctive country effects. In Panel 3 of Figure 7, it is shown that there was no significant relationship between risk tolerance and home ownership for seven of the 11 jurisdictions. This relationship is, however, modestly significant for Australia and strongly significant for Switzerland, Germany and the USA. Further, although most coefficients are not significant, there appears to be a negative relationship between IDV score and the decision to allocate money towards the purchase of a house.

In sum, the results of the country-specific analyses support H10a (individuals in individualistic societies are more likely to take out life insurance) and H11a (individuals with the same risk tolerance are more likely to invest in housing in individualistic societies), while H9a (individuals in collectivistic jurisdictions are more likely to hold savings at constant risk tolerance) is neither supported nor negated (that is showing the opposite sign).

6. IMPLICATIONS AND CONCLUSIONS

Oberdiek (2017, p. 1) observed that people are ‘shadowed by risk’ and ‘risk utterly permeates life’. More specifically, critics of globalisation and neoliberalism associate risk and risk-taking alongside associated costs with the spread of market imperatives to every corner of the world wherein many individuals have neither the aptitude nor the resources to manage risk in ways that minimise costs and maximise benefits (Dumenil & Levy, 2013). Even so, as the tech-revolution has demonstrated, risk-taking is fundamental to innovation and development with benefits for those involved and society at large notwithstanding the variable impact of costs and benefits locally and globally (see Aghion et al., 2019) and the uneven surface of related risks and uncertainties (Clark, 2022).

A substantial body of literature is devoted to better understanding the determinants of risk preferences as well as how risk preferences affect risk taking. This paper explores the influence of context in framing and moderating risk preferences and behaviour, drawing on data from a survey of working individuals in 11 jurisdictions. It is shown that there are distinctive geographical patterns of risk preferences and behaviour *by* context. Acknowledging the significant role of institutions in shaping citizens’ risk experiences, this study aligns with arguments made by

