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Essays in Behavioral Finance: National Culture and Economic Populism

Pavlo Illiashenko

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Essays in Behavioral Finance: National Culture and Economic Populism

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Declaration:
Hereby I declare that this doctoral thesis, my original investigation and achievement, submitted for the doctoral degree at Tallinn University of Technology has not been submitted for doctoral or equivalent academic degree.

Pavlo Illiashenko

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Esseesid käitumuslikust rahandusest: rahvuskultuur ja majanduslik populism

PAVLO ILLIASHENKO

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List of Publications

The list of author's publications, based on which the thesis has been prepared:

I Illiashenko, P. (2019). "Tough Guy" vs. "Cushion" hypothesis: How does individualism affect risk-taking?. *Journal of Behavioral and Experimental Finance*, 24, 100212. DOI: https://doi.org/10.1016/j.jbef.2019.04.005 (ETIS 1.1).

II Illiashenko, P., & Laidroo, L. (2020). National culture and bank risk-taking: Contradictory case of individualism. *Research in International Business and Finance*, 51, 101069. DOI: https://doi.org/10.1016/j.ribaf.2019.101069 (ETIS 1.1).

III Illiashenko, P., & Mykhailyshyna, D. (2023). Left-wing Economic Populism and Savings: How attitudes influence forward-looking financial behavior? *Eastern European Economics*, 61, No. 3. pp. 238–269.
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Author's Contribution to the Publications

Contribution to the papers in this thesis are:

I The author of the thesis is the sole author of the article.

II The author of the thesis had a leading role in preparing the dataset, systemizing the literature, running the estimations, and writing the draft article. The author of the thesis co-wrote the final version of the article.

III The author of the thesis had a leading role in preparing the dataset, systemizing the literature, running the estimations, and writing the draft article. The author of the thesis co-wrote the final version of the article.

Introduction

The landscape of economics and its subfields, including finance, has undergone a significant transformation in recent decades. While the field largely remains uniquely insular to external influences compared to other social sciences (Truc at al., 2020), it underwent a major pivot towards extradisciplinary citations after the 1990s (Fourcade et al., 2015; Angrist et al., 2020; Truc at al., 2020). Central to this transition is the two-fold change in the foundational assumptions and methodological preferences that originates with behavioral revolution in economics and finance in the last quarter of the XX century.

First, it is a relaxation of the rigid set of assumptions of human decision-making as a response to the empirical failures of the homo economicus model in favor of a more empirical approach (Angrist and Pischke, 2010). This resulted in the acknowledgment of the complexities and nuances of human behavior and the impact of supposedly irrelevant factors, predictors of human decisions, and behaviors that are supposed to be irrelevant in the neoclassical methodological approach (Thaler, 2015).

Secondly, besides the shift in the focus toward empirical work with an emphasis on identification (Angrist et al., 2020), the evolution of economics and finance scholarship since the 1990s can be viewed as a continuous expansion of the list of disciplines the finance scholars are ready to borrow insights from. The most visible stage in this progress started with the borrowing from cognitive psychology. It led to the emergence of behavioral finance as the field that takes the findings from outside disciplines seriously (Illiashenko, 2017). However, by the end of the 1990s, when behavioral finance became largely incorporated into mainstream finance scholarship (Thaler, 1999), the field expanded its interdisciplinary reach into a large number of different areas of study.

In the broad sense, the present thesis can be viewed as an exercise in the application of an interdisciplinary approach to the scholarly field of finance or as the extension of an interdisciplinarity approach within the realm of behavioral finance.

The first application of interdisciplinarity that is relevant to the present thesis is the link between cross-cultural psychology and finance. National culture is conventionally understood as a society-level amalgamation of norms, beliefs, shared values, and expected behaviors collectively serving as the guiding principles in people's lives (Karolyi, 2016). The concept of national culture has been a subject of scientific interest for centuries, with early works by Kroeber and Kluckhohn (1952). However, contemporary research on this topic gained momentum when Geert Hofstede (1980) successfully operationalized culture, representing cross-country cultural differences with a model of cultural dimensions (Minkov and Hofstede, 2011). Despite the emergence of alternative frameworks of national culture since the 1980s, such as GLOBE and Schwartz’s frameworks, Hofstede's approach to national culture remains the most widely adopted.

Hofstede's framework consists of six dimensions of national culture, each exploring different aspects of societal values and norms (Aggarwal and Goodell, 2014). In the context of cross-cultural studies in finance, the dimension of individualism versus collectivism appears to be the most important (Illiashenko and Laidroo, 2020). The national culture dimension of individualism represents the degree to which individuals relate to their group. In individualistic societies (such as the U.S. and Netherlands), the ties between individuals are not strong, and each person is expected to be self-reliant (Hofstede, 2001). In contrast, collectivist societies (such as Ecuador and Pakistan) emphasize strong connections between individuals and prioritize the group needs over

those of individual members (Hofstede, 2001). While individualism has increased in most societies since the early Hofstede's work in the late 1960s, much later studies have shown that the relative cultural distances between countries have remained constant over time (Beugelsdijk et al., 2015; Santos et al., 2017). Consequently, this implies that Hofstede's cultural framework remains relevant for contemporary cross-cultural analysis.

Since the early 2000s, scholars in finance started to empirically establish that the informal institutions exemplified by national culture contribute to corporate outcomes. For example, the literature established the association between national culture and firms' capital structure (Chui et al., 2002), dividend policy (Shao et al., 2010), cash holdings (Chen et al., 2015), debt maturity (Zheng et al., 2012), financial disclosure (Hope, 2003), board composition (Li and Harrison, 2008), and risk-taking (e.g., Li et al., 2013).

In the process, however, finance literature somewhat lost the connection with the developments in the related fields, specifically, the field of cross-cultural psychology. For instance, corporate finance studies that focus on the effects of national culture on firms' risk-taking (e.g., Kanagaretnam et al., 2013; Li et al., 2013; Ashraf et al., 2016) largely failed to acknowledge that their hypotheses development and the results run contrary to the previous findings in the cross-cultural psychology (e.g., Hsee and Weber, 1999).

Another application of interdisciplinarity that is relevant to the present thesis links the research in political science to the research in finance, specifically a stream of literature that links individuals' political attitudes to forward-looking financial behaviors. The finance literature that incorporates political attitudes and preferences as predictors of financial decisions is sparse and predominately focused on explaining the stock market participation puzzle. For instance, Kaustia and Torstila (2011) demonstrate that those who hold left-leaning political views in Finland are less likely to invest in the stock market. At the same time, in this particular case, the flow of insights goes in both directions. For example, several studies in political science explain political attitudes with individuals' exposure to financial markets or with direct ownership of financial assets (Jha, 2015; Kaustia et al., 2016; Pagliari et al., 2018; Jha and Shayo, 2019; Kerner, 2020).

The link between individuals' political attitudes to forward-looking financial behaviors belongs to a broader strand of literature focused on individuals' attitudes, beliefs, and personality traits as predictors of various financial behaviors. For example, Balasuriya et al. (2014) link optimism to participation in retirement saving plans; Bernard et al. (2014) provide evidence of the role that individuals' aspirations play in shaping financial behaviors; Ruefenacht et al. (2015) find that subjective norms and the assessment of the relationship quality predict individuals saving behavior; Conlin et al. (2015) establish that individuals' personality traits predict stock market participation; Henkel and Zimpelmann (2022) connect individuals' identity-relevant characteristics to the perception of the stock market and the subsequent stock market participation. These results suggest that individuals' beliefs and attitudes, including political preferences and leanings, have the potential to shed light on the variation in financial behaviors and financial outcomes that remain unexplained by the traditional set of socioeconomic and behavioral factors.

Inspired by these examples of interdisciplinarity, the thesis attempts to forge the linkages between related yet isolated fields of study. Specifically, the thesis aims to clarify inconsistent findings that link the national culture dimension of individualism to individuals' and firms' risk-taking and provide a fresh application of the findings in political science to explain household saving decisions. The thesis is based on three

publications (Illiashenko, 2019; Illiashenko and Laidroo, 2020; and Illiashenko and Mykhailyshyna, 2023) in which the author of the thesis is the sole or the first author.

The first publication in the thesis, ""Tough Guy" vs. "Cushion" hypothesis: How does individualism affect risk-taking?" was published in the Journal of Behavioral and Experimental Finance, vol. 24. The paper takes a hypothesis from the field of cross-cultural psychology and tests within the context of finance research. In line with the "cushion hypothesis" developed by Hsee and Weber (1999) and contrary to several related findings in corporate finance (e.g., Li et al., 2013; Ashraf et al., 2016) the results suggest that individuals in societies high on a national culture dimension of individualism tend to be more risk averse than their counterparts in collectivistic societies. This result is in line with the previous findings in the field of cross-cultural psychology. The publication I puts the "cushion hypothesis" on the map of finance scholarship and points out a contradiction between findings from different fields of study.

The second publication, titled "National culture and bank risk-taking: Contradictory case of individualism," was published in the Journal of Research in International Business and Finance, vol. 51. In this paper, the authors take the inspiration from the first publication of the present thesis to re-examine the link between national culture and firms' risk-taking that was previously established in corporate finance literature. The result suggests a negative association between individualism and bank risk-taking and, thus, is in line with the first publication in the present thesis and is contrary to the previous findings in corporate finance. Therefore, the second publication clarifies the link between the national culture dimension of individualism and firms' risk-taking.

The third publication, "Left-wing Economic Populism and Savings: How attitudes influence forward-looking financial behavior?" was published in the Journal of Eastern European Economics, vol. 61. Using the case of Ukraine, the paper connects the field of political science to the field of household finance by considering the individuals' populism attitudes as a predictor of households' decisions to save. The study finds that left-wing economic populism serves as an economically significant predictor of individuals' decision to save on top of an extensive set of traditional and behavioral predictors.

The remaining sections of the thesis are organized as follows. Section 1 presents a summary of the three published articles included in the thesis. Section 2 provides final comments and conclusions, including the contribution of each publication to the existing empirical literature in the corresponding field of study.

1. Summaries of the Studies

1.1. National culture and risk-taking

The global financial crisis of 2007–2009 sparked a surge in research interest in risk-taking behavior with a primary focus on the buildup of systematic risk and the potential of regulatory and macroprudential policies to counteract it. In the process, scholars renewed the interest in risk-taking behavior, exploring the predictors of risk-taking at an individual and corporate level. In particular, the corporate finance literature leveraged the (re)discovery of national culture as a potentially important factor behind finance (Chui et al., 2002) and macroeconomic (Guiso et al., 2006) outcomes to explain the cross-country differences in the behavior of firms, including banks. Li et al. (2013) and Ashraf et al. (2016) established empirically a positive association between the national culture dimension of individualism and corporate risk-taking.

In these and similar studies (Kanagaretnam et al., 2013; Mihet, 2013; Mourouzidou-Damtsa et al., 2017), the authors suggest that the national culture influences corporate managers' decision-making, which, in turn, determines the firm-level degree of risk-taking. Explicitly or implicitly, such a proposition rests on the following two ideas. First, managers in countries high on a national culture dimension of individualism tend to be more overconfident than the managers in countries high on collectivism (low on individualism) (Chui et al., 2010). Secondly, overconfident managers tend to exhibit a preference for a high degree of risk-taking (Pan and Statman, 2012).

While the related empirical literature supports the proposition that executives' characteristics influence corporate decisions and outcomes, the suggested mechanism of how the national culture dimension of individualism might be linked to the managers' attitudes toward risk does not rest on the solid empirical ground. Indeed, several previous studies find that top managers behave consistently between their personal and work-related domains (Cronqvist et al., 2012; Cain and McKeon, 2016) and that their characteristics, at least to a degree, affect corporate outcomes (Bertrand and Schoar, 2003; Malmendier and Tate, 2005; Graham et al., 2013). Similarly, the existing evidence favors the notion that overconfidence is associated with a tendency to take greater risks (Campbell et al., 2004; Malmendier and Tate, 2005; Chuang and Lee, 2006; Pan and Statman, 2012). However, the evidence that links individualism and overconfidence is less convincing. Most supporters of the mechanism that links individualism to risk-taking refer to the suggestion made by Chui et al. (2010) that individualism has a positive association with overconfidence. However, these scholars seem to overlook empirical evidence outside of the field of finance that finds a negative association between individualism and overconfidence (Yates et al., 1997, 1998; Acker and Duck, 2008; Meisel et al., 2016; Krawczyk and Wilamowski, 2017).

In addition to the above-mentioned issues with the mechanism that links individualism to a higher level of risk-taking, the studies in corporate finance largely fail to cite and address the contrary findings from the adjacent fields of research (Hsee and Weber, 1997, 1999; Weber and Hsee, 1998a, 1998b; Fan and Xiao, 2006; Statman, 2008; Wang and Fischbeck, 2008; Pyles et al., 2016). These studies find a negative association between the national culture dimension of individualism and either risk preferences or risk attitudes. Most of the studies in this stream of literature explain their findings by the mechanism suggested by the "cushion hypothesis" first formulated by (Hsee and Weber, 1999). The hypothesis postulates that individuals in countries high on collectivism are more likely to rely on their extensive social networks in the case of financial need

(so they could be "cushioned" against financial problems), and, as a result, such individuals tend to have a higher preference for taking risks than those in individualistic societies.

Therefore, there seems to be a contradiction in the empirical literature. Scholars in corporate finance argue that managers in individualistic countries are overconfident, leading to higher risk-taking at the corporate level. On the other hand, researchers in psychology and behavioral finance propose the "cushion hypothesis," which posits that individuals in collectivist societies are more risk-seeking due to the perception of a financial safety net provided by their communities.

Inspired by this apparent contradiction, the first two papers in the thesis aspire to re-examine the association between the national culture dimension of individualism and both individual and corporate risk-taking. In addition, both studies also seek to ascertain the methodological challenges in corporate finance studies on the effects of the national culture as well as address such limitations whenever possible.

1.1.1. "Tough Guy" vs. "Cushion" hypothesis: How does individualism affect risk-taking?

The empirical literature in corporate finance that finds a positive association between the national culture dimension of individualism and firms' risk-taking largely fails to cite and address the contrary findings from the fields of psychology and behavioral finance. These studies establish the opposite result and tend to explain it with reference to the "cushion hypothesis", a proposition that extensive social networks in more collectivistic societies limit the negative consequences of failed risky decisions and, thus, tend to enable risk-seeking and risk-taking.

One of the potential reasons as to why the "cushion hypothesis" did not find its way into the corporate finance literature is that it was previously tested only on a small sample of countries. Therefore, the authors could understandably find the evidence of such a hypothesis lacking. Indeed, the original studies by Hsee and Weber essentially present the two-countries comparison, while Fan and Xiao (2006), Wang and Fischbeck (2008), and Pyles et al. (2016) rely on a sample of fewer than five countries. To the best of the author's knowledge, the only two studies that test the "cushion hypothesis" on a relatively large sample of countries are Statman (2008) and Rieger et al. (2014). However, Statman (2008) reports only a correlation coefficient between individualism and a country's average level of risk preferences, while Rieger et al. (2014) rely on a set of methodological choices that makes the results incompatible with other studies.

In an attempt to address the above-mentioned limitation, the paper tests the "cushion hypothesis" on three different datasets with samples with 25, 49, and 41 countries. First, the paper tests the association between the national culture dimension of individualism and individual investors' risk-taking. In this case, the data comes from the unique dataset containing all the trades made on the Nasdaq OMX Tallinn over the 2004 to 2012 period, while investors' risk-taking is measured as an average standard deviation of monthly portfolio returns. Second, the paper uses Rieger et al. (2014) data to test the association between individualism and individuals' risk preferences measured as an individual's willingness to pay for the hypothetical lotteries. Third, the paper uses the data from the World Values Survey (WVS) to test the link between individualism and individuals' risk attitudes. In this case, risk attitudes are measured with a response to a single survey equation following Mata et al. (2016). In each case, the individuals' willingness to take risks (risk-taking, risk preferences, and risk attitudes) is regressed on a country-level dimension of individualism in the presence of a wide set of individual-level and country-level

controls. Though each dataset possesses inherent weaknesses, the datasets complement one another, both conceptually and empirically. Consequently, if empirical evidence derived from all three datasets converges, it becomes rather challenging to argue that the specific data limitations solely influence the results.

The cumulative evidence presented in the paper suggests a negative association between the dimension of individualism and individual risk-taking and is consistent with the "cushion hypothesis". The findings also align with somewhat related studies by Weigert (2015) and Schneider et al. (2017). The first of these studies finds that investors in individualistic countries are more crash-averse than investors in collectivist societies. The second suggests a positive association between the degree of social cushioning and the willingness to take risks.

1.1.2. National culture and bank risk-taking: Contradictory case of individualism

Starting in the early 2000s, researchers in economics and finance have rediscovered national culture as a predictor of both country-level and firm-level outcomes. For instance, national culture was found to influence corporate finance phenomena (Chui et al., 2002; Shao et al., 2010; Chen et al., 2015) and aggregate outcomes in financial markets (Chui et al., 2010; Eun et al., 2015).

Focusing on the link between the dimensions of national culture and corporate risk-taking, the empirical literature finds that banks in individualistic societies take bigger risks as measured mostly as an accounting-based z-score or a standard deviation of return on bank assets (Kanagaretnam et al., 2014; Ashraf et al., 2016). While these studies are concerned with a firm-level outcome, the suggested mechanism operates via the decisions made by executives and is due to the fact that individualism fosters an increase in the overconfidence of corporate managers, resulting in a greater willingness to engage in risk-taking behavior. At the same time, however, the literature focused on the same association but at the individual level reaches the opposite conclusion. Specifically, a number of studies (e.g., Hsee and Weber, 1997, 1999; Fan and Xiao, 2006; Wang and Fischbeck, 2008; Pyles et al., 2016), including the first study in this thesis, find a negative association between the dimension of individualism and individuals' attitude toward risk.

The second publication argues that the above-mentioned contradiction might result from the confounding effects of corporate governance. The paper provides suggestive evidence that, in contrast to collectivistic societies, non-listed banks (but not listed banks) in individualistic societies tend to rely on risk-inducing compensation practices. This presents a potential problem because the bank samples in both Kanagaretnam et al. (2014) and Ashraf et al. (2016) are heavily dominated by non-listed banks, and neither study controls for the potential confounding effects of corporate governance. Therefore, the results establishing the positive association between the dimension of individualism and bank risk-taking might be either or both biased and incomplete.

In order to address this potential issue, the present paper relies on a sample of 467 commercial listed banks from 56 countries to replicate the results from Kanagaretnam et al. (2014) and Ashraf et al. (2016) while following the original methodology as closely as possible (applying the same approach to the regression specifications).

The results suggest a negative link between the national culture dimension of individualism and bank risk-taking. This is the opposite to the results in Kanagaretnam et al. (2014) and Ashraf et al. (2016) but is in line with the studies examining the association between individualism and risk-taking (including its correlates) at the individual level

(e.g., Illiashenko, 2019). At the same time, the present study cannot clarify the mechanism which links national culture and bank risk-taking. Therefore, it is difficult to argue that the study provides any definitive answer. Instead, a careful take on study results suggests that the association between national culture and risk-taking at the firm level depends on methodological choices and is rather nuanced.

1.2. Economic populism and saving decisions

1.2.1. Left-wing Economic Populism and Savings: How attitudes influence forward-looking financial behavior?

In response to the changes in political landscape, the academic interest in populism has increased considerably in recent years. The resulting empirical literature is vast but can be characterized by a relatively narrow focus on political aspects of mostly right-wing populist issues (ethnicity, immigration, political nationalism) in developed countries (Berman, 2021). While such a focus is understandable due to the predominance of right-wing populism in the U.S. and Europe, the two largest economies in the world, it seems to represent a singular view of populism as a phenomenon. Contrary to this trend, Devinney and Hartwell (2020) warn us about the existence of different varieties of populism and suggest adopting a holistic view to avoid misguided conclusions.

Taking advantage of the apparent gap in the empirical literature on populism, the present paper focuses on left-wing economic populism in the context of Ukraine, an emerging market East European economy. Following Dornbusch and Edwards (2007), Acemoglu et al. (2013), and Rodrik (2018), the authors define economic populism as a special case of left-wing populism with a focus on simplification of economic problems and a disregard for the limits of the economic policy in addressing these problems. Finally, instead of a more common focus on the predictors of populism, the paper focuses on the association between left-wing economic populism and saving decisions as an example of the households' forward-looking financial decision-making.

The paper hypothesizes that left-wing economic populism attitudes reflect a degree of distrust to the current economic order and a measure of the accumulated negative economic experiences, which in turn, negatively affect forward-looking rational economic behavior. Therefore, in addition to a set of standard socioeconomic and behavioral characteristics, individuals' left-wing economic populism attitudes predict saving decisions at the individual level. While the data limitations do not allow for a direct test of the mechanism that links economic populism and savings, the authors' conjecture rests on two channels informed by the prior finding from the adjacent fields of study: motivations to save (economic aspirations) and conspicuous consumption (the intersection of instant gratification and households' status considerations). In doing so, the paper also relies on findings in the field of psychology, specifically the literature on the role of aspirations (Bernard et al., 2014; Janzen et al., 2017), to propose the mechanism behind the association between populism and savings.

Using the data from a 2019 representative survey, the present paper tests the hypothesis that individuals with a high level of support for left-wing economic populism policies are less likely to have both savings at financial institutions and savings generally. The results are consistent with the authors' hypothesis. Specifically, the study finds that a one-standard-deviation decrease in self-reported left-wing economic populism measure increases the likelihood of having bank savings by 20% after controlling for a wide set of socioeconomic and behavioral characteristics.

2. Final Comments and Conclusion

Each paper in the thesis presents an attempt to connect related yet separate research streams in order to either address contradictory conclusions in the empirical literature or suggest new avenues for explaining stylized facts in individual-level financial decisions.

The first two studies explore an apparent contradiction in conclusions about the association between the national culture dimension of individualism and risk-taking. It might well be the case that such a contradiction has the potential to reinforce existing stereotypes and, thus, lead to unanticipated harm, especially when informing future studies and policy decisions. Given the fact that the scholars in both streams often fail to acknowledge each other's work, the risk of reinforcing pre-existing stereotypes and narratives is not trivial. It is well established that ideology has the potential to influence academic research outcomes, including in the field of economics (Jelveh et al., 2022). A case in point is the real-world implications of using Zimbardo's field experiment observations to justify the "broken windows" theory of community policing (NPR, 2016).

The findings of these two studies suggest that the association between the national culture dimension of individualism and both individual and firm-level risk-taking is negative. This result is in line with the "cushion hypothesis" suggested by Hsee and Weber (1999). However, neither study in the thesis can clarify the mechanism by which national culture is linked to risk-taking. Therefore, these findings cannot be treated as evidence in favor of social safety nets' role in encouraging task-taking.

The first paper in this thesis contributes to the existing literature by, to the best of the author's knowledge, being the first to comprehensively investigate the association between the cultural dimension of individualism and risk-taking at the individual level. Similarly, the second paper is the first to investigate the association between individualism and bank risk-taking while considering the potential confounding effects of corporate governance by restricting the sample to the listed banks only. Finally, both papers are the first to incorporate the methodological advice from the cross-cultural literature (Kirkman et al., 2017; Beugelsdijk et al., 2017) by adjusting the national culture scores for the degree of national cultural tightness taken from Gelfand et al. (2011).

The third paper contributes to empirical literature in political economy and behavioral finance. First, it contributes to the field of political economy by exploring left-wing economic populism, a type of populism that received limited scholarly attention, both conceptually and geographically. Secondly, the paper contributes to the field of behavioral finance by testing individuals' populist attitudes, a political economy phenomenon, as a predictor of households' forward-looking financial behaviors. The results show that individual beliefs and attitudes proxied with a measure of self-reported left-wing economic populism attitudes play a separate and distinct role in explaining saving decisions. This result provides a new avenue for exploring well-known facts about non-optimal households' financial behaviors, such as households under-saving (Agarwal et al., 2017; Illiashenko, 2017). Finally, the publication suggests that psychological factors might play an important role in explaining individual-level financial decisions.

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Abstract

Essays in Behavioral Finance: National Culture and Economic Populism

The present thesis contributes to the literature in finance, and behavioral finance in particular, by adopting an interdisciplinary approach to address a contradiction in findings between cross-cultural psychology and corporate finance, as well as to provide novel empirical evidence regarding household saving decisions. It includes three papers, Publication I and Publication II that focus on the association between the national culture dimension of individualism and risk-taking, as well as Publication III that focuses on the left-wing economic populism as a predictor of individuals' decision to save.

The transformation of the landscape of economics and its subfields, such as finance, in recent decades has been shaped by the credibility revolution and a corresponding shift toward interdisciplinarity. Over these years, scholars in finance have borrowed insights from multiple disciplines, including the fields of cross-cultural studies and political science. However, the strive for interdisciplinarity has had its limits as attested by the apparent breakdown in communication between corporate finance and cross-cultural psychology that led to the emergence of two opposite conclusions about the link between the dimension of individualism and risk-taking. While the studies in corporate finance (e.g., Li et al., 2013; Mihet, 2013; Ashraf et al., 2016) find that such association is positive, empirical studies in cross-cultural psychology (e.g., Hsee and Weber, 1999) that individuals in individualistic societies tend to be more risk averse. Since both streams of literature explain their findings in terms of how national culture shapes the decisions of individuals, these opposite findings present a contradiction worth addressing.

The connection between the fields of finance and political science has led to new empirical findings in finance, specifically as to the role individuals' beliefs and attitudes shape financial decisions. However, the empirical literature in this stream of research has a rather narrow focus. The majority of studies at the intersection between political science and finance explore the role that political affiliation plays in determining stock market participation (e.g., Kaustia and Torstila, 2011). These studies present a special case of the association between individuals' beliefs and attitudes on the one hand and financial outcomes on the other. While such a strand of empirical literature is relatively new, it already can boast a number of intriguing findings. For example, the prior literature has established a link between optimism and saving plans (Balasuriya et al., 2014), aspirations and financial behaviors (Ruefenacht et al., 2015), individuals' personality traits (Conlin et al., 2015) as well as individuals' identity-relevant characteristics (Henkel and Zimpelmann, 2022) and stock market participation. Given these empirical successes, it is reasonable to assume that individuals' beliefs and attitudes have a yet untapped explanatory power of a wide range of household financial decisions, including savings.

The first publication, "Tough Guy" vs. "Cushion" Hypothesis: How does Individualism Affect Risk-taking?", published in the *Journal of Behavioral and Experimental Finance*, adopts a cross-cultural psychology hypothesis and tests it within the framework of finance research. The results align with the "cushion hypothesis" by Hsee and Weber (1999), indicating that individuals in individualistic societies are more risk-averse than those in collectivistic societies, contrary to the findings in the field of corporate finance.

The second publication, "National Culture and Bank Risk-taking: Contradictory Case of Individualism," published in *Research in International Business and Finance*, revisits the

link between national culture and firms' risk-taking, drawing inspiration from the first publication. By applying the same methodology as previous corporate finance studies to a homogenous sample of commercial listed banks from 56 countries, the paper establishes a negative association between individualism and bank risk-taking. This finding runs along the results of the first publication and is contrary to finance literature.

The third publication, "Left-wing Economic Populism and Savings: How Attitudes Influence Forward-looking Financial Behavior?" in *Eastern European Economics*, connects political science and household finance by examining individuals' populism attitudes as predictors of household savings decisions. The study finds that in addition to a broad set of socioeconomic and behavioral factors, a measure of individuals' populism attitudes is an economically significant predictor of households' decision to save.

The publications in the present thesis contribute to the empirical literature by identifying and exploring the previous studies' contradiction about the link between the national culture dimension of individualism and risk-taking or by providing new empirical evidence about the role of political attitudes in shaping individuals saving decisions.

Lühikokkuvõte

Esseesid käitumuslikust rahandusest: rahvuskultuur ja majanduslik populism

Käesolev väitekiri annab oma panuse rahanduse ja eelkõige käitumusliku rahanduse alasesse kirjandusse, võttes kasutusele interdistsiplinaarse lähenemisviisi käsitlemaks kultuuridevahelise psühholoogia ja ettevõtte rahanduse uurimuste tulemuste vastuolusid ning pakkumaks uudseid empiirilisi tõendeid kodumajapidamiste säästmisotsuste kohta. See sisaldab kolme artiklit. Artikkel I ja Artikkel II keskenduvad individualismi rahvuskultuuri mõõtme ja riskide võtmise seostele. Artikkel III keskendub vasakpoolsele majanduspopulismile kui üksikisikute säästmisotsuse ennustajale.

Viimastel aastakümnetel toimunud majandusmaastiku ja selle alamvaldkondade, näiteks rahanduse, muutumist on kujundanud usaldusväärsuse revolutsioon ja sellest tulenev nihe interdistsiplinaarsuse suunas. Nende aastate jooksul on rahandusteadlased laenanud teadmisi mitmest distsipliinist, sealhulgas kultuuridevahelistest uuringutest ja politoloogiast. Interdistsiplinaarsuse poole püüdlemisel on aga olnud oma piirid, mida kinnitab ettevõtte rahanduse ja kultuuridevahelise psühholoogia vahelise suhtluse ilmne katkemine, mis on viinud kahe vastandliku järelduseni individualismi mõõtme ja riskide võtmise vahelise seose kohta. Kui ettevõtte rahanduse uuringutes (nt Li et al., 2013; Mihet, 2013; Ashraf et al., 2016) leitakse, et see seos on positiivne, siis kultuuridevahelise psühholoogia empiirilistes uuringutes (nt Hsee & Weber, 1999) näidatakse, et individualistlike ühiskondade indiviidid kalduvad olema riskikartlikumad. Kuna mõlemad kirjanduse voolud selgitavad oma järeldusi selle kaudu, kuidas rahvuskultuur kujundab üksikisikute otsuseid, väärivad need vastandlikud järeldused käsitlemist.

Seos rahanduse ja politoloogia vahel on viinud uute empiiriliste järeldusteni rahanduses, eriti selles osas, et milline on inimeste uskumuste ja hoiakute roll finantsotsuste kujundamisel. Siiski on selle uurimissuuna empiiriline kirjandus üsna kitsa fookusega. Enamikus politoloogia ja rahanduse ristumiskohas tehtud uuringutes uuritakse poliitilise kuuluvuse rolli aktsiaturul osalemise määramisel (nt Kaustia & Torstila, 2011). Need uuringud näitavad ühelt poolt üksikisikute uskumuste ja hoiakute ning teiselt poolt rahaliste tulemuste vahelise seose erijuhtu. Kuigi selline empiiriline uurimissuund on suhteliselt uus, võib see juba kiidelda mitmete intrigeerivate leidudega. Näiteks on varasemas kirjanduses tuvastatud aktsiaturul osalemise seos optimismi ja säästmisplaanide (Balasuriya et al., 2014), püüdluste ja finantskäitumise (Ruefenacht et al., 2015), üksikisikute isiksuseomaduste (Conlin et al., 2015) kui ka üksikisikute identiteediga seotud omaduste (Henkel ja Zimpelmann, 2022) vahel. Arvestades neid empiirilisi edusamme, võib eeldada, et inimeste uskumustel ja hoiakutel on veel kasutamata seletusjõud paljude kodumajapidamiste finantsotsuste, sealhulgas säästmise kontekstis.

Esimene artikkel ““Tough Guy” vs. “Cushion” Hypothesis: How Is Individualism Affect Risk-taking?”, mis ilmus ajakirjas Journal of Behavioral and Experimental Finance, põhineb kultuuridevahelise psühholoogia hüpoteesil ja selle testimisel. Saadud tulemused ühtivad Hsee & Weberi (1999) “padjahüpoteesiga” (cushion hypothesis), mis näitab, et individualistlikes ühiskondades on inimesed riskikartlikumad kui kollektivistlikes ühiskondades, vastupidiselt ettevõtete rahanduse uurimustes levinud järeldustele.

Teises artiklis “National Culture and Bank Risk-taking: Contradictory Case of Individualism”, mis ilmus ajakirjas Research in International Business and Finance, käsitletakse uuesti seost rahvuskultuuri ja ettevõtete riskide võtmise vahel, ammutades

inspiratsiooni esimesest artiklist. Rakendades 56 riigi kommertspankadest koosnevale homogeensele valimile sama metoodikat nagu varasemad ettevõtte rahanduse uuringud, tuvastab artikkel negatiivse seose individualismi ja pankade riskide võtmise vahel. See järeldus on kooskõlas esimese artikli tulemustega ja on vastupidine rahanduse uurimustes leitule.

Kolmas artikkel "Left-wing Economic Populism and Savings: How Attitudes Influence Forward-looking Financial Behavior?", mis on ilmumas ajakirjas Eastern European Economics, ühendab politoloogia ja kodumajapidamiste rahanduse, uurides üksikisikute populismihoiakuid kodumajapidamiste säästmisotsuste ennustajatena. Uuringus leitakse, et lisaks paljudele sotsiaalmajanduslikele ja käitumuslikele teguritele on kodumajapidamiste säästmisotsuse majanduslikult oluline ennustaja ka inimeste populismihoiakute mõõdik.

Käesolevas väitekirjas avaldatud publikatsioonid panustavad empiirilisse kirjandusse identifitseerides ja uurides varasemates uuringutes individualismi rahvuskultuuri mõõtme ja riskijulguse vahelise seose tuvastatud vastuolusid ning pakkudes uusi empiirilisi tõendeid poliitiliste hoiakute rolli kohta indiviidide säästmisotsuste kujundamisel.

Appendix 1

Publication I

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"Tough Guy" vs. "Cushion" hypothesis: How does individualism affect risk-taking?

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ABSTRACT

Corporate finance literature reports a positive association between the cultural dimension of individualism and firm risk-taking, assuming that national culture directly affects the decision-making of corporate executives (tough guy hypothesis). In contrast, studies that link individualism and risk-taking at the individual level find that individuals in collectivistic societies tend to take greater risks (cushion hypothesis). These findings are difficult to reconcile since both strands of literature have important limitations. While findings from corporate finance literature might be not robust to alternative explanations, behavioral finance studies rely on a small number of countries in their respective samples. This study contributes to the second strand of literature by testing the prediction of cushion hypothesis on the individual-level data from three different sources that cover 25, 49, and 41 countries respectively. The cumulative evidence indicates that, consistent with the cushion hypothesis, the link between the individualism and risk-taking is negative.

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1. Introduction

Risk-taking behavior received a new wave of scholarly attention since the global financial crisis of 2007–2009. This spike of academic interest was caused by a crisis-inspired realization that risk-taking can be non-optimal (excessive or insufficient) even at the aggregate level, which in turn may lead to macrofinancial instability. The resulting stream of research is mostly concerned with either the buildup of systematic risk or with the influence of macroprudential policy might have on risk-taking behavior of financial intermediaries (e.g., Altunbas et al., 2018). However, the offshoot of this research agenda resulted in a renewed interest in the predictors and correlates of risk-taking, both at the firm and at the individual level, especially in the cross-country perspective.

On the parallel since the early 2000s, researchers have discovered that national culture represents an important omitted variable in the study of many economic phenomena. Most importantly, scholars become aware that along with the formal institutions (legal system, investor protection, etc.) such informal institutions as represented by culture also help to explain both corporate decisions and actions of individuals. For instance, national culture was shown to influence firms' capital structure (Chui et al., 2002), dividend policy (Shao et al., 2010), cash holdings (Chen et al., 2015), debt maturity (Zheng et al., 2012), financial disclosure (Hope, 2003), board composition (Li and Harrison, 2008) and other aspects of corporate, as well as macroeconomic outcomes (Guiso et al., 2006; Gorodnichenko and Roland, 2017).

At the junction of these trends emerged two different streams of research that reached the opposite conclusions regarding the way national culture influence risk-taking.

Scholars with a background in corporate finance (e.g., Li et al., 2013; Ashraf et al., 2016) find that corporate managers in highly individualistic countries are relatively more overconfident which in turn leads to a higher risk-taking at a corporate level. I refer to this two-stage mechanism as "tough guy" hypothesis. On the other hand, scholars with a background in psychology and/or behavioral finance refer to the "cushion hypothesis" which suggests that people in collectivist societies, such as China, are more likely to receive financial help if they are in need (i.e. they could be "cushioned" if they fell), and consequently tend to be more risk seeking than those in individualistic societies such as the United States (Hsee and Weber, 1999).

This contradiction is surprising in itself; however, it also has the potential to cause unanticipated harm by creating or reinforcing existing cultural stereotypes. Interestingly, researchers in both cases largely do not to cite each other's work, which only contributes to the formation of stereotypes and narratives that, in turn, may influence policy decisions for the worse.[1] While our

[1] One the most vivid examples of narrative that lead to the failed policies with severe negative consequences is the use of Philip Zimbardo field experiment observation as a justification "for broken windows" theory of communal policing (NPR, 2016).

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understanding of narratives in economics and economic policy is still at the very early stage (Shiller, 2017), it is likely to be related to the problem of ideology that seems to influence the results of academic research, including research in economics (Jelveh et al., 2018).

Guided by this contradiction, I review corresponding literature and conclude that theoretical considerations favor cushion hypothesis over tough guy hypothesis. Since the empirical support for the cushion hypothesis is limited to studies on a small sample of countries (usually less than five), I test the prediction of the hypothesis on the individual-level data from three sources, effectively testing the cushion hypothesis on samples with 25, 49, and 41 countries.

The contribution of the present paper is threefold. First, to the best of my knowledge this the first study that comprehensively investigates the link between individualism and individual-level risk-taking. The only two previous studies on a sample of more than five countries are not comparable with the studies from both strands of literature. While Statman (2008) reports only a correlation coefficient between country average level of risk preferences and individualism, Rieger et al. (2014) make several methodological choices that prevents direct comparison of the results to the rest of the literature.[2] Secondly, the paper bridges the gap between the related but so far isolated streams of literature that investigates the same research question but reach contradictory conclusions. Finally, the paper contributes to the studies on national culture and individual-level outcomes by introducing methodological advice from the cross-cultural literature. Specifically, following methodological advice of Beugelsdijk et al. (2017), the paper attempts to adjust the scores of national culture for the degree of national cultural tightness.

The cumulative evidence indicates that the link between the dimension of individualism and individual risk-taking is, indeed, negative, which is consistent with cushion hypothesis.

The rest of this paper is organized as follows. Section 2 reviews relevant literature, including both streams of research discussed in this paper, and hypothesizes the link between the cultural dimension of individualism and individual-level risk-taking. Section 3 introduces three data sources and the measures of risk-taking. Section 4 introduces control variables and estimation methodology. Section 5 reports the empirical results. The final section concludes.

2. Literature review and hypothesis development

2.1. National culture

National culture is generally understood as a set of norms and beliefs (also shared values and expected behaviors) which altogether serve as the guiding principles in peoples' lives. While national culture has been of scientific interest for centuries (Kroeber and Kluckhohn, 1952), contemporary research was made possible only when Geert Hofstede (Hofstede, 1980) successfully operationalized culture, representing cross-country cultural differences with the model of cultural dimensions (Minkov and Hofstede, 2011). Although alternative frameworks of national culture have emerged since the 1980s (most notably, GLOBE and Schwartz's frameworks) Hofstede's framework of national culture remains the most widely adopted.[3]

While Hofstede's framework consists of six dimensions of national culture, in the context of cross-cultural studies of risk-taking, only two of these dimensions are considered to be relevant, dimensions of individualism vs. collectivism and uncertainty avoidance. Individualism (IND) represents a degree to which individuals relate to the group, meaning that in individualistic societies the ties between individuals are loose and everybody stands on his own. The dimension of uncertainty avoidance (UAI) captures the extent to which a society feel comfortable with uncertainty and ambiguity. While it might be tempting to conclude that high UAI corresponds to risk aversion,[4] Hofstede himself has warned that UAI does not imply the avoidance of risk.

2.2. National culture and firm risk-taking

Most well-known studies establishing a positive link between individualism and risk-taking come from corporate finance literature (e.g., Kanagaretnam et al., 2013; Li et al., 2013; Mihet, 2013; Ashraf et al., 2016). These studies find the significant association between individualism and risk-taking behavior measured as a standard deviation of the firm's returns while controlling for the firm- and country-level characteristics. By doing so, these studies claim to focus on the direct relationship between culture influence on corporate risk-taking through managerial decision making. Because of this, such studies are comparable to the studies on individual risk preferences, as (1) both streams focus on how culture influence risk-taking by affecting individual decision makers and (2) individuals' risk-taking correlate with their risk preferences.

In the hypothesis development, studies from corporate finance explicitly and implicitly follow two ideas. First, individualism is linked to overconfidence (Chui et al., 2010). Secondly, overconfidence is linked to risk-taking (e.g., Pan and Statman, 2012). Thus, a higher level of individualism results in higher overconfidence which leads to greater risk-taking.

In this paper I refer to this two-stage relationship as "tough guy" hypothesis.

Contrary to the claims of the corporate finance literature, empirical evidence does not fully support the two-stage relationship of the tough guy hypothesis. While, empirical evidence supports the link between overconfidence and risk-taking (Malmendier and Tate, 2005; Chuang and Lee, 2006), it is silent about the link between individualism and overconfidence. The supposed support for the second part of the argument comes from the suggestion made by Chui et al. (2010). However, a number of studies have shown that relatively more collectivistic East-Asian populations are more overconfident than the Westerners (Yates et al., 1997, 1998; Acker and Duck, 2008; Meisel et al., 2016; Krawczyk and Wilamowski, 2017). Therefore, the empirical evidence rather points out to a negative link between individualism and overconfidence.

The second potential drawback of corporate finance studies is that they either do not cite potential contradicting evidence or dismiss it without serious contemplation. For example, only one out of studies cite above (Li et al., 2013) notes that equity-based compensation may influence the decisions of executives. However, the authors dismiss this alternative explanation due to the data limitations. Likewise, only one study (Mihet, 2013)

[2] First, as a measure of individualism Rieger et al. (2014) use data from their own survey and this data has relatively small and statistically non-significant correlation with the original Hofstede dimension. Secondly, Rieger et al. (2014) regress individuals' risk preferences not only on the country-level measure of individualism but also on the individual difference between the individual's level of individualism and respective country-average. According to Minkov and Hofstede (2011) this approach is not compatible with the Hofstede framework of cultural dimensions.

[3] Throughout the text we refer to dimensions of national culture as Hofstede's dimensions of national culture, unless specified otherwise.

[4] Several authors point out that international business literature, which has a particular interest in national culture, indeed, usually use the concepts of risk and uncertainty interchangeably (Ullah et al., 2019).

mentions the direct contradicting evidence in the form of cushion hypothesis (that establish a negative association between individualism and risk-taking) but explains it away by controlling for country-level cost of bankruptcy.

2.3. National culture and individual risk-taking

Early empirical studies that link national culture and individual risk preferences date back to a series of papers published by Christopher Hsee and Elke Weber. The authors observed that American students are more risk-averse than their Chinese counterparts, which came as a surprise to both student participants and the researchers (Hsee and Weber, 1997). Hsee and Weber suggested that the difference in preferences could be explained by the differences in national culture. Specifically, authors proposed that individuals in collectivist societies are more likely to be cushioned by their friends and immediate family if they fail (receive financial help if they are in need) and therefore are more comfortable with taking greater risks comparing to the individuals in individualistic societies. Hsee and Weber (1999) refer to this conjecture as "cushion hypothesis".

While the later studies are limited to a small sample of countries, the results are consistent with the hypothesis (e.g., Fan and Xiao, 2006; Wang and Fischbeck, 2008; Pyles et al., 2016). In respect to the two-stage argument of the cushion hypothesis, the empirical evidence that can confirm the legitimacy of both logical steps is scarce. While to the best of my knowledge, there is no empirical evidence that contradicts the proposed negative link between the level of individualism and the size of social safety nets, this proposition still should be tested empirically. At the same time, available empirical evidence supports the proposition that social cushioning, indeed, is associated with the greater propensity to take risks Schneider et al. (2017).

Empirical evidence from larger cross-country sample is also scarce. Weigert (2015) provide indirect support for the cushion hypothesis by concluding that investors in collectivistic societies are less crash-averse comparing to investors in individualistic countries. Regarding the individual-level risk preferences, Statman (2008) shows that the correlation between individualism and individual risk preferences is indeed negative in a sample of 22 countries. The study, however, does not control for either individual-level or country-level correlates such as age, gender, or the country's level of GDP per capita. Finally, in a sample of 53 countries, Rieger et al. (2014) found no association between the dimension of individualism and individual risk preferences when controlling for age, gender, country's GDP per capita, and the dimension of uncertainty avoidance.

2.4. Hypothesis

The empirical studies that examine the link between the cultural dimension of individualism and risk-taking reach opposite conclusions. At the same time, both streams of research have important limitations that call for revisiting this research question. While the main drawback of corporate finance studies is a failure to consider potential confounding variables related to corporate governance, the main weakness of an alternative strand of literature is the small number of countries in the respective study samples. Indeed, if the results of Rieger et al. (2014) are discarded on the basis of incomparable regression specification, the pool of studies that find the support for the cushion hypothesis is reduced to the studies on less than five countries.

Considering that in contrast to the tough guy hypothesis, cushion hypothesis appears to have stronger theoretical support, I formulate the following hypothesis:

H1: There is a negative association between the cultural dimension of individualism and individual-level risk-taking.

To test this hypothesis, I rely on the individual-level data from three data sources. Specifically, I use the data on (1) investors' actual risk-taking, (2) individuals' risk preferences and individuals' risk attitudes. While each dataset has its own weaknesses related either to the nature of the data or to the limited availability of the data, these datasets complement each other. Therefore, if empirical evidence obtained from all three of these datasets will converge, it will be difficult to argue that the results are driven by the specific limitations of the data.

3. Data sources and measures of risk

3.1. Investors' risk-taking

The data on investors actual risk-taking comes from the unique Estonian dataset containing all trades made on the Nasdaq OMX Tallinn during the period of the full business cycle from 2004 to 2012. The data includes trades made by both locals and foreigners. There are 33,847 distinct individual investors of whom 25,877 who made at least one transaction during the period, including 557 foreigners representing 29 countries. Estonian stock market is rather small, consisting of only 23 listed companies during the period, and is characterized by the liquidity constraints for active trading. Indeed, the total number of transactions made by all individual investors is 575,860 which means that an average individual investor pursues a buy-and-hold strategy, making only 1.5 trades per year.

Nevertheless, previous studies had shown that investors in the Estonian dataset are not unique in their characteristics and behavior. Using Estonian dataset Talpsepp (2013) and Liivamägi (2016) found that men trade more frequently than women which are in line with previous literature, most famously, Barber and Odean (2001). In line with Grinblatt and Keloharju (2001) and Feng and Seasholes (2005), there is no gender difference in disposition effect (Talpsepp, 2013). Also, in line with Feng and Seasholes (2005) higher level of investors experience and sophistication reduces disposition effect (Talpsepp, 2011).

This study is focused on the trading behavior of 447 foreign investors (110 observations were dropped due to missing data). For each investor, the dataset contains the price and transaction date for the specific stock. Based on this, Vaarmets et al. (2018) calculated the number of transactions, portfolio turnover, returns, and other variables that describe investors' trading behavior.

Following Markowitz (1991) and Modigliani and Modigliani (1997) this study uses the standard deviation of portfolio's monthly returns across the full length of the sample as a proxy for the risk-taking behavior, which is defined as follows:

$$RiskPort_i = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x}_i)^2}, \quad (1)$$

where $RiskPort_i$ is a standard deviation of portfolio returns for the investor i; x_i is a portfolio returns for the investor i; $\bar{x}_i$ is a sample's average portfolio return; and n is a sample size.

One of the possible limitations of the data is the absence of important socio-economic characteristics. The data on gender is not available for foreign investors and the data on age is known only for 281 out of 447 investors. However, since differences in both age and gender should manifest in the trading style choices (such as diversification and trading activity), I expect that the differences in age and gender would be absorbed by the differences in these characteristics. Another potential limitation of this data is a high concentration of observation in a small number of countries. Three countries, Latvia, Lithuania, and Finland comprise 75%

of the sample, while 17 countries have less than ten observations each. However, the sample includes all individual investors[5] that make trades on Nasdaq OMX Tallinn. In this respect, the sample is might be considered as representative of the whole community of foreigners interested in the Estonian market.

3.2. Individuals' risk preferences

The data on individuals' risk preferences comes from the INTRA survey, conducted between 2008 and 2012 by the group of researchers from the University of Zurich in collaboration with various universities worldwide. The survey was conducted with 6912 economics, finance, and business administration students from 53 countries (see Rieger et al. (2014) for details). After the data collection, the INTRA survey data was used to analyze cross-country differences in risk preferences (Rieger et al., 2014), time preferences (Wang et al., 2016), and loss-aversion (Wang et al., 2017), as well as to estimate parameters of cumulative prospect theory (Rieger et al., 2017).

The online appendix to Rieger et al. (2014) provides an individual-level data that can be used to estimate individuals' risk preferences from an individual's willingness to pay for the hypothetical lotteries. Specifically, following the original methodology of Rieger et al. (2014) I estimate risk preferences as follows:

$$RiskPref_i = \frac{1}{6} \times \sum_{k=1}^{k=6} \left(\frac{EV_k - CE_k}{|EV_k|} \right) \times (-1)\,, \tag{2}$$

where $RiskPref_i$ represents the inverse relative risk premium (thus higher value of $RiskPref_i$ corresponds to lower risk-aversion) of individual i; EV_k is the expected value of a lottery k; and CE_k denotes the amount the participant was willing to pay for the lottery k. There are six hypothetical lotteries in total.[6] In contrast to Rieger et al. (2014), I use the inverse measure to make the interpretation of the results more comparable with other proxies of risk in this paper. Following Rieger et al. (2014), estimated relative risk premiums for each lottery was trimmed at 5% at both tales of distribution before calculating the average value.[7]

There are two potential limitations of the data. First, the socio-economic information on participants is limited to only two parameters, age, and gender. Secondly, while most of the data was collected in 2008 and 2009 in the immediate proximity of the global financial crisis, the data for a few countries were collected later, up to 2012. Since risk preferences could be affected by the crisis events, the difference in the timing of data collection is unfortunate. More importantly, since the original data does not contain the information of the year of the survey, it is impossible to apply year fixed effects to isolate the potential effect of the time difference. On the other hand, Rieger et al. (2014) report that they found no systematic differences in risk-preferences between countries that could be attributed to the different time of data collection.

3.3. Individuals' risk attitudes

The data on individuals' risk attitudes comes from the World Values Survey (WVS), the largest global academic study of individuals' values and attitudes. WVS has a number of characteristics that make it arguably one of the most widely used datasets in the social sciences. These characteristics among others include the following: (1) the survey is conducted in almost 100 countries that contain more than 90% of the world population; (2) the survey is conducted with a harmonized questionnaire administered mostly in face-to-face interviews; (3) the survey is based on the representative national samples; (4) in many cases WVS allows for exploring the time dimension as it is conducted in waves where the earlier period is 1981–1984 and the most recent wave, wave 6, was conducted in 2010–2014, and wave 7 is in the process of data collection.

Following Mata et al. (2016), I use a single survey question to proxy individuals' risk attitudes. In this item, participants were asked to assess their similarity to a hypothetical individual on the scale from 1 to 6, where 1 represents the highest and 6 the lowest degree of similarity. The hypothetical individual was described with the following quote: "Adventure and taking risks are important to this person; to have an exciting life". This item is a part of Schwartz (2012) Value Survey, which was designed to explore a set of independent universal values.

The individuals' risk attitudes in the present paper are estimated as follows:

$$RiskAtt_i = Response_i \times (-1) + 6, \tag{3}$$

where $RiskAtt_i$ represent risk attitudes of individual i (where higher value corresponds to greater willingness to take risks); $Response_i$ is the original response provided by the individual to the WVS interviewer. In comparison to the original data, the order of the response was reversed for the easier interpretation, so the higher level corresponds to a more positive attitude to risk.

There are two potential concerns regarding the comparability of *RiskAtt* with other two measure of risk used in this paper *RiskPort* and *RiskPref*. First, as noted by Mata et al. (2016) *RiskAtt* proxies two very closely related but distinct concepts, namely, risk attitudes and sensation seeking. At the same time, other measures of risk in this paper are much more related to what is usually understood as risk preferences. Secondly, in contrast to the *RiskPort* and *RiskPref*, *RiskAtt* describe risk attitudes in the general domain, not in the domain of financial risks.

The first limitation is possible to overcome by controlling to the degree of a person's sensation seeking (the part that refers to adventure in the question formulation). Fortunately, a related WVS item could be used for exactly this purpose. The variable *spoil* provides a survey respondent's answer to the following questions: "[…] please indicate […] whether [this hypothetical] person is very much like you, like you, somewhat like you, not like you, or not at all like you? [the person is described as follows]: "It is important to this person to have a good time; to "spoil" "oneself". It is expected, that respondents' who indicate that the similarity with such hypothetical individual is high, are the persons who are likely to seek adventure. Therefore, controlling for *spoil*, it should be possible to isolate the effect of "adventure" and focus on "risk".

Regarding the second limitation, the main concern is if risk preferences are clearly domain specific, then a comparison of *RiskAtt* with two other measures of risk-taking is problematic. While the discussion about the degree of domain differences for risk preferences in the literature is not conclusive, I follow the conclusion of Falk et al. (2018) who suggest that risk preferences correspond to the latent psychological trait and, thus, are well correlated across domains of life.

[5] 110 missing data appoint represent investors who, while have a registered account, did not make any investments.