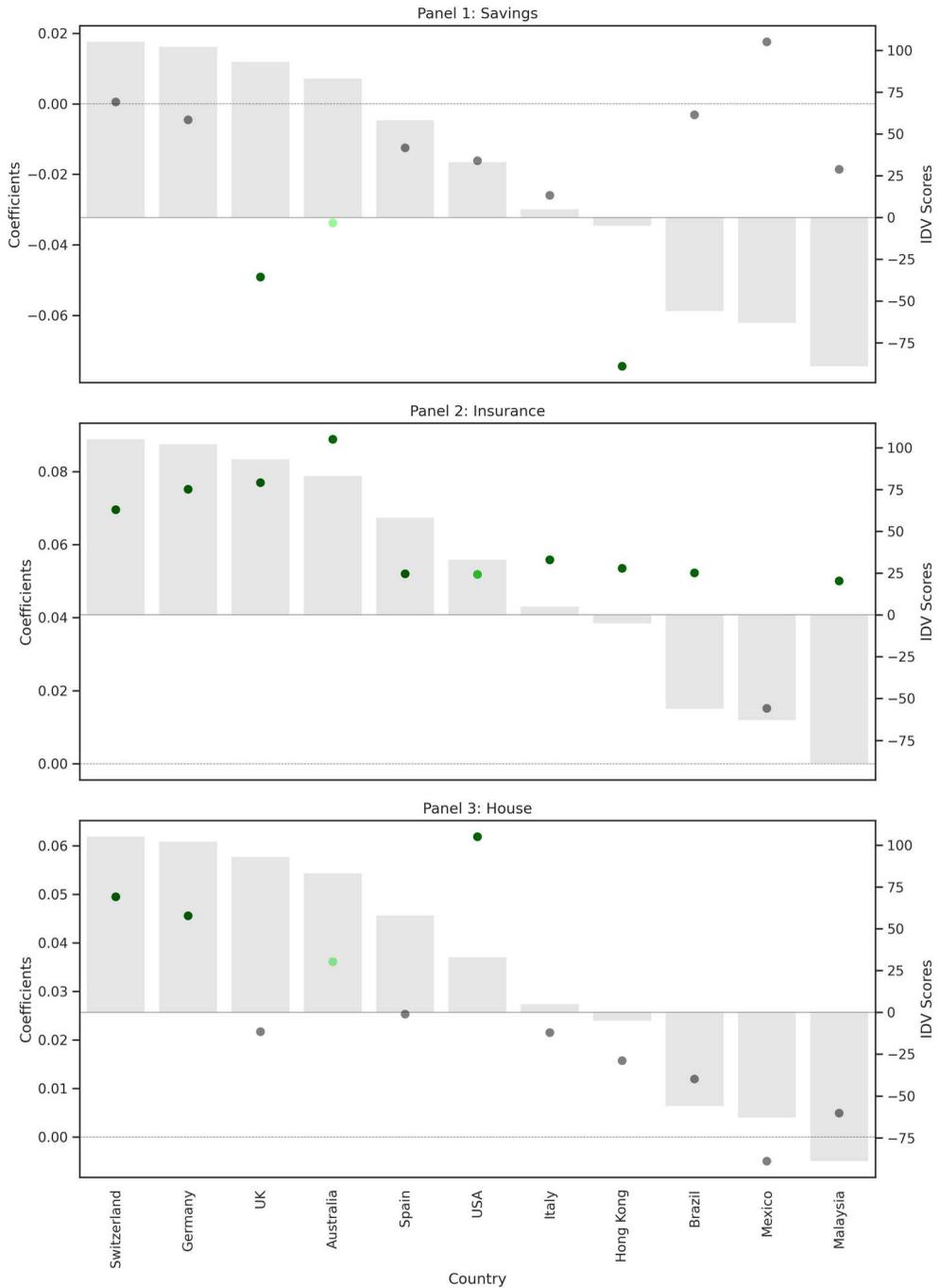


Figure 7. Three country-specific coefficients of risk preferences on a set of financial instruments. Note: The left axis refers to the coefficient value of the predictor referenced in the respective panel's title. The right axis refers to the IDV scores. Grey circles present $p > 0.1$, light green presents $p < 0.1$, green presents $p < 0.05$ and dark green presents $p < 0.01$.

Christopherson (2002) and Gertler (2010) amongst others regarding the impact of national institutions on 'local' behaviour and expectations.

In presenting these findings, we acknowledge related research by behavioural scientists such as Hsee and Weber (1999), Tanaka et al. (2010) and Weber and Hsee (1999). Whereas their findings were either country-specific and/or relied upon selected country pairs (e.g., China and the US), we used a dataset of 11 jurisdictions with varying cultural traditions to illustrate this argument. More specifically, we reference risk-cultures via Minkov et al.'s (2017) updated version of Hofstede's (2001) study of culture and behaviour which provided country-specific scores on a continuum between individualism and collectivism. This enabled us to demonstrate empirically the role of culture in framing the nature and scope of the risk respondents were willing to take in each country considering their characteristics and circumstances.

The results show that being female has a significant negative effect on risk preferences and, contrary to our hypothesis, this effect is stronger in more individualistic societies. One possible explanation is that while equality-focused feminist theory advocates the equal standing of genders in terms of desires, wants, goals and achievement (Wollstonecraft, 2016), individualistic societies tend to value the contributions and perspectives of individuals across genders (Butler, 2002). Additionally, we observed similar moderating effects (positive and negative) of culture on income, health and perceptions of social welfare as predictors of individual risk preferences. Importantly, culture does *not* appear to moderate the effects of age, education and the number of dependants on risk preferences.

Whatever the statistical significance of country-specific patterns of risk tolerance, as people's personal circumstances change so too do their levels of risk tolerance. The existence of commonalities and differences in individual risk behaviour on a global basis dampens suggestions that differences in risk taking are entirely due to country-specific institutions and cultures (Goldsmith-Pinkham & Shue, 2023). As well, our findings amplify concerns about the limitations of behavioural research that relies upon limited cases in university laboratory conditions and/or eschews context in favour of claims to the effect that observed patterns of behaviour in these conditions have universal applicability.

While we expected education and financial literacy to affect risk tolerance as suggested by Lusardi and Mitchell (2011), this was only partly apparent in the pooled econometric results and was largely absent in country-specific results. Nevertheless, variations in the importance of competence could be attributed to differences between jurisdictions in terms of the premium that respondents attribute to financial knowledge and understanding. Equally, the limited significance of experience and negative experience of risk-taking may mean that competence is not meaningful for many people. This result challenges claims to the effect that enhancing individuals' financial competence across the Organisation for Economic Co-operation and Development (OECD) jurisdictions and beyond would make an appreciable difference to the quality of individual financial decision-making and welfare.

One explanation for this finding could be found in the varying significance of financial services and the salience or otherwise of risk-related financial decision-making in everyday life for many people across the OECD and beyond. Witness the varying importance of financial markets for the purchase and consumption of housing by country and financial regime (see Clark, 2021, for related empirical research).