[6] Rieger et al. (2014) estimate risk preferences "in gains" and "in losses". Since only risk preferences "in gains" are comparable with other measures of risk used in the previous literature, in this paper I estimate only risk preferences "in gains".

[7] Rieger et al. (2014) do not elaborate on exact procedure used to exclude outliers. Given that, I exclude the relative risk premia at the highest and lowest 5% levels for each country separately. I argue that this approach is less likely to affect the sample composition on a country level.

4. Methodology

4.1. Measures of national culture

This paper follows previous literature by choosing Hofstede's cultural framework as the main way to approximate national culture. Previous literature has found that both individualism and uncertainty avoidance predict risk-taking. Therefore, while the focus of the present paper is the link between the dimension of individualism and risk-taking, I investigate the effect of both cultural dimensions on risk-taking, individualism (*IND*) and uncertainty avoidance (*UAI*).

Hofstede's dimensions of individualism and uncertainty avoidance are represented by country-level indices that take values from 0 to 100. To increase the sample size of the present study, I complement the cultural scores from Greet Hofstede's private dataset with estimates obtained from Hofstede Insights, a consultancy firm that works closely with Greet Hofstede. To demonstrate that the results are not driven by these estimates, I exclude countries with the cultural scores provided by Hofstede Insights in the robustness analysis.

4.2. Country-level controls

To ensure the comparability of the estimation results throughout this paper, I rely on a standard set of country-level controls in all three estimations. This set of controls include the following variables: hardship and misery indexes, rule of law, and legal origin.

Hardship index is a proxy for the level of socio-economic development used by Mata et al. (2016) in their study of the link between the individual's age and risk attitudes. The index as an average of z-standardized six proxies of hardship, namely, GDP per capita (log-transformed, reversed scale), homicide rate (log-transformed), infant mortality (log-transformed), life expectancy at birth (log-transformed, reversed scale), distribution of family income (GINI), and gender gap in education enrollment. In order to calculate the hardship index, I follow the methodology of Mata et al. (2016) with only one exception. Since the data on education enrollment is available for a limited number of countries, I drop this indicator from the calculation.

The misery index is a proxy for the macroeconomic environment and is defined as the sum of inflation and unemployment rates. It is included into regression specification in order to control for the recent macroeconomic experience of individuals that is shown to affect both risk preferences and actual risk-taking. For instance, Malmendier and Nagel (2011) and Andersen et al. (2018) demonstrate that living through traumatic macroeconomic events has a negative impact on risk-taking behavior. Likewise, exposure to positive experiences leads to the opposite effect. For example, Kaustia and Knüpfer (2008) document a strong positive link between past IPO returns and future subscriptions at the individual level among Finnish investors.

Finally, a large body of literature suggests that risk-taking at the firm level is influenced by the country's institutional environment. Specifically, firm risk-taking behavior is affected by political institutions, rule of law, legal origin, creditors and shareholders protection (e.g., Boubakri et al., 2013; Li and Zahra, 2012; Acharya et al., 2011; Houston et al., 2010; Laeven and Levine, 2009; John et al., 2008). In addition, following Licht et al. (2005, 2007) and Kwok and Tadesse (2006), a strand of research that explores the link between national culture and firm risk argues that these formal institutions themselves are shaped by the national culture (e.g., Li et al., 2013). Therefore, controlling for country's institutional environment is important to establish the direct link between the cultural dimension of individualism and risk-taking behavior. However, since individuals are less influenced by the degree of creditor and shareholder protection than firms, in the main specifications I only control for country's rule of law and legal origin. I control for creditor and shareholder protection rights as a part of robustness analysis.

Table 1
Descriptive statistics.

Variable	Mean	St. Dev.	Min	P25	P75	Max	N
RiskPort	0.459	0.169	0.001	0.341	0.569	1.052	447
diversification	2.223	1.678	1	1	2.5	15	447
trading activity	3.236	1.473	0.693	2.197	4.22	7.683	447
holding period	0.521	0.659	0.01	0.104	0.632	4.038	447
in the market	0.546	0.23	0.034	0.358	0.69	1	447
portfolio size	1.17	1.688	−4.605	0.159	2.225	7.129	447
correlation	0.665	0.171	0.267	0.493	0.796	0.796	447
riskiness	−0.167	0.179	−0.581	−0.346	−0.043	0.036	447
IND	64.532	9.759	25	60	70	91	447
UAI	61.575	12.514	23	59	65	100	447
hardship	−0.643	0.394	−1.441	−1.142	−0.4	0.506	447
misery	13.526	3.541	4.837	9.824	14.714	18.315	447
rule of law	1.03	0.64	−0.86	0.73	1.70	1.95	447
legal origin	0.07	0.26	0.00	0.00	0.00	1.00	447

This table reports descriptive statistics for estimation of Eq. (4). Variables definitions are provided in Appendix.

Finally, following Rieger et al. (2014) I also control for GLOBE cultural clusters. The main reason for inclusion cultural clusters into regression specifications comes from the unbalanced nature of the samples, most notably in the case of dependent variables *RiskPref* and *RiskAtt*. Specifically, countries in these samples are not equally distributed along the cultural dimension of individualism, which if not accounted for, may result in biased estimation.

4.3. Regression specification

In line with the previous literature, I employ ordinary least squares in the case of *RiskPort* and *RiskPref*, and ordinal logistic regression in the case of *RiskAtt*. In all three cases I use cluster-robust standard errors.

The baseline regression models used in this paper are the following:

$$RiskPort_{ij} = f\left(Cult_j; Ind\ controls_{ij;}; Mkt\ controls_j; Ctry\ controls_j\right), \tag{4}$$

where i and j subscripts designate individual and country, respectively. $RiskPort_{ij}$ refers to the standard deviation of portfolio returns described in Eq. (1). $Cult_j$ are Hofstede's individualism (*IND*) and uncertainty avoidance (*UAI*). $Ind\ controls_{ij}$ include *diversification, trading activity, holding period, in the market, portfolio size*. $Mkt\ controls_j$ correlation and riskiness. Whereas, $Ctry\ controls_j$ include *hardship, misery, rule of law, and legal origin*.

Table 1 presents descriptive statistics.

$$RiskPref_{ij} = f\left(Cult_j; Ind\ controls_{ij;}; Ctry\ controls_j\right), \tag{5}$$

where i and j subscripts designate individual and country, respectively. $RiskPref_{ij}$ refers to the inverse degree of risk-aversion described in Eq. (2). $Cult_j$ are Hofstede's individualism (*IND*) and uncertainty avoidance (*UAI*). $Ind\ controls_{ij}$ include age and gender. Whereas, $Ctry\ controls_j$ include *hardship, misery, rule of law, and legal origin*.

Table 2 presents descriptive statistics.

$$RiskAtt_{ij} = f\left(Cult_j; Ind\ controls_{ij;}; Ctry\ controls_j\right), \tag{6}$$

where i and j subscripts designate individual and country, respectively. $RiskAtt_{ij}$ refers to individual risk attitudes described

Table 2
Descriptive statistics.

Variable	Mean	St. Dev.	Min	P25	P75	Max	N
RiskPref	−0.69	0.33	−1.00	−0.90	−0.56	4.06	6291
age	21.45	3.74	0.00	20.00	22.00	62.00	6291
gender	0.52	0.50	0.00	0.00	1.00	1.00	6291
IND	51.53	21.97	13.00	30.00	68.00	91.00	6291
UAI	66.88	21.28	23.00	51.00	86.00	100.00	6291
hardship	−0.80	0.57	−1.47	−1.21	−0.53	1.14	6291
misery	10.39	4.78	4.37	6.99	13.03	37.63	6291
rule of law	0.89	0.93	−1.37	0.09	1.71	1.97	6291
legal origin	0.19	0.39	0.00	0.00	0.00	1.00	6291

This table reports descriptive statistics for estimation of Eq. (5). Variables definitions are provided in Appendix.

Table 3
Descriptive statistics.

Variable	Mean	St. Dev.	Min	P25	P75	Max	N
RiskAtt	3.35	1.57	1.00	2.00	5.00	6.00	50,949
age	42.37	16.58	16.00	28.00	55.00	99.00	50,949
gender	0.48	0.50	0.00	0.00	1.00	1.00	50,949
education	0.17	0.37	0.00	0.00	0.00	1.00	50,949
married	0.63	0.48	0.00	0.00	1.00	1.00	50,949
children	0.70	0.46	0.00	0.00	1.00	1.00	50,949
unemployed	0.08	0.28	0.00	0.00	0.00	1.00	50,949
income	1.84	0.59	1.00	1.00	2.00	3.00	50,949
social class	2.07	0.58	1.00	2.00	2.00	3.00	50,949
spoil	2.48	0.83	1.00	2.00	3.00	3.00	50,949
member	0.45	0.50	0.00	0.00	1.00	1.00	50,949
IND	38.77	22.33	8.00	20.00	51.00	91.00	50,949
UAI	65.04	22.46	8.00	49.00	85.00	98.00	50,949
hardship	−0.21	0.75	−1.41	−0.66	0.34	1.32	50,949
misery	12.96	6.49	3.65	7.99	15.97	30.66	50,949
rule of law	0.24	0.95	−1.63	−0.53	1.17	1.93	50,949
legal origin	0.35	0.48	0.00	0.00	1.00	1.00	50,949

This table reports descriptive statistics for estimation of Eq. (6). Variables definitions are provided in Appendix.

in Eq. (3). $Cult_j$ are Hofstede's individualism (*IND*) and uncertainty avoidance (*UAI*). *Ind controls*$_{ij}$ include *age, gender, education, children, married, unemployed, income, social class, spoil, member, and large family*. Whereas, *Ctry controls*$_j$ include *hardship, misery, rule of law, and legal origin*.

Table 3 presents descriptive statistics.

5. Empirical results

5.1. Investors' risk-taking

I regress *RiskPort*, a measure of investors' actual risk-taking, on two dimensions of national culture, including individual and country-level controls and report results in Table 4.

While, the cultural dimension of individualism does not correlate with investors' standard deviation of portfolio returns (coefficient estimate −0.002, p = 0.304), the coefficient estimate for *IND* is negative and statistically significant in the presence of individual-level and market-level controls (−0.04, p = 0.05), as well as in the presence of country-level controls (−0.005, p = 0.015). The coefficient estimate remains negative and significant when I control for GLOBE cultural clusters, however, this step does not improve the explanatory power of the model. The latter result is rather expected since countries in the dataset are equally spread along the dimension of IND.

Coefficient estimates for *correlation* and *riskiness* indicate that foreigners view Estonian stock market as a riskier version of their home market. The amount of risk these investors take is increasing if the Estonian market is correlated with the home market (positive coefficient for *correlation*) and likewise increases if the Estonian market is riskier (negative coefficient for *riskiness*). The relationship between trading style and the amount of risk the investors tolerate is within reasonable expectations. Specifically, the risk is higher for less diversified portfolios, and for investors who trade more actively. It also appears that many investors trade too little since the coefficient estimate for the holding period is positive. This suggests that investors do not update their portfolios often enough which is in line with the literature on portfolio rebalancing.

5.2. Individuals' risk preferences

Next, I regress *RiskPref*, a measure of individuals' risk preferences, on two dimensions of national culture, including individual and country-level controls and report results in Table 5.

Coefficient estimate for *IND* is negative and statistically significant at 5% when the regression is estimated without additional control variables as well as in the presence of *age* and *gender*. The link disappears in the presence of country-level covariates; however, the association is negative and statistically significant in the presence of GLOBE cultural clusters (−0.003, p = 0.006). The importance of cultural clusters is indicated by the increase in model explanatory power, adjusted R2 for the model 4 is 14.1% comparing to 6.2% for the model 3. The explanatory power of the models 4 is more than twice as high comparing the models of Rieger et al. (2014).

5.3. Individuals' risk attitudes

Finally, I regress *RiskAtt*, a measure of individuals' risk attitudes, on two dimensions of national culture, including individual and country-level controls and report results in Table 6.

While, the cultural dimension of individualism does not correlate with individuals' risk preferences (odds ratio estimate 0.995, p = 0.275), the coefficient estimate for *IND* is negative and statistically significant in the presence of GLOBE cultural clusters (0.986, p = 0.038). As in the previous case, GLOBE cultural clusters improve the explanatory power of the model and are necessary to take into account since countries in the dataset are not equally distributed along the dimension of individualism. The latter is especially relevant for the data from the World Values Survey since it has a low representation of European countries.

Among individual-level predictors of risk attitudes, only *education* is not statistically significant. As expected, being older, married and having children is negatively associated with risk attitudes. While being male, having higher income or higher social class, as well as having a preference for sensation seeking (or conspicuous consumption) is associated with a higher level of risk attitudes. Finally, consistent with the cushion hypothesis, individuals who have wider social networks (are active members of social groups) also have higher risk attitudes.

5.4. Robustness analysis and discussion

Table 7 presents the results of robustness tests. In total, the table shows the estimation results of 27 models. Baseline estimation refers to the estimations in Eqs. (4)–(6). The second specification differs from the baseline in the proxies of national culture. As suggested by Beugelsdijk et al. (2017) I adjust measures of national culture by the degree of cultural tightness from Gelfand et al. (2011). In contrast to the baseline, the third specification has two additional country-level controls, *creditors rights,* and *shareholder rights*. Baseline sample refers to the samples used in the main estimations Eqs. (4)–(6), while "Original Hofstede" refers to the sample where cultural scores provided by the Hofstede Insights are dropped, which results in a smaller sample in terms of countries. Finally, "GLOBE" refers to the estimations

Table 4
National culture and investors' risk-taking.

	Dependent variable: investors' risk-taking, RiskPort							
	Model 1		Model 2		Model 3		Model 4	
diversification			−0.020***	(0.004)	−0.019***	(0.005)	−0.018***	(0.005)
trading activity			0.021***	(0.008)	0.020***	(0.008)	0.019**	(0.007)
holding period			0.019*	(0.010)	0.021***	(0.008)	0.019**	(0.008)
in the market			0.274***	(0.047)	0.260***	(0.042)	0.259***	(0.043)
portfolio size			−0.009	(0.007)	−0.010	(0.007)	−0.011	(0.007)
correlation			0.432**	(0.174)	0.733***	(0.261)	0.523**	(0.259)
riskiness			−0.391*	(0.208)	−0.347	(0.371)	−0.528	(0.332)
IND	−0.002	(0.00)	−0.004**	(0.002)	−0.004**	(0.002)	−0.005***	(0.002)
UAI					0.001	(0.001)	0.001	(0.001)
hardship					−0.146**	(0.064)	−0.142	(0.091)
misery					−0.010**	(0.005)	−0.010**	(0.004)
rule of law					−0.071*	(0.038)	−0.013	(0.054)
legal origin					0.168***	(0.053)	0.160**	(0.062)
Constant	0.591***	(0.14)	0.162**	(0.083)	0.035	(0.209)	0.038	(0.273)
Cultural clusters	NO		NO		NO		YES	
Observations	447		447		447		447	
Countries	25		25		25		25	
Adjusted R2	1.2%		20.6%		22.6%		22.6%	

This table reports OLS estimation of Eq. (4). Cluster-robust standard errors in parentheses. Asterisk refers to statistical significance.
*p<0.1.
**p<0.05.
***p<0.01.

Table 5
National culture and individuals' risk preferences.

	Dependent variables: RiskPref							
	Model 1		Model 2		Model 3		Model 4	
age			0.006	(0.004)	0.005	(0.004)	0.003	(0.002)
gender			0.068***	(0.015)	0.072***	(0.016)	0.074***	(0.015)
IND	−0.002**	(0.00)	−0.002**	(0.001)	−0.001	(0.001)	−0.003***	(0.001)
UAI					−0.001	(0.001)	0.001	(0.001)
hardship					0.076	(0.103)	0.110	(0.088)
misery					0.003	(0.006)	−0.007	(0.005)
rule of law					0.017	(0.046)	0.035	(0.047)
legal origin					0.051	(0.058)	−0.130**	(0.056)
Constant	−0.585***	(0.05)	−0.741***	(0.101)	−0.713***	(0.142)	−0.342***	(0.129)
Cultural clusters	NO		NO		NO		YES	
Observations	6 425		6 291		6 008		6 008	
Countries	46		46		46		46	
Adjusted R2	1.6%		4.2%		6.4%		14.2%	

This table reports OLS estimation of Eq. (5). Cluster-robust standard errors in parentheses. Asterisk refers to statistical significance: *p<0.1. For variables definition see Appendix.
**p<0.05.
***p<0.01.

where instead of *IND* and *UAI*, cultural scores are *Collectivism GLOBE* and *UAI GLOBE*. For the sake of brevity, I report only coefficient estimates for the main variable of interest (*IND* or *Collectivism GLOBE)*.

The results of robustness tests provide a rather mixed picture. The main variable of interest is statistically significant and has an expected sign[8] in 20 out of 27 models. However, in none of the models, the coefficient estimates for individualism came close to become positive (negative for *Collectivism GLOBE).* Moreover, if the main variable of interest lose statistical significance in one set of tests, it tends to show increased statistical significance in another set of tests.

Given the fact that because of the data limitations the sample size varies significantly between robustness tests, it is difficult to disentangle the effects of robustness tests per se from the effect from change in the sample size. In summary, however, the cumulative empirical evidence fails to reject the H1 hypothesis. The most conservative interpretation of the results suggests that the link between individualism and risk-taking is definitely not positive.

In regard to the economic significance, national culture does not appear to be a defining predictor of individual risk-taking. However, the economic significance of individualism is notable. A two standard deviation change in IND (an approximate distance between highly individualistic and highly collectivistic countries) results in one-half to one-third standard deviation change in RiskPort and RiskPref. This is in line with the result of Ashraf et al. (2016), where two standard deviation change in individualism leads to one-third chance in accounting-based z-score for a global sample of banks. Individualism also has a notable explanatory power. In the main specifications for both *RiskPort* and *RiskPref*, individualism explains about 10% of the variation explained by countries fixed effects (13% and 18% respectively).

Finally, it is also possible to make very preliminary conclusions regarding the mechanism that links individualism and individual-level risk-taking. In order to investigate the tough guy hypothesis, I add an additional variable to the specification in Eq. (4) that proxies investor's overconfidence (a binary variable that takes the

[8] *IND* and *Collectivism GLOBE are obviously negatively correlated; thus, the expected sign Collectivism GLOBE is positive.*

Table 6
National culture and individuals' risk attitudes.

	Dependent variables: RiskAtt							
	Model 1		Model 2		Model 3		Model 4	
age			0.979***	(0.002)	0.983***	(0.002)	0.983***	(0.00)
gender			1.486***	(0.045)	1.468***	(0.048)	1.466***	(0.04)
education			0.908*	(0.050)	0.990	(0.036)	0.998	(0.03)
married			0.893**	(0.040)	0.904***	(0.035)	0.892***	(0.03)
children			0.880**	(0.051)	0.853***	(0.031)	0.871***	(0.03)
unemployed			1.248***	(0.081)	1.118**	(0.056)	1.094*	(0.05)
middle income			1.157**	(0.080)	1.080	(0.053)	1.041	(0.04)
high income			1.668***	(0.190)	1.404***	(0.148)	1.341***	(0.14)
middle social class			0.978	(0.097)	1.204***	(0.075)	1.237***	(0.08)
high social class			1.204	(0.153)	1.535***	(0.114)	1.599***	(0.11)
middle spoil			1.947***	(0.288)	2.148***	(0.28)	2.184***	(0.27)
high spoil			2.301***	(0.252)	2.552***	(0.24)	2.583***	(0.22)
member			1.305**	(0.138)	1.225***	(0.07)	1.208***	(0.07)
IND	0.995	(0.00)	0.995	(0.003)	0.996	(0.004)	0.986**	(0.01)
UAI					0.992**	(0.00)	0.985**	(0.01)
hardship					1.042	(0.21)	2.110*	(0.81)
misery					1.029**	(0.01)	0.988	(0.02)
rule of law					0.809	(0.12)	1.184	(0.21)
legal origin					1.605**	(0.30)	1.154	(0.32)
Year FE	NO		YES		YES		YES	
Cultural clusters	NO		NO		NO		YES	
Observations	64 096		52 750		50 949		50 949	
Countries	44		42		41		41	
Pseudo R2	0.12%		4.28%		5.69%		6.17%	

This table reports ordered logit estimation of Eq. (6). Cluster-robust standard errors in parentheses. Asterisk refers to statistical significance. Coefficients are odds ratio. For variables definition see Appendix.
*p<0.1.
**p<0.05.
***p<0.01.

Table 7
Robustness analysis.

	Baseline sample: Culture = Individualism			Original Hofstede: Culture = Individualism			GLOBE: Culture = Collectivism		
	RiskPort	RiskPref	RiskAtt	RiskPort	RiskPref	RiskAtt	RiskPort	RiskPref	RiskAtt
Baseline									
Culture	−0.005***	−0.003***	0.986**	−0.005***	−0.003***	0.993	−0.103	−0.009	3.520***
S.E.	(0.002)	(0.001)	(0.010)	(0.002)	(0.001)	(0.011)	(0.064)	(0.030)	(1.005)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R2	22.6%	14.1%	6.2%	22.6%	8.0%	5.5%	8.9%	6.8%	6.9%
Observations	447	6 008	50 949	447	5 773	38 062	159	5 039	37 441
Countries	25	46	41	25	43	32	18	38	29
Specification 2									
Culture	−0.009***	−0.008**	0.969*	−0.009***	−0.008**	0.959	−0.002	0.104***	5.362***
S.E.	(0.003)	(0.002)	(0.019)	(0.003)	(0.002)	(0.003)	(0.003)	(0.040)	(0.850)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R2	15.8%	14.6%	6.5%	15.8%	14.6%	6.8%	13.2%	12.8%	6.5%
Observations	62	3 499	25 196	62	3 499	23 704	62	3 277	21 144
Countries	13	25	19	13	25	18	13	23	16
Specification 3									
Culture	−0.009***	−0.002***	0.988*	−0.009***	−0.002***	0.982	0.096**	0.006	4.110***
S.E.	(0.003)	(0.002)	(0.019)	(0.003)	(0.002)	(0.016)	(0.047)	(0.037)	(1.135)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
R2	15.8%	12.1%	6.4%	15.8%	9.5%	5.6%	11.5%	13.2%	6.9%
Observations	62	5 615	45 569	62	5 529	34 834	159	4 848	36 182
Countries	13	41	35	13	40	29	18	36	27

This table reports results of robustness analysis. Cluster-robust standard errors in parentheses. Asterisk refers to statistical significance. Coefficients for dependent variable *RiskAtt* are odds ratio. For variables definition see Appendix.
*p<0.1.
**p<0.05.
***p<0.01.

Table A.1
Variable description.

Variable	Range	Explanation	Source
Dependent variables			
RiskPort	Continuous	st. dev. of portfolio returns; proxy for investors' risk-taking; for calculations see Eq. (1)	Vaarmets et al. (2018)
RiskPref	Continuous	inverse risk-aversion; proxy for individuals' risk preferences; for calculations see Eq. (2)	Rieger et al. (2014); authors calculations
RiskAtt	levels 1 to 6	risk attitudes; for calculations see Eq. (3)	WVS wave 6; authors calculations
Individual-level controls			
Diversification	Integer	number of stocks in portfolio (average before each sale)	Vaarmets et al. (2018)
Trading activity	Integer	number of trades for whole period	Vaarmets et al. (2018)
Holding period	Continuous	days each position was held in portfolio (counted by every sale)	Vaarmets et al. (2018); authors calculations
In the market	Continuous	number of days investor is present in the market	Vaarmets et al. (2018)
Portfolio size	Continuous	average portfolio size in thousands EUR (average before each sale)	Vaarmets et al. (2018)
Age	Integer	age of a person in years	Rieger et al. (2014); WVS
gender	Dummy	gender of a person, 1 - male, 0 - female	Rieger et al. (2014); WVS
education	Dummy	1 - if a person has a bachelor's degree or higher; calculated based on WVS.6 variable V248	WVS wave 6; authors calculations
married	Dummy	1 - if a person is married or has a partner; calculated based on WVS.6 variable V57	WVS wave 6; authors calculations
children	Dummy	1 - if a person has children; calculated based on WVS.6 variable V58	WVS wave 6; authors calculations
unemployed	Dummy	1 - if a person is currently unemployed; calculated based on WVS.6 variable V229	WVS wave 6; authors calculations
income	levels 1 to 3	person's self-reported income group, 1 - is lowest; calculated based on WVS.6 variable V239	WVS wave 6; authors calculations
social class	levels 1 to 3	person's self-reported social class, 1 - is lowest; calculated based on WVS.6 variable V238	WVS wave 6; authors calculations
spoil	levels 1 to 3	importance of having a good time, 1 - lowest; calculated based on WVS.6 variable V73	WVS wave 6; authors calculations
member	Dummy	1 - if a person is a member of organization; calculated based on WVS.6 variables V25–V35	WVS wave 6; authors calculations
Market-level controls			
correlation	Continuous	correlation of monthly returns between investor's home stock market and Nasdaq OMX Tallinn	Eikon; authors calculations
riskiness	Continuous	ratio of st. dev. Of monthly returns of investor's home market to Nasdaq OMX Tallinn	Eikon; authors calculations
National culture			
IND	Integer	Hofstede's cultural dimension of individualism	Geert Hofstede website, Hofstede Insights
UAI	Integer	Hofstede's cultural dimension of uncertainty avoidance	Geert Hofstede website, Hofstede Insights
TGHT	Continuous	degree of national culture tightness	Gelfand et al. (2011)
Collectivism GLOBE	Continuous	GLOBE dimension of collectivism (in group collectivism, practice)	GLOBE project website
UAI GLOBE	Continuous	GLOBE dimension of uncertainty avoidance (practice)	GLOBE project website
Country-level controls			
hardship	Continuous	index of social hardship (calculated based on Mata et al. (2016) methodology)	World Bank; authors calculations
misery	Continuous	sum of annual inflation (CPI) and unemployment rates	World Bank; authors calculations
rule of law	Continuous	rule of law index; ranges from approximately −2.5 (weak) to 2.5 (strong)	World Governance Indicators database
legal origin	Dummy	1 - if British legal origin	La Porta et al. (2008)
creditors rights	Integer	an index aggregating creditor rights	Djankov et al. (2007)
shareholders rights	Integer	an index aggregating shareholders rights (anti-self-dealing index; revised index)	Djankov et al. (2008)

value of 1 if an investor belongs to the top 50% in trading activity and the bottom 50% in returns). In untabulated results, I find that interaction term between individualism and overconfidence is not statistically significant. This result strengthens the conclusion that the two-stage link between the dimension of individualism and risk-taking implied by the tough guy hypothesis is unlikely to be valid.

6. Conclusions

Since the early 2000s, researchers have (re)discovered national culture as an important dimension in economics and finance. This interest, however, is scattered around related but distinct streams of literature with little cross-communication.

One of these streams of research examines the link between national culture and corporate risk-taking behavior (e.g., Li et al., 2013). This literature concludes that firms in countries high in individualism and low in uncertainty avoidance exhibit high degree of risk-taking. This strand of literature proposes that people in individualistic societies have a relatively higher degree of overconfidence which, in turn, leads to greater risk-taking (tough guy hypothesis).

In contrast, a parallel strand of literature following Hsee and Weber (1999) finds a negative association between individualism and individual risk attitudes. This stream of literature refers to the cushion hypothesis which suggests that people in collectivist societies (such as China), are more likely to receive financial help if they are in need and consequently tend to be more risk seeking

than those in individualistic societies such as the United States (Hsee and Weber, 1999).

Guided by this contradiction, I review corresponding literature and conclude that theoretical considerations favor cushion hypothesis over tough guy hypothesis. Since the empirical support for the cushion hypothesis is limited to the studies on a small sample of countries (usually less than five), I test the prediction of the hypothesis on the individual-level data from three sources, effectively testing the cushion hypothesis on samples with 25, 49, and 41 countries.

The cumulative evidence indicates that the link between the dimension of individualism and individual risk-taking is, indeed, negative, which is consistent with cushion hypothesis. This result survives most robustness test, in fact, the negative association between individualism and individual-level risk-taking is present in 20 out of 27 models. More importantly, in none of the models, the coefficient estimates for individualism came close to become positive.

The conservative take on findings suggests the link between cultural dimension of individualism and risk-taking is not positive, and there is no evidence in favor of the tough guy hypothesis. While the results instead are in line with the cushion hypothesis, the study cannot clarify the mechanism that links individualism and risk-taking. Therefore, further interdisciplinary research is needed while any policy recommendations are premature.

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Appendix

See Table A.1.

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Appendix 2

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National culture and bank risk-taking: Contradictory case of individualism

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ABSTRACT

Previous studies have reported a positive association between the cultural dimension of individualism and bank risk-taking. We hypothesize that this association is likely to be confounded by the omitted effects of corporate governance. Given the indicative evidence that such confounders are less likely to affect listed banks, we test this association for a global sample of 467 commercial listed banks from 56 countries. Our results show that the association between individualism and bank risk-taking is negative. This result is consistent with the cushioning hypothesis, the idea that people take on more risk in collectivist societies because they expect to receive help from the members of their social networks in the case of failure.

1. Introduction

There exists a stream of research which examines the link between national culture and corporate risk-taking behavior (Li et al., 2013; Mihet, 2013; Díez-Esteban et al., 2019), including bank risk-taking[1] (Kanagaretnam et al., 2013; Ashraf et al., 2016; Mourouzidou-Damtsa et al., 2019). The literature concludes that banks in countries high in individualism take on more risk as individualism leads to increasing overconfidence of corporate managers, which, in turn, results in greater risk-taking. However, based on a cushion hypothesis, proposed by Hsee and Weber (1999), one may hypothesize that the association between the cultural dimension of individualism and bank risk-taking is, instead, negative. Although such a result has not been previously reported for banks, it has been supported when focusing on the association between individualism and risk-taking of individuals (e.g., Hsee and Weber, 1999; Fan and Xiao, 2006; Wang and Fischbeck, 2008; Pyles et al., 2016; Illiashenko, 2019). This stream of research concludes that individuals in collectivistic countries take on greater risks comparing to their counterparts in individualistic countries, as they expect to be "cushioned" by their family and friends if they fail.

We argue that this contradiction could be explained with assumptions used in the literature hypothesizing a positive association between national culture and company risk-taking. We suggest that these assumptions have not been fulfilled in the previous empirical studies investigating the association between national culture and bank risk-taking. Specifically, we suggest that studies in this stream of research do not account of the potential confounding effects of corporate governance. Therefore, it would be important to

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[1] In this case, the literature proxies bank risk-taking largely via z-score. While, most of accounting-based measures of risk and z-score in particular are measures of bank total risk rather than of active deliberate risk-taking, we follow previous literature and use terms risk-taking and bank risk interchangeably. In similar vein, we do not distinguish between risk-taking, risk attitudes, or risk preferences and use the terms interchangeably.

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understand whether the positive association between individualism and bank risk would remain when the potential effects of corporate governance are taken into account. Specifically, we hypothesize that non-listed banks in individualistic countries tend to rely on risk-inducing compensation practices much more often than the banks in collectivistic countries. In turn, since samples in the two most relevant studies (Kanagaretnam et al., 2013; Ashraf et al., 2016) are dominated by non-listed banks, it is possible that the main result of these studies is driven by the difference in compensation practices, not in individualism. Closely following the methodology of previous studies, we test this hypothesis on a global sample of 467 commercial listed banks from 56 countries and fail to reject it. This result is robust to a number of alternative specifications and sample restrictions, including the adjustment of national culture dimensions for the degree of the country's cultural tightness.

We argue that the sample of listed banks is better suited to answer a question about the effects of national culture for several reasons. First, as we discuss in Section 3.1., the dimension of individualism does not correlate with the choice of compensation practices for listed banks. Secondly, commercial listed banks are relatively more similar in their business models than a mixed sample of non-listed and listed banks used in the previous literature (that also includes saving, commercial, and investment banks). Thus, considering a sample of commercial listed banks allows us to isolate the potential confounding effects.

The main contribution of the present paper is twofold, interdisciplinary and methodological. Most importantly, the paper is bridging the gap between the parallel (so far completely isolated) streams of research that reach contradictory conclusions regarding the effects of national culture on risk-taking. In our opinion, the lack of cross-reference between these clearly connected strands of literature might lead to unanticipated harm due to the risk of creating or reinforcing cultural stereotypes and corresponding narratives. Despite the role that narratives play in economics is at its infancy (Shiller, 2017), stereotypes and narratives are likely to contribute to ideological divide that influence the results of research in economics (Jelveh et al., 2018). In addition, the paper connects corporate governance literature with the literature on bank risk. We show that the issues of corporate governance have important implications for the studies that link national culture and bank risk-taking. Similarly, we contribute to the future studies on national culture and corporate finance outcomes by introducing the methodological advice from the cross-cultural studies. Specifically, to the best of our knowledge, this is the first study in cultural finance to follow Beugelsdijk et al. (2017) methodological advice of adjusting scores of national culture for the degree of cultural tightness.

Our results challenge widely assumed conjunction regarding the direction of the association between cultural dimension of individualism and firm risk-taking as well as the proposed mechanism behind this association. We conclude that there is a need for the further interdisciplinary research on effects of national culture and that at this moment any policy recommendations are premature.

The rest of this paper is organized as follows. Section 2 reviews the literature that links national culture and risk-taking. Section 3 explores alternative explanations for the positive association between individualism and bank risk found in prior studies and hypothesizes effect of the cultural dimension of individualism on bank risk-taking. Section 4 introduces data and variables. Section 5 reports empirical results. The final section concludes.

2. Literature review

2.1. National culture

Over the last 10–20 years, researchers have (re)discovered national culture as an important dimension in finance and economics. For instance, it has been shown to influence corporate finance (Chui et al., 2002; Shao et al., 2010; Chen et al., 2015), financial markets (Chui et al., 2010; Eun et al., 2015), and economic outcomes (Guiso et al., 2006; Gorodnichenko and Roland, 2017).

National culture is generally understood as a society-level set of norms, beliefs, shared values, and expected behaviors that altogether serve as the guiding principles in peoples' lives. The modern approach to national culture follows from Geert Hofstede (Hofstede, 1980) model of cultural dimensions[2] (Minkov and Hofstede, 2011) in which national culture conditions individual decision making directly and via the development of institutions. In turn, by conditioning the decision making of individuals, national culture affects a number of corporate outcomes (for the reviews of effects of culture on corporate outcomes in finance see Aggarwal and Goodell, 2014; Karolyi, 2016; Goodell, 2019).

In the context of studies of risk-taking, two dimensions of national culture are especially relevant, individualism vs. collectivism and uncertainty avoidance.

Individualism (IND) represents a degree to which individuals relate to the group. In individualistic societies ties between individuals are loose, thus, people are expected to look after themselves and their immediate family only (Hofstede, 2001). Individuals in high-IND societies (such as the U.S.), in contrast to those in societies low in IND (such as Ecuador), are more likely to believe that success is attributed to one's effort and that everybody stands on his own. Individualism is the most discussed construct in cross-cultural studies across disciplines (Santos et al., 2017) and considered to be one of the most significant variables in cross-country studies in terms of its explanatory power (Schwartz, 1999; Triandis, 2001).

Defining the dimension of uncertainty avoidance (UAI) Hofstede (2001) explains that it captures the extent to which a society feels comfortable with uncertainty and ambiguity. While it might be tempting to conclude that high UAI corresponds to risk

[2] There are alternative frameworks, most notable GLOBE cultural clusters and cultural competencies as well as Schwartz's cultural dimensions. However, Hofstede's framework of national culture is the most widely adopted. Throughout the text we refer to dimensions of national culture as Hofstede's dimensions of national culture, unless specified otherwise.

aversion[3], Hofstede himself has warned that uncertainty avoidance does not imply the avoidance of risk. On the contrary, people in uncertainty-avoiding societies may paradoxically take greater risks by taking risky actions in order to reduce ambiguity (Hofstede, 2001). Building on this, (Ashraf et al. (2016) suggest that people in high-UAI countries (such as Greece) still tend to take risks, but these are limited to known risks, while in less uncertainty avoidant countries (such as Denmark) people tend to take both known and unknown risks.

There exist critical objections to the use of Hofstede's framework of cultural dimensions for a cross-country type of analysis. The two most often mentioned arguments from the five proposed by Shenkar (2001) are the following. First, culture is dynamic and can change over time. Second, within-nation variation cultural traits might be substantial or even higher than the between-country variation. These are valid concerns. For instance, since the early Hofstede's work in the late 1960s, the level of individualism has increased in most societies worldwide (Beugelsdijk et al., 2015; Santos et al., 2017). However, further investigations have shown that while it happened in absolute terms, in relative terms the cultural distances between countries remained stable (Beugelsdijk et al., 2015; Santos et al., 2017). This suggests that Hofstede's cultural framework is still relevant for the cross-cultural analysis. Concerning the second argument, the cross-cultural literature seems to converge on the following response. While the evidence of a relatively larger within-country cultural variation is mixed (Minkov and Hofstede, 2012; Vieider et al., 2015a), studies that use country-level cultural variables should correct for the degree of cultural tightness (Kirkman et al., 2017; Beugelsdijk et al., 2017). We will further discuss this issue in Section 4.5.

The link between the national culture and risk-taking has been investigated from two main perspectives – individual and corporate levels. These are discussed in the following sub-sections.

2.2. National culture and individual risk-taking

First empirical cross-cultural studies on individual risk preferences date back to an early work of Christopher Hsee and Elke Weber (Hsee and Weber, 1997, 1999; Weber and Hsee, 1998a,b). Hsee and Weber observed that Chinese students were less risk-averse than their American counterparts. The result was surprising as Americans were expected to have pro-risk attitudes instead of Chinese (Hsee and Weber, 1997). The authors suggested that the observed difference in risk preferences could be explained by the cultural differences between the two countries. To explain the finding, Hsee and Weber formulated the "cushion hypothesis" which proposes that individuals in collectivist societies, such as China, are more likely to receive financial help if they are in need (could be "cushioned" if they fail), and, therefore, have higher preference for risk than those in individualistic societies, such as the U.S. (Hsee and Weber, 1999).

The later studies, focusing simultaneously on a small number of countries, mostly support the cushion hypothesis (e.g., Fan and Xiao, 2006; Wang and Fischbeck, 2008; Pyles et al., 2016). To the best of our knowledge, there are only three studies[4] that use a sample with more than five countries. Among these, both Statman (2008) and Illiashenko (2019) provide results that are consistent with the cushion hypothesis. At the same time, Rieger et al. (2014) found a positive association between willingness to take risks and the level of individualism. However, this association disappeared when the authors controlled for uncertainty avoidance and the result itself might be not relevant for the present study for the following reasons. First, as a measure of individualism Rieger et al. (2014) used the data obtained from their own survey. The correlation between this measure and Hofstede dimension of IND was positive, but only at 0.49 and not statistically significant[5] . Secondly, Rieger et al. (2014) regressed individuals' relative risk aversion not only on the country-level measure of individualism but also on the individual difference between the individual's level of IND and respective country-average. This might be problematic, since Hofstede's dimensions of national culture are not the predictors of individual differences, as underlining traits do not correlate meaningfully across individuals (Minkov and Hofstede, 2011). Indeed, using data on risk preferences collected by Rieger et al. (2014); Illiashenko (2019) showed that the link between individualism and risk is negative under different methodological choices. Furthermore, Illiashenko (2019) obtained similar results using two additional proxies risk preferences: (1) data on investors' risk-taking from Nasdaq OMX Tallinn Stock Exchange (used in Liivamägi, 2016; Vaarmets et al., 2018; Liivamägi et al., 2019; Vaarmets et al., 2019), and (2) data on individuals risk attitudes from World Values Survey (following Mata et al., 2016).

In related streams of research, Weigert (2015) found that investors in collectivistic countries are less crash-averse comparing to their counterparts in individualistic countries. Similarly, Schneider et al. (2017) investigated the willingness to take financial risks as a function of social and state "cushioning" and found a positive link between social cushioning and risk-taking. Both results provide additional albeit indirect support for the cushion hypothesis.

[3] Several authors point out that international business literature, which has a particular interest in national culture, indeed, usually use the concepts of risk and uncertainty interchangeably (Ullah et al., 2019; Buckley et al., 2016).

[4] Another sometimes cited study is a working paper by Vieider et al. (2012) that found no link between individualism and risk attitudes in a sample of 30 countries. This result, however, is not included in a final version of the paper (Vieider et al., 2015b). Finally, Tan et al. (2019) find a positive association between cultural dimension of individualism and trading activity in 21 simulated asset markets. While one might speculate that trading activity should have a positive association with risk-taking, we are very cautious about this result because of the non-representative nature of samples used in the study.

[5] Commenting on correlation with Hofstede's IND, Rieger et al. (2014) pointed out to the set of countries that were much more individualistic comparing to Hofstede's data (China, Vietnam, Taiwan, Thailand, Turkey, Romania).

2.3. National culture and corporate risk-taking

Corporate finance literature finds that two dimensions of national culture, individualism and uncertainty avoidance, have a statistically significant association with corporate risk-taking (Li et al., 2013; Mihet, 2013; Díez-Esteban et al., 2019) and bank risk-taking in particular (Kanagaretnam et al., 2013; Ashraf et al., 2016; Mourouzidou-Damtsa et al., 2019). Banks in countries high in individualism and low in uncertainty avoidance exhibit high degree of risk-taking as measured by accounting-based proxies, most commonly, z-score.

This stream of literature generally acknowledges that national culture might affect firm risk-taking by conditioning the decision-making of executives (direct effect) and by influencing country's institutions (indirect effect). At the same time, the papers almost exclusively focus on the direct effects of national culture by means of controlling for possible channels of the indirect effects. We carry this perspective throughout the present paper. If not specified otherwise, the link between national culture and bank risk is understood as being direct, existing after possible indirect effects have been controlled for.

The approach applied by the previous literature rests on two assumptions. First, top executives should be able to exert sufficient influence on corporate decisions, so their preferences could directly affect corporate outcomes. Secondly, to establish a direct link between national culture and corporate risk-taking, a study must control for all possible firm- and country-level predictors of risk, irrespective of their direct or indirect (via country's institutions) effect on bank risk.

In respect to the first assumption, a number of studies have documented that managers' characteristics do indeed affect corporate decisions and outcomes[6] (e.g., Bertrand and Schoar, 2003; Malmendier and Tate 2005; Graham et al., 2013). Likewise, several studies have found that executives tend to behave consistently across personal and job-related decision-making domains (Cronqvist et al., 2012; Cain and McKeon, 2016). At the same time, the proposed mechanism that links individualism with executives' risk-taking does not look convincing. Mostly, the authors cite the Chui et al. (2010) suggestion that individualism could lead to overconfidence, which, in turn, is positively linked to risk-taking. While the empirical evidence does suggest that overconfidence is associated with greater risk (Campbell et al., 2004; Malmendier and Tate, 2005; Chuang and Lee, 2006; Pan and Statman, 2012), it is silent about the link between cultural dimension of individualism and overconfidence, especially in financial context[7] . In contrast, empirical studies show that East-Asian populations, who are more collectivistic compared to the U.S. and Europe, tend to be more overconfident than Westerners (e.g., Yates et al., 1997, 1998; Acker and Duck, 2008; Meisel et al., 2016; Krawczyk and Wilamowski, 2017).

Regarding the second assumption, several studies (e.g., Li et al., 2013) suggest that, in addition to country-level predictors of firm risk-taking (economic development and institutional environment), firm-level factors, including corporate governance, could be of particular importance. However, due to data availability, previous literature does not control for this channel of association. To be fair, in untabulated sensitivity checks, Kanagaretnam et al. (2013) attempt to take this issue into account by controlling for Bryan et al. (2010) country-average data on compensation mix for a sample of 381 non-US the ADR issuers from 43 countries. Due to the limitations of this data and substantial within country heterogeneity, we believe that such approach does not address the problem fully.

Table 1 summarizes the main empirical studies discussed in this sub-section. While three out of six papers specifically investigate the relationship between individualism and bank risk-taking, we consider only two of them as particularly relevant for the present study, Kanagaretnam et al. (2013) and Ashraf et al. (2016). We do not consider the study of Mourouzidou-Damtsa et al. (2019) as relevant for the present paper for two reasons. First, the paper relies on a single-item question from World Values Survey to estimate the country-level value of individualism, which makes the results incomparable with other studies that rely on recognized frameworks of cultural dimensions[8] . Secondly, authors limit their sample to systemically important institutions from only 19 European countries, which significantly reduces the variability of IND. As a result, we consider only Kanagaretnam et al. (2013) and Ashraf et al. (2016) as papers relevant for the present study and limit the discussion to those papers only.

3. Corporate governance and bank risk-taking

Due to data availability issues, previous studies, including Kanagaretnam et al. (2013) and Ashraf et al. (2016), do not account for the potential confounding effects of corporate governance. Therefore, the results that establish a positive link between individualism and bank risk-taking might be biased or incomplete. For example, if the reliance on equity-based compensation is more prevalent in individualistic countries, then the direct association between bank risk-taking and cultural dimension of individualism could be spurious.

In order to investigate the link between bank risk-taking and the main mechanisms of corporate governance[9] we review the corresponding literature on the effects of (1) board characteristics, (2) ownership structure, and (3) executive compensation. Since

[6] For a literature review see Plöckinger et al. (2016).

[7] Previous literature links rather individual-level individualism (not a dimension of national culture) to potential correlates of overconfidence such as confidence or self-attribution bias (see Goodell (2019) for a brief review of literature).

[8] It can be easily seen (Fig. 3 in Ahern et al., 2015) that according to this measure, U.S. and Brazil have about the same level of individualism, while in the Hofstede's framework these countries are a world apart. Similarly, while several cross-cultural studies (Beugelsdijk et al., 2015; Santos et al., 2017) relied on the World Values Survey data in their analysis of changes in individualism over time, these studies used a very different approach for individualism derivation.

[9] Due to the structure of banking regulation in most countries, market for corporate control is not considered as an important mechanism of corporate governance for banks (DeYoung et al., 2009).

Table 1
Studies that find a positive link between IND and corporate risk-taking.

	Li et al. (2013)	Mihet (2013)	Kanagaretnam et al. (2013)	Ashraf et al. (2016)	Mourouzidou- Damtsa et al. (2019)	Díez-Esteban et al. (2019)
Sector	Manufacturing	400 industries	Banks	Banks	Banks	Non-financial
Years	1997-2006	2000-2012	2000-2006	2001-2007	1995-2014	2007-2015
Countries	35	51	65	75	19	37
Firms	7250	50000	12466	1974	99	5572
Database	Compustat	CVU (IMF)	BankSkope	BankSkope	Bloomberg	Thomson One Banker
Model	HLM	HLM, OLS	OLS	OLS	HLM	GMM
Data	cross-section	cross-section	cross-section	cross-section	panel	panel
Culture	Hofstede /Schwartz	Hofstede	Hofstede	Hofstede /GLOBE	WVS	Hofstede

the agency problem that banks face is to some degree different from agency problem faced by firms from other sectors (Becht et al., 2011; Laeven, 2013), we focus on the bank corporate governance literature whenever possible.

Since our review[10] concludes that neither board characteristics nor ownership structure drive the association between national culture and banks risk, we present the corresponding discussion in the Online Appendix (Section OA.1. and OA.2.). The following section first discusses the potential link between executive compensation and then concludes with the hypothesis development.

3.1. Executives compensation and bank risk

The leading theory of executive compensation follows from agency theory (Holmström and Tirole, 1993) and still represents a foundation of compensation practice (Becht et al., 2011). In this framework, shareholders in a widely held firm use equity-based compensation to link executives' wealth to stock performance, thus, aligning CEO's objectives with their interests (Grove et al., 2011).

Since diversified shareholders are less risk-averse than the executives who face undiversified firm's risk, it is usually assumed that the goal of equity-based compensation is to increase risk-taking of managers. While there is no direct evidence that shareholders insist on greater risk-taking (Becht et al., 2011), and incentives that reduce risk-taking could not be designed (Edmans et al., 2017), the empirical evidence by and large supports this theoretical prediction.

Most studies argue that banks' boards use equity-based compensation to reward executives for excessive risk-taking (DeYoung et al., 2013; Federal Reserve, 2010). Specifically, DeYoung et al. (2013) show that before the financial crisis of 2008, CEO compensation in U.S. banks was changed to encourage executives to exploit new growth opportunities created by deregulation and debt securitization, leading to an increase in risk-taking. The link between executive compensation and risk-taking is established for the international (Gropp and Köhler, 2010) and U.S. samples of banks (Bebchuk and Spamann, 2010; Brown et al., 2015), as well as for U.S. financial firms[11] (Cheng et al., 2015).

Due to better data availability, the empirical evidence cited above comes predominantly from the samples of listed firms. At the same time, much less is known about the compensation in non-listed firms (Pindado and Requejo, 2015). Still, the evidence converges on the following observations: (1) executive compensation is lower in non-listed firms, and (2) equity-based compensation is less common among non-listed firms (Gomez-Mejia et al., 2001; Carrasco-Hernandez and Sánchez-Marön, 2007; Sapp, 2008; Bryan et al., 2010; Chizema, 2010; Frydman and Saks, 2010).

Several studies have argued that equity-based compensation practices are more prevalent in countries with higher levels of individualism (Schuler and Rogovsky, 1998; Tosi and Greckhamer, 2004; Bryan et al., 2012). These studies do not establish a causal link between individualism and compensation practices and mostly do not control for either country economic development or for institutional environment. Therefore, we do not exclude the possibility that the link between individualism and compensation in these studies might be driven by omitted variables, most likely linked to the degree of country's economic and/or financial development[12] .

We test if the positive association between equity-based compensation and individualism remains intact when we control for GDP, British legal origin, and a country being a developed market according to the MSCI classification (for details see Online Appendix, Section OA.3.). We find that the correlation remains intact only for a mixed sample of listed and non-listed companies while it disappears in the sample of listed companies only. This suggestive result has important implications for the purposes of the present study. It appears that non-listed firms in highly individualistic countries, indeed, tend to have a higher prevalence of risk-inducing compensation practices. Therefore, the results of Kanagaretnam et al. (2013) and Ashraf et al. (2016) might be driven not only by the

[10] The discussion relies heavily on Srivastav and Hagendorff (2016); Haan and Vlahu (2016), and John et al. (2016).

[11] It worth noting that equity-based compensation first of all link the managers and firm's outcomes by the means of the "skin-in-the-game". In particular circumstances, this might lead to a lower level of risk-taking (see Bienz et al. (2018) for the case of private equity industry). However, the empirical evidence for the bank industry prior to 2008 financial crisis seems to indicate that equity-based compensation led to an increased risk taken by bank managers.

[12] In addition, an indirect evidence suggests that social and cultural norms are not important in explaining cross-country variation in CEO compensation (Gabaix and Landier, 2008; Jasso and Meyersson Milgrom, 2008).

direct effects of national culture but also by the effects of dominant compensation practices.

3.2. Hypothesis development

The empirical studies that link the dimension of individualism and risk-taking reach contradictory conclusions. Despite these two sets of results come from different streams of research and supposedly concern different types of risk-taking (individual risk preferences vs. firm risk-taking), the findings should coincide, not contradict each other. This should be expected because (1) both strands of literature propose that national culture affects both individuals and corporate managers directly and (2) there is a direct and straightforward association between individual risk-preferences and actual risk-taking (Dorn and Huberman, 2005).

In addition to reaching the opposite conclusions, both streams of literature have their substantial weaknesses. For studies focused on individual-level risk-taking it is a small sample of countries[13], while for studies on the bank risk it is the potential effect of confounders. In our opinion, however, the latter is more worrisome. Specifically, we argue that the conclusions from corporate finance literature (Kanagaretnam et al., 2013; Ashraf et al., 2016), might be affected by the confounders related to corporate governance.

As discussed in Section 3.1., pay-for-performance compensation practices are more prevalent in countries high in individualism. While for listed firms this correlation disappears in the presence of proxies for economic development and institutional environment, it remains intact for the mixed sample of listed and non-listed firms. Since Kanagaretnam et al. (2013) and Ashraf et al. (2016) samples are dominated by non-listed banks, it is possible that the positive direct link between IND and bank risk is an artifact of the differences in compensation practices.

In addition, savings, commercial, and investment banks follow drastically different business strategies that differ in the level of bank risk as well as in the nature of risk these banks take. Therefore, in the setting of a cross-country study, the results of Kanagaretnam et al. (2013) and Ashraf et al. (2016) might be driven by the within-country sample composition rather than by the effect of national culture per se. For example, if highly individualistic countries tend to have more investment banks compared to low-IND countries, then the association between individualism and bank risk-taking would be biased in a positive direction.

It is possible to argue that both long-term incentives and investment banks are more prevalent in highly individualistic countries, exactly because of the effects of individualism. However, we consider this proposition as a hypothesis that should be tested explicitly in the first place. Until then we consider executive compensation and business strategies as potential confounders.

Use of a global sample of listed commercial banks allows to isolate the effect of both of these potential confounders[14] . In addition, constructing a sample of only listed banks, while controlling for additional dimensions of institutional environment, would enable to control for other confounders that might be related to corporate governance. For instance, ownership concentration and ownership structure are not the predictors of risk for the listed banks (Gropp and Köhler, 2010; Magalhaes et al., 2010; Barry et al., 2011). Similarly, legal origin and shareholder protection tend to dominate the effects of various board characteristics on bank risk (Kim et al., 2007; Yeh et al., 2011; Li and Song, 2013; Ferreira et al., 2010).