Our results indicate that risk preferences adapt to changing expectations of future circumstances, including health prospects. This effect applies almost uniformly across jurisdictions and cultures. One interpretation could be that people tend to take the risks that they believe they can afford. If so, this also suggests that individuals' risk preferences reflect the opportunities available, their current wellbeing and capacity to make commitments, and their expectations of the near-term future given the expected costs of failure. As such, governments may encourage individual risk-taking over the short and medium term through health, employment and income

replacement programmes that underwrite or insure individuals' prospects. Our findings also suggest that the design of these types of programmes need to be sensitive to country-context.

We also considered the effect of risk preferences on the uptake of financial instruments and, crucially, how context moderates this type of effect. Like our findings on the effects of individual-level characteristics on risk preferences, it was found that risk tolerance affects the uptake of risky financial assets and that this effect differs by context. For example, we showed that risk tolerance positively influences the uptake of life insurance, but this effect is stronger in individualistic as compared to collectivistic ones. Similar results were found as regards the purchase of a house.

Crucially, culture does not appear to moderate the decision to save surplus income. It could be that the capacity and likelihood of saving by individual and across societies is determined by factors not captured in our analysis. Given varying rates of saving evident across the OECD, it could also be that saving is determined more by real incomes and government incentives/disincentives than by precautionary behaviour in different types of jurisdictions. Alternatively, it could be that individuals in individualistic societies have differing motives to save than those in collectivistic societies.

ACKNOWLEDGEMENTS

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DISCLOSURE STATEMENT

This paper was made possible by a research grant between the Smith School of Enterprise and the Environment at Oxford University and Zurich Insurance. The representative sample survey which underpins the study was administered by Epiphany RBC (Amsterdam). In all matters related to the design and execution of the survey research Oxford University's protocols and standards governed the relationship with the data providers.

NOTES

1. Data from the survey were collected over a four-week period in March and April 2016. Of the approximately 15,000 respondents, 11,584 completed the questionnaire. In this paper, each country sample involved at least 900 respondents who had completed the survey. See the Survey Appendix in the online supplemental data.
2. Throughout we refer to countries and/or jurisdictions of residence. The latter refers to Hong Kong, which is now a part of the People's Republic of China. Notwithstanding the formal incorporation of Hong Kong into the Chinese nation-state, vestiges of British institutions and cultural expectations surrounding individual behaviour and social expectations remain.
3. The International Monetary Fund (2016, p. ix) noted that 'the political climate is unsettled in many jurisdictions. A lack of income growth and a rise in inequality have opened the door for populist and inward-looking policies'. It also warned of the risks 'of a gradual slide into economic and financial stagnation'.
4. The Statistical Appendix in the online supplemental data provides summary statistics for the variables used from the survey in this paper.
5. This type of self-assessment has been shown to be predictive of risk attitudes in the field and with representative sample surveys (Dohmen et al., 2018) and in experimental settings (see Vieider et al., 2016).

6. See Statistical Appendix Figure A1 in the online supplemental data. It shows that the spread of perceptions of government and welfare policies is indeed large within and across jurisdictions.
7. As a robustness check, we also ran an ordered logit regression where all possible categorical answers to the risk tolerance question were considered. The estimated effects were generally comparable. However, some differences (that is generally increasing coefficient significance but not sign) were evident for age, number of dependants, financial literacy and perceived welfare. These results are in Table A2 of the Statistical Appendix in the online supplemental data.
8. In addition, we calculated the between-country variation in risk tolerance at 8.5%. This operation decomposes individual-level variation into the variance of the average risk preference across jurisdictions and the average of the within-country variance. Formally, this corresponds to the R-squared of a simple OLS regression of all individual-level observations on a set of country dummies. As such, the larger part of the variance can be attributed to *within*-country effects. It can be shown that 8.5% of the variance in risk tolerance is explained by the country dummies. We also performed a Bonferroni test, which was designed to calculate the difference in risk tolerance for pairs of jurisdictions. It is shown that 70% of these differences were significant at the 1% level.
9. We also investigated whether the negative effect that age exerts on risk aversion depends on individuals' income level. The inclusion of this interaction effect does not change the result that older individuals are less risk tolerant than their younger counterparts. Nonetheless, risk tolerance declines more with age if the individual has a low income. The effect of age on risk aversion for wealthier individuals is smaller and negative.