Given the above, we conclude that the mechanism linking cultural dimension of individualism and risk-taking proposed by the cushion hypothesis is more plausible than mechanism suggested by corporate finance literature. Therefore, we formulate the following hypothesis:

H1. For the global sample of commercial listed banks, there is a negative association between the level of individualism and bank risk-taking.

4. Methodology

4.1. Data

For the sake of comparability of the results, the present study follows methodological choices of Kanagaretnam et al. (2013) and Ashraf et al. (2016). Therefore, the paper focuses on a global sample of commercial listed banks from 2001 to 2006. Both Kanagaretnam et al. (2013) and Ashraf et al. (2016) rely on a rather similar period for their analysis, 2000–2006 and 2001–2007 respectively. In our opinion, however, period 2001 to 2006 allows for better isolation of the effects of 1998 and 2008 financial crises.

The initial sample included all banks in the Thomson Reuters Eikon database for which the financial and the stock price data was available. Only data for commercial banks was considered. We also excluded non-listed banks together with banks listed on over-the-counter markets, as well as subsidiaries of the parent banks in the sample. Importantly, the financial data on banks comes from

[13] This is possibly a less relevant concern given that recent study Illiashenko (2019) is based on the data from three different sources that cover 25, 49, and 41 countries.

[14] In it also worth noting that individualism might have a positive association with the propensity for opportunistic behavior (Chen et al., 2002) which, in turn, might be associated with an increased appetite for risk (Goodell, 2019). This effect, however, is conditional on a quality of corporate governance, as banks with better-developed corporate governance mechanisms (listed banks in contrast to non-listed banks) could recognize this effect and develop mechanisms to ensure more cautious behavior. Considering a sample of listed bank only, allows us to exclude this complication from the equation.

consolidated accounting forms[15] . Therefore, while the bank may have operations in several countries, the results are assigned to the country of the parent bank. This is fortunate, as Mihet (2013) and Ashraf and Arshad (2017) show that corporate risk-taking is affected by the national culture of the firm's home culture.

Finally, we excluded banks that are not representative of a typical listed commercial bank due to the specific country's characteristics. For example, in contrast to most countries, small regional banks in the United States while limited in the area of operations (thus, hardly compares to listed banks around the world) are still listed on the organized markets. Since a large number of such banks might bias the estimation results for the U.S., we limit our sample to the banks that have a threshold of bank's assets to country's GDP of more than 1%, which corresponds to the smallest level in our sample outside the U.S. As a result, 170 small banks from the United States are excluded from our final sample. In our opinion, such approach is preferable to alternatives found in the previous literature[16] .

Following Kanagaretnam et al. (2013) and Ashraf et al. (2016), we investigate the link between national culture and bank risk in a cross-section. Therefore, the measure of bank-risk taking, as well as bank-level and country-level controls, are averaged over a sample period. In line with previous studies, we only kept banks that have at least four years data over 2001 to 2006 period[17] . As a result, the final sample covers 467 banks from 56 countries in the case of accounting-based z-score and 399 banks from 54 countries in the case of market-based z-score.

4.2. Measures of bank risk-taking

Bank risk-taking can be measured with a variety of proxy indicators, both accounting and market-based. This paper follows the corresponding literature by considering the three most relevant risk measures[18] . Namely, accounting-based z-score (ZS), market-based z-score (Mkt), and standard deviation of return on assets (σROA). We consider both versions of z-score as our main specification, while ROA is considered as part of a robustness analysis. This choice follows from a relatively high correlation between ZS and σROA (0.86) while the Pearson's correlation coefficient between ZS and Mkt is relatively low in comparison (0.49).

Accounting-based z-score captures the overall bank risk by measuring the distance from the insolvency in standard deviations and equivalent to the number of standard deviations that bank ROA should fall to eliminate equity. While z-score is rather a simplistic approach to approximate bank's risk and/or stability, it remains popular in the literature, including the most recent studies (e.g., Ahi and Laidroo, 2019; Albulescu and Ionescu, 2018; Caiazza et al., 2018; Pino and Sharma, 2019; Dwumfour, 2017; Sarmiento et al., 2017). Naturally, due to its simplicity, z-score has a number of disadvantages. However, our choice of this variable is foremost dictated be the need for consistency with the previous literature on culture and bank risk-taking. Moreover, relatively recent literature validates the use of z-score as the bank insolvency risk measure (Lepetit and Strobel, 2015).

In this paper, it is calculated as:

$$lnZS_i = ln\left(\frac{R\bar{O}A_i + C\bar{A}R_i}{\sigma\mathrm{ROA}_i}\right) \times (-1) \tag{1}$$

where *σROA* is a standard deviation of return on assets for bank *i* over a sample period, $R\bar{O}A_i$ and $C\bar{A}R_i$ are return on assets and capital asset ratio, both calculated as an average over the sample period. Greater profitability and capitalization lead to a higher z-score, and higher standard deviation of return on assets leads to a lower z-score. Therefore, the greater the z-score, the lower the probability of insolvency and the more stable is the bank. Following Laeven and Levine (2009) and Lepetit and Strobel (2015) we take the natural logarithm of z-score for the purposes of data normalization. We multiply the log-transformed z-score values by minus one to ensure straightforward interpretation of the results, so the higher measure of risk will correspond to greater risk.

Following Lepetit et al. (2008); Crouzille et al. (2004), and Prabha and Whilborg (2014), the market-based z-score in this paper is calculated as:

$$lnMkt_i = ln\left(\sum_1^n \frac{Avrt_{it} + 1}{\sigma\mathrm{Ret}_{it}} \times \frac{1}{n}\right) \times (-1) \tag{2}$$

where *Avert* corresponds to an average of daily stock returns for stock *i* during the given year *t* and *σRet* to the standard deviation of daily stock returns for a stock during the given year, and *n* is the length of a sample period. As this z-score is highly skewed, we employ natural logarithm of market-based z-score. Since the higher the z-score, the more stable the bank is, we multiply the log-transformed z-score values by minus one to ensure straightforward interpretation of the results, so the higher measure of risk will correspond to the greater risk.

[15] The additional reason for restricting financial data to consolidated financial statements is to consider the perspective of ultimate bank owners as close as possible (Westman, 2011).

[16] For instance, to address a related concern, Ashraf et al. (2016) used a subjective cut-off, including only top 100 banks from countries with large number of banks (Austria, France, Germany, Japan, Russia, Switzerland).

[17] Kanagaretnam et al. (2013) required three and Ashraf et al. (2016) four years of data for the seven-year period.

[18] Accounting based z-score is used in all three studies on culture and bank risk-taking (Kanagaretnam et al., 2013; Ashraf et al., 2016; Mourouzidou-Damtsa et al., 2019). In addition, we argue that the standard deviation of the net interest margin (Kanagaretnam et al., 2013; Ashraf et al., 2016) and loan loss provision (Mourouzidou-Damtsa et al., 2019) captures only a part of the total risk of the bank and might be incomparable with the overall bank risk captured by z-score and σ(ROA).

The additional measure of bank-risk taking is calculated as follows:

$$ln\sigma ROA_i = ln(\sigma ROA_i) \tag{3}$$

where *ROA* is a return on assets. As *lnROA* is highly skewed, we applied log-transformation to this variable.

To reduce the influence of outliers, CAR_i, ROA_i, and Mkt_i were trimmed at 1% in both tails of the distribution.

4.3. Measures of national culture

This paper follows Kanagaretnam et al. (2013) and Ashraf et al. (2016) by choosing Hofstede's cultural framework as the main way to approximate national culture. Since only two out of four major cultural dimensions were consistently significant in the previous studies, we limit our choice of culture variables to dimensions of individualism (*IND*) and uncertainty avoidance (*UAI*).

Hofstede's cultural dimensions are represented by country-level indices that take values from 0 to 100 and reflect the relative position of a country versus others, rather than absolute level. The data on cultural variables used in this paper was obtained by combining cultural scores from Greet Hofstede's private dataset and estimates made by Hofstede Insights, a business consultancy specializing in cross-cultural issues and working closely with Greet Hofstede himself. To show that the results are not driven by the Hofstede Insights estimates, we restrict our sample only to the countries with original Hofstede score in the robustness analysis.

4.4. Regression specification

Following previous literature, we control for a large set of bank-level and country-level predictors of bank risk. Online Appendix, Section OA.4 provides a comparison of variables usage between previous studies and the present paper, including the direction and statistical significance of the effects.

In contrast to Kanagaretnam et al. (2013) and Ashraf et al. (2016), we exclude bank's leverage (capital structure) and loan loss provisions from the list of controls. Both variables might be considered as measures of bank risk-taking behavior on their own (e.g., Laidroo and Männasoo, 2017). We also control for the interest marginal revenue as its low level may encourage greater risk-taking (Delis and Kouretas, 2011), as well as for income diversity and funding structure to take into account differences in business strategies that still might exist even among the banks of the same type. Finally, as explained in Section 3.2, we control for shareholders rights protection to minimize the potential confounding effect of board characteristics on bank risk, and for the government ownership for the reasons explained in Section 3.1.

Appendix C provides detailed information on the variables description and corresponding data sources. Table 2 shows descriptive statistics.

In order to reduce the influence of outliers, all bank-level controls except bank size are trimmed at 1% in both tails of the distribution before transforming the initial panel data into the cross-section sample.

The baseline regression model used in this paper is the following:

$$Risk_{ij} = f(Nat.\ culture_j;\ Bank\ controls_{ij;};\ Ctry\ controls_j) \tag{4}$$

where i and j subscripts designate bank and country, respectively. $Risk_{ij}$ refers to either accounting-based or market-based z-score

Table 2
Descriptive statistics.

Variable	Mean	St. Dev.	Min	p25	p75	Max	N
lnZS	−3.34	0.80	−6.66	−3.90	−2.77	−0.95	467
lnMkt	0.55	0.38	−0.90	0.33	0.76	1.76	399
lnσROA	−5.75	0.91	−9.27	−6.47	−5.08	−3.47	467
Bank size	15.68	2.15	10.07	14.31	17.11	20.87	467
Bank growth	0.12	0.19	−0.09	−0.01	0.18	1.28	467
Income diversity	0.25	0.11	0.01	0.18	0.33	0.61	467
Funding structure	0.74	0.14	0.17	0.66	0.85	0.93	467
Interest marginal revenue	0.57	0.19	0.07	0.45	0.68	0.96	467
State-owned	0.07	0.26	0.00	0.00	0.00	1.00	467
IND	50.46	27.16	8.00	30.00	76.00	91.00	467
UAI	64.54	21.48	8.00	46.00	86.00	100.00	467
GDP	9.94	0.90	7.76	9.18	10.61	11.03	467
Rule of law	0.73	0.19	0.18	0.63	0.86	1.00	467
Legal origin	0.40	0.49	0.00	0.00	1.00	1.00	467
Creditor rights	0.43	0.22	0.00	0.25	0.50	1.00	467
Shareholder rights	0.50	0.20	0.08	0.39	0.65	1.00	467
Information sharing	0.94	0.25	0.00	1.00	1.00	1.00	467
Deposit insurance	0.74	0.39	0.00	0.70	1.00	1.00	467
Restrictions	0.55	0.16	0.20	0.40	0.60	0.90	467
Stringency	3.53	1.14	1.00	3.00	4.00	6.00	467
Concentration	0.54	0.22	0.27	0.37	0.70	1.00	467

Notes: For definitions of variables see Appendix C.

(*lnZS* and *lnMkt* respectively). $Nat.\ culture_j$ are individualism (*IND*) and uncertainty avoidance (*UAI*) from Hofstede's national culture framework. *Bank* $controls_{ij}$ include *bank size*, *bank growth*, *income diversity*, *funding structure*, *interest marginal revenue, and state-owned*. Whereas, *Country* $controls_j$ include *GDP*, *rule of law*, *legal origin*, *creditor rights*, *shareholder rights*, *information sharing*, *deposit insurance*, *restrictions*, *capital stringency,* and *concentration*.

In line with Kanagaretnam et al. (2013) and Ashraf et al. (2016), we employ ordinary least squares on cross-sectional data with cluster-robust standard errors to estimate the effects of national culture on bank risk-taking behavior.

4.5. Robustness analysis

In order to ensure the robustness of our main results, we perform the following steps. First, we replicate the estimations of Kanagaretnam et al. (2013) and Ashraf et al. (2016) using our sample of listed banks and accounting-based z-score as a proxy for bank risk (*lnZS*). Secondly, we form two alternative specifications, subject our sample to two additional restrictions, and add a third proxy for bank risk-taking (*lnσROA*) that results in 27 models in total.

Following previous literature more closely, in our second specification, we consider *loan loss provisions* and *capital structure* as bank-level control variables instead of *income diversity*, *funding structure*, and *interest marginal revenue*.

In our third specification, we adjust cultural scores, as suggested by Beugelsdijk et al. (2017), by interacting both IND and UAI with the Gelfand et al. (2011) national culture tightness score (*TGHT*), rescaled to 0–1 range.[19]

The adjusted cultural variables are calculated as follows:

$$INDadj_j = IND_j \times \frac{TGHT_j}{max(TGHT)} \tag{5}$$

$$UAIadj_j = UAI_j \times \frac{TGHT_j}{max(TGHT)} \tag{6}$$

where, a country's *j IND* and *UAI* are Hofstede's individualism and uncertainty aversion correspondingly, and *TGHT* is Gelfand et al. (2011) national culture tightness score. Before the adjustment, United States is a country with the highest level of individualism at 91, while Italy is at the sevenths place in our dataset with *IND* equals 76. However, since the cultural tightness is higher in Italy than in the U.S. (6.8 for Italy compared to 5.1 for the U.S.), after the adjustment Italy's level of *IND* is higher than in the U.S. (42 compared to 38 for the U.S.).

Since Gelfand et al. (2011) data is available only for 28 countries in our sample, the reduction in the number of county-level controls is a necessity to accommodate the decline in degrees of freedom at the country-level. Therefore, in our third specification, a list of *Country* $controls_j$ in the Eq. (4) includes only the following correlates: *GDP*, *rule of law*, *legal origin*, *deposit insurance*, and *concentration*.

Finally, we subject our sample to the following restrictions. First, we limit our sample to countries for which the original Hofstede's cultural scores are available. Secondly, we exclude the United States and Japan from the sample as the countries with the largest number of observations.

5. Empirical results

5.1. Main specification analysis

We regress the main bank risk-taking measures, accounting-based z-score (*lnZS*) and market-based z-score (*lnMkt*), on two dimensions of national culture, including bank- and country-level control variables and report results in Table 3.

Since we control for a larger set of bank-level variables, but do not control for capital structure and loss loan provisions, we expect that the results for bank-specific variables will be relatively more mixed if comparing to the previous studies and may differ in terms of significance. Nonetheless, consistent with the previous literature we find that in the case of market-based z-score, *bank size* (Li et al., 2013; Mourouzidou-Damtsa et al., 2019) and *interest marginal revenue* (Mourouzidou-Damtsa et al., 2019) impact bank risk-taking negatively, while *bank growth* has a positive impact (Li et al., 2013; Kanagaretnam et al., 2013; Ashraf et al., 2016) in the case of both measure of bank risk. There is even more consistency in the results when country-level controls are included into the specification. All bank-level variables (except *Bank growth* and *State-owned* in the case of *lnZS* as the dependent variable) are statistically significant and take on expected signs. While it might seem surprising that most of important country-level controls (such as rule of law or legal origin) are not statistically significant, this result is consistent with the previous literature that links national culture and bank risk-taking (see Online Appendix Table AO.4.1). Given that the statistical power of our study might be lower due to a smaller sample and that the consistency of results for country-level controls in the previous studies is rather rare, we conclude that these results are encouraging and validate our model for the further analysis.

Coefficients of two dimensions of national culture capture direct effects of national culture on bank risk-taking. Contrary to the results of previous studies, we find that the coefficient estimate for *IND* is negative and statistically significant at 1% for both our main measure of bank risk-taking behavior.

[19] In contrast to Gelfand et al. (2011) who measure cultural tightness-looseness via direct questions, Uz (2015) derives it from a within-country variation in responses to a number of the World Values Survey questions. While, both approaches might be used in practice, we follow Gelfand et al. (2011) as it is much more widely adopted.

Table 3
Regression results: national culture and bank risk-taking.

	Dependent variables:											
	lnZS		lnMkt		lnZS		lnMkt		lnZS		lnMkt	
IND					−0.009***	(0.002)	−0.005***	(0.001)	−0.010***	(0.003)	−0.005***	(0.001)
UAI					0.001	(0.003)	−0.001	(0.002)	0.002	(0.003)	0.001	(0.001)
Bank size	−0.063***	(0.024)	−0.061***	(0.017)	−0.034	(0.023)	−0.047***	(0.017)	−0.01	(0.024)	−0.031*	(0.018)
Bank growth	0.136	(0.279)	0.426**	(0.189)	−0.043	(0.258)	0.324*	(0.179)	−0.173	(0.267)	0.289*	(0.162)
Income diversity	1.303***	(0.415)	0.485**	(0.231)	0.908***	(0.326)	0.337	(0.255)	0.512	(0.331)	0.205	(0.214)
Funding structure	0.912**	(0.383)	0.390**	(0.186)	0.379	(0.382)	0.174	(0.189)	0.287	(0.369)	0.004	(0.152)
State-owned	0.08	(0.180)	0.180***	(0.058)	−0.139	(0.173)	0.074	(0.046)	−0.06	(0.182)	0.053	(0.034)
Interest marginal revenue	−0.813***	(0.298)	−0.265*	(0.141)	−0.607**	(0.268)	−0.147	(0.115)	−0.832***	(0.283)	−0.457***	(0.136)
GDP									−0.075	(0.108)	−0.039	(0.048)
Rule of law									−0.14	(0.501)	−0.217	(0.215)
Legal origin									0.033	(0.147)	0.07	(0.058)
Creditor rights									0.049	(0.191)	0.259***	(0.096)
Shareholder rights									−0.1	(0.275)	0.032	(0.181)
Information sharing									−0.035	(0.160)	−0.093	(0.115)
Deposit insurance									−0.023	(0.113)	0.117*	(0.069)
Restrictions									−0.185	(0.284)	0.135	(0.137)
Concentration									−0.757***	(0.263)	−0.549**	(0.224)
Stringency									0.028	(0.036)	−0.026	(0.021)
Constant	−2.912***	(0.590)	1.228***	(0.419)	−2.562***	(0.457)	1.442***	(0.374)	−1.354	(0.986)	2.123***	(0.417)
Banks/countries	503/63		422/58		503/63		422/58		467/56		399/54	
Adjusted R2	0.066		0.181		0.150		0.274		0.167		0.426	

Note: *p < 0.1; **p < 0.05; ***p < 0.01; For definitions of variables see Appendix C.

Therefore, our main empirical result shows the support for H1. The association between the cultural dimension of individualism and bank risk-taking seems to be negative. This result contradicts previous literature in the field of corporate finance (Li et al., 2013; Mihet, 2013; Kanagaretnam et al., 2013; Ashraf et al., 2016;Mourouzidou-Damtsa et al., 2019). Instead, it supports findings of the literature focused on individual risk-taking behavior (Hsee and Weber, 1999; Fan and Xiao, 2006; Statman, 2008; Illiashenko, 2019).

The economic significance of the results is noteworthy and higher than in previous studies. For example, a one standard deviation change in *IND* (27.16) is associated with a change in accounting-based z-score (*lnZS*) of 0.272 (0.010 × 27.16), where the mean *lnZS* is −3.34 and standard deviation equal to 0.80. In contrast, Ashraf et al. (2016), who examined the period from 2001 to 2007, a one standard deviation change in *IND* (21.86) is associated with a change in accounting-based z-score (*lnZS*) of 0.109 (0.005 × 21.86), where the mean *lnZS* is −3.24 and standard deviation equals to 0.87.

Also, in contrast to previous studies, the coefficient estimate for uncertainty avoidance remains non-significant, even in a regression specification with no country-level controls. In untabulated results, we observe that when proxies for the institutional environment are not included into regression specification, we find that the coefficient estimate for *UAI* becomes positive and statistically significant at 1% in the case of accounting-based z-score and at 5% in the case of the market-based z-score. This is opposite to the result found in previous studies (Li et al., 2013; Mihet, 2013; Kanagaretnam et al., 2013; Ashraf et al., 2016).

This result is consistent with Minkov (2018) who finds that cultural uncertainty avoidance might be dominated by dimension of individualism and institutional factors that are relevant for restrictive society. To some degree, it is also consistent with our hypothesis regarding the effects of IND on bank risk-taking. Given a negative correlation between *IND* and *UAI* (about -0.4 in our sample) and that previous literature have shown that *IND* and *UAI* affect bank risk-taking in opposite directions, it is rather logical to expect a positive link between *UAI* and bank risk if the link between *IND* and risk in the present study is negative.

5.2. Replication of previous studies

In order to argue that the differences in regression specification do not drive the difference between our main result and findings of Kanagaretnam et al. (2013) and Ashraf et al. (2016), we replicate estimations from the original papers. Online Appendix, Section OA.5. provides a thorough explanation of the procedure and compares descriptive statistics between the original studies and our replication. The data is quite comparable. For instance, the mean of the dependent variable *lnZS* is −3.486 in Kanagaretnam et al. (2013) and −3.240 in Ashraf et al. (2016), while it equals −3.270 and −3.250 in our replications correspondingly.

Table 4 reports the results of estimation that follows the methodology of Kanagaretnam et al. (2013) and Ashraf et al. (2016) as closely as possible.

In line with our results reported in Section 5.1., we find that the coefficient estimate for *IND* is negative and statistically significant in both cases. In other respects, the estimation results are very similar to the results from the original papers. Especially, if we take into account the difference in the sample size and the fact that Kanagaretnam et al. (2013) report significance levels estimated from the one-tailed tests, that could produce a larger number of significant predictors.

Table 4
Regression results: replication of previous studies.

	Original Kanagaretnam et al. (2013)		Replication of Kanagaretnam et al. (2013)		Original Ashraf et al. (2016)		Replication of Ashraf et al. (2016)	
IND	0.017***	(2.950)	−0.004**	(0.001)	0.005 ***	(0.001)	−0.003**	(0.001)
Bank size	0.058***	(2.950)	−0.031	(0.021)	−0.014 *	(0.096)	0.005	(0.013)
Bank growth	0.305***	(2.360)	0.101***	(0.027)	0.004 ***	(0.000)	0.000	(0.002)
Loan loss prov.	0.087***	(2.310)	14.554***	(3.154)	0.162 ***	(0.000)	0.464***	(0.086)
Capital structure	−0.040	(0.300)	−5.311***	(0.906)				
TBTF	0.094	(0.450)	−0.022	(0.103)				
GDP	−0.018	(1.100)	−0.128**	(0.058)	−0.137 ***	(0.000)	−0.092*	(0.049)
Rule of law	−0.014	(1.340)	0.026	(0.033)	−0.260 ***	(0.000)	−0.026	(0.070)
Legal origin	0.06***	(3.880)	0.054	(0.044)	0.018	(0.735)	−0.040	(0.064)
Creditor rights	0.196***	(4.670)	−0.077	(0.076)	0.003	(0.866)	−0.022	(0.039)
Information sharing	−0.137***	(2.290)	0.085	(0.161)	0.047	(0.480)	−0.093	(0.101)
Deposit insurance	0.451***	(5.650)	0.347**	(0.155)	0.061	(0.269)	−0.088	(0.081)
Restrictions					−0.017 *	(0.091)	−0.012	(0.023)
Stringency					−0.039 ***	(0.003)	−0.030	(0.028)
Concentration	0.204	(1.600)	0.306	(0.245)	0.001	(0.278)	−0.001	(0.002)
Constant	−2.888***	(10.420)	−1.73***	(0.367)	−1.862 ***	(0.000)	−1.974***	(0.660)
Banks/countries	6515/65		477/52		1974/75		589/64	
Adjusted R2	0.153		0.289		0.258		0.231	

Note: *p < 0.1; **p < 0.05; ***p < 0.01; underscored level of statistical significance refers to results for one tailed tests. For definitions of variables see Appendix C.

5.3. Alternative robustness tests

As explained in Section 4.5., we continue robustness analysis by considering an alternative measure of bank risk-taking (*lnσROA*) and estimating two additional specifications and restrict our main sample in two ways.

In total, we estimate 27 models (3 dependent variables x 3 specifications x 3 samples) and report the results in Table 5. For brevity, we do not report coefficient estimates for both bank-level and country-level controls. As before, all models are estimated with ordinary least squares on cross-sectional data with cluster-robust standard errors.

While we observe varying levels of statistical significance for the coefficient estimate of *IND*, is negative in all models and the level of statistical significance is below 5% in 26 out of 27 models. In short, our main result survives additional robustness tests.

Although our dataset provides unique possibilities to address national culture, it is vulnerable to several limitations.

First, one may suggest that large multinational banks and very small local banks may not represent national culture appropriately. Therefore, we run a robustness test by excluding top 10% largest and top 10% smallest banks from the sample (see Online Appendix, Table AO.6.1.) Although the statistical significance of individualism somewhat decreases, all signs of the significant coefficients remain as before.

Table 5
Regression specification: robustness analysis.

	Sample 1. Dependent variable:			Sample 2. Dependent variable:			Sample 3. Dependent variable:		
	lnZS	lnMkt	lnσROA	lnZS	lnMkt	lnσROA	lnZS	lnMkt	lnσROA
Baseline specification									
IND	−0.010***	−0.005***	−0.012***	−0.011***	−0.005***	−0.012***	−0.007**	−0.004**	−0.007**
	(0.003)	(0.001)	(0.003)	(0.004)	(0.001)	(0.004)	(0.003)	(0.002)	(0.003)
UAI	0.002	0.001	−0.004	0.002	0.001	−0.003	−0.001	0.001	−0.001
	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.004)	(0.003)	(0.002)	(0.003)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Specification 2									
IND	−0.006**	−0.004***	−0.006*	−0.006**	−0.004**	−0.005*	−0.007**	−0.004**	−0.007**
	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
UAI	−0.002	−0.0001	−0.004	−0.002	0.0002	−0.004	−0.001	0.001	−0.001
	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.002)	(0.003)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Specification 3									
IND adj.	−0.015***	−0.006**	−0.023***	−0.016***	−0.006**	−0.023***	−0.019***	−0.007**	−0.025***
	(0.004)	(0.003)	(0.006)	(0.004)	(0.003)	(0.006)	(0.005)	(0.003)	(0.007)
UAI adj.	0.009***	0.002	0.002	0.008***	0.002	0.002	0.017***	0.001	0.013
	(0.003)	(0.001)	(0.004)	(0.003)	(0.001)	(0.005)	(0.005)	(0.003)	(0.008)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: *p < 0.1; **p < 0.05; ***p < 0.01. For definitions of variables see Appendix C.

Second, Kwok and Tadesse (2006) and Aggarwal and Goodell (2009) have shown that national preferences for the type of financial system (bank or market-based) depend on national culture. As the presence of listed banks may reflect the level of stock market development, it may influence the reported results. We use data from Claessens et al. (2000) to create a control variable for bank-based vs. market-based financial system and include it in estimations (see Online Appendix, Table AO.6.2.). The main results do not change after adding this control variable.

We have so far focused only on the cultural dimensions of individualism and uncertainty avoidance. It is possible to argue that masculinity (MAS) and power distance (PDI) also matter. Therefore, we add the variables in the models (see Online Appendix, Section A.O.6.3.). The inclusion of these variables does not change the results reported previously. Significant negative association with individualism remains intact. We do observe that the masculinity exhibits a negative association with bank risk-taking, while in previous studies on bank samples (Ashraf et al., 2016) is not statistically significant. Since the potential link between the cultural dimension of masculinity and bank risk-taking is out of scope of this study, we refrain from commenting on it.

6. Conclusions

Our findings could be summarized in two statements. First, there is a negative association between the dimension of individualism and bank risk-taking. This finding is in line with previous studies that came mostly from a behavioral finance tradition (e.g., Fan and Xiao, 2006; Illiashenko, 2019). This result suggests that the positive link between cultural dimension of individualism and bank risk found in previous studies could be driven by unobserved company-level characteristics related to corporate governance. Therefore, our finding favors cushion hypothesis over the hypothesis proposed by, among others, Kanagaretnam et al. (2013) and Ashraf et al. (2016). This result is not entirely surprising as the latter hypothesis requires a positive link between the level of individualism and overconfidence, while a number of studies provide suggestive evidence to the contrary (e.g., Yates et al., 1997, 1998; Krawczyk and Wilamowski, 2017).

Second, in contrast to previous literature that finds the negative association between the dimension of uncertainty avoidance and bank risk-taking, in the present study, we observe that such link is either not statistically significant or becomes positive when national culture is adjusted for the degree of looseness-tightness. This result is not entirely unexpected as empirical evidence suggests that the dimension of uncertainty avoidance might not be as robust as previously thought and dominated by the dimension of individualism (Minkov, 2018). Since the statistical power of our study is lower than in previous instances (at least due to the smaller number of observations), one can expect that less influential predictor might turn out not statistically significant. In addition, the weak evidence that points to the positive relationship between uncertainty avoidance and bank risk-taking is consistent with our main hypothesis regarding the effects of individualism. Given a negative correlation between IND and UAI, a positive link between UAI and bank risk rather should be expected in the first place.

While our results are robust to several alternative specifications and sample restrictions, including the adjustment of national culture dimensions for the degree of country's cultural tightness (Beugelsdijk et al., 2017; Gelfand et al., 2011), we cannot argue that our findings provide a definitive answer. The results instead suggest that the link between national culture and corporate outcomes is more nuanced and complex than the previous corporate finance studies have assumed.

Taken together our findings suggest the need for further interdisciplinary research on effects of national culture. Specifically, future research should take into account that the results might be conditional on sample characteristics as the results of our study that focuses on listed banks are different from the previous studies focused on samples dominated by non-listed banks. At this moment, it seems reasonable to assume that any policy recommendations are premature.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ribaf.2019.101069.

Appendix C

Table C1

Table C1
Variable description.

Variable	Definition	Data source
Measures of risk		
lnZS	Reversed natural log of accounting-based z-score (Eq. 1)	Eikon, authors' calculations
lnMkt	Reversed natural log of market-based z-score (Eq. 2)	Eikon, authors' calculations
lnσROA	Natural log of st.dev. of return on assets (Eq. 3)	Eikon, authors' calculations
Bank-level variables		
Bank size	Natural log of total assets	Eikon, authors' calculations
Bank growth	Average growth rate of total assets over a period	Eikon, authors' calculations
Income diversity	Non-interest income to the sum of interest and non-interest income	Eikon, authors' calculations
Funding structure	Deposits to total assets	
Interest marginal revenue	Net interest income to interest income	Eikon, authors' calculations
State-owned	Dummy variable equals 1 if a bank has more than 50% government ownership	Eikon, authors' calculations
Loan loss provision	Loan loss provision to total assets	Eikon, authors' calculations
Capital structure	Equity to total assets	Eikon, authors' calculations
TBTF	Bank's total assets to country's GDP, a dummy variable that takes a value of 1 if the ratio is more than 1% for the US and more that 10% for other countries	Eikon, IMF, authors' calculations
Country-level variables		
IND	Individualism	Greet Hofstede's website, Hofstede Insights
UAI	Uncertainty avoidance	Greet Hofstede's website, Hofstede Insights
IND adj.	Individualism adjusted by cultural tightness (Eq. 5)	Greet Hofstede's website, Hofstede Insights, Gelfand et al. (2011)
UAI adj.	Uncertainty avoidance adjusted by cultural tightness (Eq. 6)	Greet Hofstede's website, Hofstede Insights, Gelfand et al. (2011)
GDP	Natural log of GDP per capita, constant 2011 international USD	IMF
Rule of law	Extent to which agents have confidence in and abide by the rules of society. Index from 0 to 1, higher value corresponds to higher level of rule of law	Country Risk Guide (ICRG) database
Legal origin	Dummy variable equals 1 if legal origin of a country is British and 0 otherwise	Djankov et al. (2007)
Creditor rights	Creditors' legal rights against debtor in case of debtor's reorganization or liquidation. The index originally ranges from 0 (weak) to 4 (strong), normalized to the range from 0 to 1.	Djankov et al. (2007)
Shareholder rights	Legal protection of minority shareholders against expropriation by corporate insiders. Index from 0 to 1, higher value corresponds to greater protection	Djankov et al. (2008)
Information sharing	Dummy variable equals 1 if either a public registry or a private bureau operates in the country, 0 otherwise.	Djankov et al. (2007)
Deposit insurance	Dummy variable equals 1 if a country implements explicit deposit insurance system and 0 otherwise.	Barth et al. (2013)
Restrictions	Overall restrictions on banking activities measures the restrictions on securities, insurance and real estate activities. It originally ranges from 3 to 12 and higher value refers to greater restrictions, normilized to the range from 0 to 1.	World Bank
Stringency	Measures the stringency of capital requirements. Index varies from 0 to 10 and higher value refers to greater stringency.	Barth et al. (2013)
Concentration	Assets of three largest banks as a share of assets of all commercial banks.	Financial Structure Database

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Appendix 3

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Left-wing Economic Populism and Savings: How Do Attitudes Influence Forward-Looking Financial Behavior?

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ABSTRACT
This paper uses the case of Ukraine to explore the association between attitudes and saving behavior. We hypothesize that individuals' preferences and beliefs, which we proxy with support for left-wing populist economic policies, have an adverse effect on strategic, forward-looking behavior. Using the data from a nationally representative survey conducted in 2019, we find that support for populist economic policies has a negative association with a likelihood to have bank savings. The results hold in the presence of socio-economic and behavioral factors and when we remove the variation attributed to the cultural and socio-economic factors from our measure of economic populism.

KEYWORDS
Economic populism; financial decision making; savings; Ukraine

JEL CLASSIFICATION
G51; G41; D72

Introduction

Populism is on the rise globally. IfGC (2018) shows that the number of countries with populist leaders has increased fivefold in the last 28 years: from 4 in 1990 to 20 in 2018. Correspondingly, academic interest in populism and its correlates is also increasing in recent years.

The scholarly interest in populism, however, is mostly focused on right-wing populism conceptually and the developed countries geographically. This is understandable given that in recent years the biggest economies such as the US and EU have experienced an increase in right-wing populism. Yet, the focus on ethnic (immigration) or nationalistic (independence from the EU) issues at the center of right-wing populism does not help to explain the populist attitudes in other countries. Broadly speaking, such an approach goes against a holistic view that there are different varieties of populism and that holding a singular view of populism might be at best misguided and at worst dangerous (Devinney and Hartwell 2020), especially for policymakers.

In addition, the focus in the empirical literature is primarily on the political rather than economic populism[1] and on the determinants of populism support, rather than how such populist attitudes correlate with economic and financial behaviors. A notable exception in recent literature is represented by Hartwell and Devinney (2021) who focus on incorporating the phenomenon of populism into the risk and uncertainty considerations within international business literature. Nevertheless, the existing approach seems to leave behind

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an economic aspect of populist attitudes (specifically, left-wing economic populism) and its corresponding association with households' economic behavior, especially in the context of East European economies.

In our view, the inquiry into economic populism can shed additional light on households' economic behavior. We argue, that it can help to understand the role of additional factors driving individual economic decisions. Just like the focus on behavioral considerations following the emergence of behavioral economics and behavioral finance improved our understanding of economic and financial decision-making (Illiashenko 2017a), the focus on economic populism might help both scholars and policymakers to understand households' forward-looking financial behaviors. First, such an approach is in line with a general trend of expanding the scope of the drivers of economic and financial behaviors, from traditional socio-economic characteristics to behavioral biases and nonstandard preferences, and then from the focus on the biased individual to the focus on the enculturated actor (Demeritt and Hoff 2018). Secondly, forward-looking economic and financial behaviors continue to be at the center of behavioral development economics (Kremer, Rao, and Schilbach 2019) that is at its core concerned with a question of economic convergence. We think that the latter has an important value for policymakers concerned with the future of East European economies.

In this paper, we use the self-reported level of support for a set of populist economic policies to develop a measure of economic populism in the context of Ukraine, a middle-income emerging economy. We understand economic populism as a special case of left-wing populism and similarly to Dornbusch and Edwards (2007), Acemoglu, Egorov, and Sonin (2013), and Rodrik (2018), define it as a simplification of economic problems and disregard for the limits of the economic policy such as costs, unintended consequences, or the effectiveness in achieving policy goals. For the sake of brevity, throughout the paper, we refer to left-wing economic populism as economic populism.

In order to check the validity of our measure of economic populism we explore its correlation with a set of cultural and socio-economic characteristics, as well as with the proxies of the regional economic development and historical legacies of past institutions. We show that our measures of economic populism behave in line with expectations and prior empirical literature. We briefly discuss the results of the validation tests in Section 3.2.4 and provide the detailed results and discussion in Sections AO.3 in the accompanying Online Appendix.

To the best of our knowledge, the existing research does not answer the question of how populism and economic populism in particular are linked with strategic forward-looking financial behaviors. Inspired by this gap in the literature, in our next step, we show that economic populism has an association with saving decisions. Specifically, we hypothesize that in the case of Ukraine, support for populist economic policies can be used to proxy the set of individuals' attitudes and beliefs that are linked to forward-looking financial behavior and that it has a negative association with savings. Using the data from a representative survey conducted in 2019 we demonstrate that a one-standard-deviation decrease in economic populism measure increases the likelihood of having bank savings by 20% after controlling for a wide set of socio-economic characteristics, economic expectations, risk and time preferences, and trust to strangers.

In addition to common robustness tests that include an alternative dependent variable and changes to the main specification, we take two additional steps to improve the validity

of our results. First, we use two alternative measures of economic populism in addition to our main additive index that reflects the support of populist economic policies. Secondly, we aim to separate the effect of economic populism and the part of the variation in economic populism that is explained by either socio-economic or cultural factors. We start with three differently constructed indices of economic populism mentioned above and for each of them, we extract the part that is not explained (1) by cultural factors (such as liberalism, anti-establishment attitudes, and exclusion attitudes); (2) the part that is not explained by (1) and socio-economic characteristics; and (3) the part that is not explained by (2) and the rest of control variables used in the main specification. As a result, we use five versions of the each of three different measures of economic populism.

The rest of the paper is structured as follows. In Section 2 we provide a literature review on the factors that affect saving decisions and formulate our hypothesis. Then, Section 3 introduces the data, variables, and empirical strategy. 4 presents empirical results, robustness tests, and the discussion. Finally, section 5 concludes. The accompanying Online Appendix presents a detailed discussion of how we construct different versions of the economic populism variable (Sections OA. 1), the descriptive statistics for all versions of economic populism available (Sections OA. 2), the detailed validation tests for the economic populism variable (Sections OA. 3), additional robustness tests (Sections OA. 4), and a brief overview of Ukraine's background including the discussion about the evolution of economic growth and the share of the population who make savings, as well as a brief discussion of the corresponding societal beliefs (Sections OA. 5).

Literature Review and Hypothesis Development

Predictors of Savings

Previous studies identify a number of socio-economic factors as predictors of household savings, including age, gender, household composition, income and wealth, homeownership, education, ethnicity, and employment (Fisher and Anong 2012). For instance, evidence shows a non-linear association with age where savings tend to increase up to a certain point in middle age and then start to decline (Burney and Khan 1992; Hong, Sung, and Kim 2002; Rha, Montalto, and Hanna 2006; Yuh and Hanna 2010; Yao, Xiao, and Liao 2015). Gender also turns out to be an important predictor, with pre-2008 empirical evidence from eight European countries (Fernández-López et al. 2015) and the U.S. (Fisher 2010) suggesting that women are less likely to save for retirement. At the same time, the effects of gender, marital status, and household composition could be interlinked (Sunden and Surette 1998; Johannisson 2008; Knoll, Tamborini, and Whitman 2012; Whitaker, Bokemeiner, and Loveridge 2013), therefore, it is important to control for the marital status and household composition (for instance, household size) along individual's gender. Unsurprisingly, the majority of studies find a positive association between savings and the person's level of education (Browning and Lusardi 1996; Lee, Park, and Montalto 2000; Remble, Marshall, and Keeney 2014), income (Browning and Lusardi 1996; Perry and Morris 2005; Yuh and Hanna 2010), and financial literacy (Karlan, Ratan, and Zinman 2014; Lusardi and Mitchell 2014). However, such research mostly focuses on the developed countries.[2] There is much less known about the nuances of saving behaviors in lower- and upper-middle income developing countries, especially CEE and former USSR countries. This is unfortunate as the

findings about saving behavior in developed countries cannot always be extrapolated to CEE and former Soviet countries. For instance, while savings are the highest for middle-aged individuals in developed countries, the research from this region paints an opposite picture (Beckmann et al. 2013; Gregory, Mokhtari, and Schrettl 1999).

Apart from socio-economic predictors, many studies indicate the importance of behavioral factors. Based on important breakthroughs in behavioral economics and behavioral finance since the early 1980s (Hirshleifer 2015; Frydman and Camerer 2016; Illiashenko 2017a), empirical literature accumulated an impressive body of evidence in the domain of household finance. While in the domain of saving behavior, there are good reasons to stress that both neoclassical and behavioral factors are not mutually exclusive (Illiashenko 2017b) and both affect savings, the evidence shows that behavioral factors have a greater influence over saving behavior. For instance, a seminal empirical study Chetty et al. (2014) show that behavioral features that help to overcome present bias and inertia, like automatic enrollment, matter more than tax incentives for savers.[3]

There is a large body of literature that explores the effects of time inconsistency on households' financial decisions, including savings (Laibson et al. 1998; O'donoghue and Rabin 1999; Goda et al. 2015; Bradford et al. 2017). Importantly, the negative effects of time inconsistency on forward-looking financial behaviors (including savings) can be conditional on the naivete of an individual with more severe negative effects observed for individuals who are not aware of their biased time preferences. Indeed, there is abundant literature that illustrates the benefits of using commitment devices, including extensive literature on the Save More Tomorrow scheme (Madrian and Shea (2001); Thaler and Benartzi (2004); and an array of recent studies).

The association between risk preferences and savings is less clear. The majority of the literature seems to view risk aversion as a predictor of the intention to save in order to create a saving buffer (Magendans, Gutteling, and Zebel 2017). It is also possible to suggest that the fact that self-employed seem to have a greater inclination to save (Yuh and Hanna 2010) implies a positive relationship between risk aversion and savings. Self-employed are exposed to a greater background risk and, thus, are more willing to save for a precautionary motive. However, the same finding can be interpreted in the opposite direction, as self-employed should be more risk-seeking in the first place, the fact that they save more is an indication of a positive association between willingness to take risks and saving behavior. This interpretation might be consistent with DeVaney, Anong, and Whirl (2007) who report that households with a more risk-tolerant head are more likely to save.

Behavioral literature also finds that time preferences correlate with procrastination, inattention, or limited memory and also predict saving behavior. For instance, a surprisingly large fraction of households fails to take advantage of participation in corporate saving plans (in which employers match the individual contribution), basically leaving money on the table (Choi, Laibson, and Madrian 2011). At the same time, simple reminders (Karlan et al. 2016) and procedure simplification (Beshears et al. 2013) have the potential to counteract intention and procrastination, and increase savings.

These results suggest a role that motivation can play to encourage saving. In turn, motivation for a specific future-oriented behavior is likely to correlate with an individual's aspirations. Indeed, experimental evidence suggests that an intervention aimed at improving individuals' aspirations results in a motivational effect on a wide range of future-oriented behavior, including savings (Bernard et al. 2014). Interestingly, the association

between the level of aspirations and future-oriented behavior has an inverted-U relationship (Janzen et al. 2017). Therefore, we would expect that individuals with both low and high aspirations about their financial success are less likely to save. In the case of low aspirations, the individuals are likely to believe in the futility of making savings, while individuals with high aspirations are, probably, over-optimistic about the trajectory of their future income and see no point in sacrificing present-day consumption.

The empirical literature also identifies the role of trust. Deetlefs et al. (2019) demonstrate that the level of trust in financial providers has a direct and indirect (via an interest in retirement savings that might be related to aspirations) relationship with saving behavior. This includes the trust toward financial institutions that handle households' saving and the general level of trust toward broad financial system (Agnew et al. 2012; Baidoo and Akoto 2019; Galiani, Gertler, and Navajas-Ahumada 2022).

Finally, social context might represent a frequently missing part of the savings puzzle. For instance, Cole, Mailath, and Postlewaite (1992) convincingly argue that, on a general level, saving decisions are embedded within a wider social context. Therefore, it might be reasonable to expect that social norms and attitudes, including the perception of relative wealth and income gaps, can affect saving behavior. The empirical literature provides suggestive evidence that this is indeed the case. For instance, using the structural equation modeling approach over the German survey data, Ruefenacht et al. (2015) find that social context constructs – subjective norms and relationship quality – both have a strong association with saving behavior. Similarly, the perception of income and wealth inequality might affect the households' motivation to save. Likewise, the literature suggests a link between both income and wealth inequality and saving behavior. However, the results are contradictory. First, inequality might motivate households to save in order to increase their future income, and thus, to decrease the relative gap against households at the top of the distribution. Jin, Li, and Wu (2011) and Roychowdhury (2016) provide empirical evidence in support of this hypothesis using Chinese and Indian data correspondingly. Secondly, poor households might resort to conspicuous consumption to signal their social status under the conditions of high inequality. Correspondingly, this would imply a focus on consumption in the present at the expense of saving. Christen and Morgan (2005) and Darku (2014) provide supportive evidence based on the US and Canadian data, while Jaikumar and Sarin (2015) obtain similar results in the sample of Indian households.

Hypothesis Development

Existing empirical literature shows that both cultural traits and personal attitudes affect forward-looking financial behaviors (Agarwal, Chomsisengphet, and Lim 2017; Balasuriya, Gough, and Vasileva 2014).

We suggest that in Ukraine, economic populism proxies a set of individual beliefs and attitudes that are linked to forward-looking, strategic, and, broadly speaking, rational economic behavior. Our conjecture is based on the observation that populism is driven by economic circumstances, and especially affected by financial crises (Algan et al. 2017; Funke, Schularick, and Trebesch 2016; Hernández and Kriesi 2016). Thus, the degree to which an individual supports populist economic policies can represent an accumulated negative experience that transforms into disbelief in the prevailing economic system that, in turn, negatively affects forward-looking financial behaviors.

If our conjecture is correct, we expect that a proxy of distrust of the current economic order would serve as a predictor of individual-level saving decisions in addition to a set of standard socio-economic characteristics and a number of behavioral proxies including present bias. As a proxy for the distrust in economic systems as a whole, we rely on the extensive literature on populist attitudes and specifically on a measure of economic populism first introduced by CES (2019) and then developed further in the present paper. Using the survey data on saving decisions and the individual-level data on economic populism attitudes we are testing the following hypothesis.[4]

H1: *Households with a higher degree of economic populism attitudes are less likely to have bank savings.*

It is important to note that we do not claim a direct causal relationship between political beliefs and saving behavior. Instead, we believe that such a set of beliefs and attitudes should also result in political preferences that fit into the concept of left-wing economic populism. At least this is likely to be the case in Ukraine, the country where political populism mostly persists in the domain of economic policy and has a definite left-wing orientation (Protsenko 2017; Brik and Krymeniuk 2019; Kuzio 2021). Since we cannot measure the set of attitudes and beliefs described above directly (due to both potential complexity and lack of data), we opt for using the measure of economic populism (data for which we have at our disposal) as a proxy. In other words, we use political beliefs for a set of wider correlated beliefs and attitudes.

Unfortunately, the limitations of our data do not allow us to investigate the mechanisms that link individual attitudes and beliefs (proxied with our measure of the support for left-wing economic populist policies) and saving behavior. However, at the core, our conjecture is based on two channels: economic aspirations (motivation) and consumption habits at the intersection of instant gratification and status considerations (conspicuous consumption).

First, we argue that chronic macrofinancial instability and economic stagnation captured by the dynamics of GDP per capita over the long-run[5] leads a large fraction of households to develop a set of beliefs that have a negative impact on saving decisions. The two most likely links are distrust in the prevailing economic order and low households' economic aspirations, both of which have a negative effect on the decision to save. This channel represents the core of our argument.

Another potential channel that could link chronic negative economic experiences with saving decisions is households' reaction to poverty and inequality. It is feasible that low income and high wealth inequality, which results from frequent financial crises, motivates poor individuals to show their status by engaging in conspicuous consumption at the expense of savings. As discussed in Section 2 the empirical literature provides contradictory evidence about the association between inequality and savings. However, Gruber (2018) suggests that increasing savings as a response to a widening gap in relative income is used as a strategy only by individuals with relatively high socio-economic status. Somewhat stretching the evidence, we propose that this result provides a potential resolution to the previous contradictory results. More importantly, it well might be the case that individuals with low socio-economic status respond to their economic circumstances by forming and pursuing consumption habits fueled by instant gratification. Here we assume habit formation that is

similar to lower socio-economic status caregivers' indulgence of children's food choices (Perry and Calarco 2017), however, beyond that we also assume that adults can engage in self-indulgence as a response to their economic circumstances. If these conjectures are correct, we would expect Ukrainian households with low economic aspirations to engage in conspicuous consumption or at least focus on present-day consumption at the expense of savings.

Data and Methodology

Data

Our data comes from the survey conducted in February-March 2019 by Kantar Ukraine, commissioned by the Center for Economic Strategy. The sample consists of 2000 respondents and is representative of the adult population (18+ years) of Ukraine with quotas based on age, region, gender, and settlement size. In the Donetsk and Luhansk oblasts, the survey was conducted only in the territory controlled by the Ukrainian government. The survey was conducted using a Computer-Assisted Telephone Interviewing (CATI) method.

Variables

In this section, we explain the selection of variables. Table 1 presents descriptive statistics for dependent and explanatory variables. More detailed descriptive statistics for alternative measures of *populism* is provided in the Online Appendix. Variable definitions are provided in Table A1 in Appendix A.

Dependent Variable

Our main dependent variable *bank savings* takes the value of 1 if a person has any savings in a bank and the value of 0 otherwise. According to the data, only 11.7% of respondents have any bank savings. This figure is in line with the previous survey evidence. For instance, GfK (2017) reports that 32% of Ukrainians make savings regularly but only 9% use banking institutions.[6] Similarly, the share of Ukrainians with bank savings in our data is close to FINREP (2017, 2019) - about 12%, and to results from older studies FINREP (2010) – 10% and SOCIS (2006) – 10.4%.

In the robustness analysis, we use *savings* instead of *bank savings* as a dependent variable. *Savings* is a binary variable that takes the value of 1 if a person has any bank or non-bank savings. However, it is important to note that *savings* variable is not exhaustive as our data does not have a separate measure on whether an individual has non-bank savings specifically. In the absence of a direct measure of total savings, we construct *savings* variable to include those who have bank savings and those whose main reason for not having bank savings is the fact that they do have non-bank savings. This, however, does not include those who have non-bank savings but this is not the main reason they do not have bank savings. Therefore, *savings* is likely to underestimate the fraction of Ukrainians who have savings. Indeed, according to the data, only 17.8% of Ukrainians have a bank or non-bank savings. This is lower than the share of respondents who make savings regularly – 32% (GfK 2017) as well as lower than a share of Ukrainians who have saved in 2014 and 2017 according to the data from the Global Findex database.[7] However, recent survey evidence focused on the

Table 1. Descriptive statistics.

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Bank savings	1,970	0.117	0.322	0.000	0.000	0.000	0.000	1.000
Savings	1,954	0.178	0.383	0.000	0.000	0.000	0.000	1.000
Female	2,000	0.547	0.498	0.000	0.000	1.000	1.000	1.000
Age	2,000	47.312	16.484	18.000	33.000	46.000	62.000	87.000
Partner	1,994	0.644	0.479	0.000	0.000	1.000	1.000	1.000
Household size	1,978	3.084	1.571	1.000	2.000	3.000	4.000	12.000
Education: high school	1,998	0.167	0.373	0.000	0.000	0.000	0.000	1.000
Education: prof.	1,998	0.364	0.481	0.000	0.000	0.000	1.000	1.000
Education uni.	1,998	0.468	0.499	0.000	0.000	0.000	1.000	1.000
Income: very low	1,905	0.161	0.367	0.000	0.000	0.000	0.000	1.000
Income: low	1,905	0.457	0.498	0.000	0.000	0.000	1.000	1.000
Income: medium	1,905	0.271	0.445	0.000	0.000	0.000	1.000	1.000
Income: high	1,905	0.111	0.314	0.000	0.000	0.000	0.000	1.000
Emergency expense	2,000	0.651	0.477	0.000	0.000	1.000	1.000	1.000
Unemployed	1,989	0.120	0.325	0.000	0.000	0.000	0.000	1.000
Retired	1,989	0.301	0.459	0.000	0.000	0.000	1.000	1.000
Student	1,989	0.017	0.128	0.000	0.000	0.000	0.000	1.000
Housekeeping	1,989	0.039	0.194	0.000	0.000	0.000	0.000	1.000
City type: village	2,000	0.325	0.468	0.000	0.000	0.000	1.000	1.000
City type: small	2,000	0.220	0.415	0.000	0.000	0.000	0.000	1.000
City type: medium	2,000	0.230	0.421	0.000	0.000	0.000	0.000	1.000
City type: large	2,000	0.225	0.418	0.000	0.000	0.000	0.000	1.000
Ukrainian language	2,000	0.479	0.500	0.000	0.000	0.000	1.000	1.000
Risk: low	1,905	0.412	0.492	0.000	0.000	0.000	1.000	1.000
Risk: average	1,905	0.318	0.466	0.000	0.000	0.000	1.000	1.000
Risk: above average	1,905	0.163	0.369	0.000	0.000	0.000	0.000	1.000
Risk: high	1,905	0.108	0.311	0.000	0.000	0.000	0.000	1.000
Longterm plans	1,977	0.403	0.491	0.000	0.000	0.000	1.000	1.000
Commitment device	1,745	0.215	0.411	0.000	0.000	0.000	0.000	1.000
Longterm discount	1,007	0.773	0.325	0.056	0.717	0.774	0.857	4.642
Present bias	1,007	0.268	0.959	0.00000	0.013	0.120	0.200	18.016
Rate exp.: don't know	2,000	0.225	0.418	0.000	0.000	0.000	0.000	1.000
Rate exp.: positive	2,000	0.106	0.308	0.000	0.000	0.000	0.000	1.000
Rate exp.: negative	2,000	0.236	0.424	0.000	0.000	0.000	0.000	1.000
Rate exp.: crisis	2,000	0.434	0.496	0.000	0.000	0.000	1.000	1.000
Populism	2,000	84.209	15.277	0.000	78.100	87.500	96.900	100.000
Trust	2,000	0.527	0.499	0.000	0.000	1.000	1.000	1.000
Anti-establishment	2,000	1.150	0.542	0.000	0.800	1.000	1.300	3.000
Liberalism	2,000	1.441	0.650	0.000	1.000	1.250	2.000	3.000
Exclusion LGBT	2,000	0.558	0.497	0.000	0.000	1.000	1.000	1.000
Exclusion race	2,000	0.080	0.271	0.000	0.000	0.000	0.000	1.000

effects of the COVID-19 pandemic suggests that only about 23% of Ukrainians have savings that can last for 3 months or longer (InfoSapiens 2020).[8] Given the evidence, it appears that our figure is reasonably close to the fraction of the population with a meaningful amount of savings. Still, given the uncertainty, we use *savings* variable only in the robustness analysis.