ORCID

Gordon L. Clark  <http://orcid.org/0000-0003-3159-7674>

Mads Hoefer  <http://orcid.org/0000-0002-7147-4655>

Stefania Innocenti  <http://orcid.org/0000-0001-7926-0961>

REFERENCES

- Aghion, P., Akcigit, U., Bergeaud, A., Blundell, R., & Hémous, D. (2019). Innovation and top income inequality. *Review of Economic Studies*, 86(1), 1–45. <https://doi.org/10.1093/restud/rdy027>
- Aghion, P., Cohen, E., David, B., & Gigout-Magiorani, T. (2021). Le COVID et comment repenser notre politique industrielle. Mimeo.
- Alesina, A., & Giuliano, P. (2015). Culture and institutions. *Journal of Economic Literature*, 53(4), 898–944. <https://doi.org/10.1257/jel.53.4.898>
- Aoyama, Y. (2009). Entrepreneurship and regional culture: The case of hamamatsu and Kyoto, Japan. *Regional Studies*, 43(3), 495–512. <https://doi.org/10.1080/00343400902777042>
- Atanasov, P. D. (2015). Risk preferences in choices for self and others: meta-analysis and research directions. Available at SSRN 1682569.
- Bakshi, G., & Chen, Z. (1994). Baby boom, population aging and capital markets. *Journal of Business*, 67(2), 165–202. <https://doi.org/10.1086/296629>
- Barber, B., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *Quarterly Journal of Economics*, 116(1), 261–292. <https://doi.org/10.1162/003355301556400>
- Bartzsch, N. (2008). Precautionary saving and income uncertainty in Germany: New evidence from microdata. *Jahrbücher für Nationalökonomie und Statistik*, 228(1), 5–24. <https://doi.org/10.1515/jbnst-2008-0103>
- Bathelt, H., & Glückler, J. (2011). *The relational economy*. Oxford University Press.
- Berkowitz, M. K., & Qiu, J. (2006). A further look at household portfolio choice and health status. *Journal of Banking and Finance*, 30(4), 1201–1217. <https://doi.org/10.1016/j.jbankfin.2005.05.006>
- Bird, E. J. (2001). Does the welfare state induce risk-taking? *Journal of Public Economics*, 80(3), 357–383. [https://doi.org/10.1016/S0047-2727\(00\)00117-1](https://doi.org/10.1016/S0047-2727(00)00117-1)

- Bontempo, R. N., Bottom, W. P., & Weber, E. U. (1997). Cross-cultural differences in risk perception: A model-based approach. *Risk Analysis*, 17(4), 479–488. <https://doi.org/10.1111/j.1539-6924.1997.tb00888.x>
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge University Press.
- Bressan, S., Pace, N., & Pelizzon, L. (2014). Health status and portfolio choice: Is their relationship economically relevant? *International Review of Financial Analysis*, 32(1), 109–122. <https://doi.org/10.1016/j.irfa.2014.01.008>
- Brown, S., Ortiz, A., & Taylor, K. (2006). Educational attainment and risk preference. Working paper. Sheffield: Department of Economics, University of Sheffield.
- Butler, C. (2002). *Postmodernism: A very short Introduction*. Oxford University Press.
- Charness, G., Garcia, T., Offerman, T., & Villeval, M. C. (2020). Do measures of risk attitude in the laboratory predict behavior under risk in and outside of the laboratory? *Journal of Risk and Uncertainty*, 60(2), 99–123. <https://doi.org/10.1007/s11166-020-09325-6>
- Charness, G., & Gneezy, U. (2012). Strong evidence for gender differences in risk-taking. *Journal of Economic Behaviour and Organisation*, 83(1), 50–58. <https://doi.org/10.1016/j.jebo.2011.06.007>
- Christopherson. (2002). Why do national labor market practices continue to diverge in the global economy? The “missing link” of investment rules. *Economic Geography*, 78(1), 1–20.
- Chui, A. C., Titman, S., & Wei, K. J. (2010). Individualism and momentum around the world. *Journal of Finance*, 65(1), 361–392. <https://doi.org/10.1111/j.1540-6261.2009.01532.x>
- Clark, G. L. (2021). The significance of financial competence and risk tolerance in home-related expenditure by jurisdiction and regime. *Zeitschrift für Wirtschaftsgeographie*, 65(1), 12–27. <https://doi.org/10.1515/zfw-2020-0035>
- Clark, G. L. (2022). Agency, sentiment, and risk and uncertainty: Fears of job loss in 8 European jurisdictions”. *ZFW – Advances in Economic Geography*, 66(1), 3–17. <https://doi.org/10.1515/zfw-2021-0037>
- Clark, G. L., Knox-Hayes, J., & Strauss, K. (2012). *Saving for retirement: Intention, context, and behaviour*. Oxford University Press.
- Coile, C., & Milligan, K. (2009). How household portfolios evolve after retirement: The effect of aging and health shocks. *Review of Income Wealth*, 55(2), 226–248. <https://doi.org/10.1111/j.1475-4991.2009.00320.x>
- Cox, R., Brounen, D., & Neuteboom, P. (2015). Financial literacy, risk aversion and choice of mortgage type by households. *The Journal of Real Estate Finance and Economics*, 50(1), 74–112. <https://doi.org/10.1007/s11146-013-9453-9>
- Crainich, D., Eeckhoudt, L., & Trannoy, A. (2013). Even (mixed) risk lovers are prudent. *American Economic Review*, 103(4), 1529–1535. <https://doi.org/10.1257/aer.103.4.1529>
- Davis, L. S., & Williamson, C. R. (2022). Individualism and women’s economic rights. *Journal of Economic Behavior and Organization*, 198(C), 579–597. <https://doi.org/10.1016/j.jebo.2022.04.011>
- Diaz-Serrano, L. (2005). On the negative relationship between labor income uncertainty and homeownership: Risk-aversion vs. Credit constraints. *Journal of Housing Economics*, 14(2), 109–126. <https://doi.org/10.1016/j.jhe.2005.06.002>
- Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2018). On the relationship between cognitive ability and risk preference. *Journal of Economic Perspectives*, 32(2), 115–134. <https://doi.org/10.1257/jep.32.2.115>
- Duménil, G., & Lévy, D. (2013). *The crisis of neoliberalism*. Harvard University Press. <https://doi.org/10.4159/harvard.9780674059306>
- Ebert, S., & Wiesen, D. (2014). Joint measurement of risk aversion, prudence, and temperance. *Journal of Risk and Uncertainty*, 48(3), 231–252. <https://doi.org/10.1007/s11166-014-9193-0>
- Edwards, R. D. (2008). Health risk and portfolio choice. *Journal of Business and Economic Statistics*, 26(4), 472–485. <https://doi.org/10.1198/073500107000000287>
- Eling, M., Ghavibazoo, O., & Hanewald, K. (2021). Willingness to take financial risks and insurance holdings: A European survey. *Journal of Behavioral and Experimental Economics*, 95, 101781. <https://doi.org/10.1016/j.socec.2021.101781>