Our main reason for using the alternative measure of savings is to make sure that the results are not driven by distrust in banks. Using *savings*, which includes both bank and non-bank savings, allows separating the decision to make savings from the decision to keep these savings in the banking system. However, since Ukrainians lag behind the world in both bank savings and broad savings, we expect that the results will not be markedly different from the results when the alternative measure of savings is used. Indeed, when compared to the rest of the World, specifically to 144 countries for which data in the Findex Global database is available for 2017, Ukraine is at the 31st percentile (27th in 2014) for the fraction of savers and at the 43rd percentile (26th in 2014) for the share of people who save using financial institutions. If we take the average between the 2014 and 2017 data, the share of those who save and save with financial institutions are 40.0% and 10.3%, while the average for 144 countries is 51% and 22% correspondingly.

Socio-Economic Characteristics

First, we control for the gender and age of the respondent. Since the literature suggests a non-linear link between savings and age, we control for both *age* and *age squared* in all specifications.

In addition to other standard socio-economic characteristics such as *household size*, *partner*, and *education* (general secondary or below, professional, university), we use two proxies of respondent's income. In addition to *income* (very low, low, medium, high) we also control for *emergency expense* which is a binary variable that reflects the possibility to come up with an emergency expense of UAH 3000 (about EUR 100) without borrowing or selling assets. Since 65.2% of respondents can cover emergency expense but only 11.7% have bank savings, we treat *emergency expense* as a proxy of available financial resources, not as a proxy of savings. Indeed, the correlation between *emergency expense* and *income* is 0.30, while it is 0.15 between *emergency expense* and *bank savings* (correlation between *income* and *bank savings* is 0.2). As a robustness check, we run the main regression specification without including *emergency expense*.

Since our main proxy for an individual's income may suffer from income underreporting, especially at the higher end of the income distribution, we use an alternative measure of income, *income level* in the robustness analysis. This variable measures what an individual can afford to buy, ranging from not having enough money to buy food to be able to make any purchases at any time. It is important to note, that this variable does not necessarily measure income alone, but could be better interpreted as a combination of measures of income and wealth, and therefore could be more correlated with savings. However, the data does not support this caveat as the correlation coefficient between *income level* and *income* is 0.53 in contrast to 0.16 for the correlation between *income level* and *bank saving*. Still, since *income level* is an indirect measure of income, we use this variable instead of *income* only in the robustness analysis.

Finally, we also control for the respondent's *employment status* (employed, unemployed, retired, student, housekeeping), *city type* (village, small, medium, or large city), *region* (24 Oblasts and Kyiv city), and *Ukrainian language*, a binary variable that takes the value of 1 if

a respondent had chosen Ukrainian and as the language of the interview, and 0 if the respondent had chosen Russian. In our sample, about 48% of the respondents chose Ukrainian as the language of the interview. This figure substantially underestimates the fraction of Ukrainian speakers.[9] Therefore, we believe that variable *Ukrainian language* measures a very strong preference for the Ukrainian language, and, thus, can be used as a proxy for cultural characteristics.

Expectations, Preferences, and Attitudes

The fact that the share of the population with bank savings is consistent through time (Section 3.2.1) gives us confidence that our results are unlikely to be affected by any time-specific circumstances. However, as an extra precaution, we control for the respondent's *real interest rate expectations*. This variable captures four different opinions regarding the expected real deposit rates in the next year: positive, negative, don't know, and expect a financial crisis. It is likely that these opinions capture respondents' economic expectations. Thus, controlling for *real interest rate expectations* should ensure that our results are not affected by time-specific factors. Indeed, if a respondent expects that real deposit rates should be negative (i.e., the return on bank deposits would not compensate for the inflation), such a respondent is less likely to hold savings in a bank.

Then, we control for risk[10] and time preferences. First, we control for *risk taking*, which measures attitudes toward financial risks (low, average, above average, and high). The variable is constructed similarly to the one used in the European Central Bank's Household Finance and Consumption Survey and represents a response to the following question: "Which of the following statements comes closest to describing the amount of financial risk that you are willing to take when you save or make investments"?. The European Central Bank Survey provides four response options: (1) Take substantial financial risks expecting to earn substantial returns; (2) Take above average financial risks expecting to earn above average returns; (3) Take average financial risks expecting to earn average returns; and (4) Not willing to take any financial risk. In the original survey conducted by CES (from which take our data), the order of the responses was reversed so the higher level corresponds to greater risk taking.

It is important to note that variable *risk taking* describes the attitude to risk taking in the financial domain. At the same time, it is likely that saving behavior responds better to the general level of risk-taking. Unfortunately, we do not have such a proxy in our data. However, a brief look at the World Values Survey (WVS) data suggests that our variable *risk taking* describes general risk attitude quite well. For instance, WVS data from the 6th wave (2010–2014) shows that about 70% of Ukrainians describe their general attitude toward risk as low. In comparison, in our data, the share of respondents with similar attitudes (but in financial domain) is at the level of 73%. The existing empirical literature also gives us the confidence to proceed. While the academic discussion about the differences in risk taking across different domains is not conclusive, the authors of the most recent and authoritative study on cross-country differences in preferences (including risk preferences), Falk et al. (2018), conclude that the risk preferences are highly correlated across different domains and results from the common latent psychological trait.

Secondly, we follow Wang, Rieger, and Hens (2016) and calculate measures of both time-consistent (*longterm discount*) and quasi-hyperbolic discounting (*present bias*). However, the questions used to estimate the discount rates have a high non-response rate: only 1007

out of 2000 respondents gave a meaningful response to these questions. Therefore, in the main specification, we use an alternative measure of time preferences, whether an individual makes *longterm plans*. We investigate the effect of *longterm discount* and *present bias* in a separate estimation. However, not all answers to the discount questions were reasonable, producing clear outliers in both *longterm discount* and *present bias*. In order to maximize the sample size, we re-code these answers instead of dropping them from the sample.[11] First, for the respondents who said that they would prefer 1000 UAH (approx. 30 euro) today over any amount in 1 or 10 years, we impute the maximum value from the sample. Second, for the people who answered that they would prefer less money in the future than today, we assume that they are indifferent between receiving money today or in the future and impute 1000 UAH.

In addition, we control for an individual's willingness to use a *commitment device*. In our data, it refers to a willingness to use a savings account from which money cannot be withdrawn prematurely. While previous studies rarely if ever control for such preference, such a methodological choice is driven by the data availability. The willingness to lock in on a decision using a commitment device can be understood as a proxy for an individual's awareness of his or her *present bias* and willingness to act on it. Therefore, the ability to control for *commitment device* is a useful addition to both our main and alternative measures of time preferences.

Finally, we also control for *trust* that captures a response to a question if most people can be trusted. In our framework, *populism* captures mistrust in the economic system, not the level of trust to other people. Since these traits can be correlated, it is important to distinguish between different types of trust and, thus, control for *trust* to others.

Economic Populism

Main measures of Economic Populism. As explained in the Introduction we define economic populism as a simplification of economic problems and disregard for the limits of economic policy such as costs, unintended consequences, or effectiveness. To the best of our knowledge, none of the existing studies has developed a measure of economic populism. Here, we present a measure of economic populism and show that it is highly correlated with many of the predictors of the standard political populism measures.

We proxy economic populism via the support for economic policies that can be characterized as populist in the Ukrainian context. These policies are: (1) price controls on medicines and food; (2) raising the minimum pension by 3.3 times; (3) reducing retirement age; (4) capping the maximum salary to the equivalent of 5 minimum wages; (5) ordering employers to increase a salary up to $ 1,000; (6) directing the natural gas produced in Ukraine toward the needs of the population; (7) reducing the natural gas price by half; (8) guaranteed employment for all citizens.

These policies were selected from a set of the actual election manifestos issued by the main candidates in the last presidential elections as policies that are hardly feasible to implement in the Ukrainian context and are likely to result in welfare losses in the long run when implemented (see CES (2019), a report by the economic policy think tank Center for Economic Strategy). While support for these policies may be rational for an individual with incomplete information and an unreasonably high discount rate, it is inconsistent with welfare maximization for a fully informed individual. Therefore, our approach is consistent

with our definition of economic populism as a simplification of economic problems and disregard for the limits of economic policy.

The main proxy for economic populism in this study is an additive index based on the degree of support for eight populist policies. The support for each policy is coded on a 0–1 scale, where each 0.25 step represents an increase in the agreement that a policy would have a positive effect on the household's well-being, from 0 - fully disagree to 1 - fully agree. Thus, *populism* is a sum of individuals' responses. We then normalize the resulting index on a scale of 0 to 100.[12]

Then, we use two additional proxies of economic populism. First, we use principal component analysis to reduce the dimensionality of the data (*populism PCA*). Secondly, we define economic populism not simply as support for populist economic policies but at the same time as a simultaneous rejection of mainstream economic policies. These policies are: (1) increasing the pension age; (2) introducing the second pillar pension system; (3) increasing gas production in Ukraine and eventually stopping importing gas; (4) paying utilities subsidies in cash rather than in kind. Variable *populism broad*, then, is constructed similarly to *populism* when points are added for support of populist policies defined above and rejection of the above-mentioned mainstream policies.

Additional Measures of Economic Populism

In order to separate economic populism from the broader phenomenon, we regress our three measures of economic populism, first, on the set of cultural covariates that have been shown to affect the standard measures of political populism, then additionally on a range of socio-economic characteristics and finally on the set of controls we use in our main specifications.[13] The purpose of this exercise is twofold. First, we observe whether our measures of populism correlate with these variables in a manner predicted by literature on populist attitudes. Second, we use the residuals from these regressions as additional proxies of economic populism. Therefore, we create a total of 15 measures of populist attitudes.

As described above, we create *populism*, *populism PCA*, *populism broad*. Then, for each of these measures, we run 4 different regression specifications and take residuals from each of them. The residuals from these regressions are then used as proxies of economic populism.

First, we regress these three main proxies of economic populism (*populism*, *populism PCA*, *populism broad*) on a set of cultural factors and take residuals to get *populism II*, *populism PCA II*, *populism broad II*. The set of cultural variables includes positioning on an economic liberalism scale, attitudes toward the establishment (acceptability of corruption and a preference for the new faces in public office regardless of the level of experience), exclusion attitudes toward LGBT, and exclusion attitudes toward people of a different race.

Secondly, we regress *populism*, *populism PCA*, and *populism broad* on (a) the set of cultural variables discussed above and (2) a set of socio-economic characteristics that include age, gender, education, household size, marital status (having a partner), income, an additional proxy of income (*emergency expense*), employment status, city type, and a language preference. This is the same set of socio-economic characteristics we future use as predictors of the decision to save. Then, we take residuals from these regressions and get *populism III*, *populism PCA III*, and *populism broad III*.

Third, we regress *populism*, *populism PCA*, and *populism broad* on (1) the set of cultural variables; and (2) all of the variables in specification 1.3 from Table 2 that we use to predict

Table 2. Regression Results: Main specification.

	Dependent variable:			
	Bank Savings Model 1.1	Bank Savings Model 1.2	Bank Savings Model 1.3	Bank Savings Model 1.4
Economic populism	0.976*** (0.004)	0.988*** (0.005)	0.988** (0.005)	0.989 (0.007)
Female		0.678** (0.115)	0.652** (0.123)	0.664* (0.165)
Age		0.946* (0.030)	0.933** (0.033)	0.911* (0.047)
Age squared		1.001* (0.0003)	1.001** (0.0004)	1.001** (0.001)
Partner		0.818 (0.154)	0.711* (0.146)	0.517** (0.142)
Household size		0.873** (0.058)	0.918 (0.068)	0.875 (0.096)
Education: prof.		1.598 (0.506)	1.691 (0.612)	1.368 (0.657)
Education uni.		2.057** (0.633)	2.056** (0.726)	1.736 (0.797)
Income: low		2.771*** (0.978)	2.485** (0.969)	5.247** (3.571)
Income: medium		4.905*** (1.899)	3.799*** (1.638)	13.257*** (9.753)
Income: high		7.201*** (2.959)	6.246*** (2.895)	17.948*** (13.736)
Can cover emerg.		2.324*** (0.514)	2.061*** (0.504)	2.227** (0.745)
Unemployed		0.806 (0.256)	0.693 (0.248)	0.981 (0.411)
Retired		1.739** (0.474)	1.760* (0.521)	1.108 (0.517)
Student		1.199 (0.664)	1.134 (0.773)	0.904 (0.801)
Housekeeping		0.884 (0.481)	0.978 (0.558)	0.900 (0.626)
City: small		1.399 (0.366)	1.563 (0.433)	1.786 (0.633)
City: medium		1.567* (0.393)	1.671* (0.459)	1.051 (0.387)
City: large		2.273*** (0.657)	2.008** (0.640)	2.210* (0.968)
Ukrainian language		0.826 (0.156)	0.773 (0.156)	0.721 (0.206)
Rate exp.: negative			1.228 (0.301)	1.358 (0.436)
Rate exp.: crisis			0.404*** (0.104)	0.568* (0.196)
Rate exp.: don't know			0.243*** (0.095)	0.278** (0.182)
Risk: average			1.674** (0.378)	2.277*** (0.737)
Risk: above average			1.491 (0.406)	1.686 (0.636)
Risk: high			1.229 (0.420)	1.404 (0.650)
Longterm plans			1.004 (0.180)	0.999 (0.247)
Commitment device			1.587** (0.317)	1.854** (0.497)
Trust			1.391* (0.251)	1.587** (0.387)
Present bias				1.166* (0.083)
Longterm discount				0.921 (0.490)
Constant	0.329* (0.222)	0.063** (0.072)	0.063** (0.079)	0.035* (0.065)
Adjusted Pseudo R2	0.023	0.09	0.131	0.116
Observations	1,970	1,871	1,619	926

Note: *$p<.1$; **$p<.05$; ***$p<.01$.

The table provides odds ratios with robust odds ratio adjusted standard errors from the logistic regression. The dependent variable is bank savings, region fixed effects are used in all specifications.

our main dependent variable (*bank savings*). This set of variables also includes all socio-economic characteristics that we use in the previous step. Then, we take residuals from these regressions and get *populism IV*, *populism PCA IV*, and *populism broad IV* correspondingly.

Forth, we regress our three main measures of economic populism (*populism*, *populism PCA*, and *populism broad*) on a set of cultural variables as well as on all the variables in the specification 1.4 from Table 2 and get *populism V*, *populism PCA V*, *populism broad V*.

As a result, we have $3 + 3 \times 4 = 15$ measures of economic populism, i.e., three main measures of economic populism and 12 additional measures constructed as residuals from the four steps above.

We normalize all measures of economic populism on a scale of 0 to 100. The detailed descriptive statistics for all measures is presented in the Online Appendix (Section OA. 2).

Validation

Next we address the issue of the validity of our three main measures of economic populism.

First, we explore if these measures correlate with the individuals' attitudes and socio-economic characteristics in line with the results from the existing empirical literature. We find that in line with expectations *populism*, *populism PCA*, and *populism broad* have a strong negative correlation with a proxy of liberalism, and a positive correlation with anti-establishment and exclusion attitudes. Similarly, we find that all three main measures of economic populism correlate with socio-economic characteristics in a logical and predictable manner. For instance, these measures have a positive association with the proxies of an individual's economic vulnerability. Please refer to the Online Appendix Section OA.1 in the accompanying Online Appendix for a detailed discussion.

In addition, we show that the support for populist economic policies in Ukraine is higher in (1) declining cities as measured by the intensity of nighttime illumination and the city area; (2) regions that experienced the decline in a relative ranking of GDP per capita; and (3) to the East of the long-gone historical border between the Hapsburg and Russian empires that crosses modern Western Ukraine. These findings are rather expected given the existing literature on populist and related attitudes. Please see Section AO.3 in the accompanying Online Appendix for future discussion. These findings provide additional support for our economic populism measure.

Empirical Strategy

In our main analysis, we use logistic regression with *bank savings* as a dependent variable. The baseline regression model includes the following sets of controls. Socioeconomic characteristics include *age*, *female*, *education*, *household size*, *partner*, *income*, *emergency expense*, *employment status*, *Ukrainian language*, *city type* and *region*. Preferences and behavioral traits include *risk taking*, *longterm plans*, *commitment device*, *longterm discount*, and *present bias*. Economic expectations are captured with *real interest rate expectations*. Finally, attitudes include *populism* and *trust*.

In addition, in the further analysis (Section 4.2), we use 15 different measures of populism. First, we use three differently calculated indices of populism: *populism*, *populism PCA* and *populism broad*. Then, to address the issue of endogeneity and separate the pure economic populism effect from the populism, defined more broadly we substitute these variables with the normalized residuals as explained in the section above.

We perform the following steps to ensure the robustness of our main results. First, we form an alternative specification with the different proxy for income (*income level* instead of *income*). We do so in order to avoid income underestimation, a standard issue with survey data. We also run our main models without including *emergency expense*. However, our main results are not affected and, thus, we do not report these estimates for brevity. Secondly, we use *savings* instead of *bank savings* variable to explore whether the independent variables influence saving behavior per se or just whether individuals trust their savings to the banking system. Finally, we perform these two changes simultaneously. We perform the robustness tests both on our main model, as well as the models, where we control for *longterm discount* and *present bias*.

Results

Main Specification

We regress our main dependent variable *bank savings* first solely on *populism* (Model 1.1), then adding socio-economic variables (Model 1.2), preferences, attitudes, and expectations (Model 1.3) and additional measures of time preferences (Model 1.4). We consider Model 1.3 as our main specification. While Model 1.4 contains traditional measures of time preferences, it also has a much smaller sample driven by a large number of missing data in the questions used to calculate *longterm discount* and *present bias* variables. The results are reported in Table 2.

Socio-Economic Predictors of Savings

The results show that consistently with the previous literature (Fernández-López et al. 2015; Fisher 2010) there is a significant gender gap in bank savings, with females being significantly less likely than males to have *bank savings*. This effect is relatively large, with men being roughly 1.5 times more likely to have a savings account than women and this effect remains consistently significant across different models.

We can also observe a non-linear relationship between *bank savings* and *age* where we see a hint for a U-shaped relationship between age and savings. Though this result is statistically significant in all specifications, the magnitude is relatively small. As mentioned previously, this seems consistent with the literature on savings behavior in Eastern Europe, such as Gregory, Mokhtari, and Schrettl (1999), Beckmann et al. (2013).

The variables measuring household composition (*household size* and *partner*) give us some suggestive evidence of the negative relationship between the size of the household and the propensity to have *bank savings* though such results are not robust to different specifications.

Education has a significant and large effect on the propensity to have *bank savings*. While there is no statistically significant difference in the propensity to have *bank savings* between individuals with general secondary and professional education, those who have university education are roughly 2 times more likely to have *bank savings* than those who only have general secondary education. Those with higher education may have a higher level of financial literacy and therefore find it easier to navigate the banking system and open a savings account [14] or maybe better in managing their personal finances, spending less, and therefore having more money to save.

Income has a major effect on the probability of having *bank savings*, both measured as monthly household income (*income*) and as the ability to cover an *emergency expense*. People with low *income* are around 2.5 to 5.2 times more likely to have *bank savings* compared to people with very low *income*, while those with medium and high levels of *income* are roughly 4–13 times and 6.2–17.9 times respectively more likely to have *bank savings* compared to those with very low *income*. Similarly, individuals who are able to cover an *emergency expense* are roughly twice as likely to have *bank savings* compared to those who can't. This effect remains significant and roughly of the same magnitude in all models. This is not surprising as the literature has consistently shown the existence of a significant positive relationship between income and saving behavior (Browning and Lusardi 1996; Perry and Morris 2005; Yuh and Hanna 2010).

Though there is no statistically significant difference in *bank savings* between employed and the unemployed, students or housekeepers, the retirees are somewhat (around 1.7 times) more likely to have *bank savings* compared to those employed. This could be due to the fact that many retirees receive their pensions through the banking system and therefore could be more familiar with it and more willing to trust their savings to it (again, this interpretation is supported in the regression with *savings* as dependent variable (Section 4.3).

The propensity to have *bank savings* also increases linearly with the *city type*. Those who live in medium cities are roughly 1.6 to 1.7 more likely to have *bank savings* compared to those who live in rural area, while those who live in large cities are around 2 times more likely. While the effect of medium cities is significant in all except for the last model, the effect of large cities is significant throughout the models. This effect could be explained by a better developed financial infrastructure and easier access to banks in medium or large cities as compared to rural areas and small cities. However, the difference between cities and villages remains statistically significant and of similar magnitude when general *savings* rather than *bank savings* is used as a dependent variable (Section 4.3). Another potential explanation is that *city size* partially captures the differences in the income and wealth between individuals who live in cities and villages. Individuals who live in smaller towns and villages are on average poorer than those who live in large cities and therefore may be less able to make savings. If, as discussed previously, our measure of income is imperfect and is subject to measurement error, *city size* may provide additional information on income.

Preferences, Attitudes and Expectations

The results show that risk preferences are non-linearly correlated with the propensity to have *bank savings*. Those who have an average level of *risk taking* are roughly 1.7 to 2.3 times more likely to have *bank savings* compared to those with a low level of *risk taking*. Those with above-average or high levels of *risk taking*, however, are not significantly more likely to have bank savings than those with a low level of *risk taking*. There could be different reasons for the absence of *bank savings* for those who have low and high levels of *risk taking*. On one hand, those with a high level of *risk taking* could be not making any savings at all due to their willingness to take on risks, including the risk of an unexpected future financial shock, thus being less likely to have *bank savings*. On the other hand, those with a low level of *risk taking* could be unwilling to take the risk of trusting their savings to the banking system, given the prevalence of financial crises in Ukraine.[15]

Surprisingly, our results show that making *longterm plans* does not have a significant effect on the individual's propensity to make savings. One possible explanation is that as compared to the implicit measure of time preferences through calculating discount rates, answers to the questions on making *long term plans* could be subject to social desirability bias when the respondents do not answer the question honestly but answer in line with what they think is acceptable by society and long term planning could be considered to be a desirable thing. In model 1.4, we also add measures of time preferences: both time-consistent *longterm discount* and quasi-hyperbolic *present bias*. Note that due to the high non-response rate on the questions used to calculate these variables, our sample for this model is reduced almost by half. It is also important to point out that the resulting subsample is not representative of the Ukrainian population as it is significantly different in a number of socio-economic characteristics. In addition, this sample could be also different in some of the unobservable characteristics, such as financial literacy, as individuals who failed to provide an answer to the discount question could find it more difficult to produce mental calculations to answer the discount questions. Nevertheless, while it is important to keep in mind that the results from this subsample may not be directly comparable to the rest of the models, they may still be informative. The model shows that while *longterm discount* is statistically insignificant, *present bias* variable has a positive effect on the propensity to have *bank savings*. Since the higher values of *present bias* imply that an individual is less present biased, these results show that as expected, less present biased individuals are more likely to have *bank savings*.

People who choose a *commitment device* (a savings account from which the money could be withdrawn only after an application, over savings account without such restrictions) are somewhat more likely to have *bank savings* (around 1.6 to 1.9 times as those who did not choose a commitment device). These results are statistically significant in all models where *commitment device* is included. This is expected: people who choose a *commitment device* are likely to be aware of their present biases and are taking measures to prevent themselves from overspending and thus are more successful in making savings.

Real interest rate expectations also have an effect on bank savings. Somewhat surprisingly, those who expect negative real interest rates are not any less likely to have bank savings than those who expect positive real interest rates. Those, however, who expect a financial crisis and therefore do not think that interest rates are an important factor in deciding on whether to have *bank savings* are 1.8 to 2.5 times less likely to have *bank savings* than those who expect positive real interest rate. Those who do not know whether real interest rates are positive or negative are even less likely to have *bank savings*: they are 3.6 to 4.1 times less likely to have bank savings compared to those who expect positive real interest rate.

Finally, the results show that trust in others has a statistically significant effect on having *bank savings*, with those who are trusting others being 39%-59% more likely to have *bank savings*. These results can be interpreted as suggesting that those who are more open-minded and more trusting could be more easily persuaded to open a savings account.

Economic Populism

Populism maintains a significant and negative effect on the propensity to have *bank savings* in all, except for the last specification. A single point decrease in the *populism* index leads to the increase in the probability of having *bank savings* of between 1 and 2.5%. Though the

magnitude of the effect reduces when more covariates are added, as mentioned above, it remains statistically significant in 3 out of 4 specifications.[16] The lack of statistical significance in the last model could be driven, first, by much smaller sample size, and secondly by a non-representative sample.

These results suggest that *populism* captures an additional dimension of individual attitudes, not explained by *education*, *income* or *trust*. People who score high on *populism* index could feel disillusionment with the mainstream economic policies in particular and economic institutions in general, thus opting for unrealistic alternatives. This may lead to distrust toward all mainstream economic institutions and even the economic system in general, thus not being willing to engage in it by making savings. An alternative interpretation could be that *populism* variable captures general anti-establishment attitudes and mistrust in the mainstream institutions, rather than distrust toward the economic institutions in particular. In the next section, we try to disentangle these two effects as well as distinguishing the effect of the "pure" economic populism from the effect of its covariates by using the residuals from the regression of *populism* indices on a number of controls.