- Fafchamps, M., & Gubert, F. (2007). The formation of risk sharing networks. *Journal of Development Economics*, 83(2), 326–350. <https://doi.org/10.1016/j.jdeveco.2006.05.005>
- Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. (2018). Global evidence on economic preferences. *Quarterly Journal of Economics*, 133(4), 1645–1692. <https://doi.org/10.1093/qje/qjy013>
- Falk, A., & Hermle, J. (2018). Relationship of gender differences in preferences to economic development and gender equality. *Science*, 362(6412), IZA DP No. 12059. <https://doi.org/10.1126/science.aas9899>
- Fan, J. X., & Xiao, J. J. (2006). Cross-cultural differences in risk tolerance: A comparison between Chinese and Americans. *Journal of Personal Finance*, 5(3), 54–75.
- Faulconbridge, J. R. (2008). Negotiating cultures of work in transnational law firms. *Journal of Economic Geography*, 8(4), 497–517. <https://doi.org/10.1093/jeg/lbn013>
- Fiedler, K., & Juslin, P. (2006). Taking the interface between mind and environment seriously. In K. Fiedler & P. Juslin (Eds.), *Information sampling and adaptive cognition* (pp. 3–29). Cambridge University Press.
- Fung, H. H. (2013). Aging in culture. *The Gerontologist*, 53(3), 369–377. <https://doi.org/10.1093/geront/gnt024>
- Gertler, M. S. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography*, 3(1), 75–99. <https://doi.org/10.1093/jeg/3.1.75>
- Gertler, M. S. (2010). Rules of the game: The place of institutions in regional economic change. *Regional Studies*, 44(1), 1–15. <https://doi.org/10.1080/00343400903389979>
- Giesbert, L., Steiner, S., & Bendig, M. (2011). Participation in micro life insurance and the use of other financial services in Ghana. *Journal of Risk and Insurance*, 78(1), 7–35. <https://doi.org/10.1111/j.1539-6975.2010.01405.x>
- Goldsmith-Pinkham, P., & Shue, K. (2023). The gender gap in housing returns. *Journal of Finance*, 78(2), 1097–1145. <https://doi.org/10.1111/jofi.13212>
- Görlitz, K., & Tamm, M. (2015). Parenthood and risk preferences. Available at SSRN 2618442.
- Grable, J. E. (2000). Financial risk tolerance and additional factors that affect risk taking in everyday money matters. *Journal of Business and Psychology*, 14(4), 625–630. <https://doi.org/10.1023/A:1022994314982>
- Greif, A. (2006). *Institutions and the path to the modern economy: Lessons from medieval trade*. Cambridge University Press.
- Haliassos, M. (2012). Financial innovation and economic crisis: An introduction. In *Financial innovation: Too much or Too little?* Cambridge, MA: MIT Press, vii–xxii.
- Han, N. W., & Hung, M. W. (2017). Optimal consumption, portfolio, and life insurance policies under interest rate and inflation risks. *Insurance: Mathematics and Economics*, 73(C), 54–67. <https://doi.org/10.1016/j.insmatheco.2017.01.004>
- Hardin, R. (1996). Trustworthiness. *Ethics*, 107(1), 26–42. <https://doi.org/10.1086/233695>
- Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6186), 862–867. <https://doi.org/10.1126/science.1232491>
- Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review*, 102(2), 284–304. <https://doi.org/10.1037/0033-295X.102.2.284>
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Smith Henrich, N., Hill, K., Gil-White, F., Gurven, M., Marlowe, F. W., Patton, J. Q., & Tracer, D. (2005). ‘Economic man’ in a cross-cultural perspective: Behavioural experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, 28(6), 795–815. <https://doi.org/10.1017/S0140525X05000142>
- Hofstede, G. (2001). *Culture’s consequences: Comparing values, behaviors, institutions, and organizations across nations*. Sage.
- Hsee, C. K., & Weber, E. U. (1999). Cross-national differences in risk preference and lay predictions. *Journal of Behavioural Decision Making*, 12(2), 165–179. [https://doi.org/10.1002/\(SICI\)1099-0771\(199906\)12:2<165::AID-BDM316>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1099-0771(199906)12:2<165::AID-BDM316>3.0.CO;2-N)
- Huggins, R., & Thompson, P. (2015). Culture and place-based development: A socio-economic analysis. *Regional Studies*, 49(1), 130–159. <https://doi.org/10.1080/00343404.2014.889817>
- Huggins, R., & Thompson, P. (2019). The behavioural foundations of urban and regional development: Culture, psychology and agency. *Journal of Economic Geography*, 19(1), 121–146. <https://doi.org/10.1093/jeg/lbx040>

- Humphrey, A., & Bliuc, A. M. (2021). Western individualism and the psychological wellbeing of young people: A systematic review of their associations. *Youth*, 2(1), 1–11. <https://doi.org/10.3390/youth2010001>
- International Monetary Fund. (2016). *World economic outlook: Subdued demand and remedies*. IMF.
- Jones, G. A. (2017). The geographies of *capital in the twenty-first century*. In H. Boushey, J. B. DeLong, & M. Steinbaum (Eds.), *After piketty: An agenda for economics and inequality* (pp. 280–303). Harvard University Press.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–291. <https://doi.org/10.2307/1914185>
- Klinke, I. (2022). A theory for the “anglo-saxon mind”: ellen Churchill semple’s reinterpretation of friedrich ratzel’s anthropogeographie. *Geographica Helvetica*, 77(4), 467–478. <https://doi.org/10.5194/gh-77-467-2022>
- LeFebvre, R., & Franke, V. (2013). Culture matters: Individualism vs. Collectivism in conflict decision-making. *Societies*, 3(1), 128–146. <https://doi.org/10.3390/soc3010128>
- Leland, H. E. (1968). Saving and uncertainty: The precautionary demand for saving. *Quarterly Journal of Economics*, 82(3), 465–473. <https://doi.org/10.2307/1879518>
- Liao, W. C., Zhao, D., & Sing, T. F. (2014). Risk attitude and housing wealth effect. *The Journal of Real Estate Finance and Economics*, 48(3), 467–491. <https://doi.org/10.1007/s11146-013-9407-2>
- Liebenberg, A. P., Carson, J. M., & Dumm, R. E. (2012). A dynamic analysis of the demand for life insurance. *Journal of Risk and Insurance*, 79(3), 619–644. <https://doi.org/10.1111/j.1539-6975.2011.01454.x>
- Limosani, M., & Millemaci, E. (2014). Precautionary savings of agents with heterogeneous risk aversion. *Applied Economics*, 46(20), 2342–2361. <https://doi.org/10.1080/00036846.2014.896983>
- Lindquist, G. S., & Säre-Söderbergh, J. (2011). ‘Girls will be girls’, especially among boys: Risk-taking in the ‘daily double’ on *jeopardy*. *Economic Letters*, 112(2), 158–160. <https://doi.org/10.1016/j.econlet.2011.04.010>
- Lowe, S. G., Searle, B. A., & Smith, S. J. (2012). From housing wealth to mortgage debt: The emergence of Britain’s asset-shaped welfare state. *Social Policy and Society*, 11(1), 105–116. <https://doi.org/10.1017/S1474746411000455>
- Lu, W., Niu, G., & Zhou, Y. (2021). Individualism and financial inclusion. *Journal of Economic Behavior & Organization*, 183(C), 268–288. <https://doi.org/10.1016/j.jebo.2021.01.008>
- Luciano, E., Outreville, J. F., & Rossi, M. (2016). Life insurance ownership by Italian households: A gender-based differences analysis. *Geneva Papers on Risk and Insurance: Issues and Practice*, 41(3), 468–490. <https://doi.org/10.1057/gpp.2016.7>
- Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: An overview. *Journal of Pension Economics and Finance*, 10(4), 497–508. <https://doi.org/10.1017/S1474747211000448>
- MacKinnon, D., Cumbers, A., Pike, A., Birch, K., & McMaster, R. (2009). Evolution in economic geography: Institutions, political economy, and adaptation. *Economic Geography*, 85(2), 129–150. <https://doi.org/10.1111/j.1944-8287.2009.01017.x>
- Minkov, M., Dutt, P., Schachner, M., Morales, O., Sanchez, C., Jandosova, J., & Mudd, B. (2017). A revision of Hofstede’s individualism–collectivism dimension: A new national index from a 56-country study. *Cross Cultural and Strategic Management*, 24(3), 386–404. <https://doi.org/10.1108/CCSM-11-2016-0197>
- Moon, K. K., Lee, S. H., & Jeong, S. Y. (2023). Examining the relationship between individualism and pro-environmental behavior: The moderating role of social cohesion. *Behavioral Sciences*, 13(8), 661. <https://doi.org/10.3390/bs13080661>
- Morduch, J., & Schneider, R. (2017). *The financial diaries: How American families cope in a world of uncertainty*. Princeton University Press.
- Mudzingiri, C., Mwamba, J. W. M., Keyser, J. N., & Bara, A. (2019). Indecisiveness on risk preference and time preference choices. Does financial literacy matter? *Cogent Psychology*, 6(1), 1647817. <https://doi.org/10.1080/23311908.2019.1647817>
- Nahata, R., Hazarika, S., & Tandon, K. (2014). Success in global venture capital investing: Do institutional and cultural differences matter? *Journal of Financial and Quantitative Analysis*, 49(2), 1039–1070. <https://doi.org/10.1017/S0022109014000568>