Alternative Measures of Economic Populism

The main specification shows that support of *populism* is strongly and negatively correlated with the propensity to have *bank savings*. However, the index used in the main specification is an additive index, which may not fully capture the relative importance of different dimensions. The index used in the main specification also captures absolute support of populist policies rather than relative support (i.e. if an individual is more likely to support populist policies than non-populist ones). Therefore, here, we add two alternative measures, outlined in the section 3.2.4: *populism PCA* and *populism broad*.

In addition, it is unclear, what dimension of populism these variables captures: general dissatisfaction with the establishment, and thus supporting the non-mainstream economic policies simply as an act of protest, whether these beliefs are reflecting their genuine ideological position, whether such views are correlated with some feelings of resentment toward minority groups, such as LGBT and racial minorities, or whether this is the effect of "pure" populism.

To separate these effects and ensure that *populism* reflects the "pure" populism effect, as discussed in Sections 3.2.4 and 3.3, we use residuals from the regression of populism measures on 4 sets of control variables. We then regress *bank savings* on the residuals from this regression and use all other control variables that were used in the main models (model 1.3 and model 1.4) to separate the effect of "pure" economic populism.

In Table 3 we present the odds ratios on various measures of populist attitudes. The results show that the *populism* retains a negative and statistically significant effect on the presence of *bank savings* in 11 out of 15 specifications.[17] First, two alternative measures of *populism*: *populism PCA* and *populism broad* are negative and statistically significant and of similar magnitude: a one-point decrease in any of the three indices increases the probability to have *bank savings* by about 1%. When it comes to the indices that are based on the residuals, we expect these measures to have a lower effect on the probability to have *bank savings* if the variables that the *populism* indices were regressed on to generate the residuals are correlated with the probability to have *bank savings*. Nevertheless, we observe that the effect of the populism indices based on the residuals is of a similar magnitude as the original

Table 3. Regression Results: Alternative measures of economic populism.

	Dependent variable:				
	Bank Savings Model 2.1	Bank Savings Model 2.2	Bank Savings Model 2.3	Bank Savings Model 2.4	Bank Savings Model 2.5
Populism	0.988** (0.005)				
Populism II		0.990* (0.006)			
Populism III			0.988** (0.006)		
Populism IV				0.988** (0.006)	
Populism V					0.992 (0.007)
Adjusted Pseudo R2	0.131	0.129	0.13	0.13	0.114
Controls Main 1.3	YES	YES	YES	YES	NO
Controls Main 1.4	NO	NO	NO	NO	YES
Observations	1,619	1,619	1,619	1,619	926
	Dependent variable:				
	Bank Savings Model 2.6	Bank Savings Model 2.7	Bank Savings Model 2.8	Bank Savings Model 2.9	Bank Savings Model 2.10
Populism PCA	0.987** (0.005)				
Populism PCA II		0.989* (0.006)			
Populism PCA III			0.987** (0.006)		
Populism PCA IV				0.988** (0.006)	
Populism PCA V					0.992 (0.007)
Adjusted Pseudo R2	0.132	0.129	0.13	0.13	0.114
Controls Main 1.3	YES	YES	YES	YES	NO
Controls Main 1.4	NO	NO	NO	NO	YES
Observations	1,619	1,619	1,619	1,619	926
	Dependent variable:				
	Bank Savings Model 2.11	Bank Savings Model 2.12	Bank Savings Model 2.13	Bank Savings Model 2.14	Bank Savings Model 2.15
Populism broad	0.986** (0.007)				
Populism broad II		0.990 (0.007)			
Populism broad III			0.990* (0.006)		
Populism broad IV				0.990* (0.006)	
Populism broad V					0.994 (0.008)
Adjusted Pseudo R2	0.13	0.129	0.129	0.129	0.113
Controls Main 1.3	YES	YES	YES	YES	NO
Controls Main 1.4	NO	NO	NO	NO	YES
Observations	1,619	1,619	1,619	1,619	926

Note: *$p<.1$; **$p<.05$; ***$p<.01$.

The table provides odds ratios with robust odds ratio adjusted standard errors from the logistic regression. The dependent variable is bank savings, region fixed effects are used in all specifications. All models include the same controls as in Table 2 model 1.3 or Table 2 model 1.4.

populism indices. This is the case with indices generated based on the residuals, from regression which includes solely the cultural variables (*anti-establishment index*, *liberalism index* and exclusion attitudes), indices generated based on the residuals from regressions which include both cultural and socio-economic variables and based on the regressions which include all the control variables from the main specification (Table 2, Model (1.3)). This shows that *populism* influences *bank savings* not solely through its correlation with other attitudes such as *liberalism*, *anti-establishment* or *exclusion* attitudes, or the correlation with other socio-economic variables or preferences variables, but that there is a distinct idiosyncratic component of "pure" economic populism, which is reflecting distrust toward mainstream economic policies and seeking easy and unrealistic economic policies that affect the probability of having *bank savings*.

When it comes to the residuals, based on the regressions, which include all the controls discussed above but also measures of time preferences: *longterm discount* and *present bias* we can observe that in all cases these measures of *populism* are insignificant. However, the original *populism* measure was also insignificant in the regression where *longterm discount* and *present bias* were controlled for. It is likely the case due to the limited and non-representative sample rather than the effect of *populism* being driven by its correlation with time preferences.

Robustness Analysis

To check the robustness of our main specification, we perform several robustness tests. First, we use a different measure of income. Secondly, we use *savings* rather than *bank savings* as a main dependent variable. Finally, we include both *savings* rather than *bank savings* and *income level* rather than *income*. We perform these robustness checks both with Model 1.3 and Model 1.4 from Table 2. The results of robustness analysis are presented in Table 4 and show that the main specification is generally robust to these changes: coefficients on most of the variables of interest remain statistically significant and of a similar magnitude.

One notable exception is the coefficient on the *female* variable becoming insignificant in the fourth and fifth specifications. As mentioned above, the *income level* could be better in assessing the real level of income of individuals with high incomes. Thus, these results show that being able to control for the income of the individuals at the top of the income distribution, makes gender less statistically significant in explaining savings (especially all savings as compared to bank savings only). This indicates that the gender gap in savings could be primarily driven by the income gap, as opposed to the gap in financial inclusion or financial literacy.

Another difference is the high level of *risk taking* becoming statistically significant in the models where *savings* is used as a dependent variable. The results show that individuals with a high level of *risk taking* are roughly twice more likely to have *savings* as compared to those with a low level of *risk taking*. Note that in the main specification the effect of high risk-taking was also somewhat positive, though of a much smaller magnitude and not statistically significant. This result could be driven by the way the *savings* variable is constructed. As noted above, we do not observe all individuals who have non-bank savings just those who say having non-bank savings is the most important reason for not having bank savings. The main reason for not having *bank savings* could be correlated with *risk taking*, with

Table 4. Regression Results: Robustness check.

	Dependent variable:				
	Bank Savings	Bank Savings	Savings	Savings	Savings
	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5
Economic populism	0.988** (0.005)	0.987* (0.006)	0.984*** (0.005)	0.985*** (0.004)	0.983*** (0.006)
Female	0.646** (0.124)	0.671* (0.169)	0.740* (0.119)	0.787 (0.127)	0.749 (0.156)
Age	0.935* (0.033)	0.924 (0.048)	0.952 (0.031)	0.954 (0.030)	0.957 (0.044)
Age squared	1.001** (0.0004)	1.001* (0.001)	1.001 (0.0003)	1.001 (0.0003)	1.001 (0.001)
Partner	0.794 (0.162)	0.607* (0.165)	0.794 (0.143)	0.897 (0.158)	0.830 (0.193)
Household size	0.940 (0.064)	0.907 (0.089)	0.902* (0.056)	0.912 (0.052)	0.872* (0.068)
Education: prof.	1.792* (0.656)	1.110 (0.524)	1.340 (0.388)	1.294 (0.370)	0.850 (0.307)
Education uni.	2.394** (0.870)	1.613 (0.739)	1.911** (0.539)	1.961** (0.548)	1.172 (0.405)
Can cover emerg.	1.996*** (0.485)	2.315*** (0.788)	2.536*** (0.535)	2.446*** (0.509)	2.544*** (0.695)
Unemployed	0.544* (0.186)	0.673 (0.269)	0.811 (0.222)	0.729 (0.184)	0.971 (0.294)
Retired	1.599 (0.479)	0.831 (0.383)	1.622* (0.424)	1.472 (0.383)	1.094 (0.406)
Student	1.013 (0.654)	0.731 (0.602)	1.406 (0.809)	1.372 (0.747)	1.299 (0.827)
Housekeeping	0.773 (0.474)	0.653 (0.472)	0.646 (0.356)	0.491 (0.287)	0.501 (0.355)
City: small	1.638* (0.452)	1.786 (0.628)	1.420 (0.340)	1.539* (0.363)	1.331 (0.409)
City: medium	1.836** (0.504)	1.222 (0.439)	1.655** (0.387)	1.942*** (0.453)	1.373 (0.405)
City: large	2.249*** (0.708)	2.625** (1.123)	1.959** (0.541)	2.087*** (0.563)	1.786* (0.623)
Ukrainian language	0.661** (0.129)	0.624* (0.172)	0.951 (0.172)	0.803 (0.143)	0.727 (0.181)
Income lev.: medium	1.547* (0.345)	2.134** (0.687)		2.002*** (0.381)	2.790*** (0.748)
Income lev.: high	4.016*** (1.216)	4.795*** (2.006)		3.941*** (1.055)	5.938*** (2.126)
Income: low			2.365** (0.795)		
Income: medium			3.801*** (1.372)		
Income: high			5.059*** (1.990)		
Rate exp.: negative	1.225 (0.293)	1.343 (0.429)	1.296 (0.286)	1.359 (0.292)	1.514 (0.427)
Rate exp.: crisis	0.375*** (0.095)	0.513* (0.176)	0.446*** (0.101)	0.430*** (0.095)	0.532** (0.152)
Rate exp.: don't know	0.222*** (0.087)	0.286** (0.184)	0.340*** (0.109)	0.315*** (0.100)	0.472 (0.201)
Risk: average	1.773*** (0.399)	2.284*** (0.742)	1.923*** (0.383)	1.910*** (0.372)	2.415*** (0.680)
Risk: above average	1.588* (0.430)	1.856* (0.679)	2.003*** (0.489)	2.040*** (0.491)	2.484*** (0.795)
Risk: high	1.347 (0.451)	1.731 (0.798)	1.834** (0.504)	1.828** (0.497)	2.135** (0.795)
Longterm plans	0.928 (0.167)	0.818 (0.205)	0.983 (0.151)	0.923 (0.141)	0.951 (0.192)
Commitment device	1.704*** (0.334)	1.981*** (0.512)	1.636*** (0.286)	1.708*** (0.292)	1.833*** (0.411)
Trust	1.385* (0.248)	1.600** (0.375)	1.343* (0.210)	1.308* (0.200)	1.545** (0.308)
Present bias		1.126 (0.078)			1.086 (0.069)
Longterm discount		0.894 (0.441)			0.949 (0.304)
Constant	0.085** (0.099)	0.109 (0.180)	0.105** (0.114)	0.133* (0.137)	0.156 (0.217)
Adjusted Pseudo R2	0.139	0.109	0.156	0.163	0.136
Observations	1,656	942	1,609	1,646	939

Note: *$p<.1$; **$p<.05$; ***$p<.01$.

The table provides odds ratios with robust odds ratio adjusted standard errors from the logistic regression. The dependent variable is either bank savings or savings, region fixed effects are used in all specifications.

people with a low level of *risk taking* not choosing to put their savings in the bank mainly fearing the risks associated with trusting their savings to the banking system, even if they have non-bank savings, while those who have a high level of risk-taking do not find the risks associated with banking system important, thus being more likely to say that the main reason for avoiding bank savings is having non-bank savings.

The effect of income itself is somewhat smaller in magnitude when measured by *income level* as opposed to *income*, though remaining statistically significant. This could be driven by the fact that people with different incomes differ in their purchasing behavior within the same goods category, thus requiring a different amount of income to be able to afford the purchases in that category. Most importantly, the effect of *populism* remains statistically significant and of a similar magnitude in all specifications, thus our results in Section 4.1 remain robust.

Finally, we also include a set of variables that captures the relative economic performance of a respondent's city. Specifically, we proxy the city's socio-economic performance with the data on the changes in the intensity of illumination and the change in the city area. This change to the main specification does not affect the main results. Since in such a case the sample consists of the urban population only, the sample size declines considerably. For the reasons of consistency, we do not include the results of this robustness check in the main body of the paper and instead include it in the accompanying Online Appendix (Section AO. 4).

Discussion: Validity and Limitations

Here, we provide an additional discussion regarding the validity and limitations of our results.

First, is important to keep in mind the fact that we have only cross-sectional data. Therefore, we are aware that the results can be driven by specific characteristics of the time of data collection (February-March 2019). For instance, data from February 2019 Ifo World Economic Survey shows that inflation expectations in Ukraine were among the highest in the World, below only Zimbabwe, Argentina, Turkey, and Egypt (Boumans, Garnitz, and Wackerbauer 2019). However, similar data from 2014 shows that inflation expectations in Ukraine were among the highest in the World even though the country experienced several years of close to zero inflation rate. Therefore, the data seems to indicate the persistence of high inflation expectations irrespective of macroeconomic circumstances, which, in turn, suggests that our results are unlikely to be affected by macroeconomic circumstances as of the period of the data collection. In addition, we believe that by controlling for the economic expectations of households (specifically for the expectations about the real return on bank deposits) we can ensure that the results are not driven by time-specific circumstances. At the same time, we cannot exclude the possibility that our results are not immune to societal changes. In recent years, and especially since the beginning of the full-scale Russian invasion of Ukraine, Ukrainian society undergoes significant transformation the extent of which will be known only with time and further studies. Therefore, even in the context of a single-country study, future research is needed to investigate the time-wise robustness of our results and conclusions.

Second, while our study adds an additional data point for understanding both individuals' attitudes and financial behaviors in the context of an East European country, we should be careful when generalizing our results over the entire region. Ukraine has a set of

unique historical and socio-economic characteristics that might set it apart from the rest of the countries in the former Eastern Bloc. While our results fit into the previous empirical findings about saving behavior, we believe that our results should not be used to make cross-country generalizations. Instead, the results could be used in order to test both existing and future generalizations about individual behavior in both behavioral finance and political science fields. In other words, we believe that cross-country generalizations should incorporate our results as an additional data point to be explained or simply taken into account in addition to the results from similar empirical studies.

Third, while our data does not allow for the clear establishment of a causal link between individuals' attitudes and saving behavior, we feel that is necessary to address the potential concerns of reversed causality. The existing literature is ambiguous on the direction of causality between political attitudes and financial behaviors. For instance, Jha (2015) shows that holding shares in overseas joint-stock companies made English MPs more likely to support the reform that gave more power to parliament during the English Civil War. Present-day evidence also points to the link between financial assets and political behavior. Kaustia, Knüpfer, and Torstila (2016) use a natural experiment in Finland where due to the process of demutualization of several regional telecommunication companies thousands of people became stock owners. The results show that in the localities where more people became shareholders, the share of the vote for right-of-center parties increased. An experimental study by Jha and Shayo (2019) also shows that exposure to the financial markets affected the political behavior of Israeli voters. However, in this case, those that were exposed to financial markets were less likely to vote for right-wing parties, because these parties are skeptical of the peace negotiations in the Israeli-Palestinian conflict. At the same time, ownership of financial assets has also been shown to affect not just general right-left political attitudes but also views on certain policies in the economic and financial spheres. This is particularly relevant to our case, as we measure populist attitudes as the support of certain populist economic policies. Pagliari, Phillips, and Young (2018) show that ownership of financial assets is associated with lower support for stringent financial policy in the US. Finally, Kerner (2020), argues that in Latin America individuals are more likely to support neoliberal policies if they see that the returns on their financial assets (such as pension funds) are high, but the ownership of such financial assets may have a negative effect on the support of neoliberal policies if the returns are low. On the other hand, some studies suggest that the causality may go in the opposite direction and preexisting political attitudes may have a causal effect on certain financial behaviors. For instance, Kaustia and Torstila (2011) show that in the case of Finland people with left-leaning political views are less likely to invest in the stock market as well as tend to have lower savings rate. We believe that in our case there is some suggestive evidence that the relationship goes from populist attitudes to savings behavior due to a relatively stable savings rate over time and the volatility in the related attitudes, such as support for privatization (Brik and Shestakovskyi 2020).

Conclusion

Our results show that both socio-economic factors (such as *gender*, *income*, etc.) and behavioral factors matter in explaining saving behavior in Ukraine, yet individual beliefs and attitudes that are proxied with a measure of left-wing economic populism still play a separate and distinct role.

In line with previous empirical results, we can observe that *gender*, *income*, and *education* have a significant and positive effect on having *bank savings*. At the same, age has a non-linear effect, with those of middle age being least likely to have *bank savings*. Similarly, we find that expecting an economic crisis and not having any expectations regarding *real interest rate* have a negative effect on the propensity to have savings. In short, we show that Ukrainian households behave in line with their counterparts from comparable countries. Thus, other results must be also generalizable.

Though the effect of the socio-economic and behavioral factors on saving behavior has been extensively studied before, our paper contributes to the existing literature in several ways. First, we show that there exists a link between attitudes, namely populist attitudes, and savings behavior. We show that a single point decrease in the index of economic populism (mean 84.209, standard deviation 15.277) leads to a 1 to 2.5% increase in the probability of having bank savings.

We extensively show that the measure of left-wing economic populism used in this paper is a valid measure of populist attitudes, as it is correlated with the usual predictors of populism, both cultural and socio-economic, and behave in an expected and predictable way. For instance, we show that institutional persistence has an expected effect on left-wing economic populism. In addition, the level of left-wing economic populism is higher in areas that have experienced economic decline.

We further show that our results hold even when we remove some of the variation driven by cultural and socio-economic factors, suggesting that *bank savings* are affected by "pure" left-wing economic populism rather than solely its covariates. These results remain robust to different specifications, a different measure of the dependent variable, and different measures of left-wing economic populism.

Further research is needed to explore the role attitudes can play in saving behavior, both in the context of developing and developed countries and both those that experience economic crises and those with relatively good economic performance. In addition, we believe that more empirical research on economic populism is needed, both on its predictors and how it may affect observable behaviors to see whether people passively harbor a sense of resentment and distrust toward the mainstream institutions or act on it in either public or private spheres.

Importantly, further research is also needed to explore the attitudes that correlate with right-wing economic populism. The latter might result in the opposite result, especially if attitudes at the core of right-wing economic populism correlate with a high degree of individual autonomy and an increased sense of individual responsibility. In such a case, individuals high on right-wing economic populism would be more likely to save.

Finally, our results might be interpreted as a hint toward the importance of psychological factors for forward-looking financial decisions. For example, an extreme case of low economic aspirations might correlate with the feeling of learned helplessness and the position on the internal-external scale of the locus of control: individuals whose savings are eaten up by constantly reoccurring inflation might simply decide that preserving the purchasing power of their savings, let alone increasing it via positive real return on investments, is beyond their control and, thus, abstain from saving altogether. Such beliefs might also correlate with economic populism attitudes.

Notes

1. Here, we understand political populism as the distrust toward the elites and the belief that there is an inherent conflict between the ordinary people and the elites (Mudde 2004). The majority of studies with a similar view on populism tend to measure it either as voting for parties that exhibit certain populist characteristics (Inglehart and Norris 2016; Hernández and Kriesi 2016; Van Hauwaert and Van Kessel 2018) or a set of survey questions about the belief in the existence of the inherent conflict between people and elites, disillusionment with elites and politics, and a preference for inexperienced over the career politicians. See Akkerman, Mudde, and Zaslove (2014), Spruyt, Keppens, and Van Droogenbroeck (2016) for more details.
2. On the other side of the spectrum, literature in economic development and financial inclusion is focused predominantly on the financial decision of households living at the level of the international poverty line.
3. Tax incentives are a standard remedy that aims at increasing savings by addressing financial constraints.
4. Due to the data limitations, we focus specifically on bank savings. However, the hypothesis should in the same way apply to broader measures of financial savings. We use such a measure in the robustness analysis.
5. See a brief discussion of Ukraine's economic performance in Section AO. 5 in the accompanying Online Appendix.
6. GfK (2017) relies on a sample of adults older than 16 years. In contrast, most surveys, including the source of our data, survey the population above 18 years. Since, the population of 16–17 years of age is less likely to have bank savings, the share of the population with bank savings in GfK (2017) is at least 1–2% points lower than it could be in a sample of adults older than 18 years. Therefore, data in GfK (2017) is quite close to 11.7% in our data.
7. The database, including documentation and microdata, is available here: https://globalfindex.worldbank.org/.
8. The data includes only working Ukrainians. Therefore, it is likely to overestimate the fraction of savers.
9. As the interviews were mainly started in Russian and the question about the language of the interview was also mainly asked in Russian, it is likely that only those people who have a strong preference for Ukrainian chose to switch the language rather than continue in the default Russian.
10. We are aware that terms risk preferences and risk attitudes depict slightly different constructs. The term risk preferences are usually used within the revealed preferences approach, while the term risk attitudes are usually used to describe self-reported preferences. In the present paper, risk preferences are self-reported. Nevertheless, we use both terms interchangeably.
11. As an alternative way to deal with unreasonable present bias and longterm discount, we trimmed the outliers at the 95th percentile. That method produced similar results, which are not reported.
12. Our approach follows CES (2019), a report based on the same original survey data as the present study. However, in contrast to the present study, the economic populism index in CES (2019) increases by 1 if a person shows any support for a populist policy and is not normalized to the scale from 1 to 100.
13. Due to a large number of missing values in the variables indicating time preferences we run the populism proxies on two of the main specifications: excluding and then including variables *present bias* and *longterm discount*.
14. In Section 4.3 we also use broad savings rather than bank savings as a dependent variable. In those regressions, the effect of education becomes somewhat smaller, which provides suggestive evidence to this interpretation.
15. See more detailed discussion in Section 4.3, where we use *savings* rather than *bank savings* as a dependent variable.
16. And in the last model it approaches the threshold of statistical significance with the p-value of 0.108.

17. 3 out of 4 models in which the effect of *populism* is insignificant include controls for *longterm discount* and *present bias*. The results in these models may be different due to a significantly smaller, non-representative sample.

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Appendix

Appendix A. Variable definitions

Table A1. Variables definition.

Variable name	Variable type	Definition	Values
bank savings	binary	Answer to the question: "Do you have any savings in the savings account in the bank?"	1 = YES; 0 = NO
age	continuous	Age of the respondent.	from 18 to 87
female	binary	Gender of the respondent.	1 = female; 0 = male
education	factor	Education level of the respondent.	1 = secondary or below; 2 = professional; 3 = university;
household size	continuous	Answer to the question "How many people including you live in your household?"	from 1 to 12 (12 is imputed for all who have more than 12 people living in their household)
partner	binary	Answer "Married" To the question "What is your marital status?	1= yes; 0 = no
income	factor	Answer to the question "What is the average monthly income of your family?	1= <3000 UAH; 2 = 3–10000 UAH; 3 = 10000–20000 UAH 4 = >20000 UAH
income level	factor	Answer to the question "How would you rate the financial status of your family?"	1=have to save on food or clothing; 2= have to save to buy cellphone, a suit or expensive purchases; 3= have to save to buy a house or a car or can buy anything
emergency expense	binary	Whether an individual can cover 3000 UAH emergency expense by spending less, taking money out of savings or if it does not pose an issue	1= yes; 0 = have to borrow or does not know how would be able to cover such expense
employment status	factor	Answer to the question "What is your employment status?"	1= employed; 2= unemployed; 3= student; 4=retired; 5=housekeeping
Ukrainian language	binary	Answer to the question "Which language would you prefer to continue this conversation?"	1= Ukrainian, 0 = Russian
city type	factor	Size of the city of residence	1= rural area; 2=town-50k; 3 = 50k-500k;4 = 500k+
region	factor	Region a respondent lives in	25 regions
risk taking	factor	Answer to the question "What best describes your attitudes toward financial risk when making decisions on savings and investment?"	1="not willing to take any financial risks;" 2= "average financial risks for average rewards;" 3 = "above average financial risks for above average rewards;" 4="significant financial risks for significant rewards"
longterm discount	continious	Calculated based on the questions: "Imagine you were offered 1000 UAH (30 euro) now as a gift or a fixed sum of money in a year (ten years). For what amount of money would you be willing to wait? See Wang, Rieger, and Hens (2016) for the methodology	continuous
present bias	continious	See longterm discount	continuous
longterm plans	binary	Disagreement with the statement: Usually I do not make long term plans"	1=disagree (fully or partly); 0=agree (fully or partly)
commitment device	binary	Answer to the question: "If you were able to choose between two different savings accounts with the same interest rate which would you choose?"	0=account from which money can be withdrawn at any time;1= account where you need to wait for 5–10 days
rate exp.	factor	Answer to the question: "How does potential income from savings account in UAH correspond to losses from inflation and devaluation?"	1= income from savings higher; 2= income from savings lower 3 = savings in UAH is a bad idea as financial crisis is likely 4= difficult to say

(*Continued*)

Table A1. (Continued).

Variable name	Variable type	Definition	Values
liberalism	continuous	Additive index, calculated based on the attitudes toward competition, private property and optimal level of taxation.	0 to 3
anti establishment	continuous	Additive index, calculated based on the intention to vote, opinion on acceptability of corruption and preference of new and inexperienced public official.	0 to 3
exclusion LGBT	binary	Selecting LGBT in: "Which of the following groups would you not like to be a neighbor with?"	0 = LGBT not selected, 1= LGBT selected
exclusion race	binary	Selecting black people in: "Which of the following groups would you not like to be a neighbor with?"	0 = black people not selected; 1 = black people selected
trust	binary	Agreement with :Most people can be trusted	0 = no; 1 = yes
populism	continuous	Additive index calculated based on the belief in a positive effect on their wellbeing of 8 populist policies, normalized to 0–100 scale.See CES (2019) for more details.	0 to 100

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Publications

Illiashenko, P., & Mykhailyshyna, D. (2023). Left-wing Economic Populism and Savings: How attitudes influence forward-looking financial behavior? Eastern European Economics, 61, No. 3. pp. 238–269.
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2019–2019	Kyiv School of Economics
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2018–	Centre for Economic Strategy
2017–	Tallinn University of Technology
2014–2015	AYA
2013–2014	Kinto
2012–2015	Voice of the Capital
2011–2013	Astrum Capital
2010–2011	Phoenix Capital
2009–2010	Ukranet (iTrader)
2008–2009	Megapolis Capital
2007–2008	Fintime
2006–2007	SG-Ukraine

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