- Neugarten, B. L. (1977). Personality and aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (pp. 626–649). Van Nostrand Reinhold.
- Oberdiek, J. (2017). *Imposing risk: A normative framework*. Oxford University Press.
- Outreville, J. F. (2015). The relationship between relative risk aversion and the level of education: A survey and implications for the demand for life insurance. *Journal of Economic Surveys*, 29(1), 97–111. <https://doi.org/10.1111/joes.12050>
- Palsson, A. (1996). Does the degree of relative risk aversion vary with household characteristics? *Journal of Economic Psychology*, 17(6), 771–787. [https://doi.org/10.1016/S0167-4870\(96\)00039-6](https://doi.org/10.1016/S0167-4870(96)00039-6)
- Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press.
- Posner, R. A., & Rasmusen, E. R. (1999). Creating and enforcing norms, with specific reference to sanctions. *International Review of Law and Economics*, 19(3), 369–382. [https://doi.org/10.1016/S0144-8188\(99\)00013-7](https://doi.org/10.1016/S0144-8188(99)00013-7)
- Rapp, C., Shore, J., & Tosun, J. (2018). Not so risky business? How social policies shape the perceived feasibility of self-employment. *Journal of European Social Policy*, 28(2), 143–160. <https://doi.org/10.1177/0958928717711973>
- Rieger, M. O., Wang, M., & Hens, T. (2015). Risk preferences around the world. *Management Science*, 61(3), 637–648. <https://doi.org/10.1287/mnsc.2013.1869>
- Rodríguez-Pose, A., Terrero-Dávila, J., & Lee, N. (2023). Left-behind versus unequal places: Interpersonal inequality, economic decline and the rise of populism in the USA and Europe. *Journal of Economic Geography*, 23(5), 951–977. <https://doi.org/10.1093/jeg/lbad005>
- Rosen, H. S., & Wu, S. (2004). Portfolio choice and health status. *Journal of Financial Economics*, 72(3), 457–484. [https://doi.org/10.1016/S0304-405X\(03\)00178-8](https://doi.org/10.1016/S0304-405X(03)00178-8)
- Shafir, E., Diamond, P., & Tversky, A. (1997). Money illusion. *Quarterly Journal of Economics*, 112(2), 341–374. <https://doi.org/10.1162/003355397555208>
- Shaw, K. L. (1996). An empirical analysis of risk aversion and income growth. *Journal of Labor Economics*, 14(4), 626–653. <https://doi.org/10.1086/209825>
- Simon, H. (1956). Rational choice and the structure of the environment. *Psychological Review*, 63(2), 129–138. <https://doi.org/10.1037/h0042769>
- Smith, S. (2013). Crisis and innovation in the housing economy: A tale of three markets. In M. Haliassos (Ed.), *Financial innovation: Too much or Too little?* (pp. 71–101). MIT Press.
- Spigel, B. (2017). Bourdieu, culture, and the economic geography of practice: Entrepreneurial mentorship in Ottawa and Waterloo, Canada. *Journal of Economic Geography*, 17(2), 287–310.
- Sutter, M., Weyland, M., Untertrifaller, A., & Froitzheim, M. (2020). Financial literacy, risk and time preferences: Results from a randomized educational intervention. *CESifo Working Paper No. 8489*. <https://www2.uibk.ac.at/downloads/c4041030/2paper/2020-27.pdf>
- Tanaka, T., Camerer, C. F., & Nguyen, Q. (2010). Risk and time preferences: Linking experimental and household survey data from Vietnam. *American Economic Review*, 100(1), 557–571. <https://doi.org/10.1257/aer.100.1.557>
- Thaler, R. (2015). *Misbehaving: The making of behavioral economics*. W.W. Norton.
- Van Rooij, M. C., Lusardi, A., & Alessie, R. J. (2012). Financial literacy, retirement planning and household wealth. *Economic Journal*, 122(560), 449–478. <https://doi.org/10.1111/j.1468-0297.2012.02501.x>
- Vieider, F. M., Villegas-Palacio, C., Martinsson, P., & Mejia, M. (2016). Risk taking for oneself and others: a structural model approach. *Economic Inquiry*, 54(2), 879–894. <https://doi.org/10.1111/ecin.12290>
- Wang, M., & Fischbeck, P. S. (2008). Evaluating lotteries, risks, and risk-mitigation programs. *Journal of Risk Research*, 11(6), 775–795. <https://doi.org/10.1080/13669870801967259>
- Wang, Z., Rafai, I., & Willinger, M. (2023). Does age affect the relation between risk and time preferences? Evidence from a representative sample. *Southern Economic Journal*, 90(2), 341–368. <https://doi.org/10.1002/soej.12662>

- Weber, E. U., & Hsee, C. K. (1999). Models and mosaics: Investigating cross-cultural differences in risk perception and risk preference. *Psychometric Bulletin and Review*, 6(4), 611–617. <https://doi.org/10.3758/BF03212969>
- Wollstonecraft, M. (2016). Vindication of the rights of woman. In *Democracy: a reader* (pp. 297–306). Columbia University Press.
- Yamagishi, T., Cook, K. S., & Watabe, M. (1998). Uncertainty, trust, and commitment formation in the United States and Japan. *American Journal of Sociology*, 104(1), 165–194. <https://doi.org/10.1086/210005>
- Yao, R., Sharpe, D. L., & Wang, F. (2011). Decomposing the age effect on risk tolerance. *The Journal of Socio-Economics*, 40(6), 879–887. <https://doi.org/10.1016/j.socecc.2011.08.023>